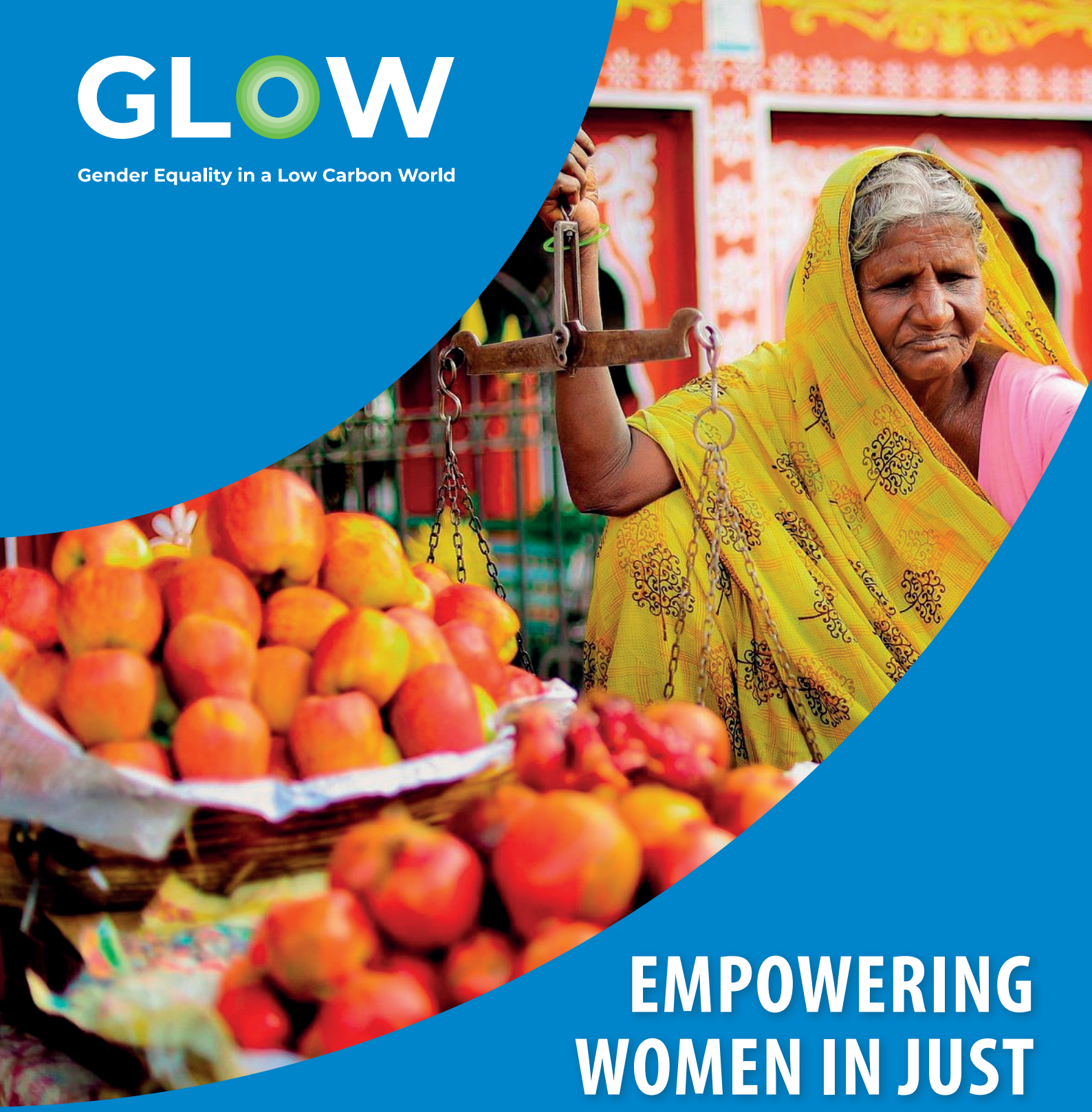
GLOW

Gender Equality in a Low Carbon World



EMPOWERING WOMEN IN JUST TRANSITIONS

Insights from the GLOW programme

CDKN Climate & Development Knowledge Network

ODI

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Executive summary

Net zero emissions development is the new framing for global development – our futures depend on it. The world needs to be on a trajectory to net zero carbon emissions by mid-century to meet the 1.5°C temperature goal of the Paris Agreement, but it is far off track.

Meanwhile, progressing gender equality[i] is a human right and is more pressing than ever. The Covid-19 pandemic set back progress on gender equality – driving a deeper development gap between women and men.[1] While this setback has largely been recovered, headway on gender equality in economic participation and opportunity, education, health, survival and political empowerment has barely edged forward on a global average in the past two decades.

For social justice, as well as for environmental and economic sustainability reasons, action on gender equality and climate change must both accelerate massively. The goals are synergistic. Pursuing them intentionally in tandem will achieve more than a narrow focus on either gender equality or climate change alone.

The **Gender Equality in a Low Carbon World (GLOW) programme**[2] is an action research programme, 2021–24, which investigates opportunities for women's economic empowerment in low-carbon transitions across 12 projects in 17 countries. Its projects target the land use sectors (agriculture, agroforestry and forestry), the blue economy and eco-tourism. Elements of the programme look at the application of biocircular economy principles to reuse organic wastes, reduce emissions and enhance livelihoods. This report summarises learning from GLOW on common challenges and promising solutions for advancing women's empowerment in the transitions in these sectors.

GLOW projects identified and pursued **four main routes for simultaneously empowering women and driving mitigation and adaptation in the natural resource-based sectors:**

1. **Making women's existing economic activities more productive and climate-smart:** Introducing climate-resilient and low-carbon production methods to increase efficiency and improve yield size and reliability of revenues from agriculture, forest, aquaculture and ecotourism activities in which women are already involved. Examples of climate-smart methods introduced to improve women workers' productivity and reduce menial aspects of their work include regenerative agriculture methods that enrich the organic content of soils to boost yields; introducing solar-powered irrigation with a minimal carbon footprint to increase yields and reduce women's workloads; and increasing water use efficiency, to maintain production even during times of water stress.

i We recognise that gender is a spectrum, encompassing people with diverse sexual orientations, gender identities and expressions and sex characteristics (SOGIESC). This report and the research on which it is based has focused particularly on relations between women and men.

Woman farmer, Kenya. © CIFOR-ICRAF

2. **Helping women enter male-dominated activities while also climate-mainstreaming those activities and sectors:** Identifying activities in existing sectors and value chains that have been traditionally male-dominated (previously had a glass ceiling). This is about capacity development activities targeted at women entrants into various sectors. It is also about interventions aimed at power-holders, including male family and community members, and government and business leaders to cultivate their support for women's entry into these jobs while simultaneously introducing climate-smart measures. An example is identifying specific entry points for women in different parts of the mango value chain in Malawi to increase their income. This category describes simultaneous gender mainstreaming and climate mainstreaming into development policies, programmes and business models. Many of the learnings arose in this category.
3. **Supporting women to consolidate business models for their existing low-carbon and climate-resilient economic activities**: Helping women to strengthen the financial viability of and formalise (make more secure) the work they are already doing that is inherently low-carbon and climate-resilient. This involves assisting women to establish their own enterprises and identifying and growing markets for their goods and services. Examples include formalising women-led non-timber forest product enterprises in Nepal and Bolivian women seeking to develop high-value, low-impact cultural, scientific tourism and community-based eco-tourism businesses.
4. **Supporting women to access totally new low-carbon, climate-resilient jobs:** Ensuring women benefit from new technologies and production systems that are emerging. Many technologies are designed to reuse and recycle materials and to deliver high water, energy and production efficiency by creating closed-loop systems, such as hydroponics and aquaponics. This entry point is about identifying opportunities to make these new and inherently climate-smart production systems gender-equitable from the outset. The GLOW studies principally involved reusing and recycling organic materials in the biocircular economy. Some of these technologies have fewer barriers to entry for women than conventional production systems. For example, they tend to require smaller land footprints (such as black soldier fly farming) or relatively low start-up costs that would benefit women entrepreneurs, who face discrimination and structural disadvantages in accessing land and capital.

From these four main routes to low-carbon transition and women's economic empowerment, we identified the following main findings and recommendations:

- **In the natural resource-based sectors where GLOW is focused, it is not easy or practical, nor desirable to separate the 'low-carbon' from the 'climate-resilient'.** The opportunity is to combine emissions avoidance with heightened resilience to climate shocks and stresses. Therefore, the researchers extended their brief on climate change mitigation to look simultaneously at adaptation.
- **Climate action must be rights-based and locally appropriate.** Gender norms are social constructs shaped by local cultural beliefs and practices (such as shaping opportunities for women based on their age, marital status, differing physical and intellectual abilities, and ethnic and caste affiliation). It is well established that climate change *adaptation* should be locally-led and locally-informed. GLOW research also highlights the importance from a gender perspective of tailoring climate change *mitigation action* to local contexts. Social norms shape women's ability to adopt new practices, access new jobs, skills and information, and shape women's mobility, all of which are relevant to mitigation action.
- **Climate initiatives can address and reduce discriminatory barriers for women, with positive spillover benefits into other areas of women's lives.** While tailoring to local circumstances is essential, local relevance must never be used as an excuse for discriminatory or harmful practices against women which breach their rights. Indeed, the opposite: climate initiatives can and should be intentionally designed to confront and change damaging gender biases for the better.
- **Women's contributions matter.** Women's full, equitable and meaningful involvement in decision-making, design, implementation and evaluation of climate initiatives makes a material difference in the effectiveness and sustainability of initiatives.
- **Women's access to emergent low-carbon, climate-resilient technologies drives innovation and learning.** Women's equitable participation in green jobs deploying emergent climate-smart technologies, such as black soldier fly farming and aquaponics, drives faster and more comprehensive institutional learning than if women were excluded.
- **Some groups of women are guardians of knowledge and practices that are inherently low-carbon, climate-resilient and ecologically sustainable.** These women do not necessarily need upskilling but can benefit from opportunities to consolidate peer learning among themselves. This can enable them to secure reliable markets for their products and influence others in their sector regarding their sustainable practices. Intermediary organisations can have roles to play, as demonstrated by GLOW researchers who partnered with Indigenous and lower-caste women in rural Nepal to enhance the business prospects of their ecologically sustainable enterprises, co-document their inspiring stories and facilitate their participation in broader advocacy and trading platforms. In some contexts, existing women-led production practices may also significantly enhance ecosystem integrity and biodiversity, as observed anecdotally by GLOW researchers and especially in locations managed by Indigenous women. Biodiversity surveying and monitoring is a gap that could be better integrated in future studies.

There are many well-established measures of good 'gender and development practice' that apply equally to, or can be adapted for, low-carbon, climate-resilient development initiatives. These well-known good practices should not be overlooked because of a tunnel-vision focus on technological aspects of emissions reduction. These aspects are fundamental to achieving progress on climate action and gender equality, and ensuring that the synergies between gender and climate domains are achieved:

- **Address women's under-representation in public policy-making and collective decision-making** by increasing the representation of women and boosting their capabilities to fulfil these roles, including by:
  - Strengthening women's climate literacy and capacity in the technical low-carbon, climate-resilient aspects of production, logistics, marketing and other value chain activities.
  - Strengthening the capacity of women in management and decision-making roles through improved financial literacy and business skills.
  - Strengthening women's self-confidence and capacity for policy engagement with key stakeholders through co-producing documentary evidence and participating in deliberative public dialogues.

- **Increase women's uptake of decent, low-carbon, climate-resilient jobs**, including by:
  - Mapping the gaps and potentials for women's participation in a wide range of activities along low-carbon, climate-resilient value chains, identifying gender-specific barriers to entry at each stage, and devising and funding gender-specific activities to address barriers and enable women's participation.
  - Making alliances with power-holders to increase women's influence and sphere of activity into low-carbon, climate-resilient work.
  - Encouraging gender champions, role models and mentors in low-carbon, climate-resilient education, skills training and work.

- **Increase women's access to productive assets for low-carbon, climate-resilient economic transitions**, including by:
  - Supporting collective actions by women to advocate for, secure and pool productive assets, including cash, land and inputs (such as greater purchasing power, fundraising power and access to information as a group rather than as individuals).
  - Exploring how emergent low-carbon, climate-resilient technologies and associated new production modes, such as hydroponics, may be particularly suitable for women workers and entrepreneurs because these modes have inherently small land footprints and/or upfront capital requirements. This means the barriers to women's entry may be less under present gender-unequal circumstances.

A farmer tends to her maize crop, Cambodia. © Neil Palmer, IWMI

- **Increase women's access to markets for sustainably-produced goods and services**, including by:
  - Leveraging the potential for information and communication technologies (ICT), including smartphones and digital platforms, to give women workers and entrepreneurs far greater access to weather and climate information (for climate-resilient production, processing, storage and distribution) and information about sustainable inputs and market conditions for trading.

- **Capitalise on many women's high degree of initiative, but ensure that the most marginalised women are not left behind**, including by:
  - Tailoring capacity development to specific groups of women based on their intended life trajectories and the sociocultural opportunities and constraints they are likely to face, for example by empowering young, unmarried women with technical, life and business skills that will 'travel well' with them when they expect to marry and move location.
  - Designing and implementing social protection supports for the poorest and most heavily disadvantaged women who do not have the wherewithal to participate immediately in training and capacity development and/or whose healthcare needs are unmet. More extended periods of intervention involving partnerships among government agencies, community-based organisations and/or non-governmental organisations (NGOs) may be desirable or necessary (and may also become necessary in response to sudden climate shocks) to enable them to meet basic survival needs. The longer-term intention would be to support women to graduate from poverty into more stable livelihoods and higher living standards.

- **Strengthen enabling policies and their implementation**, including by:
  - Strengthening the gender and social equity dimensions of climate policies and relevant sectoral and economic policies (such as land restoration, environmental protection, fisheries and maritime policies), recognising that they may not integrate gender rights legislation sufficiently nor make appropriate provision for different social groups (such as by age, ability, as well as gender) to benefit from low-carbon, climate-resilient transitions.

- Getting funding into the hands of women entrepreneurs to accelerate their leadership and effectiveness in transitions (together with the suite of capability-strengthening measures discussed earlier).
- Fostering partnerships of women's groups, women-led and women-dominated enterprises with intermediary organisations to pool data, advance gender-related advocacy and transparency, and accelerate women-friendly low-carbon business opportunities.
- Strengthening the gender capacity of local government personnel: while gender sensitivity, awareness and commitment to action are vital in all areas of government, the GLOW projects found particular gaps at the local level, suggesting that targeted gender training is needed for local officials who have much operational discretion that can be used for or against women's and disadvantaged people's benefit.

- **Address unpaid and heavily underpaid work as an intrinsic part of climate action**, including by promoting low-carbon and climate-resilient technologies that reduce workers' drudgery, whether in the care and subsistence realms or in smallholder agriculture, agroforestry and blue economy sectors more generally.

In each country, these recommendations apply to governments' strategies and plans for 'just transitions,' which may include preferential investment for entirely new sectors and industries. The recommendations are also highly relevant to international dialogues and negotiations on just transitions in the UNFCCC and elsewhere.

Action across the above dimensions will deliver the climate and gender justice we want to see in the world. People currently left behind in economically vulnerable, climate-vulnerable, low-productivity and insecure jobs will have decent work and new leadership opportunities that raise their capabilities and well-being. Women will be equally co-leading and benefiting from transitions to a net-zero, climate-resilient future.

PEOPLE CURRENTLY LEFT BEHIND IN ECONOMICALLY VULNERABLE, CLIMATE-VULNERABLE, LOW-PRODUCTIVITY AND INSECURE JOBS WILL HAVE DECENT WORK AND NEW LEADERSHIP OPPORTUNITIES THAT RAISE THEIR CAPABILITIES AND WELL-BEING.

Columbia woman holds coffee cherries from the farm. © Neil Palmer, CIAT

CHAPTER 1

INTRODUCTION

Net zero is the frame for global development

It is a matter of urgency to transform the global economy into a net zero economy – in which we cut or avoid creating greenhouse gas emissions from fossil fuel use, land use change and other sources. In this world, we embrace ultra-low emissions production and consumption. We cancel out our remaining emissions to reach 'net zero', primarily (although not exclusively) by locking up greenhouse gases in carbon-rich ecosystems such as healthy forests, wetlands and soils.

It is urgent because greenhouse gas emissions from human activity are driving climate change that has led to "widespread adverse impacts and related losses and damages to nature and people" in all world regions, according to the **Intergovernmental Panel on Climate Change (IPCC)** report 2023, A.2.[3] Already, increasing frequency and intensity of droughts and heatwaves are causing crop losses, tree deaths and risks to workers' health and productivity. This is today's reality.

The world is way off track to meet the temperature goal of the Paris Agreement: to limit average global temperature rise to 1.5°C. Average warming is already 1.1°C above pre-industrial levels, and the extent of present climate-related losses and damages is greater than scientists had anticipated. At average global warming above 1.5°C, the risks to vulnerable social and ecological systems are very high indeed.

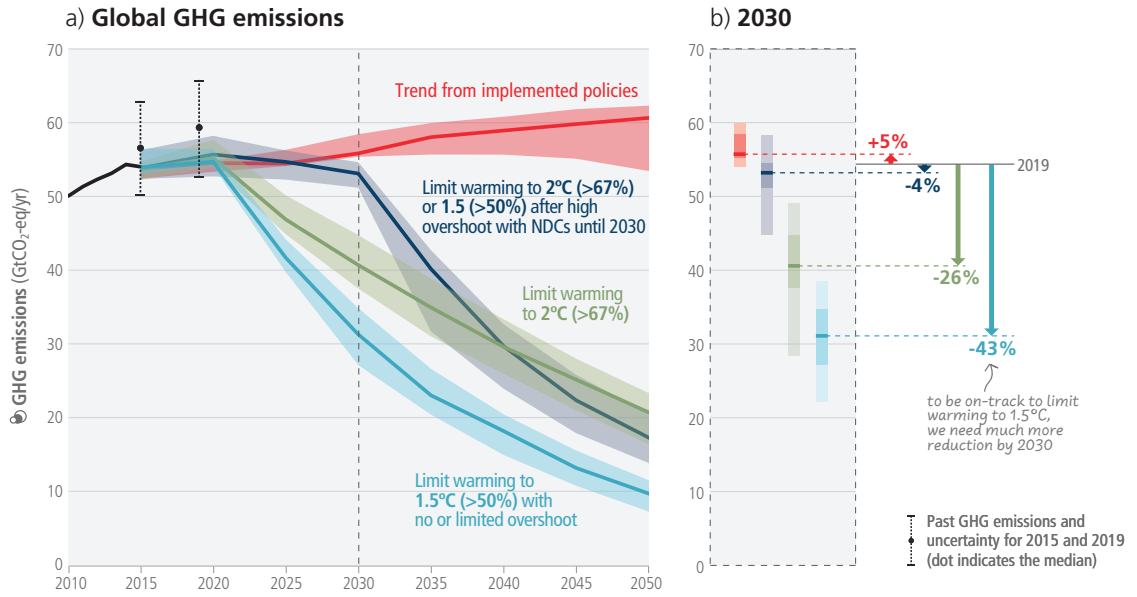
In spite of this, global emissions continue to rise year on year. From a small dip in emissions during the Covid-19 pandemic in 2020, emissions are now higher than ever before. Global emissions must decline irreversibly by 2025 and be at least 43% (below 2019 levels) by 2030 (see Figure 1) – to get back on track. It is a tall order.

Nepal woman vegetable farmer who uses solar pumps for irrigation in Nepal.
© Nabin Baral/IWMI

Inventory of forest flora, Nepal © Usha Thakuri

Governments' international commitments to reduce or avoid emissions, **the 'NDCs': Nationally Determined Contributions**[4] collectively fall far short of this need. They add up to a greenhouse gas emissions pathway of 2.9°C of global warming – or 2.5°C of warming if developing countries get international support for their climate plans.[ii]

FIGURE 1: Rapid and heavy emissions cuts are needed for a 1.5°C world[5]



Projected global greenhouse gas emissions from countries' climate plans, the Nationally Determined Contributions (NDCs) announced before COP26 in late 2021, would make it likely that warming will exceed 1.5°C and also make it harder after 2030 to limit warming to below 2°C.

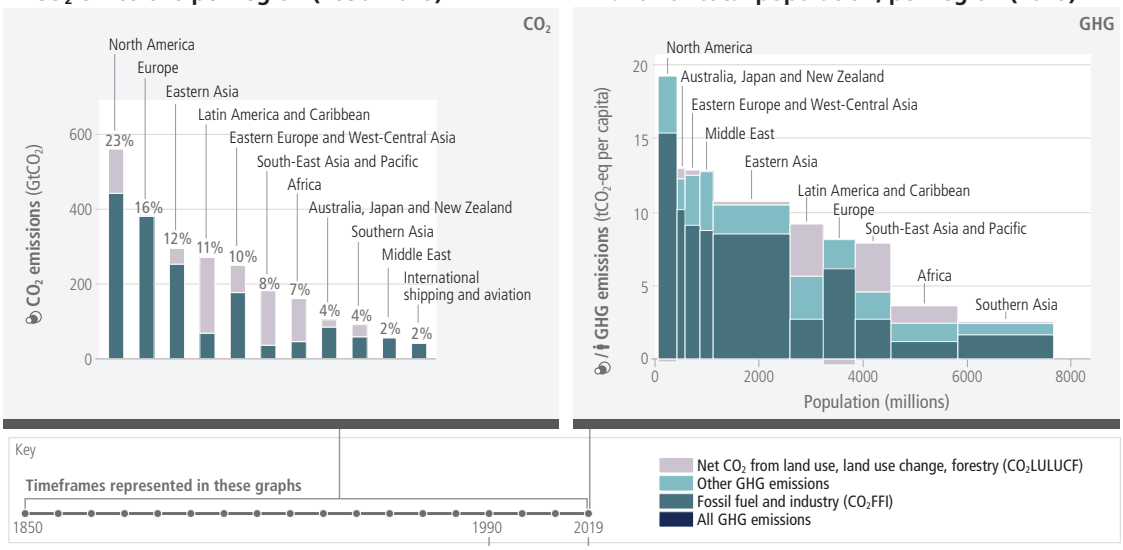
Source: IPCC, 2023

ii Countries with high emissions must reduce their emissions; developing countries with small per capita emissions calculate how many emissions they would avoid by taking a low-carbon trajectory compared to a 'business as usual' trajectory.

