Report

South Africa's Green Edge: Women's employment *and* leadership *in* a sustainable economy

June 2026

IN PARTNERSHIP WITH:

CIF

IFC International Finance Corporation
WORLD BANK GROUP

About IFC

IFC — a member of the World Bank Group — is the largest global development institution focused on the private sector in emerging markets. We work in more than 100 countries, using our capital, expertise, and influence to create markets and opportunities in developing countries. In fiscal year 2025, IFC committed a record $71.7 billion to private companies and financial institutions in developing countries, leveraging private sector solutions and mobilizing private capital to create a world free of poverty on a livable planet. For more information, visit www.ifc.org.

2121 Pennsylvania Avenue, N.W.
Washington, D.C. 20433
Internet: www.ifc.org

Acknowledgments

This publication was produced by the World Bank Group's Gender Department. It was led by Operations Officer, Franziska Deininger, and Consultant, Laura Pérez Castro, under the guidance of Manager, Amy Luinstra and Senior Investment Officer, Marieme Niang Ep Camara, along with Global Director, Robin Mearns.

The report was made possible with the generous contribution of the Climate Investment Funds' Women-Led Coal Transitions grant mechanism, as part of the Accelerated Coal Transitions program.

The analysis was conducted by Kirsten Newitt, Sam Kelly, Alice Berkeley, Jakob Kessel, and Frances Burnley from Ergon Associates, in collaboration with Caroline Solik from Mthente Research and Consulting Services.

The authors are grateful for valuable insights from key informants in South Africa, including those from Phatisa, AgDevCo, United Exports, Westfalia Fruit, SOLA, Old Mutual Alternative Investments, Inspired Evolution, Women in Green Hydrogen/GIZ, HDF Energy, HySA Infrastructure, the Just Energy Transition Project Management Unit, and the Presidential Climate Commission.

The authors are also grateful to the following World Bank Group colleagues for their support, review, and inputs: Social Development Specialist, Lauren Pyres; Consultant, Global Manufacturing, Agribusiness and Forestry, Sara Seavey; Consultant, Global Energy & Mining, Inka Ivette Schomer; Operations Officer, Manufacturing, Agribusiness and Forestry Africa, Esther Rojas-Garcia; Consultant, Global Manufacturing, Agribusiness and Forestry, Lydia Ndunge Mueni Mbevi; Principal Industry Specialist, Climate Strategy & Business Development, Peter Mockel; Operations Officer, Gender and Economic Inclusion, Wendy Okolo; and Senior Social Development Specialists, Samaneh Hemat and Bandita Sijapati. The authors also thank peer reviewers Amy Cuff from AgDevCo, Tania Swanepoel from Old Mutual Alternative Investments, and Susan Byakika from Deutsche Gesellschaft für Internationale Zusammenarbeit/Women in Green Hydrogen South Africa.

The team would also like to thank Gina Wilkinson for editing this report and Beatriz Calvo Garro for graphic design.

Contents

List of Tables, Figures, and Boxes


Photo: © Arne Hoel / World Bank

Executive Summary

South Africa is highly vulnerable to the impacts of climate change, with droughts, floods, and other extreme weather events affecting a wide range of businesses—and the jobs and livelihoods they support. South Africa is also a leading global emitter of greenhouse gases. This is largely due to an energy mix that relies heavily on coal, with limited, but growing, use of renewable energy. In response, the government has positioned climate change adaptation and mitigation at the center of its economic development strategy, including ambitious energy decarbonization goals.

The green transition presents challenges for businesses in the energy sector and beyond, but it also offers great opportunities for private sector investment, innovation, and job creation. South Africa's shift to a low-carbon and climate-resilient economy will reshape the labor market, and this will impact men and women differently. Job losses are expected in carbon-heavy sectors like coal, where men dominate, but women workers and small business owners tied to these industries will also be impacted. On the other hand, climate-smart industries will offer new opportunities for workers with vocational and science, technology, engineering, and mathematics (STEM) skills, but women remain underrepresented in technical positions. Without targeted action they risk being left behind in the green transition, with women of color in particular facing entrenched barriers to accessing skilled higher-paying roles. A deeper, more inclusive talent pool would help businesses access the skills they need to adopt more sustainable practices.