FIGURE 2: Emissions have grown in most regions but are distributed unevenly, both in the present day and cumulatively since 1850[6]

a) **Historical cumulative net anthropogenic CO_2 emissions per region (1850–2019)**

b) **Net anthropogenic GHG emissions per capita and for total population, per region (2019)**



Global emissions come primarily from carbon dioxide from fossil fuel use and industry (dark green-blue bars in the figure), carbon dioxide from land use, land use change and forestry (grey bars in the figure, such as forest clearance) and other greenhouse gas emissions such as methane, nitrous oxides and fluorinated gases (light blue bars). The height of each rectangle shows per capita emissions, the width shows the population of the region, so that the area of the rectangles refers to the total emissions for each region. Emissions from international aviation and shipping are not included. In the case of two regions, the area for CO_2-LULUCF is below the axis, indicating net carbon dioxide removals (absorption from the atmosphere, for example, from tree growing and improved soil management) rather than emissions. *Source: IPCC, 2023*

Gender and social inclusion shape risk and resilience

Climate change is already laden with historic injustices: countries hardest hit by climate change impacts are the least developed countries and small island states that have generated the fewest emissions.

Within countries, different groups of people are also more vulnerable to the impacts of climate change because of their social and economic status, including the assets they own and control and sociocultural norms that shape their exercise of rights:

> "Regions and people with considerable development constraints have high vulnerability to climatic hazards (high confidence) … Vulnerability at different spatial levels is exacerbated by inequity and marginalisation linked to gender, ethnicity, low income or combinations thereof (high confidence), especially for many Indigenous Peoples and local communities (high confidence). Present development challenges causing high vulnerability are influenced by historical and ongoing patterns of inequity such as colonialism, especially for many Indigenous Peoples and local communities (high confidence)."[7]

This landscape of climate-related losses and damages is already a feature of today's world. Notwithstanding, further climate change impacts may be expected beyond present levels. Even if economies shifted onto a global trajectory toward 1.5°C today, warming would continue to increase until at least 2040, with associated impacts.[8] There is an urgent need for enhanced resilience and adaptive capacity at all scales to address current and future climate risks.

Climate change and social inequity are often described as interacting negatively with each other to 'compound' risk. People are more vulnerable to climate hazards when they are less educated, healthy, politically empowered and economically secure. They are more resilient when they gain these qualities. Where discrimination exists in society, as it does in many places against women and other social groups, then climate shocks and stresses may elicit spontaneous, discriminatory responses, such as gender-based violence. In this way, climate hazards – more frequent and intense as a result of climate change – can act as an amplifier of harm. Understanding the underlying social and economic inequalities and how they contribute to climate vulnerability and risk is the key to crafting socially and gender-just interventions that also address the causes and consequences of climate change.

Gender inequality: the crucial context

The existing extent of gender inequality forms the crucial backdrop for climate action. Gender equality is a human right and is based on international law and national legislation in most countries in the world. Gender equality is also inextricably linked to economic performance and human development.

UNDP's Gender Development Index tracks the disparity between women's and men's attainment of longevity, education and income per capita. On these combined measures, some countries are at parity, but many countries have a marked gap of 15 percentage points or more, especially in education and income. **UNDP's Gender Inequality Index**[9] tracks gender equality based on indicators of reproductive health, empowerment and the labour market. It illuminates deep disparities between men and women, boys and girls, by country.

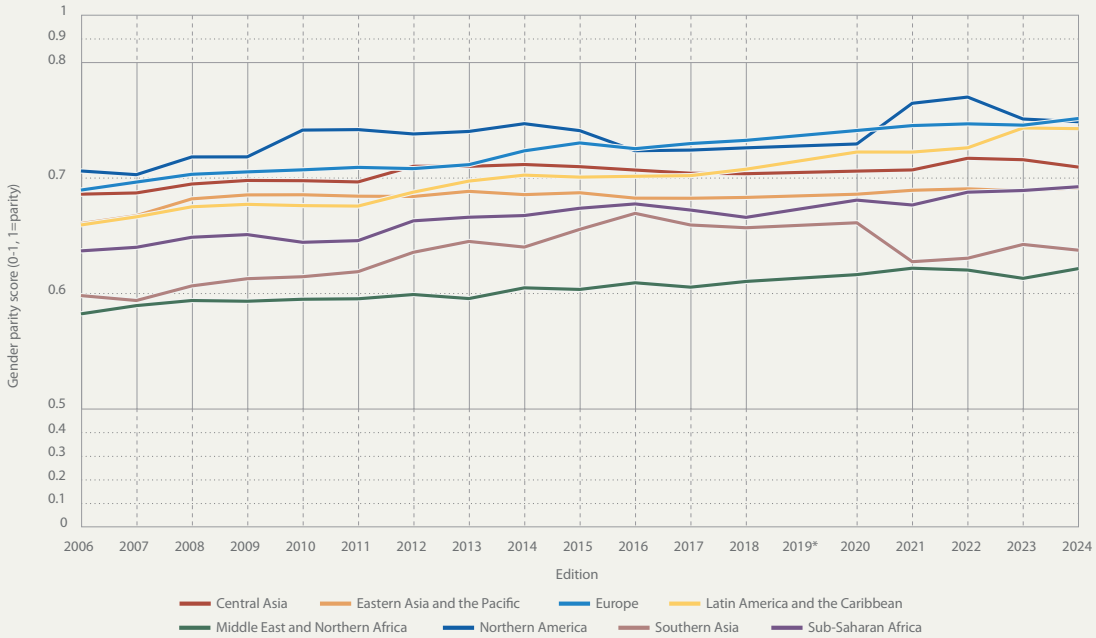
Globally, the **World Economic Forum's (WEF) Global Gender Gap Index**[10] tracks the gender development gap between women and men in economic, political and education spheres and finds that at current rates of progress, it will take 134 years to close the gender gap.

These indices showed gender inequality shooting up during the Covid-19 pandemic, when women lost paid work more quickly, more girls than boys dropped out of school entirely, and women and girls assumed even more unpaid care work.

These setbacks have largely been recovered, but still, the WEF's Global Gender Gap Index 2024 shows that gender equality has barely budged for almost two decades, on a global average.

FIGURE 3: Regional gender gaps over time[11]

The World Economic Forum's Global Gender Gap Index (GGGI) Framework compares economic participation and opportunity, educational attainment, health and survival, and political empowerment for women and men. It focuses on outcomes (people's wellbeing now) as opposed to processes that could lead to their future wellbeing. The chart shows the trend over time, across the combined indicators and disaggregated by region, since the GGGI was established in 2006. Gender parity is represented by 1.0.



Note: Population-weighted averages for the 101 economies featured in all editions of the index, from 2006–2024. Results of the fourteenth edition of the Global Gender Gap Index were presented in the *Global Gender Gap Report 2020*, released in December 2019. There is no corresponding edition for 2019.

Source: WEF, 2024

The drivers of gender inequality, and barriers and opportunities for women's economic empowerment, are specific to context. As UNDP highlights, gender inequalities are complex, and it takes sophisticated analysis to understand and address them adequately. There is no one-size-fits-all approach. This is especially so when promoting gender equality in the context of climate action, whether it is climate change mitigation, adaptation or both.

For this reason, this report dedicates a whole chapter (Chapter 3) to discussing exactly how gender equality, economic development and climate action intersect in each GLOW country and sector. Furthermore, opportunities for women are shaped by their income and education, ethnicity, indigeneity, marital status, age, different abilities and other factors. Where GLOW projects have analysed the barriers and opportunities for specific groups of women based on intersectionality, the report identifies learning from this to illuminate how approaches can be tailored to diverse circumstances.

GLOW's vision

Gender Equality in a Low Carbon World (GLOW), 2021–2024 is a programme funded by the International Development Research Centre, which seeks to bring the two critical goals of sufficient action on climate change and gender equality together in an integrated vision and practical insights and recommendations for mutual progress. It supports research on promising women-led solutions for green economies and climate action.

GLOW was launched as the world reeled from the Covid-19 pandemic and global GDP had nose-dived. Governments and international bodies, including development finance institutions, were considering what fiscal measures and targeted investments were needed to aid countries' recoveries and to support the worst-hit sectors and sections of the population. They were also considering whether it was possible to 'build back better' from the pandemic in ways that would catapult forward the achievement of the Sustainable Development Goals.

Twelve GLOW action research projects were selected following an open, competitive call based on their relevance to local challenges and clear plans to influence policies and actions.

The research projects spanned 16 countries: Bolivia, Cambodia, Cameroon, El Salvador, Guatemala, Guinea, Kenya, Malawi, Nepal, Nicaragua, Philippines, Rwanda, Senegal, Tanzania, Uganda and Vietnam. It also included the Palestinian territory of Gaza, where work was halted due to the conflict.

The GLOW projects explore innovations for women's economic empowerment and climate action in agriculture, forestry and agroforestry, aquaculture, land restoration and tourism. They are led by local research experts, who work hand-in-hand with the people in government, business and civil society who can implement solutions.

Women's economic empowerment in the Global South

GLOW's research has sought to examine how women can be economically empowered through economic transitions to more climate-compatible, sustainable production systems.

There is not a single definition of women's economic empowerment, but most definitions encompass the following dimensions:

- labour market participation
- quality of work (including income levels, security/reliability of work, etc.)
- access to skills development
- agency (decision-making power over economic assets, lives and well-being at multiple levels: family, micro, meso and macro levels)
- resources (legal, financial, and social enablers that enable women to do decent work)
- care economy (tasks considered work, rather than leisure, that are unpaid and/or inequitably allocated).[12]

Geneplus livestock value chain workers explain climate-smart measures. © Intellecap

The reality is that many modes of work merely enable people to survive from day to day, such as through casual labour or low-productivity, smallholder agriculture. For example, in East Africa, Intellecap describes how women make up half of the agricultural workforce and "women employed in the sector contend with low pay, informality, inferior working conditions and lack of social protection".[13] There needs to be a shift to "allow real incomes and capabilities to be enhanced and capital accumulated, and … rebalance social injustices, such as gender inequalities".[14]

The aim of providing women with 'decent work' is a thread throughout this report, which links the definitions of women's economic empowerment in the literature to the Sustainable Development Goals and other international policy frameworks. The **International Labour Organization (ILO)** defines decent work as follows:

> "Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for all, better prospects for personal development and social integration, freedom for people to express their concerns, organise and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men."[15]

The GLOW findings discuss in applied context how women's work can be made more 'decent' through better pay and security of income, more dignified and less demeaning conditions, access to and reliability of support during sickness or disability, and support for dependents.

These aspirations and goals support **Agenda 2030's SDG 8, Decent work and economic growth** and its integration with **SDG 5: Gender equality** and **SDG 13: Climate action**.

GLOW's focal sectors of agriculture, forestry and agroforestry, aquaculture, land restoration and tourism also align with **SDG 2: Zero hunger (incorporating sustainable agriculture)**, **SDG 12: Sustainable production and consumption**, and **SDG 15: Life on land**.[16]

The synergies between women's empowerment and sustainable development are also increasingly recognised in business. For small and large business leaders, the financial imperative for women's empowerment is clear. When women are empowered, businesses can access a talented worker pool more readily. Women's leadership in low-carbon and climate-resilient enterprises strengthens the

value proposition of businesses. It frequently endows businesses with a deeper understanding and connection with their consumer base. These themes resonate deeply throughout this report and are unpacked through case study examples.

The original GLOW research, literature and policy scans have also highlighted how low-carbon development processes and the multiple dimensions of resilience are fundamental to women's economic empowerment. The GLOW programme was rightly premised on the risk that gender-blind shifts from high-carbon to low-carbon (or net zero) production systems could risk marginalising women unless they were fully involved as leaders and participants in the transition. All the evidence in this report underlines that initial premise.[17]

The research has also revealed the importance of understanding women's resilience to climate shocks and stresses and all its economic, social and psychological dimensions, as part of women's economic empowerment in the present era. Resilience can be defined as the ability to adapt to, anticipate and absorb climate shocks and stresses.

Resilience emerged organically as a towering issue in projects' contexts – because of the significant climate risks[iii] and impacts[iv] and broader economic shockwaves (such as the Covid-19 pandemic) emanating from natural resource-dependent economies.[18]

In these landscapes and economic sectors, it is not easy and practical, nor desirable, to separate the 'low-carbon' from the 'resilient', whether it is resilience to climate shocks and stresses such as drought, floods, heatwaves, ice melt, erratic rainfall, sea level rise, or resilience to other external shocks, such as pandemics and wars. The opportunity exists to combine emissions avoidance with heightened resilience. Accordingly, the findings from the GLOW action research projects are not just about low-carbon development, but they also take a pragmatic approach to resilience, including the resilience of both ecosystems and of people and their livelihoods. The conclusions and recommendations bridge these multiple aspects.

iii The potential for adverse consequences for human or ecological systems, recognising the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change.

iv The consequences of realised risks on natural and human systems, where risks result from the interactions of climate-related hazards (including extreme weather/climate events), exposure, and vulnerability. Impacts generally refer to effects on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services), and infrastructure. Impacts may be referred to as consequences or outcomes and can be adverse or beneficial.

ABOUT THE TERMINOLOGY IN THIS REPORT

In this report, 'low-carbon' is a shorthand term. Given the need for a 'net-zero carbon' trajectory for the global economy by the mid-21st century, a higher level of ambition is required for the land use sectors that are the focus of this report. When we refer to 'low-carbon' practices, these may, in many cases, incorporate land, forest and coastal management that captures carbon and other greenhouse gases from the air and locks them up in soils and vegetation.

'Climate resilience' is a shorthand in this report. It refers not only to the practices that enable economic production systems to withstand, absorb and recover from climate shocks and stresses. 'Climate resilience' also includes practices that help ecosystems and diverse species to withstand climate risks. It encompasses the notion of 'nature-positive' action in line with the **Global Biodiversity Framework**.[19]

GLOW projects were generally not framed to address biodiversity explicitly. So, there are gaps in evidence around the impacts of the GLOW activities on ecosystems and biodiversity – but where there is evidence, it is foregrounded here.

CHAPTER 2

GLOBAL JUST TRANSITIONS ARE POSSIBLE

Time to bring gender and climate mainstreaming together

Climate mainstreaming and gender mainstreaming in development have too often been apart. They have been addressed in silos, both by the private sector and by public policy. This was especially so in the immediate shadow of the Covid-19 pandemic. In 2020–21, narratives had a strong tendency to call for gender equality in economic recovery, or the 'greening' of economic recovery. The two concepts were seldom, if ever, seriously integrated.

This is clear from government policy and public sector investments, but the divide is also a common feature of private sector efforts, as described by Amar Gokhale:

> "Thinking through the intersectionality and not focusing on climate or gender as siloed sectors would be key to creating successful outcomes, with a need for capacity building and customisable frameworks at the nexus."[20]

Bolivia Quinoa farmers workshop held by INESAD. © INESAD

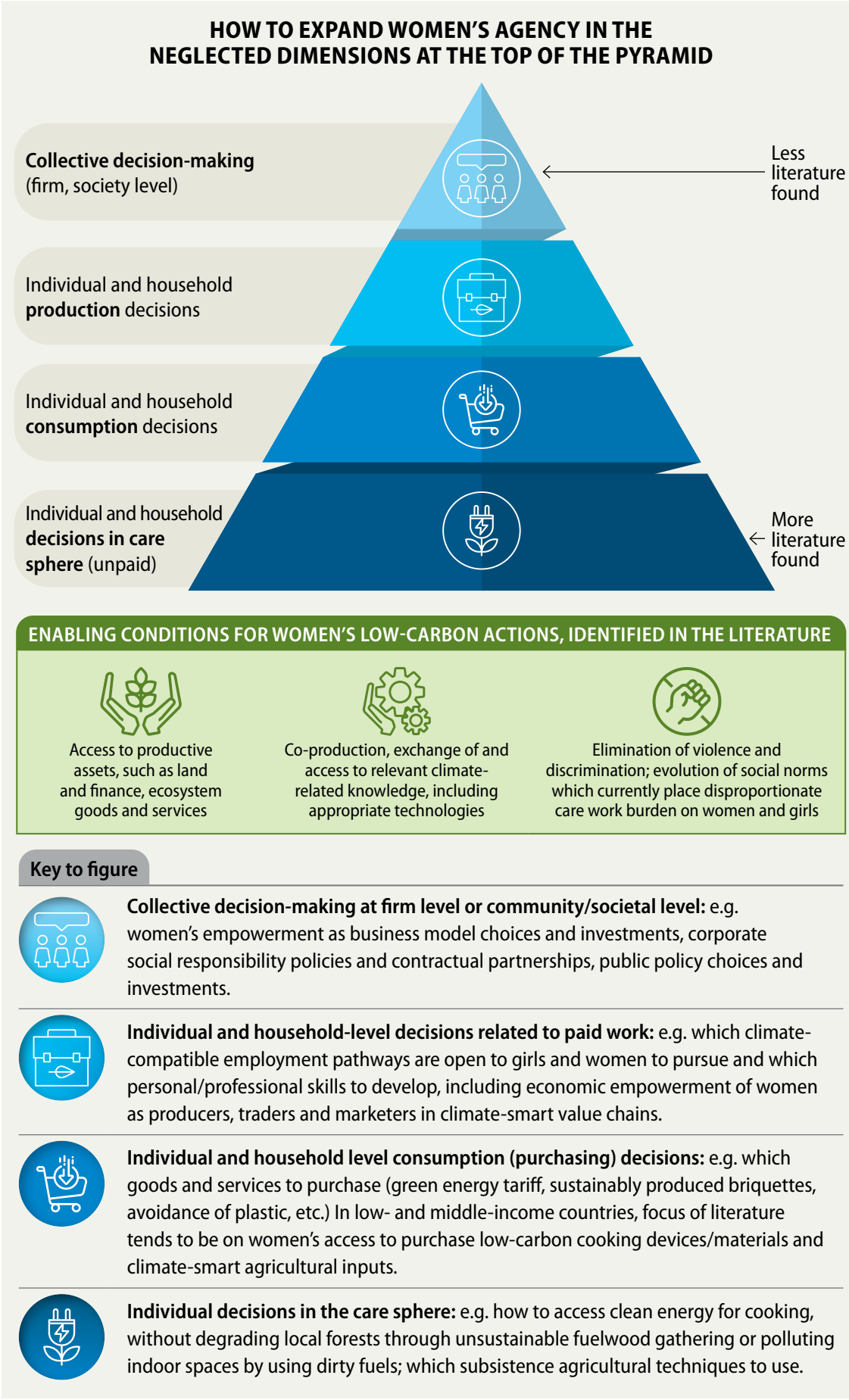
Women farming, Malawi. © CIFOR-ICRAF

Mainstreaming both gender equality and climate action in policies, programmes and investments means recognising the intersecting dynamics of gender and climate:

- **Gender inequality makes climate impacts more severe for some groups of women.** Climate change amplifies existing forms of disadvantage and exclusion, because many of spontaneous social responses to impacts are heavily discriminatory (correlating with increased marriage of girls, increased gender-based violence and increased sex trafficking; **Global Center on Adaptation and CDKN's *Stories of Resilience 2023***[21] provides many community level examples). This means it is necessary to create systems of empowerment and support for different groups of women and girls depending on their specific climate risk-related vulnerabilities.
- **Gender inequality makes it harder for some groups of women to access the climate information, resilience solutions, and low-carbon knowledge, skills and assets they need.** Existing gender inequality barriers, compounded by discrimination on the basis of caste, ethnicity, age, differing abilities and marital status, and economic barriers, mean that groups of women need targeted support to access the climate- and sustainability-specific opportunities emerging in local, national, regional and global economies. There is a "growing consensus that the impacts of climate change and non-inclusive climate action have gendered effects and exacerbate gender inequalities in the workplace. These effects consequently harm women, who are the agents of change in building … inclusive opportunities in a low-carbon economy".[22] Further, the GLOW programme scanned the literature at the intersection of gender and low-carbon development, and found that women's roles in climate change mitigation are often narrowly understood. Research and evaluation documents from low-carbon programmes with gender equality goals most frequently describe helping women to fulfil roles as household consumers of low-carbon goods. An illustrative example is the promotion of clean or improved cookstoves. These are highly important and worthwhile endeavours with multiple development benefits (including reducing menial household labour). Still, such programmes have often been devised to maintain the social status quo rather than to advance gender equality.

Far less literature describes active support for women as producers of low-carbon goods and services or as leaders of low-carbon public policy and private enterprises – that is, advancing women's economic empowerment to its full potential. There is ample potential for women to participate equally as consumers, producers and public policy and business leaders in shaping low-carbon economies. However, at the moment, women's participation in these roles assumes a pyramid shape (Figure 4).

FIGURE 4: Dimensions of women's agency described in the literature on 'just transitions'[23]



Source: Dupar and Tan, 2023

Feminist and Global South perspectives reshape just transitions

The transition to net-zero, climate-resilient economies is the focus of international knowledge-sharing and negotiation efforts under the UNFCC, driven by countries' priorities.

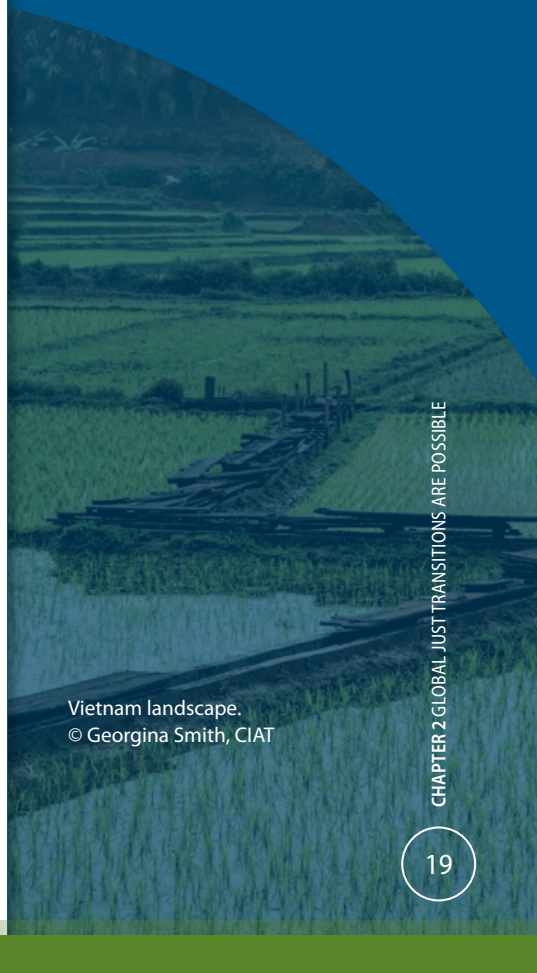
In the climate talks, there are two related workstreams. The first of these is the main entry point for GLOW's research work, with important links to the second:

- The Just Transition Work Programme.
- The work on the impact of the implementation of response measures under the climate change mitigation pillar of the convention and Paris Agreement.