The study provides new indicative data and insights on current and future green job opportunities for women in South Africa in three priority sectors: solar energy, green hydrogen, and fresh fruit production. These findings are based on a survey of 87 companies, supplemented by interviews with investors, corporate leaders, policymakers, and other experts.

While the results offer useful sector-specific perspectives, they are not fully representative of the national workforce and should be interpreted as illustrative.

Cross-sectoral findings

Many of the surveyed companies are missing out on the benefits of diverse senior leadership. Women's representation on boards is low across all sectors, even though key informants noted that the presence of women in leadership positions improves decision-making and innovation, particularly for companies managing new climate-related challenges. Barriers to strengthening women's leadership include an underdeveloped pipeline of women with STEM and technical skills, and limited family-friendly arrangements that support women with care responsibilities. Male-dominated leadership teams and culture may also deter some women from these roles.

Patterns in women's employment vary considerably between the selected sectors, but women are typically underrepresented in higher-skilled jobs, especially in technical and STEM roles. For instance, women make up the majority of the fresh fruit workforce, but they are concentrated in low-skill and low-paying jobs. In the fast-growing solar sector, women are underrepresented in all occupational categories. Across all three sectors, men outnumber women in both high-skilled STEM positions essential to the green transition, including specialist engineering roles and medium-skilled technical roles, such as technicians or skilled agricultural workers. Addressing these gaps can create a pipeline of skilled workers to meet evolving business needs.

Companies have different levels of commitment to equal opportunity policies and initiatives. Most companies surveyed for this diagnostic have policies in place to prevent and address workplace harassment, and they offer parental leave that goes beyond statutory requirements. However, meaningful support for women's career advancement, employer-supported childcare, and family-friendly policies are more limited. Similarly, most companies have a focus on gender as part of their employment equity policies, including those aligned with South Africa's Broad-based Black Economic Empowerment (B-BBEE) framework. However, this doesn't automatically address specific barriers to women's employment and career advancement.

Gender and climate initiatives are typically isolated in 'silos.' Key informant interviews indicated that companies have targeted strategies to address climate change and gender equality and inclusion, but these are not integrated. There is emerging interest in simultaneously advancing climate and gender equality objectives, however, investors and companies are often unsure where to start.

Table A: Insights from Surveyed Companies

	Fresh Fruit Production	Solar Energy	Green Hydrogen
Leadership	• Women hold 40 percent of senior management roles and 27 percent of board positions. • Barriers include entrenched gender stereotypes about women's suitability for senior positions and limited family-friendly arrangements. Only a third of companies offer leadership programs that include a focus on women.	• Women make up 45 percent of senior managers and 31 percent of board members, exceeding global averages. • Barriers include male-dominated leadership teams and women's under-representation in STEM roles. Some senior roles require relocation to remote areas, which may discourage women with care responsibilities.	• Most women are employed in junior and mid-level roles, with few represented in senior leadership positions. • Barriers include low numbers of experienced women in relevant STEM fields, negative perceptions about opportunities for women in the sector, and a lack of structured initiatives to support women's career growth, such as leadership programs.
Employment	• Women make up 60 percent of year-round workers and 62 percent of seasonal workers but are concentrated in lower-skilled and low-paying jobs. Seasonal workers are particularly vulnerable to job losses arising from climate shocks, given limited alternative job opportunities in rural areas. • High levels of gender-based occupational segregation exist across both technical and lower-skilled seasonal roles.	• Women make up 33 percent of the workforce, slightly below global and regional averages. They are particularly under-represented in medium-skilled technical and operational roles, the largest job category in the sector. • Thirty-two percent of companies reported challenges in recruiting women. Lack of inclusive workplace policies and misperceptions about the nature of work were cited as key barriers.	• Women are underrepresented, particularly in technical roles. Given that the sector is in the early stages of development, women are more prominently represented in upstream areas of the value chain, such as public policy, consulting, and research and development. • Many traditional energy sector workers are pivoting into green hydrogen. As a result, green hydrogen is at risk of replicating broader patterns of gender-based occupational segregation.
Skills	• Women make up 30 percent of high-skilled STEM workers, compared to 52 percent of administrative roles. • Despite growing numbers of women in STEM education relevant to the agricultural sector, companies reported difficulties attracting female candidates into high-skilled STEM roles.	• Women are better represented in high-skilled STEM roles than the global average (39 percent versus 32 percent). However, competition between employers for female graduates is high. Qualified women are often recruited by international independent power producers that offer higher salaries. • As the sector expands and demand for STEM skills increases, low enrolment rates of women in tertiary-level STEM studies may lead to challenges in recruiting women.	• As the sector expands, demand will increase for highly skilled STEM roles. Women's low enrolment rates in engineering and other relevant tertiary studies pose a recruitment challenge. • Unconscious bias, limited support for care responsibilities, and the remote nature of work in green hydrogen projects are all cited as barriers to women's entry into the sector.