The 'Impact of the implementation of response measures' workstream came earlier, and sought to identify the socioeconomic impacts of climate change mitigation measures: "These impacts could be positive or negative, therefore the Convention, the Kyoto Protocol and the Paris Agreement seek to minimize the negative and maximize the positive impacts of implementation of mitigation policies and actions."[24]

This workstream has tended to focus especially on energy transitions: both production and consumption. It covers workers who are being displaced by shifts from fossil fuel extraction to low-carbon energy production. This includes compensation, reskilling, retraining and redeployment of workers from occupations such as coal mining, into greener alternatives. It also covers policy instruments that can protect low-income and economically-vulnerable consumers during the phase-out of fossil fuel subsidies and the promotion of cleaner fuels.

As described by **Dupar and Tan (2023)**,[25] the tenor of discussions tended to be around workforce redeployment. This framing eclipsed the needs of workers who start in the most disadvantaged positions, including women, informal sector, and rural workers in the Global South, and need to progress into more secure, low-carbon and climate-resilient jobs, including in the same sector albeit under safer and more climate-compatible conditions. Also, this framing, and its coverage in the broader international literature, has been shallow in terms of exploring the socioeconomic impacts of the low-carbon transition, beyond the formal workforce into informal work, and in other dimensions of livelihood and socioeconomic wellbeing.



Vietnam landscape.
© Georgina Smith, CIAT

The just transition narrative has grown out of and benefitted from, challenges by diverse Global South voices to the narrower focus of the 'impacts of implementation of response measures' discussion.

As a consequence, the mandate for the UNFCCC's **Just Transition Work Programme**[26] was decided at COP27 in Sharm El Sheikh (2022) and operationalised at COP28 in UAE (2023). It reflects the appetite among governments and civil society movements, especially those rooted in the Global South, to address socioeconomic transition issues from a much wider perspective. Governments' decisions under the **Sharm El Sheikh Implementation Plan**[27] are stated as follows:

> "50. *Affirms* that sustainable and just solutions to the climate crisis must be founded on meaningful and effective social dialogue and participation of all stakeholders and notes that the global transition to low emissions provides opportunities and challenges for sustainable economic development and poverty eradication; 51. *Emphasize*s that just and equitable transition encompasses pathways that include energy, socioeconomic, workforce and other dimensions, all of which must be based on nationally defined development priorities and include social protection so as to mitigate potential impacts associated with the transition, and highlights the important role of the instruments related to social solidarity and protection in mitigating the impacts of applied measures; 52. *Decide*s to establish a work programme on just transition for discussion of pathways to achieving the goals of the Paris Agreement outlined in Article 2, paragraph 1, in the context of Article 2, paragraph 2".[28] … "85. *Encourages* Parties to increase the full, meaningful and equal participation of women in climate action and to ensure gender-responsive implementation and means of implementation, including by fully implementing the Lima work programme on gender and its gender action plan, to raise climate ambition and achieve climate goals".[29]

The UNFCCC's Just Transition Work Programme opens the door to discussing how education, information, skills training, social protection support, and access to productive assets can be extended fairly and equitably to workers and small businesses in low-paying, unsafe, insecure work that is both highly economically vulnerable and climate vulnerable in diverse development contexts.

The modalities for the Just Transition work programme include:

- at least two dialogues for Parties and Observers, each year, on just transition issues, which will feed into the annual high-level ministerial meeting on just transitions
- a text on just transitions at each Conference of the Parties (COP)
- a growing body of evidence to inform the second global stocktake of progress in implementing the Paris Agreement.

The GLOW programme's contribution is to present analysis from diverse developing countries on advancing gender equality in the just transition, along with pragmatic and empirically-tested recommendations for policy and practice.

About this report

Based on evidence from the GLOW programme, this report tells the story of women and men in largely rural and peri-urban locations in the Global South who are mostly not retraining from coal mining jobs, or switching from dirty diesel generators or chemical nitrogen-based fertilisers. They are starting from a position of economic disempowerment due to a lack of material inputs, finance and productive assets for their livelihoods and businesses. They are trying to gain access to energy and inputs because they lack them almost completely. They want the means for decent, productive livelihoods and are willing to leapfrog conventional polluting methods to embrace low-carbon and climate-resilient means.

The projects range from women horticulturalists in Senegal and Guinea who want access to solar-powered irrigation to overcome the tedious, time-consuming work of manual irrigation, to women advancing their economic empowerment in Cameroon by restoring the health and fertility of depleted, unproductive lands.

They range from involving women in the scaling up of emergent technologies such as Integrated Multi Trophic Aquaculture in Kenya to demonstrate both its ecological-climate sustainability and economic empowerment potential, to women leading the revival of indigenous and local craft-making for local markets in Nepal.

The women's empowerment perspective is heavily shaped by geography, class and socioeconomic status, and existing types and levels of production and consumption. All are framed by structural aspects of national economies and by opportunity spaces in national policy for managing just transitions.

However, a common thread runs through all the stories: We currently see a world where economic transition policy narratives, policies and investments have until recently been dominated by Global North, male-dominated industries. The world we want to see is one where women are co-leading, benefiting fairly and equitably from just transitions, and provided with adequate resources to achieve this. This report discusses how we can achieve this vision.

Difficult labour of a woman coffee farmer, Colombia. ©Neil Palmer, CIAT

A woman uses groundwater for irrigation, Cambodia. © Neil Palmer, IWMI

FIGURE 5: GLOW's contribution to just transition policy and practice[30]

How GLOW has assessed the potential for women's economic empowerment in the just transitions of natural resource-based sectors (agriculture, (agro)forestry, coastal-marine and eco-tourism) through four integrated lenses

LOW-CARBON OR CARBON- POSITIVE
Switch to lower carbon production and consumption and provide access to low-carbon services for those without services (e.g. low-carbon energy); foster land, water and coastal-marine management that enhance natural greenhouse gas sequestration and storage

RESILIENT TO CLIMATE (AND OTHER) SHOCKS AND STRESSES
Anticipate and absorb future climate shocks and stresses, adapt to avoid and reduce negative climate impacts in present and future (e.g. increase water efficiency to anticipate drought); building such resilience may also buffer against other, and intersecting, shocks and stresses

GENDER-EQUITABLE
Promote gender-equitable access to, and benefits from the low-carbon, climate-resilient economic transition, including skills and jobs; women in leadership; equal pay for equal work; equitable distribution of unpaid work, including care work. Address intersecting issues for Indigenous, young, elderly and minority women as well as those living with disabilities

WORK THAT IS 'DECENT'
Advance 'decent work' conditions: decent pay, dignified and non-exploitative working conditions, opportunities for professional advancement, social protection (benefits to prevent hardship from illness, disability, etc.), all of which should raise and maintain living standards and buffer against all shocks

Source: Authors' original diagram

CHAPTER 3

NATIONAL JUST TRANSITIONS ARE POSSIBLE

This chapter spells out the nature of the low-carbon, climate-resilient economic opportunity in greater detail. It illustrates how the GLOW projects provide evidence for and pilot-test the creation of decent[v] low-carbon, climate-resilient jobs for women in 17 countries across the Global South. The projects are using this evidence to leverage broader changes in policies and practices.

Improved agricultural productivity for women farmers

Bolivia

The *antiplano* is the high Andean plateau located mainly in Bolivia and partly in Peru and Chile. In Bolivia's *antiplano*, Indigenous communities live in harsh climatic conditions and eke out livelihoods from farming, principally by growing quinoa.

Despite communities' hopes that quinoa cultivation could provide secure jobs in balance with the local ecology, it has not done so. In recent years, communities have experienced more adverse and intense weather events in a changing climate, compounded by economic pressures and the Covid-19 pandemic. All these shocks have increased households' vulnerability and diminished their resilience.

Bolivia's **Constitution (2009)**[31] has decent jobs as one of the country's principal development goals [pop up: Bolivia's Constitution (2009) Article 46]. The Constitution also promotes social and gender equality and forbids discrimination. Nevertheless, data from 2019 shows that 91% of agricultural employment is economically vulnerable because it is own-account work or unpaid

Women's empowerment, Kenya plant. © Georgina Smith, CIAT

v The definition of 'decent work' by the International Labour Organization is: 'productive and delivers a fair income, security in the workplace and social protection'. For a full definition, visit https://www.ilo.org/topics/decent-work

family work on the farm.[vi] Women, especially Indigenous women, have the worst rates of employment vulnerability.

- **The opportunity** is to create ways for Indigenous women quinoa farmers to adopt climate-smart practices and stabilise their incomes in the face of climate change.
- The GLOW project **Creating indigenous women's green jobs under low-carbon Covid-19 response and recovery**[32] is piloting ways for Indigenous women quinoa farmers to make their livelihoods more secure. The project has estimated the carbon and water footprints of quinoa farming in several locations in the *antiplano*. The communities and researchers are introducing water and energy-saving measures to enhance the sustainability of farming practices and reduce farmers' vulnerability to climate shocks.

Cameroon

Cameroon has committed to restoring 12 million hectares of degraded lands as part of the **African Forest Landscape Restoration Initiative (AFR100)**.[33] Land becomes degraded when it is unsustainably logged or cleared, diminishing soil fertility, as well as its carbon stores and biological richness. The best way to restore land depends on the location because Cameroon is a vast country with varying microclimates and soil and vegetation types. Planting appropriate tree species and managing trees, crops and livestock sustainably to revitalise soils and watercourses is central to the task – and all in the context of eradicating poverty.

Rural women are key to these efforts, because of the vital role they play in agriculture, food security and tree and land management. However, their participation in land restoration is held back by sociocultural and institutional factors. Giving technical support and supplies to rural women's associations, often via NGOs, can provide meaningful incentives for women to participate.

- The **opportunity** is to enable more rural women and minority groups to lead land restoration initiatives and tree-based businesses in Cameroon. This should enable them to improve their financial security and food and nutritional security.
- The GLOW project **Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon**[34] is working to strengthen government policies and business practices to foster women's and minority groups' leadership and participation and benefit from land restoration initiatives.

vi The Food and Agriculture Organization of the United Nations (FAO) classifies own-account and contributing family labour as 'vulnerable work'.

Land restoration in Cameroon. © CIFOR-ICRAF

Senegal and Guinea

Both the Senegal and Guinea governments rely on renewable energy – a mix of solar, hydro and wind power – to underpin their green energy transition and meet their nations' needs for more energy.

The horticulture sector is an essential source of jobs for women in both countries and is growing rapidly. Horticulture generates 16% and 5% of GDP in Senegal and Guinea, respectively, and it increased production by 37% from 2012–2018. Women are very present in horticultural value chains, from production to marketing and processing. However, certain activities, notably irrigation to grow the plants, require a great deal of growers' time, as well as financial investment. Irrigation work can also be tedious, especially in small farms that rely on manual irrigation.[35]

The **opportunity** is to give women more access to solar energy for irrigation in horticulture, which would alleviate their workload and permit them more leisure time or time for further income-generating activities.

- The GLOW project **Energy transition for the economic empowerment of women through the horticultural value chain in a post-Covid context in Guinea and Senegal**[36] is providing evidence for the benefits of women's access to and control of solar-powered irrigation systems. This evidence will inform policy decisions for establishing a regulatory framework and public policies to support the large-scale adoption of such systems.

Women's leadership in agricultural value chains

Central America

Many international manufacturers and retailers source agricultural produce and processed foods from the Central American countries of El Salvador, Guatemala and Nicaragua.

However, these value chains are not yet well-managed for climate change adaptation and mitigation: the countries are highly vulnerable to climate change impacts, and their greenhouse gas credentials could be much enhanced.

Business leaders lack knowledge of gender gaps across the agricultural value chains and how to create new, decent jobs for women in the sector.

- The **opportunity** is to better integrate women workers into the agricultural value chains of large corporations with well-paying, secure work while also 'greening' the chains. Such a two-pronged strategy could significantly increase women's incomes, create jobs resilient to climate impacts and accelerate low-carbon transitions.
- The GLOW project **Empowering women in agricultural value chains for a low-carbon transition in Central America**[37] is developing recommendations for how agri-businesses in El Salvador, Guatemala and Nicaragua can reduce the carbon and water footprints of their tomato and cocoa value chains. It can also enhance women's economic opportunities, including by improving their carbon and water management skills.

Malawi

In Malawi, most people live in rural areas. Almost two-thirds of cultivated land is taken up with small-scale maize farming. Smallholder farmers use few agricultural inputs and rely on rainwater. Their yields are low and they are trapped in chronic poverty and food insecurity. Tobacco has long been Malawi's dominant cash crop. However, global demand for tobacco is declining. The government is seeking to restructure the economy into alternative cash crops that can enhance rural livelihoods and generate exports.

Climate change also challenges farming livelihoods – in the form of slow-onset changes, such as erratic rainfall and extreme weather, including frequent storms. Combined with the Covid-19 pandemic, these factors pushed farming households further into poverty. Women are especially affected because of local gender norms and barriers.

Malawi's domestic and export markets are growing for improved fruit products, including processed mango fruit and macadamia nuts. The fruit and nut trees thrive in agroforestry systems – 'trees on farms'. These systems can be managed to enrich soils and sequester carbon. They also offer farmers some protection against the impact of climate change, because the diverse species in agroforestry systems are more resilient than single agricultural crops.

- The **opportunity** is to provide smallholder farmers with appropriate resources and training to integrate them into fruit and macadamia value chains to enhance their economic opportunities. If economic empowerment activities can be designed to confront discriminatory social norms and give women access to knowledge, skills, finance and other productive assets, then the activities could be significant in advancing gender equality, too.
- The GLOW project **Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)**[38] is collaborating with public and private sector, university and NGO partners to co-develop and test mango and macadamia nut processing activities by women. The project works with district and national authorities and private businesses to change policies and practices to engage and empower more women in high-value chain activities.

Nepal

In Nepal, there is an exodus of male workers from the countryside to the cities and overseas for work, so women make up most of the agricultural workforce. Their farming duties add to their considerable care roles for young and elderly dependents.

Agriculture is a highly climate-vulnerable sector. There is considerable potential for adaptation actions to introduce new technologies and practices – or even to spread effective indigenous practices – to promote climate resilience. Although the government and Constitution are strong on gender equality, investments and practices are not yet adequate to empower women with climate-smart skills and technologies to take advantage.

The Covid-19 pandemic also disproportionately affected women in Nepal and worsened their existing climate-related vulnerabilities.

- The **opportunity** is to create a gender-responsive entrepreneurial ecosystem that supports women's economic empowerment. This could take advantage of the rising use of digital technology and align interventions for women's empowerment with Nepal's Nationally Determined Contribution (NDC), which prioritises agroforestry practices with a low-carbon

Women collecting leaves for plate making. © Srijana Baral

footprint, gender-inclusive policies, an inclusive economy, healthy agricultural landscapes and increased access to climate-smart agricultural technologies.

- The GLOW project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal**[39] is undertaking a joint investigation with local women and 'deliberative dialogues' with women farmers, market traders and local power-holders, such as government officials (also forest-based entrepreneurs, see the section on Women-led sustainable forest enterprises). The project aims to strengthen women's voices, self-confidence and meaningful participation in creating high-value chain opportunities for their small businesses.
- The results include reopening of the local weekly farmers market after Covid in response to the needs of women farmers, in particular. To ensure that this effort was not a once-off, the project identified the importance of mainstreaming gender-responsive budgeting into municipal plans. This approach is intended to ensure sustained support for women farmers' needs and priorities into the future: the practice was successfully integrated in one municipality. At another site, efforts resulted in technical and institutional strengthening of a local agricultural cooperative and advances in women's entrepreneurship, thanks to support for the branding and marketing of legumes.

Southeast Asia

Smallholders are the backbone of Southeast Asian agriculture, with women comprising around 32% of agricultural labour in the region's agricultural-exporting countries, in communities with 50% higher poverty rates than cities.

Association of Southeast Asian Nations (ASEAN) policy-makers have recognised the importance of agriculture in meeting the region's climate change mitigation goals: soils, trees and crops can store significant greenhouse gases, especially in combination with forest protection and restoration. The sector could also contribute significantly to climate resilience, through appropriate local adaptation practices.

Most women are engaged only as agricultural labourers, are seldom landowners, are less educated or literate than men, and carry a heavier load of unpaid care work. As men migrate to cities for work, women increasingly become the heads of households and are vulnerable to climate and economic shocks.

- The **opportunity** is to foster climate-mainstreaming and gender-mainstreaming in the policies and practices of agriculture value chain actors. More specifically, the Covid-19 pandemic affected the livelihoods of 55 million smallholder farmers. The **ASEAN Comprehensive Recovery Framework Implementation Plan**[40] provided an opportunity for gender and climate-responsive recovery.

- The GLOW project **ASEAN green recovery through equity and empowerment (AGREE)**[41] works with agribusinesses and social enterprises to mainstream gender and enhance inclusion while contributing to national and regional climate objectives. It works with businesses to pilot-test training for women farmers and cooperatives on enterprise growth, market access, environmental conservation and climate-smart practices. It provides practical advice to policy-makers on achieving NDC targets and women's empowerment through incentives, public procurement, and financing schemes and policies aligning with NDCs.

Women-led sustainable forest enterprises

Nepal

More than 40% of Nepal's land area is covered by forest. The Government of Nepal has presented the sustainable management of healthy forests as a key adaptation and mitigation priority in its **NDC**.[42] The government and local communities also recognise forests as a critical source of livelihoods, food and nutritional security, materials for homes, and support for cultural, religious and spiritual life.

Women are heavily involved in forest management. Nepal has strong gender equality provisions in its Constitution and also in its NDC; similarly, regulations mandate the increased representation of women in Community Forest User Groups. However, in reality, women have little decision-making power over natural resources. Indigenous women, Dalits (historically known as 'untouchables'), the land-poor and landless, women with disabilities, and single and widowed women are notably excluded.

- The **opportunity** is for management, technology, and markets in forest products to evolve to provide greater economic empowerment and climate-resilient development for women in rural Nepal. However, challenges prevent them from using their knowledge and skills to generate more sustainable futures.
- To overcome those challenges, ForestAction Nepal's action research project, **Economic empowerment of women through forest solutions**[43] aims to enhance women's economic status through low-carbon enterprises based on forest resources. The goal is to enable women and marginalised communities to withstand challenges posed by climate change and pandemics such as Covid-19. Indeed, the project has already resulted in empowering women with the skills to launch their own businesses – processing and marketing sustainably harvested forest products. No fewer than 18 women-led enterprises have been supported to launch and expand their businesses.
- The project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal (CREW)**[44] also worked with women on the sustainable management of the high-value aromatic plant wintergreen (*Gaultheria*). This forest-growing shrub is the primary source of income for women at one of its sites.
- Both Nepal initiatives have demonstrated how ongoing engagement with Community Forest User Groups can facilitate the emergence of women's leadership in these local institutions and more inclusive forms of forest governance.

Decent jobs for women in aquaculture

Kenya

Kenya Vision 2030[45] aims to transform Kenya into "a newly-industrialising, middle-income country providing a high quality of life to all its citizens in a clean and secure environment". In this context, the Government of Kenya considers the blue economy (covering oceans, coasts and lakes) one of its priority economic sectors. The blue economy is seen as an engine of growth and development, with important contributions to make to food and nutrition security as well as creating employment, generating income, wealth, foreign exchange earnings, and reducing poverty.

But women's place in the blue economy is not assured. The structural gender inequalities in Kenya's coastal fisheries communities have led to women's disproportionately suffering a steep decline in business opportunities, higher losses and diminishing returns. This is because women have limited access to ocean resources, feel insecure at sea, lack the skills and capital to invest in fishing vessels and post-harvest handling facilities, and suffer social pressure and discrimination from the hierarchical power dynamics in their communities.

- The **opportunity** is for women to have decent jobs cultivating seaweed and raising fish, with the help of new technologies – work that would provide them with secure incomes and safe working environments while enabling them to provide for themselves and their families.
- The GLOW project **Aquaculture of seaweeds and fish: Opportunities for blue economic empowerment and Covid-19 resilience in Kenya**[46] is demonstrating how integrated multi-trophic aquaculture (IMTA), opportunities for fish farming and seaweed production can support women's economic empowerment. It is working to build women's agency,[vii] resources and institutional structures for productive low-carbon, climate-resilient jobs in Kwale and Kilifi Counties. The project hopes that these pilot experiences can be scaled up to create a more gender-equitable blue economy. You can find more information on the project website.[47]

vii **agency:** the ability to take action or choose which action to take (Cambridge English Dictionary)

Fish marketing, Kenya. ©ILO

Bolivian Indigenous woman at her craft stall. © SDSN Bolivia

Women's empowerment through sustainable tourism

Bolivia

In Bolivia, the structure of the economy has been weighted toward heavily greenhouse gas-emitting sectors, such as mining. Now, an open, national debate is taking place about how different sectors of the economy could be supported to grow in a more ecologically sustainable way and support decent livelihoods equitably for both women and men.

Eco-tourism is in the spotlight. Women are already well-represented in the tourism and hospitality sectors. Visitors seek out handicrafts and ecologically sustainable activities, such as hiking and biking, where women already excel as producers and guides.

- The **opportunity** is to grow the eco-tourism sector in ways that empower both women and men economically. Eco-tourism could generate foreign exchange revenues, while giving women and men decent work and securing a pivot from the male-dominated, environmentally harmful extractive activities on which Bolivia has relied in the past. The country could develop the sector in ways that protect and enhance its rich natural and cultural assets, especially if it focuses on high-value tourism.
- The GLOW project **Tourism as an engine of gender-inclusive and sustainable development in Bolivia**[48] aims to influence the country's development pathway. It has created a new institution, the Sustainable Tourism Observatory **ORBITA**,[49] to galvanise thinking, training and innovation to expand gender-responsive eco-tourism.
- The project's findings have resonated so strongly with the Government of Bolivia that the team is now working with the Office of the Vice Presidency to draft a Supreme Decree setting out how tourism has the potential to become the main export product of Bolivia in just 5–6 years, generating much-needed foreign currency and hundreds of thousands of high-quality jobs, especially for women and young people, with minimal environmental harm.

Women's empowerment in circular economies

East Africa

Women outnumber men in Africa's agricultural workforce, yet women have lower rates of agricultural productivity. It is not because they are less efficient farmers, but because they do not have equitable access to agricultural inputs, land rights and markets for their products. These challenges only deepened during the Covid-19 pandemic.[50]

The FAO suggests that agricultural productivity in sub-Saharan Africa would rise by 20% if women had equal access to inputs and land. Transformations in women's access to these productive assets would increase productivity and empower women as farmers, employees, consumers and partners.[51]

The answer is not necessarily to spend more money on external agricultural inputs for diminishing returns: many emergent regenerative[viii, 52] and circular economy[ix, 53] technologies and techniques provide climate-smart solutions with rapid returns on investment and/or money-saving benefits. They can also offer women economic opportunities along value chains, opportunities that require relatively small land footprints. They include the growing use of black soldier fly farming in sub-Saharan Africa: a fly that eats through municipal organic waste to generate high-quality compost and larvae that provide a protein-rich livestock feed, in what is a form of circular bioeconomy.

Another emergent technology is aquaponics, a sustainable farming technique that combines aquaculture (fish farming) with hydroponics (soilless plant cultivation). Its low-input system is low-carbon and climate-resilient. It has immense potential to transform women's lives in Africa, advancing their economic empowerment and food security, and the environmental sustainability of their practices.

- The **opportunity** is to introduce more business leaders to climate-smart and 'gender lens investing' perspectives, demonstrating the combined potency of climate and gender mainstreaming to deliver robust and sustainable financial results. The opportunity also lies in introducing regenerative and circular (bio)economy technologies and techniques that can reduce vulnerabilities to climate change impacts such as unpredictable rainfall and boost the agricultural yields of women workers and entrepreneurs.
- The GLOW project **Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities**[54] has worked intensively in the East African countries of Kenya, Tanzania, Uganda and Rwanda. The project focuses on a range of small and medium enterprises using regenerative agriculture and circular economy technologies and practices. Together, they demonstrate the business case for gender and climate mainstreaming, identifying the specific types of support women workers and entrepreneurs want, and defining how broader government policies and business standards could enable low-carbon, gender-equitable enterprises to flourish.

viii **Regenerative agriculture** is a way of farming that focuses on soil health. When soil is healthy, it produces more food and nutrition, stores more carbon and increases biodiversity – the variety of species." (WEF)

ix The **circular economy** aims to "reduce the use of virgin raw materials and waste production, to improve the circularity of the raw materials used, and to extend their lifetime, completing the economic and ecological cycles of resource flows". (Paes et al. 2019)

CHAPTER 4

CROSS-CUTTING INSIGHTS: WHY WOMEN'S ECONOMIC EMPOWERMENT AND CLIMATE ACTION GO HAND IN HAND

Women's contributions matter and make a material difference to development effectiveness

Women's economic empowerment and climate action go hand in hand because women bring different and important perspectives and experiences as producers, consumers, and policy and business leaders. That is why women, in their diversity, need to be involved as participants and as leaders.

A woman cuts lemongrass to be distilled into essential oil, Nepal. © Chandra Shekhar Karki, CIFOR

When women are involved in the ideation and planning, they contribute perspectives on feasibility in production and product design, as well as in logistics and marketing. This includes guiding on the appropriateness of products for different segments of the market. For example, women often know more about consumption and use of products than men, based on their conventional economic roles.

For example, in Bolivia, women face limited opportunities when starting businesses [in the tourism sector], particularly in accessing financing, which prevents them from growing and establishing themselves personally and professionally. Despite these barriers, the sector offers unique opportunities for women. Women are often the ones who make holiday decisions and book activities for families. They are well suited as business leaders of climate-smart eco-tourism ventures. Furthermore, the concept of 'sorority' is crucial. There is a growing demand for tourism offerings tailored specifically for women, emphasising safe and enjoyable travel experiences.[55]

Women's access to emergent technologies drives innovation and learning

Women's different perspectives and learned skills contribute to the more effective functioning of emergent low-carbon, climate-resilient technologies, also. We see this clearly in the case of coastal Kenya, where Integrated Multi Trophic Aquaculture (IMTA) is being adopted as an environmentally sustainable alternative to conventional fisheries.

IMTA systems involve the cultivation of various species that have mutually beneficial ecological interactions: fish, shellfish, and seaweeds. The waste produced by fish provides a valuable nutrient source for seaweed, which in turn contributes to water purification and the overall health of the ecosystem. Achieng G. et al. conclude that IMTA works substantially better when women are involved in all aspects of the business. Gender inclusivity in the piloting and scaling up of IMTA systems is not just a matter of social justice, they say, but also an entirely pragmatic way to strengthen the achievements and sustainability of its use:

> "For example, women are traditionally involved in the processing and marketing segments of aquaculture in many societies, while men are more involved in the cultivation and harvesting aspects.
>
> "By recognising and integrating these gender-specific skills and roles into the Blue Empowerment project, the project has been able to enhance efficiency, productivity, and social equity. This approach ensures that the benefits of the IMTA system, such as economic diversification, environmental sustainability and social well-being, are accessible and equitable across different genders, thereby contributing to the overall resilience and success of the project."[56]

Women bring traditional skills and knowledge that are inherently low-carbon and climate-resilient

Socio-cultural norms that have underpinned gendered roles in society can lead to the passing of specific forms of knowledge and skill among women that are highly important in the context of transforming to low-carbon, climate-resilient economies.

In the Philippines, women play a highly significant role in corn farming, according to the GLOW project **ASEAN green recovery through equity and empowerment**.[57] This is evidenced by "women's presence in most of the value chain activities, specifically in bringing quality yield attributed to women's diligent upkeep of the farms using climate-friendly practices". More than half of women corn farmers surveyed undertake harvesting, pest control, spraying, pruning and clearing, land maintenance and transplanting. By doing most of the weeding, they reduce the need for herbicides and so contribute to ecological sustainability, but this work has been fairly invisible to date. Although women's contributions to climate-smart corn production are critical, they are undervalued. When women are not there to undertake such work, the difference is abundantly clear:

> "In Maguindanao, women are leaving the corn farms to find work as domestic helpers abroad. Having fewer women who can do weeding, cleaning, and land maintenance roles (in addition to reproductive functions) leaves the corn fields in a mess. Weeds take over the corn fields as women's invisible weeding work becomes no longer available. As a result, from farming white native corn, men are preferring the glyphosate-tolerant high-yielding corn varieties. These varieties are drought-tolerant and so is a form of climate change adaptation but are also input-intensive, costly, and result in higher greenhouse gas (GHG) emission."[58]

In Nepal, Forest Action Nepal has supported 18 Indigenous women-led, sustainable, forest-based enterprises to be established, using non timber forest products to create alternatives to plastic bowls, plates and buckets/baskets. The production and sale of these sustainable products is bringing direct economic benefit to the Indigenous and lower-caste women and also bolstering their confidence. The use of the 'bio bowls and plates' (Duna-Tapari) and woven baskets is rooted in religious rituals and therefore has a strong local demand and value chain. Their production is based on women's traditional skills, which are being strengthened and revived in participating communities. Production has provided direct, stable and reliable income to the women producers and has supported the employment of elderly and differently-abled people.[59]

Rwanda_woman farmer. © Neil Palmer, CIAT

Potential exists for women's economic empowerment across the landscape of decent, green jobs

The GLOW action research projects have investigated how to strengthen low-carbon, climate-resilient economic transitions in four broad dimensions, depicted in Figure 6 that follows:

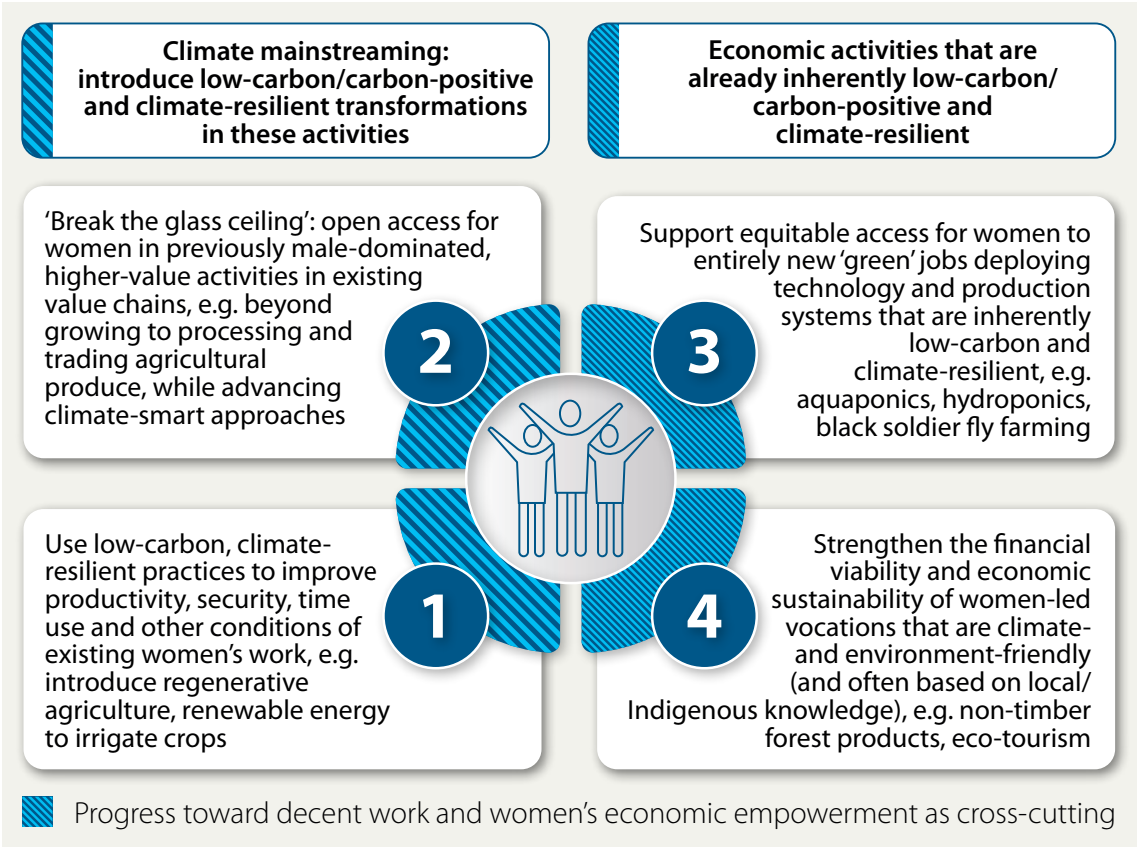
1. Climate mainstreaming into existing low-productivity and climate-vulnerable activities such as small-holder agriculture, where the introduction of climate-smart management techniques and technologies (such as solar-powered irrigation) can reduce current levels of menial work, improve productivity, yields and stability of income, and make work more rewarding.
2. Climate mainstreaming into higher-value activities in agriculture and (agro)forestry value chains, where there is potential for introducing emissions avoidance and climate resilience measures (such as reducing carbon and water footprints across processing, packaging, distribution, marketing, and trading activities).
3. Consolidating pilots and scaling up businesses based on emergent technologies and production techniques that are inherently low-carbon/carbon-positive and climate-resilient (such as aquaponics, hydroponics and black soldier fly farming).
4. Strengthening the financial viability of, consolidating and scaling up businesses based on existing women-led vocations that are inherently low carbon/carbon-positive and climate-resilient and often based on women's local and Indigenous skill and knowledge (such as sustainable non-timber forest products and forms of community-based eco-tourism).

Women workers may be relatively more concentrated in categories 1 and 4 – although this is highly context-dependent, and social norms may constrain their participation in category 2. Category 3 may be more emergent and open to creating new gender-equitable norms. However, existing societal beliefs around women's suitability to access new technologies may influence how women's participation is approached.

The implication of the differential positioning of women in each quadrant (whether a quadrant is currently women-dominated, men-dominated or emergent) is that any strategies for women's empowerment will need to address this positioning directly. The next chapter addresses common challenges, opportunities and recommendations for women's economic empowerment from across the GLOW programme. Each challenge and recommendation discussed should be interpreted through the women's positioning in different job areas. For example, the familiar call for women's increased participation in leadership, as applied to the low-carbon, climate-resilient transition, is especially germane for categories 1, 2 and 3, where women are under-represented as leaders. The call for increased women's access to productive assets and specific strategies for achieving this is relevant to all four categories, and so on.

Profound potential exists for women's economic empowerment across all four categories. Their empowerment uniformly promises to catapult forward the low-carbon/carbon-positive and climate resilience potential in each category of economic activity. Realising this potential relies on deep gender analysis and multi-faceted strategies, tailored to each context.

FIGURE 6: Entry points for women's economic empowerment in just transitions to a net zero, climate-resilient future[60]



Source: Authors' original diagram

CHAPTER 5

COMMON STRATEGIES FOR REALISING WOMEN'S ECONOMIC EMPOWERMENT IN LOW-CARBON TRANSITIONS

In this chapter, we identify a range of barriers – social, political, economic, ecological, technological – to women's achievement of economic empowerment in the context of transitions to low-carbon and climate-resilient development. We explore practical strategies for addressing each barrier, as demonstrated by the GLOW projects.

Some of the barriers and solutions are already widely acknowledged and even explicitly addressed in the Sustainable Development Goals. Others are more novel insights into applying a women's empowerment lens to low-carbon, climate-resilient development. Chapter 6 on conclusions and recommendations that follows summarises areas that are particularly suited to further piloting, research and organisational learning to advance the linked frontiers of gender equality and climate action.

Scientific and wildlife tourism in Bolivia.
© SDSN Bolivia

Promote women to decision-making roles for green economic transitions

Issues

The first issue is that women are commonly excluded from decision-making roles in both family-owned production and small enterprises, as well as external enterprises, and collective community and government decision-making. This is true for productive activity at large and equally true for decision-making in the realm of emissions avoidance and climate resilience.

For example, in East Africa, Intellecap describe how women provide the largest share of farm labour. Still, men dominate decision-making, such as how to spend income, what type of crop to plant, and what type of fertiliser and inputs to apply. In some places, women are only allowed to undertake subsistence farming, such as vegetables for food, while cash crops are reserved for men.

In this region, Intellecap found that 'gender mainstreaming' is widely interpreted by businesses to mean achieving the 'mandate of having at least one-third of the workforce as women' – a requirement that is enshrined in the **Constitution of Kenya (2010, article 27)**.[61] Dig deeper, and you realise that the one-third mandate is being met for labourers employed by businesses. However, in terms of management and company leadership, women are far in the minority.

A similar picture of **women's missing leadership emerges in Cambodia**.[62] Here, women and men say they share responsibility for agricultural decisions at the household level. Women tend to be primarily responsible for the household's finances, making independent decisions about small expenditures and managing tasks such as loan repayment. However, when it comes to public leadership positions outside the household, the dynamic changes.

GrowAsia's project **ASEAN green recovery through equity and empowerment**[63] finds that women are 51% of Cambodia's agricultural labour force, and produce 70% of the country's food, but are only 24% of household agricultural holding managers, 12% of agricultural extension officers and 10% of agricultural extension services beneficiaries. Sixty percent of agricultural cooperative members and 34% of agricultural cooperative Board of Directors are women.

Kenyan farmer on mobile. © Neil Palmer, CIAT

Few women belong to agricultural cooperative committees; when they do, they often fill administrative positions while men take on leadership roles.[64]

The second issue is that when climate-resilient development programmes solely or mainly target women and aim to elevate women's status, there may be pushback from husbands and/or from more powerful community members. Power-holders may feel that their decision-making powers and control are being compromised, and they may feel threatened. This dynamic is well recognised in the broader literature and practice. Some GLOW projects encountered pushback, but not others. It depended on the local context. GLOW projects used various strategies to diffuse pushback, cultivate support for women's changing roles and increase women's leadership in low-carbon, climate-resilient initiatives.

The third issue is that when women are given greater decision-making authority in a formal sense (such as through public appointment) or gain more decision-making authority by default (such as in the diverse contexts where the migration of working-age men from rural areas may leave a dominance of female-headed households), women may lack the capabilities to be fully effective in their decision-making roles, because of the discrimination and exclusion they have previously faced. GLOW projects have investigated the basket of capabilities women need to be effective decision-makers in the context of a changing climate and diminishing natural resource base – and how women's existing capabilities can be nourished.

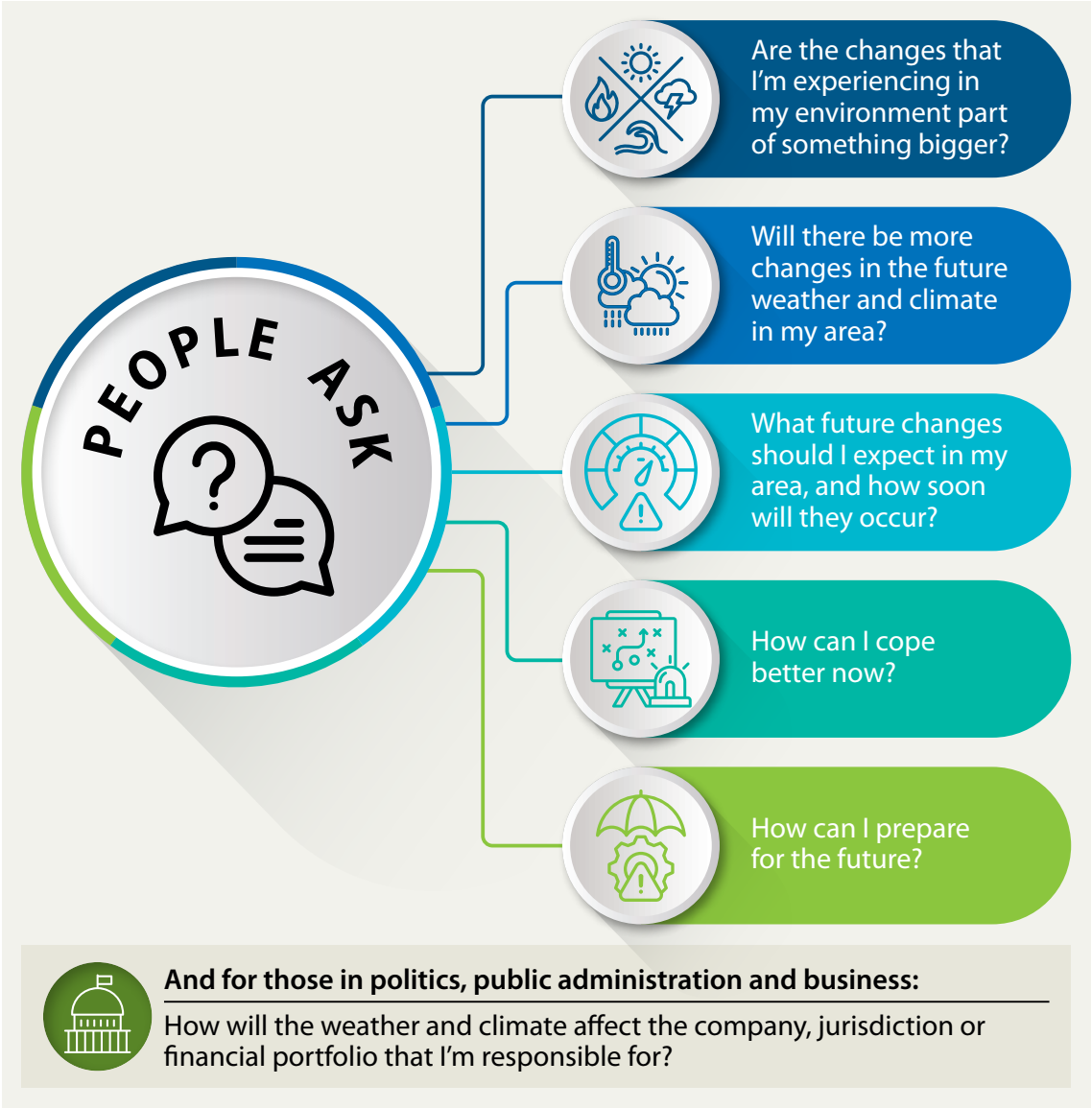
Solutions: Promote women's influence in decision-making and boost their capabilities to fulfil these roles

Putting women in decision-making roles in public and private sector policy and management is a part of the solution. Climate programmes and initiatives can include ambitious targets for equalising the gender balance of decision-making and leadership positions to enhance women's voice and influence.

Further, imparting women with the knowledge, skills and confidence to succeed as decision-makers is essential. GLOW research highlighted three dimensions for building women's capability to succeed in decision-making, management and leadership of low-carbon, climate-resilient development:

1. **Strengthen women's climate literacy and their capabilities in the technical low-carbon, climate-resilient aspects of production, logistics, marketing and other value chain activities.** Women need equitable access to weather forecast information (on daily to seasonal scales) that can help them manage their productive activities and be informed climate-smart leaders in the face of the increasingly unpredictable and erratic weather that is a consequence of climate change. They also need equal access to information that explains people's lived experience with climate shocks and stresses in the context of scientific observations, and that describes future climate change trends. To be influential climate leaders, women need to know how climate change affects their sphere of economic activity and how it will affect them in the future. (See Figure 7 that follows.)

FIGURE 7: Climate literacy efforts answer these questions[65]



Source: Dupar et al., 2019

Women also need capacity development in technical knowledge and skills for introducing low-carbon and more climate-resilient practices into existing production systems and/or innovating and developing new jobs based on climate-smart practices. Depending on the context, appropriate participatory methods for women's development may need to overcome literacy, time and mobility barriers (when women are available for training or sensitisation; how easily or safely they can reach meeting spaces). Methods should also be designed to capitalise on women's existing relevant experiences and capabilities in the low-carbon, climate-resilient and ecologically sustainable production spheres, which may hitherto have been under-recognised and undervalued.

The project **Empowering women in agricultural value chains for a low-carbon transition in Central America**[66] has provided evidence to support the establishment and consolidation of a multi-stakeholder 'green' alliance to support women leaders. The nascent alliance, termed **Iniciativa IXCHEL**[67] (materials in Spanish), launched digitally in 2024 with a webinar series that explores multiple angles of women's empowerment and water and emissions saving in agricultural value chains (for climate change mitigation and adaptation and resilience).

2. **Strengthen the capacity of women in management and decision-making roles through improved financial literacy and business skills (as appropriate).** Several GLOW projects stressed the importance of deepening women's business skills in the context of low-carbon, climate-resilient business development. For example, in coastal Kenya, capacity-building for women not only focus[es] on aquaculture techniques and ecosystem management but also leadership, business management, and financial literacy to enable women to take on more significant roles within the sector, according to Achieng et al.[68]

   In Bolivia, ORBITA Business Advisory Services strengthened women-led and women-dominated ecotourism businesses to strengthen their managerial skills, enabling businesses to use information, understand their competitive advantage, access new markets, and make better strategic decisions. Following a recruitment campaign and registration process, the services were provided to 54 enterprises, with at least 75% being female-owned, female-led, or female-worker-dominated.[69]

   Business skills can also lay the foundations for technical work to reduce greenhouse gas emissions and climate vulnerability. The project **Empowering women in agricultural value chains for a low-carbon transition in Central America**[70] found that, "when studying the activities women do on the farms, we found that very few have administrative records of their production. In this project, we are trying to see how we improve environmental sustainability by reducing carbon and water footprints; this is an important limitation because without administrative records, it is very difficult to understand exactly how much footprint is being generated in the sector."