Photo: © Ray Witlin / World Bank

Call to Action

This diagnostic reveals that many of the most effective ways for companies to embed gender into climate action are shared across sectors. Key actions summarized below offer entry points for companies to build on and design their own programs. These can be customized to their sector, business priorities, and unique operational context. Sector-specific opportunities are also examined in the body of this report. It is important to note that initiatives are likely to achieve greater impact when they are based on consultation with diverse groups of employees, taking into account gender, race, and other characteristics.

Promote women's leadership and involvement in climate decision-making

Companies are missing out on the well-documented benefits of diverse leadership, including in strategic climate action. Companies across all sectors reported challenges in recruiting and retaining women in management roles. The following practical actions can promote women's leadership and involvement in climate governance:

- Create pathways to support women's career advancement at all levels of the company.
- Establish and communicate clear, unbiased promotion processes and criteria.
- Collect, analyze, and report on gender-disaggregated data to identify and close gaps in leadership.

Expand recruitment and retention of women

As South Africa's green transition accelerates, sectors such as agribusiness, solar energy, and green hydrogen will face increased competition for skilled workers. Women represent an underutilized pool of talent, and practical steps to expand their recruitment and retention include:

- Review and map workforce and skills data to identify and tackle gender gaps.
- Design recruitment processes and outreach strategies to proactively attract more women into roles where they are underrepresented.
- Provide upskilling, reskilling, and work-based learning opportunities for women, including through collaboration with government agencies and educational institutes.
- Support more stable incomes for workers affected by climate change, such as seasonal workers in fresh fruit production.

Build respectful and inclusive workplaces

Family-friendly, anti-harassment, and racial equality policies underpin stronger recruitment and retention outcomes, and they can also improve company culture. Most of the companies surveyed for this diagnostic had introduced at least some of these policies. However, there is scope to make them more inclusive, particularly in regard to employer-supported childcare and racial equality. Steps to build more respectful and inclusive workplaces include:

- Consult workers on childcare needs, and then put the most appropriate supports into place, such as flexible working arrangements, childcare subsidies, or on-site childcare.
- Consult diverse groups of women employees, including Black women, when developing policies that support gender inclusion.
- Ensure policies on gender-based violence and harassment in the workplace are implemented effectively through confidentiality protocols, support for survivors, and training for staff and managers.

Integrate gender in green transition strategies

A fragmented approach can dilute the effectiveness of gender and climate initiatives, leaving women disproportionately exposed to climate-related shocks. The following practical steps can help to address this challenge:

- Embed gender and inclusion into climate and sustainability goals, metrics, and reporting frameworks to ensure accountability and visibility.
- Incorporate gender perspectives into climate risk assessments and recognize how climate impacts differ across genders—especially where there is high female representation, such as seasonal and informal work.

Photo: © A'Melody Lee / World Bank

1. Introduction

Climate change poses significant challenges for South Africa, with droughts, floods, and other extreme weather events impacting businesses, along with the jobs and livelihoods they support. These risks are compounded by an energy mix still heavily dependent on coal, although South Africa's adoption of renewable energy is steadily increasing (World Bank Group 2022a). Recognizing these challenges, the government has made climate change adaptation and mitigation a priority in its economic development strategy, setting ambitious goals for energy decarbonization (Presidential Climate Commission 2023a). Beyond addressing climate risks, decarbonization is also a strategic necessity to resolve persistent energy shortages, reduce reliance on aging coal infrastructure, and strengthen the long-term reliability and competitiveness of South Africa's energy system (World Bank Group 2022a; Presidential Climate Commission 2023a).

Achieving these goals will require significant contributions from the private sector through investment, innovation, and job creation, presenting both challenges and opportunities for South African businesses. For example, companies that invest in research, technology, and skills development will be best placed to capitalize on new opportunities in sectors such as renewable energy, e-transport, and associated supply chains (Presidential Climate Commission 2023a). Companies in agribusiness will also need to invest in more resilient farming methods and technologies to adapt to more frequent and intense droughts, heat waves, and flooding (World Bank Group 2022a).

South Africa's labor market will also experience significant changes, and these will affect women and men in different ways. Job losses are expected in carbon-intensive industries, such as South Africa's coal sector, where men make up the majority of the workforce. However, women are also affected—both as workers in these sectors and through their employment and ownership of small businesses that provide services in coal-dependent communities.

At the same time, new jobs in renewable energy and other green sectors will demand upgraded skills, particularly in science, technology, engineering, and mathematics (STEM). Although many South African women are pursuing STEM careers, they remain underrepresented in some of the fields most relevant to the green transition, such as technical and engineering roles. Failure to address these skills gaps and other barriers means women could miss out on new green jobs, while companies may struggle to access the workers they need to drive this low-carbon transition.

Box 1: What is the Green Transition?

The 'green transition' is a shift towards a low-carbon, resource-efficient, and socially-inclusive economy, focused on sustainable practices that promote growth, protect the environment, and address risks from climate change. The transition must be just, support workers and communities affected by this process, and ensure that benefits are shared equitably.

The green transition includes actions to mitigate and to adapt to climate change. Mitigation aims to reduce greenhouse gas emissions and invest in energy sources with smaller carbon footprints. Adaptation seeks to reduce the risks or vulnerabilities posed by climate change and increase resilience to its impacts.

Unlocking South Africa's full potential requires the participation of all members of society. However, the legacy of Apartheid continues to impact employment, land ownership, and access to education and economic opportunities. These systemic barriers disproportionately affect Black women, limiting their access to the resources, networks, and decision-making structures needed to participate and lead in emerging sectors such as renewable energy and climate-smart agriculture.

This diagnostic aims to build the evidence base for the private sector to integrate a stronger gender focus into climate governance, strategies, and actions. It examines the participation and leadership of women in three sectors: solar energy, green hydrogen, and agribusiness—specifically fresh fruit production. The diagnostic focuses on these sectors because of their central role in South Africa's green transition, strong investment potential, and significant gender implications.

The fresh fruit sector, while highly vulnerable to climate change, sustains more than 329,000 direct jobs and over a million indirect livelihoods, and continued investment in climate-smart practices is critical for resilience and growth. Solar energy is essential to meeting South Africa's decarbonization targets and expanding electricity supply, with the potential to attract $12 billion in new investment and create up to 140,000 jobs by 2030. Green hydrogen, though still in its early stages, could reduce national emissions by 15 percent and generate up to 2.5 million jobs across the value chain by 2050, positioning South Africa as one of the lowest-cost producers globally. Together, these sectors present both opportunities and risks for women's economic participation, making them strategic priorities for assessing how gender inclusion can be advanced in the green economy.

This diagnostic draws from a survey of 87 companies with a total of 9,482 direct employees, as well as insights from key informant interviews with investors, corporate leaders, policymakers, and other industry experts. It also explores if, and how, companies are integrating gender equality with climate action and identifies examples of emerging good practice in South Africa. It should be noted that the surveyed companies responded to a public open call, and as such they are not a representative sample of businesses in the selected sectors. Their decision to participate in a survey of this nature suggests they are more likely to support the climate transition and efforts to advance gender equality. More details on the methodology are contained in the annex.