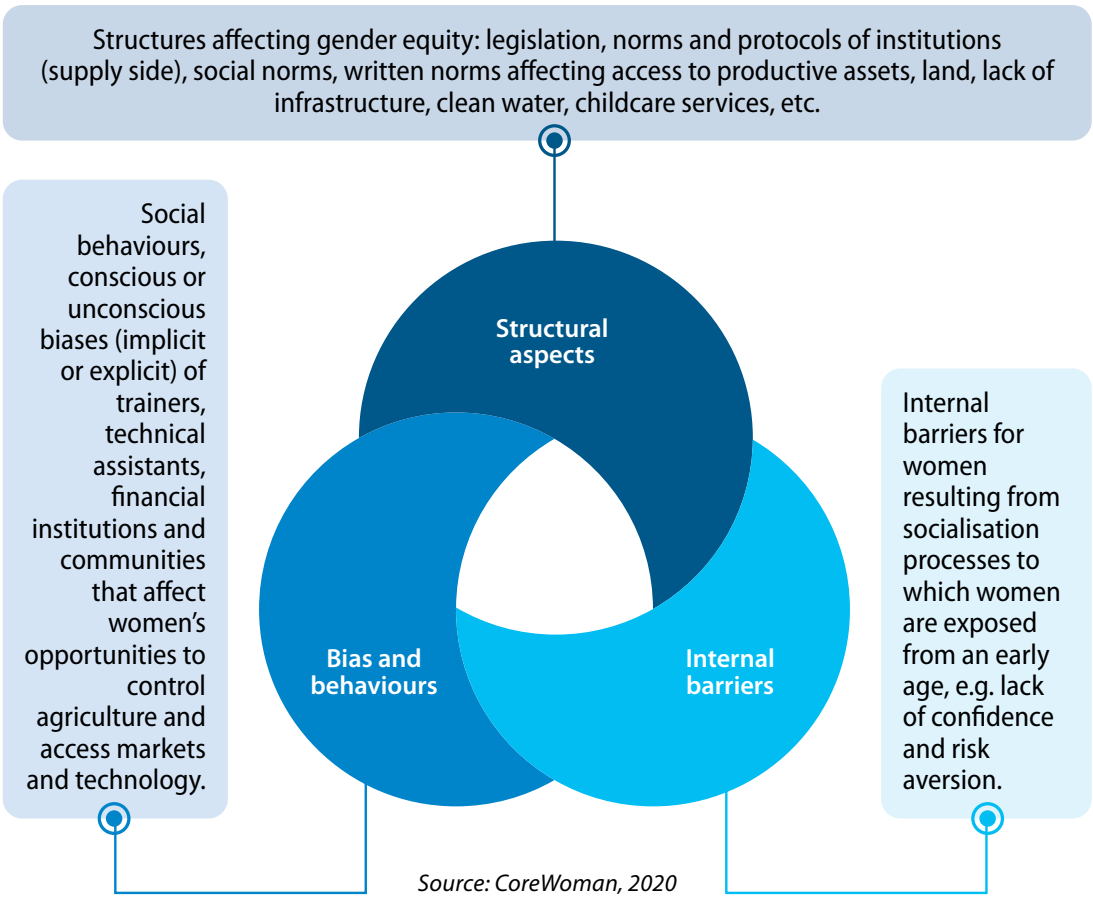
Strengthen women's self-confidence overall. As well as formal 'skills development' as such, other activities can generate confidence-building and informal learning opportunities for women, such as women-only safe spaces for sharing information and mutual self-help. In coastal Kenya, forming women-led cooperatives and support groups provide a platform for sharing knowledge, resources and best practices. In rural Nepal, ForestAction Nepal not only created organised groups of women around ecologically sustainable businesses. They also made it a priority to secure where they could store materials and manage business affairs, meet and care for children, so discharging their work and family responsibilities in balance. Peer-to-peer support is strongly evidenced as being effective in building women's self-confidence; see also the Foster 'the strength within' box on the next page and the section 'Encourage gender champions, role models and mentors' on page 47.

As well as the technical and psychosocial measures to nurture women's capabilities, as suggested above, climate programmes must mainstream logistical measures to recruit and retain women participants and leaders. Measures may involve providing facilities for nursing mothers, access to sites and materials for people living with disabilities, timing activities to suit women's availability, and so on. These practical support measures must be budgeted adequately as well, as a matter of equity and good practice. They are an essential but partial piece of the puzzle: taking a holistic approach to women's leadership, including addressing norms that constrain participation and hostile elements of the work environment, is also necessary.

Box 1: Foster 'the strength within'

Systemic approaches are helpful in confronting gender-based discrimination and fostering the empowerment of women. One example used within GLOW is the Corewoman systemic approach. It is based explicitly on the work of Naila Kabeer (**Gender Analysis Framework 1996**),[71] simplified and repackaged to engage policymakers, organisations and communities. The Corewoman approach has three main facets, as shown in Figure 8 below.

FIGURE 8: Three main facets of the Corewoman approach[72]



Source: CoreWoman, 2020

Following from Kabeer's observations, this approach describes how women may lack confidence due to their social conditioning. They may lack negotiation and communication skills that 'are a product of socialisation, not biological' according to Susana Martinez Restrepo, Corewoman co-founder.[73] These characteristics can hinder women's economic participation, leadership and empowerment.

These dynamics can also be further reinforced when institutions internalise discriminatory norms into policies and institutional behaviours. For example, banks may assume which products and information women do or do not want.

Part of the solution, of course, is to nurture women's psycho-social strength: their self-confidence and willingness to speak up and assert their rights to gender equality. Measures to increase women's self-confidence and 'sense of the possible' around their leadership in low-carbon, climate-resilient endeavours are important and highly relevant to climate initiatives and can be included in them.

Strengthening the gender equality and social inclusion elements of all policies relevant to climate action, creating safe spaces and forums for collective action where women can help each other, encouraging gender champions and role models, and confronting toxic and discriminatory beliefs and behaviours are all important components of any holistic toolkit for action, as discussed further in this report.

Box 2: What motivates women to become land restoration leaders? Lessons from Cameroon

In Cameroon, organisations working to empower women through land restoration activities tend to work with farmers groups that have at least 50% women members, as a way of supporting gender-equal participation. They do so together by engaging traditional and administrative authorities (rural councils).

Despite taking this approach, the project **Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon**[74] found that only 32% of the women in their interview sample held leadership positions in their land restoration groups.

When asked what motivated them to become farm group leaders, 89% of the women interviewed said it was due to their knowledge of the initiative, and 79% said it was because they had a good education. Other factors motivating women's leadership are the desire for income generation opportunities (68%), matrimonial status (63%) and culture and tradition (63%).

Women said that the factors holding them back from leadership are low education level, low financial capacity and matrimonial status, each mentioned by 21% of women respondents. The research team said they were "not able to elucidate how matrimonial status affects leadership, as the factor had both positive and negative effects. The group structure, the domestic workload and previous experience seem to have little effect on whether women are willing to take up leadership, as more than 60% of the women reported [those factors] as having 'no influence' on leadership".

Women who choose to become leaders do so out of the desire to help others and to contribute to the community's development (37%) and because they are nominated to the role and agree to follow the group's wishes (37%). The enhancement of one's social status is the motivation for some, as mentioned by 17% of interviewees.

The researchers found that women's desire to acquire new knowledge and skills becomes more important with time. Only 4% mentioned it as a reason for stepping into a leadership position, and 16% mentioned it as a motive for staying in leadership.[75]

Mango farmer, Malawi. © CIFOR-ICRAF

Increase women's uptake of decent low-carbon, climate-resilient jobs

Issues

Many GLOW projects addressed the situation where women are trapped in unproductive, poorly paid work – such as smallholder agriculture with meagre returns – and do not participate in some of higher-value activities in value chains. (See 1 and 2 in Figure 6 on page 36).

GLOW research looked at what happens when women are offered training to improve the ecological and economic rewards of their farming, agroforestry and value chain practices.

In general, the barriers to women's participation in training and in higher-value activities were found to be complex and highly locally-specific. Barriers include the pressures of women's unpaid care work and sparse time available, social expectations and/or personal security concerns that limit women's movement, and in places, the existence of hostile, sexist vocational and training environments (discussed further in the sections on unpaid work and social norms, below).

Barriers also include stereotypes about women's and men's roles and abilities that can – often inadvertently – limit women's access to knowledge, information and economic opportunity. This section looks at stereotypes and how projects have addressed conscious and unconscious biases. It demonstrates how projects have unlocked climate-smart economic opportunities for households languishing in poverty and climate-vulnerable work, in a fully gender-equitable way.

Solutions: Map the gaps and potentials for women's participation along low-carbon, climate-resilient value chains

A popular approach used by GLOW projects was to involve women and men producers together in mapping opportunities for women's enhanced roles in value chains. This is an approach for increasing women's diversification into higher-paying jobs that were previously more male-dominated, while simultaneously 'greening' value chains.

Approaches start with a situation analysis to ground the brainstorming process and assess options and plans. Several projects used a visualisation exercise, whereby producers map out the value chains for different products and the potential financial benefits at each stage. This process asks the questions: What are the different roles that women and men currently play at each step of the chain? What enhanced roles could women play at each step? The follow-on question is: what gender-responsive and gender-transformative actions would be needed to support women's enhanced roles and economic empowerment at different steps of the value chain and what would be the benefits to them and their families?

The situation analysis is not just about value addition; it is also grounded in assessments of ecological sustainability and climate suitability at each step, as well as an assessment of the market landscape (market access and maturity). It asks: Are the current value-chain activities climate-resilient and low-carbon (such as sustainability of plant cultivation or forest product extraction, carbon and water footprints of industrial-manufacturing processes, etc.)? If not, what options are there for improving the climate and ecological sustainability of the activities along the chain?

An example of taking the mapping approach to gender roles and women's contributions is the project **Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)**.[76] In this action research context, the resilience of tree growing and production to climate stresses is of fundamental importance, and the climate change mitigation value of the 'trees on farms' model is well recognised. Therefore, the mapping and visioning exercise along the value chain embodies both women's empowerment and low-carbon, climate-resilience goals.

After the mapping comes the generation of options for women's involvement in value addition. Strategies for women's economic empowerment are often targeted at adding value to raw materials through processing, packaging and handling. But it must not be forgotten that enhancing women's roles in marketing is essential too, so economic empowerment may also involve women's improved access to or leadership in developing new markets: women as 'sustainability communicators and marketers'.

While the mapping and pursuit of higher-value economic-productive activities for women is an important component of women's empowerment, it is quite narrowly focused on income generation. It must be viewed within a broader concept of women's economic empowerment, which embodies a range of enhanced capabilities and elements of well-being such as time saving. (See also Muriel, B. and Romero, D., 2024, **'Engaging gender equality in the economic-productive sphere'**).[77]

Market intelligence has an important role to play in maximising potential for women's economic empowerment in value chains. So, too, does broader environmental assessment beyond merely climate factors.

An illustrative case is **Creating Indigenous women's green jobs under the low-carbon Covid-19 response and recovery in the Bolivian quinoa sector**.[78] Researchers assessed the declining reliability of quinoa yields in the high plains region of Bolivia in recent years: a decline which has affected both food security (households' own use of quinoa) and the income they derive from selling it.

They found that not only are climate factors such as erratic rainfall behind reduced quinoa yields. The international quinoa market has also been largely in flux. New producer countries such as Spain have surged onto the market. International prices of quinoa have been affected by the Russia–Ukraine war.

On the environmental front, intensive agricultural practices meant to increase yields have deeply eroded the fertility and volume of topsoils, year on year. Previously, fields were left fallow to recover between cropping seasons, diverse and complementary crops were grown together, and quinoa production was mingled with llama-raising, which provided manure for soil regeneration. These practices have diminished in favour of intensive monocultures. Reliability of water supply is important for quinoa-growing, but rainfall becomes more erratic with climate change, and infertile soils with little organic matter do not retain water well.

In the context of these intersecting drivers of agricultural decline, the solutions for Indigenous women's economic empowerment in agriculture are multiple: produce and market quinoa varieties with high nutritional and aesthetic qualities and capitalise on markets for organic quinoa; add value by diversifying the range of quinoa products created – including combining it with other local products such as cañahua, amaranth, cacao, Brazil nuts, and coffee, making quinoa milk and beer, and pursuing holistic agricultural management techniques to enrich the soil and agrobiodiversity for a more robust production system.

Solutions: Make alliances with power-holders to increase women's influence and sphere of activity

One of the most promising approaches for addressing resistance or pushback on women's economic empowerment programmes was shown to be facilitated dialogues, involving different configurations of male and female stakeholders at nested scales from the household to the community and local government levels.

At the heart of this strategy is the idea of demonstrating through guided and deliberative discussion how everybody in a household or community can benefit from women's empowerment. Tools that can help with this include facilitated dialogue methods such as those used by **Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)**.[79] The use of such tools also needs to be tested for cultural and situational appropriateness.

The POWER project adapted for the Malawian context an existing methodology known as the Gender Action and Learning System (GALS) and Financial Action and Learning System (FALS), originally developed by Dr Linda Mayoux. They also borrowed and adapted from several participatory analysis frameworks, including especially Participatory Rural Appraisal (PRA) to facilitate livelihoods analysis (Chambers, 1994); the Harvard Analytical Framework to facilitate gender analysis, (March, et.al., 1999) and Kabeer's empowerment framework to facilitate power analysis (Kabeer, 2021).

The POWER method begins at the household level with participatory tools for head(s) of household, partners, children, and extended family members to examine their current situation and position in the mango value chain, understand how the POWER project interventions might change or uplift their position, and facilitate the family to plan for these changes in a gender equitable way.[80]

The method targets the transformation of gender relations in the household and at the level of the mango 'bulking centres' (the local area from which mangoes are collected and aggregated to be sold) and district levels.[81] Mentors are assigned to households and mentors lead a process over several months, which unfolds as follows:

> "[The process] begins at the household level with participatory tools for head(s) of household, partners, children, and extended family members to examine their current situation and position in the mango value chain, understand how the POWER project interventions might change or upgrade their position, and facilitate the family to plan for these changes in a gender equitable way."[82]

Welcoming the municipality team to the village. © ForestAction Nepal

There are ten modules to work through, and each takes approximately two hours. Once all ten modules have been completed, the participants are invited to plan and participate in their own graduation ceremony with other family and community members: "The graduation ceremony provides an opportunity to reflect on gender transformative change with a new generation of POWER champions."[83]

The intervention trialled by the project team was deemed highly effective. They conclude that household members were willing to accept and engage in gender-based and contextual negotiations on how to share planning tasks, leadership on asset acquisition and decision-making around resource use.[84] The POWER team does, however, believe it would take at least five years of implementation for these more gender-equitable approaches to become fully culturally embedded.

Solutions: Encourage gender champions, role models and mentors

GLOW projects consistently highlighted the role of gender champions as an effective practice for women's economic empowerment – as part of a larger suite of measures. In private sector businesses, Intellecap found it essential to designate a champion for women. This person can have responsibility for and drive forward "implementation of the actions and activities that improve inclusion of women in the business and drive the gender agenda for the business".[85] This means having a designated individual whose defined job is to advance more gender-equitable opportunities and outcomes in the business.

Such a person could, of course, be of any gender. Even with a gender champion in place, individuals across the business need to consider gender equality and equity as their mission and foreground it in their everyday work. These principles also apply in the public sector.

Role modelling was another consistent theme. It differs from assigning a gender champion, insofar as role modelling implies successful women entrepreneurs and leaders sharing their experience with new women entrants to the sector who face similar challenges. Mentorship, similarly, implies the moral and practical support of experienced women in the public, private sectors or civil societies, for their less-experienced peers.

Gnetum planting, Cameroon. © CIFOR-ICRAF

Role modelling and mentorship can be effective in informal ways, as well as more formal arrangements. The Bolivian Sustainable Tourism Observatory supported the creation of knowledge exchange platforms for Indigenous women eco-tourism entrepreneurs, which fostered opportunities for informal role modelling and mentorship among them.

Even when such activities are informal, it takes active coordination and funding to arrange and drive such networking opportunities and meeting spaces. In GLOW projects, women's groups, enterprises and intermediary organisations (such as domestic NGOs) have all relied on grant money to foster role modelling and mentorship activities.

It is hoped that the vital personal connections and inspirations that women have gained will yield legacies of empowerment in the future. In locations such as the rural Nepal example, where women entrepreneurs established actual buildings as safe spaces for women and established local agreements for ongoing use of the facility, it is hoped that these functions will be 'institutionalised' to some degree in the future.

Increase women's access to productive assets for green economic transitions

Issues

Access to productive assets is a strong, common thread that runs throughout the GLOW findings. Lack of access to productive assets for low-carbon and climate-resilient economic activities is widespread in developing economies. It is commonly documented and recognised that women have far less access to land, finance and agricultural inputs for their economic empowerment than men do. These longstanding dimensions of general poverty and inequality also hamper women's low-carbon, climate-resilient development.

In East Africa, women's unequal access to land is an entrenched issue, according to Intellecap.[86] In spite of national laws that allow for equal property rights for men and women, in practice, land is handed down to male children, not female children. Women's lack of land tenure makes it harder for them to secure credit – so they are doubly disadvantaged.

In Malawi, where the GLOW project targeted women's empowerment in fruit and macadamia net value chains, both fruit and nut farmers "… rely on projects to source seedlings. Lack of readily available water sources, limited resources to control pests and diseases, and management shortfalls (including organic or chemical fertilisers) have led to the loss of many trees and under-productivity, especially in the case of macadamia. Women, particularly, are more challenged than men, given that they are more financially and labour-constrained. They are also limited in terms of mobility."[87]

In Nepal, women struggle to access to credit from financial institutions due to the lack of required collateral and onerous documentation requirements. To compound this issue, when women disproportionately lost their jobs during the Covid-19 pandemic, the government's economic recovery plans seldom reached women engaged in agriculture and small-scale enterprises.[88]

Solutions: Women's collective action to secure productive assets

Guinean women have successfully used collective action to secure land access, ownership and resources for environmentally sustainable agriculture. In Guinea, a union of women market gardeners and traders, *Les femmes de l'Union maraichère de Tangama*,[89] acquired 3.5 hectares of land, which had originally been a demonstration plot for a university, for their members' use. They allocated the land among individual union members, for personal and household use. The smaller parcels have subsequently been handed down from mother to daughter over the generations.

The ability of the women to mobilise productive assets was further enhanced when this union joined a larger union body called the *Fédération des paysans du Fouta Djallon,*[90] a 750-member body dedicated to horticultural production (of which 700 are women). Affiliation with this body helped members to access agricultural inputs and key information from the government about production methods. It also enabled them to articulate viable requests for external support. Government agencies, financial and technical partners found that formalised women's organisations and clearer, more stable land tenure arrangements, were essential requisites for their providing support to women.[91]

It was via this collective organising that members were able to access solar panels and irrigation equipment to irrigate their fields. This eased women's previous hardships, because traditional, manual irrigation methods were very tedious. Association with the larger federation also provided conduits for women farmers to take up leadership positions in the union movement, too: the female president of the *Dalaba Union maraichère des femmes* assumed a position on the federation's board and as its general secretary: her position helped secure external assistance for the Dalaba women farmers. (See ***La transition énergétique pour l'autonomisation économique des femmes à travers (...) – Ipar, initiative prospective agricole et rurale***.[92])

Savings and loan associations run by women for women or by and for low-income community members are well established in many places as development institutions. They are also instrumental in many GLOW project locations in enabling women's low-carbon, climate-resilient activities. In the Nepali district of Arghakhanchi, the project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal**[93] recognised that savings and loans associations for women provide multiple, mutually reinforcing, functions. They provide women with cash for agricultural inputs. Savings and loans association meetings also provide fora for women to discuss gender equality and social inclusion matters, including gender-related barriers to development. Such discussions – here facilitated by project staff – have contributed to developing women's agency, with visible changes in their confidence and engagements in local planning processes.[94]

Solutions: Change the technology, change the production model

Diffusion of new technologies – illustrated by GLOW projects in East Africa – demonstrates how technologies (both new technologies and revived indigenous and local ones) can overturn production models based on high external inputs and create new models that women can embrace on a more even footing with men. If we think beyond what we have always done, emergent technologies and production techniques in agriculture and aquaculture can produce more outputs, which are also more sustainable outputs, with fewer resources.

Land-sparing and regenerative modes of agriculture and forestry, requiring low external inputs enable women to pursue economically empowering jobs and entrepreneurial growth without recourse to as many productive assets as they may have needed under conventional development. Furthermore, circular economy innovations take what were previously deemed waste materials and make them into valuable productive assets. We see this in the following examples of resource-light, or circular, low-carbon and climate-resilient production systems supported by the project **Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities**:[95]

- "**Integrated/controlled production systems** such as aquaponics and hydroponics that allow for precise control over environmental factors and help reduce resource wastage, minimise the need for mechanical tilling, reduce pressure on land resources, and promote crop diversification.
- **Appropriate land management** through recycling of waste to inputs leads to enhanced soil health allowing for carbon sequestration and reducing dependence on chemical fertilisers
- **Efficient water use** through sensors and smart greenhouses to reduce dependence of agriculture on rainfall, reduce water required for farming, manage irrigation schedules, and use available water more efficiently."[96]

The project notes that:

> "Value chains, such as organic fertilisers, prove to have greater potential for women's inclusion owing to the waste segregation aspect which is traditionally undertaken by women. Building greater gender impact in these value chains may lead to increased chances of women's economic empowerment. Some agri-business models lead to a reduction in production cost, which is inherently more suitable for women farmers given challenges faced in access to capital and inputs."[97]

Capitalise on women's initiatives, but ensure that the most marginalised are not left behind

Issues

Many women have managed to seize the initiative to access low-carbon, climate-resilient technologies and ways of working – even if their control of land and funds and their overall literacy are lower than that of men. In Senegal, IPAR and CECI have documented how women can influence the purchase of solar equipment by or with their husbands, or they can purchase it directly if they are widowed and divorced and have the funds to do so. Women farmers are managing to access and use solar panels to drive greater yields in horticulture. They deploy the solar panels and linked pumps and irrigation systems to save considerable time and labour compared to previous manual irrigation methods (workload decreasing from 7.7 hours to 7 hours per day). Their average horticultural incomes have jumped from $1,165 to $2,541 per year.[98]

However, there are distinct groups of women with different levels of empowerment, even in seemingly homogenous communities, and each group needs different forms of support. Among the communities engaged by IPAR Senegal and CECI, female solar power users are comparatively more educated and confident than non-users.[x, 99] Widows tend to have access to and use solar irrigation technologies. The data on married women is mixed: although most of them say they can influence household spending decisions, most of them also say that solar panels are 'controlled' by husbands. In polygamous households, access to solar irrigation technology is heavily defined by one's rank and status: it is the first wives who are more likely to have access to solar panels, not the second or third wives.