Section 2 of this report provides an overview of South Africa's climate challenges and priorities and explores the implications for the private sector. Section 3 presents the business case for integrating a gender lens into business strategies in the context of climate change and the green transition. Sections 4 to 6 are deep dives into the fresh fruit, solar energy, and green hydrogen sectors, examining women's current representation and opportunities in employment and leadership. Section 7 provides practical recommendations for companies to increase women's participation in employment and leadership and strengthen their businesses in the green transition.


Photo: © Arne Hoel / World Bank

2. South Africa's Green Priorities

Climate change impacts

The World Bank estimates that under a high-emission scenario, total macroeconomic damage from climate change could cost South Africa $82 billion between 2022 and 2050. This is equivalent to an average annual loss of 0.8 percent of gross domestic product and as much as 1.2 percent per year from 2040 to 2050 (World Bank Group 2022a). The impacts of climate change are already being felt. For example, droughts in the Western Cape from 2015 to 2018 resulted in the loss of over 20,000 agricultural jobs, while floods in KwaZulu-Natal in 2002 caused more than $942 million in damage and disrupted trade and infrastructure (World Bank Group 2022a). Key challenges include:

- **Rising temperatures:** Average temperatures in South Africa are rising at more than twice the global rate. Under a high-emissions scenario, temperatures could rise by 2°C by the 2050s, and up to 4.2°C by the 2090s. As much as 80 percent of total economic damage between 2022 and 2050 will be due to heat shocks, amounting to approximately $66 billion (World Bank Group 2022a). Heat stress and health-related absenteeism will reduce labor productivity, while businesses also face higher cooling and workplace safety costs (ILO 2024a).

- **Water scarcity:** With rising temperatures and declining rainfall, South Africa faces intense water stress. Aridity and drought risks are expected to increase by nearly 40 percent by the 2050s. This harms human wellbeing and drives up costs in sectors like agriculture and energy, where irrigation, cooling, and power generation depend on reliable water access (Government of South Africa 2020; World Bank Group 2022a).

- **Extreme weather:** Since 1980, South Africa has experienced 86 major weather-related disasters that affected more than 22 million people and caused over $6.2 billion in economic losses (Igamba 2023). Changes to global weather patterns are driving more frequent and severe droughts, floods, and heatwaves, which disrupt business operations, damage assets, reduce labor demand and incomes, and expose workers to greater health and safety risks. Extreme weather events can also damage roads, ports, and water and energy infrastructure, disrupting economic activity and global trade (Presidential Climate Commission 2023a).

- **Agricultural productivity and food security:** Shifting rainfall patterns, rising temperatures, and droughts reduce crop yields and livestock productivity, and threaten food security and rural employment. Exports like citrus and grapes are increasingly vulnerable, raising costs and undermining South African firms' competitiveness in global markets (World Bank Group 2022a; Government of South Africa 2020).

Climate change mitigation and decarbonization

South Africa is one of the world's top greenhouse gas emitters, with one of the lowest shares of renewable energy among G20 countries (World Bank Group 2022a). In 2022, 78 percent emissions came from the energy sector, largely due to coal-fired power that supplied 84 percent of the country's electricity needs (Department of Forestry, Fisheries and the Environment 2024a; International Energy Agency n.d.). Renewable energy made up just 8.4 percent of the energy mix. Wind power accounted for 42 percent of renewable energy production, hydro 31 percent, and solar 21 percent (International Energy Agency n.d.).

To reduce emissions, the government plans to add 26 gigawatts (GW) of renewable energy and natural gas capacity and to retire 10.5 GW of coal-based plants by 2030. However, progress on the latter has been slow due to concerns about the socioeconomic impact of transitioning away from coal, particularly for communities whose primary source of income and employment depends on the coal industry.