In Malawi, a similar picture emerged. Older and widowed women have more autonomy, whereas young women face further barriers in accessing land and technology because family members think they will marry and move away anyway. According to Kampanje et al (2022):

> "Household-level land and tree ownership and decision-making is male-dominated, but this gender inequality varies across communities and households depending on factors such as marital status and age … . We also found that the older the woman, the more decision-making authority and autonomy she has. Widows who have retained access to land from their deceased husbands, as well as older divorced women who have been allocated land in their home villages, have relatively more decision-making autonomy, and have significantly higher tree tenure security as compared to their younger counterparts." Younger women are expected to get married and move away. Married women may have access to productive assets through their husbands but it is 'conditional'".[100]

It is natural that there is diversity among women and that some are more able to capitalise on the opportunities of low-carbon, climate-resilient livelihoods and economic empowerment than others. However, what strategies are there for identifying and nurturing the capabilities, assets and empowerment of more marginalised women and indeed, other left-behind social and socioeconomic groups? GLOW project findings suggest that the following options are worth considering.

x Women's confidence levels were self-reported through the survey questionnaire, using the Women's Empowerment in Agriculture Index methodology.

Indigenous skill for producing sustainable goods. © ForestAction Nepal

Solutions: empower women with 'mobile' skills when needed

GLOW research has suggested tailoring capacity development to specific groups of women based on their intended life trajectories and the sociocultural opportunities and constraints they are likely to face; for example, by empowering young, unmarried women with technical, life and business skills that will 'travel well' with them when they marry.

In patrilineal settings, young women may be considered temporary residents because they will move to their husband's home. Young single women can be empowered with "mobile knowledge assets that they can use regardless of where they relocate to". [101]

This approach recognises that even while climate initiatives can and should confront discriminatory power structures and inequalities now, it can take a long time to shift deeply embedded social norms. Initiatives can therefore adopt women's empowerment strategies and tactics of this kind, which both:

- Empower women in the near term (in the context of existing male-biased inheritance systems, culture and the limitations for women regarding land access, tree tenure and agency).
- Contribute toward the longer-term shifts in discriminatory social norms toward *de jure* and *de facto* gender equality.

Solutions: Social protection to address shocks and extreme vulnerability

It may be necessary to design and implement social protection supports for the poorest and most heavily disadvantaged women, who do not have the wherewithal to participate immediately in training and capacity development because they live in extreme poverty or destitution. More extended intervention periods involving more partnerships among government agencies, community-based organisations and non-governmental organisations (NGOs) may be desirable or necessary for such women to graduate into more stable livelihoods, including green jobs, and higher living standards.

The need also arises in respect of women workers' healthcare needs. GrowAsia **found in Vietnam** that many women farm labourers' health and safety needs are unmet. They strongly recommend that the government extends workers' access to social insurance (state programmes to protect people from financial hardship arising from unavoidable situations such as loss of earnings during illness, injury, disability and old age); also, that businesses and workers consider increasing their social insurance participation.[102]

Increase women's access to markets for their eco-friendly products

Issues

Opportunities to develop supply chains are a crucial strategy for many developing country governments, including in the context of national just transition and climate strategies. Some constraints on low-income farmers' entry into markets and supply chains are gender-neutral as such. For example, in Cambodia, farmers with contracts to supply supermarkets and vegetable shops "struggle to produce vegetables that meet the required minimum standards in terms of size, appearance, and weight due to limited agricultural technology and knowledge and difficulties adapting to variable weather conditions".[103] Further, some equipment to help farmers adapt to unreliable weather is readily accessible and affordable, other equipment less so. In Cambodia, drip irrigation is affordable and readily used as a water efficiency measure to sustain crops. However, net houses (structures with agricultural nets that create micro-climates to nurture plant growth) are far more expensive, and farmers rely on NGOs to subsidise their access to them.

In other cases, barriers to entry in commercial farming have a more gendered aspect: in Cambodia, women farmers without a male partner find it difficult to operate heavy farm machinery to enable them to operate at greater efficiency. GrowAsia highlights the importance of disseminating more women-friendly climate-smart technologies as a way to increase financial inclusion.[104]

Community workshop, Kenya. © Intellecap

In other contexts, such as parts of Africa, Latin America and South Asia, women's lower literacy rates, lower access to information, training and ICTs have definitively hampered women's access to markets compared to their male counterparts. For example, although most farm labourers in East Africa are women, the suppliers in the value chain are men.[105] Women's improved access to digital technologies (both to enhance women producers' knowledge and access to supplies, and for marketing of their own goods and services) and collective action by women through producer cooperatives and federations emerge as two effective strategies to address these barriers.

Solutions: Link women to markets digitally

Linking women farmers, traders or customers to high-quality production inputs and to more extensive markets for their goods and services online – via digital platforms – can reduce vulnerabilities and improve opportunities for women in value chains. It means they side-step middlemen. This has been demonstrated powerfully via the **Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities** project in East Africa. For example, the project has promoted aggregation and technology platforms, which provide farmers with real-time climate data and access to marketplaces to better manage cropping schedules, reduce post-harvest losses, and build their resilience to climate-related market fluctuations.[106]

In Nepal, work by the project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal (CREW)**[107] investigated the current uptake and the potential for women farmers to use mobile apps to access weather and climate information (which supports climate-resilient production) and to connect with market data to support trading.

The project finds that, to date, gender biases and barriers have disproportionately deprived rural women from using and benefitting from digitalisation. Digital gender gaps occur in three connected ways in rural Nepal:

- unequal access to available digital technologies and infrastructure
- women's limited knowledge, at present, of how to use the technology
- a dearth in development of women-friendly mobile apps especially given low rates of women's literacy.

There is an opportunity to turn this around with actionable, achievable goals in digital policy that address the intersectional realities of women in rural Nepal.

The research looked at how many women use apps such as **Smart Krishi**,[108] which enables farmers to connect with experts, and obtain agricultural market data and weather updates. A **quantitative survey of more than 350 women farmers**[109] revealed that although they are familiar with the use of banking apps, and somewhat familiar with the use of digital technology to access relevant market information, they are barely exploiting the potential of apps to support climate-resilient agricultural livelihoods. Fewer than 5% are using digital technology specifically intended for agricultural information.

Despite constraints, survey respondents agree on the indispensability of digital technology. Over 95% said they had not received any training related to apps designed for agriculture at the start of the intervention. Still, a significant 63% reported they could maximise agricultural output by adopting digi-tech in the future.

Some infrastructural barriers to women's uptake exist, such as poor mobile phone signals in parts of rural Nepal. Other barriers are of a more sociocultural type, such as the woman who said, "My husband sends remittance money to my father-in-law who then spends it at his will. I am scared to ask for money to purchase a suitable phone." This speaks to social norms (see below) which can be addressed explicitly in low-carbon, climate-resilience initiatives – although it takes time to influence norms. The 30% of women in the survey who described themselves as heads of household were more likely to report that they also have financial autonomy, and the autonomy to use digital technology.

Use collective action to secure market access

Earlier in this chapter, we discussed the power of collective action – through associations and federations of women producers – for accessing information and productive assets for climate-smart agriculture. Associations come to the fore again as a way of securing market access for producers.

The project **Empowering women in agricultural value chains for a low-carbon transition in Central America**[110] studied cocoa and tomato value chains in Guatemala, El Salvador and Nicaragua. The rationale for choosing these was that they offer the potential for 'greening' and also for enhancing women producers' incomes as they are not subsistence crops but geared toward domestic markets in the case of tomatoes, and export markets in the case of cocoa. The researchers found that the proportion of farmers selling to more formal markets is much higher in Nicaragua (almost 80% of producers interviewed). It is much lower in the other countries, by comparison (close to 10% of cocoa farmers and between 20% and 30% of tomato farmers). Producers with access to more formal markets are more likely to raise their incomes.

Three key factors stood out as instrumental in enabling market access in Nicaragua compared to the other two countries, noting that gender was not a significant differentiator and that these factors applied equally to women and men:

- Having enough land to make the activity profitable increases the probability of selling in a more formal market almost three times.
- Having received training doubles the probability of selling in a more formal market.
- Belonging to an association increases the probability almost seven times. On this last point, Nicaragua separates itself from the rest: while in that country more than half of men and women belong to a producer organisation, in El Salvador and Guatemala, less than 20% do so. The percentage of producers who have received technical assistance is also higher in Nicaragua.[111]

The detail of an agricultural association's activities matters – it is not merely a question of 'whether to associate'. For example, it matters whether an association is skilled in negotiating good purchase deals for its members' produce. Associations are effective when they can exercise collective bargaining power for smallholders and so give farmers more influence than they would have had as individuals.[112]

Woman with child examines tomatoes for sale at the market, Guatemala. © Curt Carnemark, World Bank

Use climate initiatives as a way to address discriminatory norms

Issues

Addressing discriminatory norms against groups of women and marginalised people stretches wider than climate action alone and cuts across all facets of sustainable development. However, changing social norms should be viewed as, and financed as, an integral part of climate programming. Until now, such work has not been perceived as relevant to climate action. Donor and governmental programmes and businesses have tended to exclude work that intentionally seeks to combat gender-discriminatory or harmful social norms, considering it less relevant to climate action. In fact, it could not be more relevant. Addressing discriminatory norms calls for a dedicated budget and human resourcing, because harmful norms are holding back women and girls from participating in effective climate action. Here 'human resourcing' means both dedicated expertise and training in combating harmful norms more broadly across project implementers.

Examples of discriminatory norms that hold back women from participation in low-carbon, climate-resilient activities in the GLOW study countries include:

- In Nicaragua, Guatemala and El Salvador, smallholder women farmers have been invited in equal numbers with men to participate in training programmes to reduce the carbon and water footprint of their production systems. The incentives to participate are strong: uptake of the new methods saves resources, and therefore enhances household revenues. Despite this, trainers are told 'women don't want to come'.[113] After further investigation, the training team found out that common social perceptions are that women are 'not tomato farmers' (even though women do actually grow tomatoes) and that they face harassment in the workplace, including sexual and sexist jokes.[114]
- In Nepal, there are longstanding taboos around menstruation, particularly among certain castes. These norms hold that when women and girls are menstruating, they may not touch people, food and items in the usual way. 89% of Nepali women report their movements being restricted during menstruation, including being forbidden from moving around the community or the home. This creates obvious barriers to women's ability to engage in economic activity, as well as affecting their social lives and physical and mental health.[115]

- In coastal Kenyan communities, social norms are that women cannot go to sea and women should not swim. However, this is holding women back from participating in environmentally sustainable and economically lucrative new production technologies such as Integrated Multi-Trophic Aquaculture.[116]

Solutions: Design climate programmes to engender community acceptance and support for women's changing roles and actions

Climate programmes and initiatives can be designed so that some of the underlying 'normal' beliefs and behaviours that constrain women's productive involvement in low-carbon, climate-resilient livelihoods are explicitly contested, confronted and addressed.

Approaches to addressing such beliefs should be location-specific and institution-specific. They should be sensitively handled by embedded gender champions and their gender allies, so that initiatives protect the welfare of women and girls in communities and/or value chains and promote positive changes by demonstrating women's and girls' abilities.

For example, in the coastal Kenyan communities described above, social norms preventing women from learning to swim constrained their involvement in new, low-carbon, climate-resilient blue economy jobs. The **Blue Empowerment Project**[117] has been trying to facilitate swimming lessons for women who are eager to take up the new technology, and has supported the creation of women-only cooperatives and local platforms as places for mutual self-help and support.

The project **Empowering women in agricultural value chains for a low-carbon transition in Central America**[118] has been working with companies that off-take, process and distribute tomatoes and cocoa from suppliers in the three target countries of El Salvador, Guatemala and Nicaragua. Part of the work is around identifying opportunities for reducing emissions through energy efficiency and renewable energy use in value chains, and for reducing water use, to contribute to climate resilience. They have also undertaken gender analyses to establish whether women experience supportive or hostile work environments. The analyses have led to tailored training interventions for members of both the larger corporate teams and the tomato and cocoa marketing cooperatives that address (among others):

- identifying and halting microaggressions against women in the workplace
- designing projects from a gender perspective
- understanding and embracing notions of positive and co-responsible masculinities
- using inclusive communication and language
- (for women) socio-psychological coping skills.[119]

In this way, climate programmes and initiatives can be the vehicle for modelling and advancing positive, gender- and socially equitable norms in women's and men's workplaces, potentially generating positive spillover benefits into other walks of life.

Strengthen enabling policies

Issues

Countries' national climate plans, the NDCs, were first created and submitted to the UNFCCC in 2015–16 when the Paris Agreement came into force. Countries again submitted their enhanced NDCs with greater climate ambition in 2020–21. There was a significant jump in the mentions of women and gender between the first and second rounds. A keyword search by IUCN (2021) found that 40% of the first round of NDCs submitted by Parties to the UNFCCC in 2016 mentioned the word 'gender', almost double that proportion (78%) of the new round of enhanced NDCs submitted by 2021 mentioned 'gender'.[120]

NDCs often fail to centre equal rights and intended benefits for women and disadvantaged groups, to the extent necessary. Many countries still need to strengthen the social inclusion element of their climate laws and policies.

In addition to climate policies, countries must also strengthen the gender and social dimensions of related sectoral laws and policies that relate fundamentally to climate action, such as land management and tenure laws, green jobs and skills policies.

For example, in Cameroon, land restoration policies do not sufficiently support women's needs. The project **Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon**[121] finds that: "… while national policies and policy instruments are not gender-discriminatory, there is room to make them more gender-sensitive and transformative, especially with regards to access and control over resources, access to information and knowledge and lastly, participation, status, and power. Second, more inclusive approaches are needed to make sure people, including women and minority groups, receive up-to-date information and training on context-specific and gender-sensitive land restoration options.[122]

In Kenya, the government has ambitions to develop the 'Blue Economy' sector. However, as the government itself highlights in its five-year strategy, women are under-represented: "Currently, the Blue Economy sector is highly dominated by men with very low uptake of maritime professions by women. For this reason, there is need to develop and implement appropriate laws, policies and framework to increase women participation in the Blue Economy Sector".[123]

A women harvests the leaves from gnetum (okok), Cameroon. © Ollivier Girard, CIFOR

It is partly a question of women's having inadequate job opportunities in the blue economy sector. It is also a question of women's existing contributions being invisible or vastly under-recognised because their work is informal and precarious, which leads to their concerns being eclipsed in government policies.

Strengthen the gender and social equity dimensions of climate policies and of relevant sectoral and economic policies

Ultimately, women's economic empowerment calls for a 'tapestry' of enabling policy and regulatory measures, which are consistent, coherent and mutually aligned. They should include full integration and application of a country's gender equality laws at the sectoral level.

The project **Land restoration for post-Covid rural and indigenous women empowerment and poverty reduction in Cameroon**[124] undertook a systematic gender analysis of the policies related to land restoration. They used the Harvard analytical framework to evaluate whether national policies were gender-blind, sensitive or transformative concerning women's:

- access and control over resources
- access to information and knowledge
- participation, status and power.

The researchers assessed three general development strategies or policies, such as the National Development Plan, together with nine thematic policies related to land restoration in Cameroon or that address general environmental issues with links to land restoration. Of the twelve policies:

> "Results show that more than half of the policy or instruments were gender-blind on all the three criteria of empowerment. In four of the cases where they were gender-sensitive, in at least two of them they were gender-blind. In other words, only two out of the 12 policy instruments were gender-transformative, meaning that much work needs to be done to make our existing policies gender-sensitive and transformative with regards to access and control over resources, access to information and knowledge and lastly participation status and power."[125]

A review of multisectoral policies (agriculture, forestry, climate change and socio-economic) and experiences on the ground, done as part of the project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal**,[126] found that the constitutional provisions and broader, sectoral policy frameworks in Nepal are quite progressive in terms of ensuring the rights and entitlements of women and marginalised groups and have some level of provisions/subsidies for women farmers. However, these seemingly progressive policy provisions are not effectively translated into practice. The findings show that policy distortions start from gaps in developing sectoral regulatory instruments and institutional mechanisms, developing implementation guidelines, preparing required programs with adequate budgets, channelling resources to the target population, actual implementation on the ground to monitoring and evaluating such policies and programs and policy incoherence across sectors.

Integrating gender equity measures in climate and relevant sectoral policies requires multiple interventions. It needs champions within the legislative and executive branches of government, and engagement with relevant stakeholders in society. However, strong analysis of this type can provide a fundamental springboard towards policy change.

Implement gender equality goals and commitments

The issues

Even when gender equality legislation is strong and is well integrated on paper into climate and related sectoral policies, it may not be implemented in practice. This is the case in Nepal, where the constitution and national laws for gender equality are strong. The high-level political commitment to gender equality carries through Nepal's NDC, which GLOW has flagged as one of the most progressive NDCs for women. There is a legal requirement for local governments and institutions governing the use of natural resources (such as Community Forest Users Groups) to be comprised equally of women and men. Nevertheless, there are critical gaps between Nepal's women-friendly laws and the real-life discrimination still rife in local governance and natural resource management.

Solutions: Foster partnerships with intermediary organisations to pool data, advance advocacy and accelerate women-friendly green initiatives

Respectful partnerships with intermediary organisations are also helpful in effecting the shift and getting resources into the hands of women and community groups that need it.

Partnerships and alliances are vital with intermediary organisations that:

- can provide political, media and public profile for women-led and gender-relevant green economy issues, including, where necessary, pressure for policy change
- can pool data and coordinate learning and strategy development among different women's organisations, enterprises
- can provide conduits to financing by mobilising connections that grassroots women's organisations and small enterprises would not otherwise access (including literal translation of materials among languages where required).

Direct partnerships and alliances with investors in women-led, women-dominant and women-relevant initiatives are also helpful when external investors are respectful and led by local women's priorities (see **The action research approach** box on page 63).

An example of a highly effective intermediary organisation is the Bolivian Observatory of Sustainable Tourism (***Observatario Boliviano para el Industria Turística Sostensible – ORBITA***),[127] founded by the GLOW project **Tourism as an engine of gender-inclusive and sustainable development in Bolivia**.[128] Its purpose is to transform Bolivia's economy from reliance on traditionally male-dominated, extractive economic activities to more gender-inclusive and environmentally-sustainable activities, grounded in Bolivia's rich natural and cultural assets.

Bhujel women gather, Nepal. © Srijana Baral

ORBITA had many successes. During the initial set-up phase:

- It researched the potential of tourism as an engine for gender-inclusive and sustainable development; gender gaps and gender issues in the tourism industry; major concerns, needs, requests and recommendations from different parts of the Bolivian tourism industry during the pandemic; and the environmental footprints of Bolivian tourism. ORBITA further sponsored 25 students to undertake Masters theses on women's economic empowerment in eco-tourism.
- It provided business advisory services to women-led and women-dominated tourism enterprises.
- It built partnerships and alliances to consolidate and capitalise on Bolivia's potential as an eco-tourism leader.

These initiatives together culminated in the production of the flagship report 'Tourism with a Purpose and the 2030 Agenda in Bolivia' (available in Spanish as ***Turismo con Propósito y la Agenda 2030 en Bolivia***).[129] The report demonstrates that tourism has the potential to become the main export product of Bolivia in just 5–6 years, generating much-needed foreign currency revenues and hundreds of thousands of high-quality jobs, especially for women and young people, with minimal environmental harm. This can be achieved in Bolivia if five particularly beneficial types of tourism (cultural, adventure, community, gastronomic and scientific) are prioritised to unleash this potential.

With these ideas, ORBITA was supremely successful in capturing the political and public imagination during the economic recovery from Covid-19 and in the context of further external shocks to the Bolivian economy. The office of the Vice Presidency asked the project to turn the recommendations into a Supreme Decree to achieve real and rapid impacts.

The team produced a draft decree, currently in the hands of the Vice President of Bolivia for approval. Their efforts to promote tourism as an engine of sustainable and inclusive development have also been recognised by the Legislative Assembly, with awards to both ORBITA and SDSN Bolivia. But how to bridge from this vision and commitment to gender-responsive, low environmental impact and profitable tourism, to realising it on the ground?

The team developed a multi-pronged sustainability strategy to bridge this vision and emergent policy into a practical and sustainable pathway for implementation. Based on an analysis of supply, demand, and opportunities, ORBITA's future actions can be framed in four areas for which funding will be sought. Again, the importance of ORBITA is evident for women-led and women-dominated tourism enterprises, as well as for aspiring women leaders. ORBITA acts as an intermediary organisation with catalytic potential to mobilise cooperative agreements and funding in the following domains:

- **Working with universities:** This ORBITA programme aims to channel resources to deepen research and connect local researchers with international ones. By doing so, it also aims to promote Bolivia as a tourist destination in other countries. In addition, ORBITA has managed to convince the Chancellor of **Universidad Privada Boliviana – UPB**[130] that tourism is the future for Bolivia. As a result, UPB is presenting its new bachelor's programme in Hospitality to the Ministry of Education for approval.[131]
- **Working with subnational governments:** This programme aims to provide research services, territorial development, and public policy development for municipal and departmental governments, using the ORBITA platform to showcase data and tourism offerings.
- **Community tourism enterprises:** This ORBITA programme seeks to develop community tourism in Bolivia, promoting the participation of local communities in the sustainable management of their natural and cultural resources.
- **Business advisory services:** This ORBITA programme aims to provide a comprehensive service that offers up-to-date sectoral information, personalised advice, and high-level management training to strengthen the strategic positioning, competitiveness, and effective decision-making of tourism companies in Bolivia.[132]
- In Nepal, where we have noted the large gap between gender equality policy and implementation, the Southasia Institute for Advanced Studies, under **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal**,[133] has flexed its capabilities as a convening organisation to bring together members of communities, local governments, and national level institutions. SIAS has specifically convened these stakeholders to reach a common understanding of why gender equality and social inclusion are not being realised in the implementation of climate-smart agriculture policies. A 2023 policy roundtable focused on:

  > "the lack of or distorted policy implementation and its failure to cultivate expected outcomes for women's economic empowerment, even when policy provisions on paper are positive in terms of gender equality and social inclusion. Insights received from the experts demonstrated that the challenges posed from inadequate policies, not harmonised regulatory instruments, lack of capacity to implement policies, lack of sufficient budget, techno-bureaucratic apathy, politics of local development, and attitude of the politicians, bureaucrats and other actors."[134]

The project has responded to the constraints identified by organising further deliberative dialogues, formal and formal meetings with local stakeholders involved in women's market access for their sustainable produce, as well as training for women producers and government officials to unlock localised solutions.

Box 3: The action research approach

Action research approaches have been the foundation for capacity development and change processes for most GLOW grantees, who hail from think tanks, universities, NGOs and consultancy organisations and act as intermediaries. (Similar action research approaches are sometimes referred to as 'co-production' processes or 'knowledge brokering'.)

Simply put, these approaches regard community-based women, including entrepreneurs, and local government officials as members of the broader research team that together co-investigates the drivers, barriers and solutions for women's empowerment and climate action.

These different actors have typically gathered and analysed data together, to establish a 'situation analysis' or baseline, and they have co-developed tailored interventions for specific localities and businesses. In the case of intensive and time-heavy data collection processes, such as household surveys, the work has fallen to the GLOW grantees; later the community-, government- and enterprise-based participants on the team have come in to co-analyse the evidence and develop recommendations and actions.

The added value of the intermediary organisations is their resource and skill in contributing technical analysis (on gender and/or climate change mitigation and adaptation), facilitating focus groups and dialogues, and convening stakeholders strategically to inform and accelerate policy decisions and implementation.

These institutions were also the recipients of IDRC funding and handled the fiduciary compliance with the donor, the accounting and financial reporting. Most of them passed on micrograntes to community institutions as a form of small but strategic catalytic funding for enterprise start-ups, climate-smart shifts in production systems and the full range of capacity strengthening and peer learning support we have described in this report as being necessary to women's empowerment.

> **"THE CO-PRODUCTION APPROACH ENSURES THAT THE BENEFICIARIES ARE CLASSIFIED NOT AS MERE RESPONDENTS OF THE PROJECT BUT AS RESEARCH PARTICIPANTS." – CREW PROJECT, NEPAL**[135]

Columbian woman checks her coffee bush. © Neil Palmer, CIAT

Solutions: Strengthen the gender capacity of local government personnel

Often, there is a gap in complete understanding among government staff at district, municipal or local government staff on how to implement gender equality policies and, particularly, how to apply them to climate and sectoral actions. These personnel are critical because they are on the frontlines of delivery.

It can be highly effective to run briefings and trainings and/or foster dialogues involving local government officials to support their capabilities for implementation.

For example, in Malawi, the project **Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)**[136] aims specifically to involve district government staff in co-developing activities to empower women in food tree value chains – so that they are vested in the outcomes. The project also intentionally seeks to capacitate district staff on gender issues.

One of POWER's aims is: "to capacitate targeted end users – the Government of Malawi (through its District Agriculture, Environment, and Natural Resource [DAENR] offices), other implementing organisations, e.g. NGOs and the Food and Agriculture Organization of the United Nations (FAO), and concerned private sector actors, such as Malawi Mangoes and Shire Best – with guidelines, community training and communications materials, policy briefs, and targeted training to action the co-developed intervention and policy options."[137]

It has held deep dive 'catalyst meetings' with district government and agriculture field agents. Designed as part of the gender transformative intervention, these aimed to review the progress of work. It also provides opportunities for POWER trainers, mentors and community participants to reflect and plan together with the district officials.

These check-points also provided a chance for the project to develop the awareness and understanding of local government officials and field agents on the needs and constraints of the local women farmers and their roles in the value chain vis a vis men.[138] The sessions took three days (December 2023) and involved 24 district officials from the two targeted districts.

"Most critical to this methodology was the community engagement approach and feedback learning mechanism that allowed all stakeholders participating in the POWER Model to co-learn and reflect on things that work and might not be working for the success of meaningful women's empowerment and livelihood improvement."[139]

In Cambodia, GrowAsia has engaged especially with the agricultural extension agencies of local government. It is particularly important that extension agents understand the nature of gender-related barriers to uptake of climate-smart agriculture, because they are the ones who introduce new farming inputs and techniques to women and men in the field.

GrowAsia has recommended strongly that extension agents "are aware of the specific barriers women face, how this inequity negatively impacts all members of the community, and how these constraints can be alleviated". They also urge local extension agencies to increase women's access by "holding trainings at times convenient for women, allowing women to attend with their children, or sharing training summaries electronically via a platform that is accessible to women in rural areas (such as Telegram groups which allow for voice and video messaging)".[140]

In Vietnam, GrowAsia is urging local government personnel to tighten up health and safety measures for women farmers, and to take proactive measures to safeguard their healthcare and mobility needs during agricultural training, on account of "weather, field mud, and chemical materials used in rice cultivation, and also the ageing of women labourers".[141]

In the Philippines, GLOW researchers are promoting the idea of providing local governments with a 'local development budget menu' of women-empowering, low-carbon, climate-resilient agricultural development options, to steer these entities toward more integrated investments.[142]

Solutions: Get funding into the hands of women's groups and women entrepreneurs

Groups of local women need money to support their activities to bridge the gap between gender equality policy and its implementation, especially in the context of low-carbon, climate-resilient economies.

As discussed earlier, women need resources both for formal and informal activities that nurture their skills, confidence, leadership, product and market development, and that foster dialogue, understanding and moral-practical support among generations, genders, castes and ethnicities in their localities.

While GLOW projects explored the use of pooled funds generated by women themselves through savings and profits, there is also a pressing need for external support to finance a range of business- and livelihood-critical activities. This includes, but is not limited to:

- subsidies for inputs and capital costs for entry to low-carbon, climate-resilient markets
- resourcing for women's collective organising, community convening and policy engagement, including venue, materials and communications costs
- resourcing for training in the diverse dimensions of capability strengthening (such as technical skills, business and financial skills, and leadership coaching).

The GLOW programme did not drill in depth into institutional financing models, but a parallel initiative by Convergence and Climate Policy Initiative is highly germane. They have analysed the gender responsiveness of climate investments, published as **Blended finance and the gender-energy nexus: a stocktaking report**.[143] The analysis is based on Convergence's Historical Deals Database, which lists climate investments classified as impact investment because they:

- attract financial participation from one or more commercial investor(s) that would otherwise not have invested in the region/sector/project
- leverage concessional capital from public or philanthropic investors, with grant funding and/or technical assistance
- intend to create development impact related to the Sustainable Development Goals (SDGs) or directly benefit groups in emerging or frontier markets.

On this basis, the study found that 78% of climate transactions are 'not even gender aware'. 17% are 'aware and counting' and 5% are 'intentionally gender-focused'. Of the latter categories, most are in the agriculture sector and involve development finance institutions.

This analysis identifies a critical gap and a shift needed by public and philanthropic funders to support women's low-carbon, climate-resilience leadership in emerging and frontier economies.

Box 4: The importance of gender-responsive budgeting in policies and programmes

Gender-responsive budgeting is a strategic approach to integrating gender perspectives into budgeting and planning processes and supporting activities to enable women and men to benefit equitably. The government of Nepal endorsed gender-responsive budgeting in 2007–2008 and made it mandatory. The local government in Malarani sought the support of the GLOW project **Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal**[144] to integrate the approach into its annual plan. The project organised gender equality and social inclusion orientation and deliberative forums to sensitise local elected representatives on the policy provisions and benefits of gender-responsive budgeting. This has strengthened the municipal commitment to adopting the approach and led to a clearer articulation of target groups by municipal programmes. It has also resulted in increased gender-responsive budget allocations, and a plan for awareness training for other municipal officials and council members.

Interviewing woman entrepreneur with baby, Nepal. © ForestAction Nepal

Address unpaid work, including care work, as an intrinsic part of climate action

Issues

There is extensive literature on women's time poverty, arising from their heavy work burdens in both paid and unpaid labour – and this reality was reflected starkly in the GLOW studies. Some unpaid or vastly underpaid labour is from agricultural, agroforestry and blue economy work that is own-account or family-based work – sometimes for subsistence or minimal sale. Other unpaid labour involves caring for dependents, which peaked during the Covid-19 pandemic as women were more likely than men to stay for dependent care.

In East Africa, for example, women experience "time poverty and mobility limitations due to socio-cultural norms and traditional expectations of gender roles and unequal distribution of domestic and care responsibilities" according to Intellecap.[145] These socio-cultural constraints and expectations mean that when women farmers experience climate shocks and stresses such as water stress and declining crop yields, they are disproportionately impacted as they are less able to recover from shocks. These constraints are compounded by other barriers, such as fewer productive assets and lesser decision-making power over inputs and practices in agriculture, as discussed above.

Solutions: Shifting norms and practices around care work

The GLOW programme was not tasked explicitly with addressing potential solutions to the vast gender imbalance in unpaid care work and its consequences for low-carbon, climate-resilient transitions. A sister research programme funded by IDRC has delved in more deeply into how society values care work, how it can be rebalanced between women and men, and also to some extent be professionalised as decent work. These areas of action research are, indeed, tightly linked. There is potential for far more integrated work on the intersections between them.

Key points arising from action research on care economies, which could be integrated with low-carbon and climate-resilient transitions are:

- "**Changing the narrative of care work:** There is a strong need to shift the perception that care work is exclusively women's responsibility, addressing established norms and expectations, particularly the challenges they pose in scaling businesses and affecting gender equality.
- **Decision-makers and compensation in the care economy:** Who are the decision-makers in the care economy and what would it take for care work to no longer be seen as solely women's work? A systemic approach to the need for just and respectful compensation is critical.
- **Private sector Involvement and impact investing:** Bringing private sector solutions to the forefront is essential, promoting care entrepreneurs, financiers, and multinational corporations. Limited knowledge and capacity hinder financial flows, suggesting research, execution and outreach to boost impact investing.
- **Technology and education as enablers:** The role of technology in connecting caregivers with families and supervisors was highlighted, along with creating educational pathways for care providers. Digital enablement was also seen as a way to attract high-skilled women, offering better pay and security.

- **Policy advocacy and gender sensitivity in the care economy:** There is a need for policy advocacy, capacity building, and evidence generation to support care enterprises. Men in the workforce can be mobilized to change the narrative and make care work more aspirational. Additionally, sensitisation at the senior leadership level is suggested to foster a more inclusive and gender-sensitive industry.[146]

Points of linkage are:

- Rebalancing women's and men's contributions to unpaid care work could free more time for women to pursue low-carbon, climate-resilient income-generating activities should they choose to do so, and men to spend more time with their families.
- Both the professionalised (formal) care industry and informal care work (involving men and women as essentially household consumers) constitute important arenas where consumer choice of lower-carbon and more climate-resilient goods and services could be promoted and consumer behaviours altered for climate-smart futures.

Solutions: Promote low-carbon technologies that reduce women's (and men's) drudgery

Not all care work, unpaid or underpaid work in own-account agriculture, forestry and blue economy is a 'burden'. For many women, many elements of such work are well enjoyed or tolerated because of their socio-cultural value. They may be woven into deeply important socio-cultural activities such as the collection, processing and preparation of specific foodstuffs and religious and cultural objects, and related activities.

That said, there are many situations and contexts in which women's own account work and care work constitutes drudgery, with associated physical and psychological burdens: insufficient sleep, relaxation time, and heavy stress. The introduction of, and access to, low-carbon technologies and techniques can play a liberating role in freeing up women's time and reducing the drudgery of their paid and unpaid work. The project **Energy transition for the economic empowerment of women through the horticultural value chain in a post-Covid context in Guinea and Senegal**[147] documented how certain women-dominated activities in 'conventional' agricultural production, such as manual irrigation, impose transaction costs on women's time as well as exhaustion. In this context, introducing solar-powered irrigation can significantly relieve women's workloads in the fields. It enables them, if they so choose, to free time for other income-generating activities or to spend more time in their households and communities, including on valued social activities.[148]

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

Conclusions from GLOW's research

The GLOW programme's findings and recommendations for action can inform the decisions and practices of women workers and entrepreneurs, women's groups and community leaders. They can shape national policies and investments, as well as policy implementation. They are relevant to the broader landscape of international development partnerships and climate finance flows.

GLOW's findings may inspire and guide local and national stakeholders as they work to update and increase the ambition of the Nationally Determined Contributions to **'Version 3.0'**.[149] Intended to be the most ambitious since NDCs were first launched in 2015, NDC 3.0 has the potential to centre gender and social equity convincingly and integrally in climate action for those countries that have only made tentative steps in this direction.

GLOW's findings are also of immediate relevance and applicability to and the related UNFCCC workstream on the 'impact of the implementation response measures' (i.e. the effect of implementing climate change mitigation actions) on people's socioeconomic well-being. Beyond this, they are relevant to large cross-cutting areas of the Sustainable Development Goals and their targets.

A woman farmer tends to crops, Tanzania.
© Georgina Smith, CIAT

GLOW's research sends a clear and categorical message to these actors and processes that progress on gender equality and climate action go together. Action for gender equality, the climate, and society's response to climate risks and impacts must be intentionally designed and implemented in synergy.

The effectiveness and sustainability of climate action depends on empowering women in multiple dimensions. Progressing gender equality depends on enhancing women's resilience to climate and other shocks and stresses. Advancing gender equality calls for targeted and appropriate support to women to access the opportunities and benefits of economic transitions to net zero.

Many of the ingredients for women's economic empowerment in the context of low-carbon, climate-resilient transitions are well-established sustainable development principles recognised in Agenda 2030, although inconsistently applied. The key lesson for climate policy-makers, programme managers and implementers is that they cannot afford to overlook these fundamentals of fair, equitable and effective development in the climate arena:

- **Women need to be propelled into equal and meaningful roles in the decision-making and leadership** of climate initiatives, not merely take up roles as participants. Women's leadership makes a decisive contribution to the better quality and viability of climate initiatives.
- **Not only climate policies but relevant sectoral policies such as land restoration, environmental protection, agriculture, blue economy and tourism, should seek to empower women.** Gender equality legislation is incompletely integrated into many of the policies, strategies and investment vehicles through which low-carbon, climate-resilient actions are achieved in practice. Significant work is needed in some countries to align and integrate gender and social equity adequately in these sectoral instruments, as well as, naturally, to ensure their adequate enforcement and implementation.
- **Targeted operational measures are needed to create equitable benefits and outcomes for women.** The operational design and, critically, the budgeting of climate initiatives must include targeted support measures to enable women's participation and benefit on an equitable basis with men. Climate initiatives must also take an intersectional lens to analyse barriers for specific disadvantaged groups (such as women living with disabilities) and provide tailored, well-resourced interventions for their benefit.

The programme has also yielded further, novel insights, which merit particular attention for funding, testing, researching and learning in different contexts and to inform impact at scale:

- **Low-carbon, climate-resilient technologies and production models have the potential to relieve menial work typically undertaken by women in the natural resource sectors studied.** The research has highlighted how the introduction of low-carbon and climate-resilient technologies and production practices such as solar-powered irrigation (**Senegal, Guinea**)[150] and regenerative agriculture can (depending on the practice and the context, such as **Bolivia**)[151] stabilise production or support women's entry into higher-value activities while reducing the drudgery of underproductive manual labour and freeing time for other pursuits.
- **Land-sparing and regenerative modes of agriculture, aquaculture and forestry, enable women's economic empowerment.** There is potential for low-carbon, climate-resilient technologies to change entire production models to be lucrative and sustainable for women workers and entrepreneurs and to lighten their need for upfront assets such as land and finance, which women often lack disproportionately. An example is black soldier fly farming,

which has a small physical footprint but can turn organic waste into multiple eco-friendly, profit-generating composts and livestock feed.

- **Women's economic empowerment in low-carbon, climate-resilient transitions calls for several types of capacity strengthening for women – technical, financial and psychosocial.** Climate initiatives should target access for women, as well as men, to weather and climate information and skill-building in climate-related technology and practices. They also typically need to target women workers and entrepreneurs with financial literacy and business management skills (as relevant) to enable them to prosper in producing and marketing low-carbon, climate-resilient goods and services. Climate initiatives may consider varied, locally-appropriate measures to support women's confidence, as a way of addressing internal psychosocial barriers born of societal biases. They can equip women with advocacy and negotiation skills to be more effective climate leaders.
- **Appointing and encouraging gender champions, including allyship with men, is critical to climate initiatives that deliver for all of society.** Climate initiatives have a significant opportunity to nurture allies and champions for gender issues and the positioning of women as climate leaders. This report has outlined many forms of facilitated and deliberative dialogue at nested levels from household to community to national level to frame and enact these positive norms around the empowerment of women and disadvantaged social and socioeconomic groups. Such measures are typically overlooked in climate programmes but must be understood as an integral part of capacity strengthening and effectiveness.
- **Monitoring, evaluation and learning systems must account for the likelihood that women and diverse groups in society value a range of intangible as well as tangible benefits** arising from climate interventions. Tangible benefits include increased income and economic assets, and increased resilience such as the ability to anticipate, absorb and recover from climate or other shocks and stresses as measured by minimal interruption of production and consumption activities and related well-being. Intangible benefits include increased rest time and participation in valued social and cultural activities as a result of applying low-carbon and climate-smart measures.

Frontiers for new research

The GLOW programme has opened frontiers for new research, as follows:

The intersection of ecosystem integrity (including biodiversity), gender equality and climate action.

GLOW projects in **Bolivia**[152] (quinoa production by Indigenous women) and **Nepal** (women-led forest solutions) looked at the extent of and potential for agrobiodiversity[xi] as part of their baseline analyses. The Nepali project **Economic empowerment of women through forest solutions**[153] further worked with community forestry user groups and district authorities to extend local bylaws. The new bylaws provide for the monitoring and sustainable management of diverse tree species that women require for their non-timber forest product enterprises.

xi **agrobiodiversity:** the range of genetic resources for food and agriculture or 'biodiversity within agriculture systems' (FAO)

There is far greater potential for action research across diverse landscapes that frames, tests and draws conclusions on the simultaneous potential for women's economic empowerment, climate action and ecosystem and biodiversity restoration. This could look particularly at the restoration of species of conservation concern more broadly (such as beyond crops and livestock diversity to stabilising and restoring the far greater diversity of species in the surrounding biome, and the ecosystem services they deliver) and how this can happen outside nature conservation areas in productive landscapes.

Greater scientific and policy understanding is needed on how well-designed initiatives can target these intersections of climate, nature, and people and yield multiple benefits, which can be adequately measured over time – including through biodiversity monitoring.

Action research at this nexus would advance global assessments and future decision-making across the Global Biodiversity Framework (especially its Target 1: Plan and manage all areas to reduce biodiversity loss, and Target 2: Restore 30% of all degraded ecosystems), **Agenda 2030**[154] and the **Paris Agreement**.[155] What the Bolivia quinoa project and Nepal forest enterprise project have in common is that they are inspired and led by Indigenous women. It is already recognised in the work of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the IPCC that Indigenous-managed lands have greater biodiversity and ecosystem integrity. Research co-developed and co-documented with Indigenous communities on their knowledge and practice, and implications for policy, would be particularly valuable.

Characteristics of social protection delivery for the most marginalised women in the context of low-carbon, climate-resilient transitions.

The GLOW projects discovered a stratification among women in terms of their abilities to take up low-carbon, climate-resilient technologies, production systems and value chain activities. Even in those communities that seemed superficially to be relatively homogenous in terms of wealth levels or ethnicity, researchers found significant variety in women's participation.

There are further variables that intersect with gender and act as compounding barriers to entry into decent, low-carbon and climate-resilient livelihoods. While the GLOW research and this synthesis report highlight as much as possible the intersectional analysis undertaken in the 17 study locations, GLOW project teams universally highlighted that more research is needed. Of foremost concern is how women and female-headed households in extreme poverty – in destitution – can and should be supported to lead dignified lives that are climate-resilient and future-proofed (recognising that their emissions profile is essentially nil). Other avenues for enquiry raised in the GLOW research relate to how such intersecting factors as gender and marital status and age block or enable entry to low-carbon, climate-resilient livelihoods. There is a need to build on the World Bank's **Shock waves report and contributing papers (2015–16)**[156] on the interactions between climate change and poverty, to interrogate the relationships between climate, extreme poverty and green economic transitions from gendered and intersectional perspectives.

Further research should look deeper into what economic and sociocultural factors leave certain segments of the women's population behind in green transitions, and how social protection instruments and other targeted measures could include these diverse sub-groups of women more successfully. This could include the prospect of graduation into a more secure economic status and decent work that is low-carbon and climate-resilient (where their age, health, physical and psychological ability enables them to work).

Mapping and monitoring existing finance flows to locally-led women's climate initiatives and using this analysis to leverage and unlock further, appropriate flows.

The women-led initiatives described in the GLOW studies were financed from a combination of sources. Some of the activities received catalytic funding from Canada's International Development Research Centre (IDRC) via the GLOW action research projects themselves. Others were self-funded (as with the direct household purchases of solar power irrigation systems in Senegal) or subsidised or directly provided by publicly and philanthropically funded donor projects (again in Senegal). Some activities relied on village savings and loans association models, where participants pooled their own resources and defined their own rules.

There is significant demand in global and regional public policy forums and in the context of defining national climate plans and strategies, to understand the extent of needs for climate change mitigation and adaptation finance and cross-cutting finance (across mitigation and adaptation).

Public policy-makers and investors wish to know the quantum and quality of the supply and demand of climate finance (how much climate finance is flowing, from whom, to which countries, sectors, themes, activities and subgroups of the population, with what degree of concessionality[xii] and for what types of activities and timeframes). There is a years-long history of negotiation and analysis in the UNFCCC and its constituted bodies, such as the Standing Committee on Finance and its Biennial Assessments of climate finance and Determination of the needs of developing country Parties assessments, to better map and monitor this complex landscape.

The methodologies for tracking the climate finance flows and ascertaining the match of supply to demand are being developed iteratively but are still widely viewed as insufficient. There is a strong need for more bottom-up research and pilot testing from the perspective of women-led, local climate initiatives to define needs and develop more people-centred methods for measuring and tracking the adequacy of external support. The conception and testing of new methods could be undertaken in diverse locations and eventually developed into a more widely used methodology, based on sampling, to inform national, regional and global understanding and investment.

xii **concessional:** finance that is provided as a grant or a low-interest loan; in contrast with loans that are non-concessional because they are at market rates.