Beyond mitigation, the phasing-out of ageing coal-fired power infrastructure is also critical to strengthen South Africa's long-term energy security. For example, worsening water scarcity is constraining the operational capacity of coal plants and undermining grid stability (Presidential Climate Commission 2023a; World Bank Group 2022a; Government of South Africa 2020). With rising demand for power for climate adaptation measures such as cooling, the expansion of renewable energy offers companies the most cost-effective solution to rising electricity costs and frequent power outages.

The green transition will require an estimated $132 billion investment by 2050 to build resilience in sectors such as water, agriculture, and transport, and this offers opportunities for public and private financing (World Bank Group 2022a). South Africa has shown its ability to attract private financing—for example, the government's renewable energy auction system mobilized more than $13 billion between 2011 and 2022 (Presidential Climate Commission 2023a). However, renewable energy companies still face high upfront capital costs, critical skills gaps, and other challenges (Presidential Climate Commission 2023a; World Bank Group 2022a).

Table 1: Jobs and skills for South Africa's low carbon transition

Occupations in demand for the low carbon transition

Jobs related to renewable energy, such as solar energy and green hydrogen, as well as climate adaptation and green transition in the agribusiness sector are in high demand.

In the solar energy sector, these include energy engineer, energy efficiency technician, solar installer, energy engineering technologist, electrical engineer, electrical engineering technician, and chemical engineer. Financial advisors, policy and legal experts, project managers, investment advisors, environment and social experts, community engagement experts, health and safety experts will also be in high demand (World Bank Group 2022c).

For agribusiness, jobs in high demand include agricultural engineer, environmental engineer, mechanical engineer, civil engineer, mechanic, fitter, forklift driver, and seed processing machine operator.

Women's representation in education and training programs for high demand jobs

Engineering is a key field for the green transition but in 2016, women accounted for just 27 percent of students in university-level engineering programs. Women are better represented in other STEM fields, accounting for 51 percent of students in agriculture programs, 51 percent in physical sciences, and 56 percent in business, economics, and management studies.

In technical and vocational education and training (TVET), women make up the majority of vocational students across all program areas. At this level, women make up 45 percent of engineering and design students, 60 percent of students in electrical infrastructure construction, 52 percent in information technology, 70 percent in primary agriculture, 76 percent in processing plant operations, and 63 percent of students in farming management.

Demand will also increase for skills in project management, law, transport and logistics, and health and safety.

Sources: Department of Higher Education and Training, Statistics South Africa, and World Bank Group 2022c.


Photo: © Flore de Preneuf / World Bank

3. Why Inclusion is Important in the Green Transition

For companies responding to the challenges of climate change and the shift to a low-carbon and climate-resilient economy, advancing equal opportunities for women and men offers clear business benefits. These benefits fall into four main categories.

1. Stronger leadership, climate governance, and innovation

Evidence shows that more diverse leadership teams improve decision-making, foster innovation, and strengthen stakeholder engagement, and this is particularly relevant for South African companies grappling with the financial, technological, and regulatory challenges posed by climate change (IRENA 2019; IFC 2024). Women's presence on corporate boards is linked to stronger environmental performance and responsible business practices, and they bring greater focus to environmental, social, and governance issues, including climate and sustainability, than their male counterparts (IFC 2024; Strumskyte et al. 2022).

Women's leadership can also support decarbonization. A study of 2,000 companies found that for every 1 percentage point increase in the proportion of female managers within a firm, there was a 0.5 percent decrease in greenhouse gas emissions (Altunbas et al

2022). Key informants from the fruit production and solar energy sectors agreed that having women in leadership positions improved business decision-making, and noted that women leaders ask different questions and bring different personal and professional experiences to the table.

2. Greater access to skills

Increasing women's participation in employment can help companies secure critical skills for climate adaptation and the green transition. For example, the solar energy sector will require up to 84,000 new permanent jobs by 2050, and securing access to skilled workers will be a business imperative for firms to remain competitive (FSD Africa 2024). A range of skills will be in demand, particularly specialist vocational skills in technical fields and advanced STEM skills. An estimated 40 percent of new jobs in South Africa's solar sector will be in semi- and medium-skilled occupations related to construction and installation of solar infrastructure. A further 30 percent will be at the medium-skill level, such as technicians and other specialist vocational occupations related to the operation and maintenance of solar power facilities (FSD Africa 2024). However, these are fields in which women are often underrepresented (World Bank Group 2024; FSD Africa 2024). Equal opportunities and proactive outreach to women can deepen the talent pool and meet evolving skills needs.