Endnotes

1. Gutteres, A. (2020). *The impact of Covid-19 on women.* New York: Office of the United Nations Secretary General. https://www.unwomen.org/en/digital-library/publications/2020/04/policy-brief-the-impact-ofcovid-19-on-women
2. GLOW Programme (2021–24). *Gender Equality in a Low Carbon World (GLOW)*, an action research programme funded by the International Development Research Centre (IDRC), Canada. For more information, visit https://glowprogramme.org
3. IPCC (2022). Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf
4. UNFCCC. *Nationally Determined Contributions (NDCs)*. Bonn: UNFCCC. https://unfccc.int/NDCREG
5. IPCC (2023). Sections. In: *Climate Change 2023: Synthesis Report.* Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)] IPCC, Geneva, Switzerland, pp. 35–115 (Figure 2.5 in the original report), doi: 10.59327/IPCC/AR6-9789291691647. IPCC_AR6_SYR_LongerReport.pdf. https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_LongerReport.pdf
6. Ibid. (Figure 2.2 in original report).
7. IPCC (2022). Working Group II, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, Summary for Policy Makers, B.2.4. https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_SummaryForPolicymakers.pdf
8. Ibid.
9. United Nations Development Programme (2011). *Gender Inequality Index.* New York: UNDP. https://hdr.undp.org/data-center/thematic-composite-indices/gender-inequality-index#/indicies/GII
10. World Economic Forum (June 2024). *Global Gender Gap, Insight Report.* Geneva: WEF. https://www3.weforum.org/docs/WEF_GGGR_2024.pdf
11. Ibid.
12. Dupar, M. and Tan, E. (2023). *From low-carbon consumers to climate leaders: A review of women's roles in low-carbon economic transitions.* https://glowprogramme.org/resource/low-carbon-consumers-climate-leaders
13. Intellecap (August 2024). *Learning report.* Internal document, page 7.
14. Sumberg and Okali, 267–277, in Dupar, M. et al. (2021). *Resilient generation: supporting young people's prospects for decent work in the drylands of east and west Africa*, page 6. London: Supporting Pastoralism and Agriculture in Recurrent and Protracted Crises (SPARC). https://www.sparc-knowledge.org/publications-resources/report-resilient-generation-supporting-young-peoples-prospects-decent-work
15. International Labour Organization (2024). *Decent work.* Geneva: ILO. https://www.ilo.org/topics/decent-work

16. United Nations (2015). *Sustainable Development* Goals. New York: United Nations. https://sdgs.un.org/goals
17. Dupar, M. and Tan, E. (2023). *From low-carbon consumers to climate leaders: A review of women's roles in low-carbon economic transitions.* https://glowprogramme.org/resource/low-carbon-consumers-climate-leaders
18. IPCC (2021) Annex VII: Glossary [Matthews, J.B.R., V. Möller, R. van Diemen, J.S. Fuglestvedt, V. Masson-Delmotte, C. Méndez, S. Semenov, A. Reisinger (eds.)]. In *Climate Change 2021: The Physical Science Basis.* Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 2215–2256, doi:10.1017/9781009157896.022. https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_AnnexVII.pdf
19. United Nations Environment Programme (2022). Global Biodiversity Framework. Nairobi: UNEP. https://www.cbd.int/gbf
20. Amar Gokhale, Partner, Intellecap, *Sankalp Investment Forum* (2023). page 27. https://www.sankalpforum.com/wp-content/uploads/2023/12/Sankalp-Global-Summit-2023-Report.pdf
21. Global Center on Adaptation and Climate and Development Knowledge Network (2023). *Stories of resilience: locally led adaptation in practice*. Rotterdam and Cape Town: GCA and CDKN. https://cdkn.org/resource/stories-resilience-lessons-local-adaptation-practice
22. UNFCCC-KCI. 2024. *Impacts of the implementation of response measures on intergenerational equity, gender, local communities, Indigenous Peoples, youth and people in other vulnerable situations*, page 7. Bonn: UNFCCC. https://unfccc.int/documents/638245
23. Dupar, M. and Tan, E. (2023). *From low-carbon consumers to climate leaders: A review of women's roles in low-carbon economic transitions.* https://glowprogramme.org/resource/low-carbon-consumers-climate-leaders
24. UNFCCC-Katowice Committee of Experts on the Impacts of the Implementation of Response Measures (KCI). 2024. *Impacts of the implementation of response measures on intergenerational equity, gender, local communities, Indigenous Peoples, youth and people in other vulnerable situations*, page 7. Bonn: UNFCCC. https://unfccc.int/documents/638245
25. Dupar, M. and Tan, E. (2023). *From low-carbon consumers to climate leaders: A review of women's roles in low-carbon economic transitions.* https://glowprogramme.org/resource/low-carbon-consumers-climate-leaders
26. UNFCCC. *Just Transition Work Programme*. https://unfccc.int/topics/just-transition/united-arab-emirates-just-transition-work-programme
27. UNFCCC (2023). *Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on its fourth session, held in Sharm el-Sheikh from 6 to 20 November 2022.* Addendum. Part two: Action taken by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement at its fourth session. https://unfccc.int/documents/626569
28. UNFCCC. *Just Transition Work Programme*, as referred to in Decision 1/CMA.4, paragraphs 50–52. https://unfccc.int/documents/626569
29. Ibid., paragraph 85. https://unfccc.int/documents/626569
30. GLOW programme. Figure created for this report.
31. Government of Bolivia (2009). *Bolivia Constitution*. La Paz: Government of Bolivia. https://www.constituteproject.org/constitution/Bolivia_2009.pdf

32. GLOW project. *Creating Indigenous women's green jobs under low-carbon Covid-19 response and recovery in the Bolivian quinoa sector.* https://glowprogramme.org/project/creating-indigenous-womens-green-jobs-under-low-carbon-covid-19-response-and-recovery. See also the INESAD publications hub, https://www.inesad.edu.bo/empleos-verdes-y-agricultura-sostenible (in Spanish with some English translations).
33. African Forest Landscape Restoration Initiative (AFR100). https://afr100.org/
34. GLOW project. *Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon.* https://glowprogramme.org/project/land-restoration-post-covid-rural-and-indigenous-womens-empowerment-and-poverty-reduction
35. Tall et al. (2024). *Syntheses des Resultats.* Internal document. Dakar: IPAR Senegal.
36. GLOW project. *Energy transition for the economic empowerment of women through the horticultural value chain in a post-Covid context in Guinea and Senegal.* https://glowprogramme.org/project/energy-transition-economic-empowerment-women-through-horticultural-value-chain-post-covid
37. GLOW project. *Empowering women in agricultural value chains for a low-carbon transition in Central America.* https://glowprogramme.org/project/empowering-women-agricultural-value-chains-low-carbon-transition-central-america
38. GLOW project. *Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER).* https://glowprogramme.org/project/prioritising-options-womens-empowerment-and-resilience-food-tree-value-chains-malawi
39. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
40. ASEAN. *ASEAN Comprehensive Recovery Framework Implementation Plan*. https://asean.org/book/asean-comprehensive-recovery-framework-implementation-plan/
41. GLOW Project. *ASEAN green recovery through equity and empowerment (AGREE).* https://glowprogramme.org/project/asean-green-recovery-through-equity-and-empowerment
42. Government of Nepal (2020). *Nepal's Second Nationally Determined Contributions.* Kathmandu: Government of Nepal. https://unfccc.int/documents/497812
43. Forest Action Nepal project. *Economic empowerment of women through forest solutions.* https://glowprogramme.org/project/economic-empowerment-women-through-forest-solutions
44. CREW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
45. Government of Kenya (2007). *Kenya Vision 2030*. https://vision2030.go.ke/wp-content/uploads/2018/05/Vision-2030-Popular-Version.pdf
46. GLOW project. *Aquaculture of seaweeds and fish: Opportunities for blue economic empowerment and Covid-19 resilience in Kenya.* https://glowprogramme.org/project/aquaculture-seaweeds-and-fish-opportunities-blue-economic-empowerment-and-covid-19
47. Blue Empowerment Project. https://blueeconomy.acts-net.org/
48. GLOW project. *Tourism as an engine of gender-inclusive and sustainable development in Bolivia.* https://glowprogramme.org/project/tourism-engine-gender-inclusive-and-sustainable-development-bolivia
49. ORBITA – Sustainable Tourism Observatory, Bolivia. url: https://orbita.bo
50. International Labour Organization (2020). *Report on employment in Africa (Re-Africa) – tackling the youth employment challenge.* Geneva: ILO. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/@africa/@ro-abidjan/documents/publication/wcms_753300.pdf

51. FAO (2011). *Closing the gender gap in agriculture*. Rome: Food and Agriculture Organization. https://www.fao.org/newsroom/detail/Closing-the-gender-gap-in-agriculture/
52. World Economic Forum (2022). *What is regenerative agriculture?* Rome: WEF. https://www.weforum.org/agenda/2022/10/what-is-regenerative-agriculture/
53. Paes et al. (2019). *Organic solid waste management in a circular economy perspective – A systematic review and SWOT analysis.* ScienceDirect. https://www.sciencedirect.com/science/article/abs/pii/S0959652619329567
54. GLOW project. *Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities.* https://glowprogramme.org/project/reorienting-private-sector-enable-climate-smart-agricultural-solutions-address-gender
55. *Por qué y para qué del enfoque de género en el turismo?* Referenced in SDSN and Fundacion IES (April 2024). *Final report*. Internal document, page 7.
56. Achieng, G. et al. (2024). *Blue Empowerment Info Brief*, page 2. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Understanding-IMTA-Systems.pdf
57. GLOW Project. *ASEAN green recovery through equity and empowerment (AGREE).* https://glowprogramme.org/project/asean-green-recovery-through-equity-and-empowerment
58. PPSA and GrowAsia (2022). *Gendered barriers and parallel realities: gender and climate action research on Corn Value Chain in Bukidnon and Maguindanao, Philippines*. https://www.growasia.org/_files/ugd/80c4d8_3f867a87bfb34c18af1c3065b90996ab.pdf
59. Forest Action Nepal project. *Economic empowerment of women through forest solutions.* https://glowprogramme.org/project/economic-empowerment-women-through-forest-solutions
60. GLOW Programme. Figure created for this report.
61. Government of Kenya (2010). Constitution of Kenya 2010, article 27. https://kmpdc.go.ke/resources/Constitution_of_Kenya_2010.pdf
62. GrowAsia (2023). *Women as champions of climate action in Southeast Asia.* https://www.growasia.org/_files/ugd/80c4d8_4e882364f5584332bb837024f9eac86a.pdf
63. GLOW Project. *ASEAN green recovery through equity and empowerment (AGREE).* https://glowprogramme.org/project/asean-green-recovery-through-equity-and-empowerment
64. GrowAsia (2023). *Women as Champions of Climate Action in Southeast Asia.* https://www.growasia.org/_files/ugd/80c4d8_4e882364f5584332bb837024f9eac86a.pdf
65. Dupar et al. (2019). *Communicating climate change.* Cape Town: Climate and Development Knowledge Network. https://cdkn.org/sites/default/files/files/CDKN-Communicating-Climate-Change-guide-2019-revised-version.pdf
66. GLOW project. *Empowering women in agricultural value chains for a low-carbon transition in Central America.* https://glowprogramme.org/project/empowering-women-agricultural-value-chains-low-carbon-transition-central-america
67. Iniciatieva IXCHEL. https://fusades.org/contenido/serie-de-webinars-iniciativa-ixchel
68. Achieng, G. et al. (2024). *Blue Empowerment Info Brief*, page 2.
69. SDSN and Fundacion IES (April 2024). *Final report*. Internal document, page 4.
70. FUSADES, ASÍES and Corewoman (February 2024). *Technical report*. Internal document, section 3.1.
71. Naila Kabeer (1996). *Gender Analysis Framework.* https://www.ids.ac.uk/download.php?file=files/Dp357.pdf
72. Ibid.
73. Susana Martinez, Restrepo (April 2022). Presentation to GLOW.
74. GLOW project. *Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon.* https://glowprogramme.org/project/land-restoration-post-covid-rural-and-indigenous-womens-empowerment-and-poverty-reduction

75. Centre d'Appui aux Femmes Et aux Ruraux Yaoundé, Cameroun; in collaboration with World Agroforestry (ICRAF) and Actions pour la Biodiversité et Gestion des Terroirs (ABIOGeT) (December 2023). *Interim technical report. I*nternal document.
76. GLOW project. *Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)*. https://glowprogramme.org/project/prioritising-options-womens-empowerment-and-resilience-food-tree-value-chains-malawi
77. Muriel, B. and Romero, D. (2024). *Engaging gender equality in the economic-productive sphere*. Institute for Advanced Development Studies (INESAD). https://www.inesad.edu.bo/en/2024/01/26/engaging-gender-equality-in-the-economic-productive-sphere
78. GLOW project. *Creating Indigenous women's green jobs under low-carbon Covid-19 response and recovery in the Bolivian quinoa sector.* https://glowprogramme.org/project/creating-indigenous-womens-green-jobs-under-low-carbon-covid-19-response-and-recovery
79. GLOW project. *Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)*. Internal document. https://glowprogramme.org/project/prioritising-options-womens-empowerment-and-resilience-food-tree-value-chains-malawi
80. *POWER Gender Transformative Intervention Report (*March 2024). Internal document.
81. Kampanje et al. (2024). *POWER Household Approach Training Manual. I*nternal document; page ix.
82. Ibid.
83. Ibid., page xii.
84. *POWER Gender Transformative Intervention Report. (*March 2024). Internal document, page 16.
85. Intellecap (2024). *Case study: Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities.* https://glowprogramme.org/project/reorienting-private-sector-enable-climate-smart-agricultural-solutions-address-gender
86. Ibid.
87. Kampanje et al. (2022). *Gender assessment study for improved fruit tree and macadamia nuts value chain in Mzimba and Kasungu districts of Malawi*, page 4. https://glowprogramme.org/resource/gender-assessment-study-improved-fruit-tree-and-macademia-nuts-value-chains-mzimba-and
88. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
89. *Les femmes de l'Union maraichère de Tangama*, referenced in IPAR Senegal (2024). *Syntheses des Resultats*. Internal document. Dakar: IPAR Senegal.
90. *Fédération des paysans du Fouta Djallon*, referenced in IPAR Senegal (2024). *Syntheses des Resultats*. Internal document. Dakar: IPAR Senegal.
91. IPAR and CECI (July 2024). *Results synthesis report*. Internal document.
92. *La transition énergétique pour l'autonomisation économique des femmes à travers (...) – Ipar, initiative prospective agricole et rurale*. https://ipar.sn/La-transition-energetique-pour-l-autonomisation-economique-des-femmes-a-travers-2280.html?lang=fr
93. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
94. SIAS (May 2023). Interim technical report. Internal document, page 10.
95. GLOW project. *Reorienting the private sector to enable climate-smart agricultural solutions to address gender inequalities.* https://glowprogramme.org/project/reorienting-private-sector-enable-climate-smart-agricultural-solutions-address-gender
96. Intellecap (August 2024). Learning report. Internal document, page 14.
97. Ibid., section 6 (Recommendations for the ecosystem).

98. IPAR and CECI (July 2024). Results synthesis report. Internal document.
99. Ibid.
100. Kampanje et al. (2022). *Gender assessment study for improved fruit tree and macadamia nuts value chain in Mzimba and Kasungu districts of Malawi*; page 4. https://glowprogramme.org/resource/gender-assessment-study-improved-fruit-tree-and-macademia-nuts-value-chains-mzimba-and
101. Ibid., page 9.
102. GrowAsia (2023). *Women as champions of climate action in Southeast Asia*, page 15. https://www.growasia.org/_files/ugd/80c4d8_4e882364f5584332bb837024f9eac86a.pdf
103. Ibid., page 7.
104. Ibid.
105. Intellecap (2024). *Learning Report*. Internal document.
106. Ibid., page 14.
107. CREW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
108. Smart Krishi. https://www.smartkrishi.org/
109. Mainali S. et al. (2024) *Bridging the digi-tech gap for female farmers in rural Nepal.* Kathmandu: SIAS. https://glowprogramme.org/news-blogs/bridging-digi-tech-gap-female-farmers-rural-nepal
110. GLOW project. *Empowering women in agricultural value chains for a low-carbon transition in Central America.* https://glowprogramme.org/project/empowering-women-agricultural-value-chains-low-carbon-transition-central-america
111. FUSADES, ASÍES and CoreWoman (February 2024). *Interim technical report*. Internal document, section 3.1.
112. Ibid.
113. Margarita Beneke in CDKN COP28 video.
114. FUSADES, ASÍES and CoreWoman (February 2024). *Interim technical report*. Internal document, section 3.1.
115. Wilbur, J., Kayastha, S., Mahon, T. *et al. Qualitative study exploring the barriers to menstrual hygiene management faced by adolescents and young people with a disability, and their carers in the Kavrepalanchok district*, Nepal. *BMC Public Health* 21, 476 (2021). https://doi.org/10.1186/s12889-021-10439-y
116. Achieng, G. et al. (2024). Blue Empowerment Info Brief. https://blueeconomy.acts-net.org/images/publications/Info_Briefs/Understanding-IMTA-Systems.pdf
117. Ibid.
118. GLOW project. *Empowering women in agricultural value chains for a low-carbon transition in Central America.* https://glowprogramme.org/project/empowering-women-agricultural-value-chains-low-carbon-transition-central-america
119. FUSADES, ASÍES and CoreWoman (February 2024). *Interim technical report.* Internal document, section 4.3.2.
120. Dupar, M. and Tan, E. (2023). *From low-carbon consumers to climate leaders: A review of women's roles in low-carbon economic transitions.* https://glowprogramme.org/resource/low-carbon-consumers-climate-leaders
121. GLOW project. *Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon.* https://glowprogramme.org/project/land-restoration-post-covid-rural-and-indigenous-womens-empowerment-and-poverty-reduction
122. Degrand et al. (2024). *Constraints and opportunities to the participation of women and minorities in land restoration in Cameroon.* https://www.cifor-icraf.org/knowledge/publication/18738/

123. Government of Kenya, *Sector Plan for Blue Economy 2018–22*. https://www.planning.go.ke/wp-content/uploads/2020/11/SECTOR-PLAN-FOR-BLUE-ECONOMY-2018-2022.pdf
124. GLOW project. *Land restoration for post-Covid rural and indigenous women's empowerment and poverty reduction in Cameroon*. https://glowprogramme.org/project/land-restoration-post-covid-rural-and-indigenous-womens-empowerment-and-poverty-reduction
125. CAFER, ICRAF and ABIOGet (December 2023). *Interim technical report*. Internal document, section 3.1.4.
126. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
127. ORBITA – Sustainable Tourism Observatory, Bolivia. url: https://orbita.bo
128. GLOW project. *Tourism as an engine of gender-inclusive and sustainable development in Bolivia.* https://glowprogramme.org/project/tourism-engine-gender-inclusive-and-sustainable-development-bolivia
129. https://sdsnbolivia.org/turismo-con-proposito/
130. Universidad Privada Boliviana (UPB). https://www.upb.edu/
131. SDSN and Fundacion IES (April 2024). *Final report*. Internal document.
132. Ibid., page 5.
133. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal*. https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
134. SIAS et al. (May 2023). *Interim technical report*. Internal document, page 3.
135. CREW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal.* https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
136. GLOW project. *Prioritising options for women's empowerment and resilience in food tree value chains in Malawi (POWER)*. https://glowprogramme.org/project/prioritising-options-womens-empowerment-and-resilience-food-tree-value-chains-malawi
137. Kampanje et al. (2022). *Intrernal document.*
138. POWER project (2024). *Gender transformative intervention report*. Internal project document, page 11.
139. Ibid., page 15.
140. CPSA and GrowAsia (2023). *Gender and climate responsive analysis of vegetable value chains in Cambodia*, page 8.
141. Ibid., page 14.
142. PPSA and GrowAsia (2022). *Gendered barriers and parallel realities: gender and climate action research on Corn Value Chain in Bukidnon and Maguindanao, Philippines*. https://www.growasia.org/_files/ugd/80c4d8_3f867a87bfb34c18af1c3065b90996ab.pdf
143. Catalytic Climate Finance Facility (August 2024). *Blended finance and the gender-energy nexus: a stocktaking report.* https://www.ccfacility.org/learning-hub/blended-finance-gender-energy-nexus-report
144. GLOW project. *Co-producing a shock-resilient business ecosystem for women-led enterprises in Nepal*. https://glowprogramme.org/project/co-producing-shock-resilient-business-ecosystem-women-led-enterprises-nepal
145. Intellecap (August 2024). *Learning report*. Internal document, page 11.
146. Intellecap and IDRC (2023). *Summary of the 'Changing the narrative of care work' session at Sankalp 2023 Proceedings*, page 26.

147. GLOW project. *Energy transition for the economic empowerment of women through the horticultural value chain in a post-Covid context in Guinea and Senegal.* https://glowprogramme.org/project/energy-transition-economic-empowerment-women-through-horticultural-value-chain-post-covid
148. IPAR and CECI (July 2024). *Results synthesis report*. Internal document.
149. UNFCCC. *Nationally Determined Contributions (NDCs) Version 3.0*. Bonn: UNFCCC. https://unfccc.int/ndc-3.0
150. GLOW project. *Energy transition for the economic empowerment of women through the horticultural value chain in a post-Covid context in Guinea and Senegal.* https://glowprogramme.org/project/energy-transition-economic-empowerment-women-through-horticultural-value-chain-post-covid
151. GLOW project. *Creating Indigenous women's green jobs under low-carbon Covid-19 response and recovery in the Bolivian quinoa sector.* https://glowprogramme.org/project/creating-indigenous-womens-green-jobs-under-low-carbon-covid-19-response-and-recovery
152. Ibid.
153. Forest Action Nepal project. *Economic empowerment of women through forest solutions.* https://glowprogramme.org/project/economic-empowerment-women-through-forest-solutions
154. United Nations (2015). *Sustainable Development* Goals. New York: United Nations. https://sdgs.un.org/goals
155. UNFCCC. *Paris Agreement*. Bonn: UNFCCC. https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf
156. Bangalore, Mukund Ram; Hallegatte,Stephane; Bangalore, Mook; Bonzanigo, Laura; Fay, Marianne; Kane, Tamaro; Narloch, Ulf Gerrit; Rozenberg, Julie; Treguer, David Olivier; Vogt-Schilb, Adrien Camille. *Shock waves: managing the impacts of climate change on poverty (English)*. Climate Change and Development Washington, DC: World Bank Group. http://documents.worldbank.org/curated/en/260011486755946625/Shock-waves-managing-the-impacts-of-climate-change-on-poverty

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