3. A more resilient and productive workforce

Integrating gender equality into workforce policies helps companies retain skilled employees, improve productivity, and build operational resilience. In sectors like agribusiness, women seasonal workers are essential to harvest operations but often face job insecurity and limited advancement opportunities. Improving working conditions through stable contracts, off-season support, upskilling opportunities, and support for childcare and eldercare can help retain a skilled and reliable seasonal and permanent workforce (IFC 2017; IFC 2023). In traditionally male-dominated sectors like renewable energy, equal opportunity policies and family-friendly measures—such as childcare support and flexible work arrangements—can help companies attract and retain female talent.

4. Attract investment and deepen business relationships

Key informants in the fresh fruit sector report that a growing number of international buyers want producers to demonstrate effective environmental, social, and governance practices. Companies, particularly export-oriented firms, can meet global sustainability standards and secure preferred partner status with buyers by embedding gender inclusion principles and targets into their climate strategies.

Firms that show leadership in this area are also better positioned to access capital and concessional finance for the green transition. Major development banks, climate funds, and private investors now assess gender equality alongside climate action in their funding decisions. This is particularly the case among investors aligned with 2X Global, an organization that aims to increase investments that support women's leadership, economic participation, and gender equality in developed and emerging markets. Similarly, social inclusion and gender equality are clear objectives for government-backed investment schemes such as the Just Energy Transition Partnership and Green Hydrogen Commercialization Strategy. Businesses can also unlock incentives when they align strategies with national frameworks on inclusive growth that address both racial and gender inequalities. For an example, see Box 2.

Photo: © Curt Carnemark / World Bank

Box 2: Broad-Based Black Economic Empowerment

Broad-Based Black Economic Empowerment (B-BBEE) is a government policy to redress the legacy of apartheid by empowering previously disadvantaged groups to participate in the South African economy. Businesses are assessed using a scorecard for ownership, management control, skills development, enterprise and supplier development, and socio-economic development. Sector codes provide industry-specific guidelines for evaluating performance, including for the agriculture, construction and transport sectors.

Unlike state-owned and public entities, private companies are not required to comply with the B-BBEE Act. However, companies that participate, particularly those with higher scores, can gain business advantages, such as preferential treatment in government procurement and eligibility for certain licenses or contracts.

The diagnostic found that company interventions to expand economic opportunities for Black South Africans often include specific measures targeting women. In both the fruit production and solar energy sectors, initiatives supporting Black women entrepreneurs were more common than those promoting Black entrepreneurship in general. However, this focus on Black women is not as prevalent in leadership and employment initiatives, such as internships, scholarships, and networking programs.

Sources: B-BBEE Act (2003) and gazetted sector codes.


Photo: © Stephan Gladieu / World Bank

4. Fresh Fruit Production

Sector Snapshot

The fresh fruit sector provides critical employment for women in rural areas but faces severe climate risks that threaten jobs and productivity. Adopting sustainable practices can create new, higher-quality opportunities, but companies must pair this shift with inclusive recruitment and skills development to ensure women—who are underrepresented in STEM and technical roles—benefit from the green transition.

Women's Representation in the Fresh Fruit Production Sector in South Africa

Leadership

27%
of board members

40%
of senior managers

Employment

60%
of year-round employees

62%
of seasonal workers

Occupations

30%
of high-skilled STEM workers

58%
of high-skilled non-STEM workers

42%
of medium-skilled technical operational roles

52%
of administrative and support roles

Source: Survey of 39 companies that produce fresh fruit, supply agricultural inputs, provide professional/ technical services to the industry, and other activities, with a workforce of 7,438 year-round workers and 15,364 seasonal workers.

Industry and climate context

In 2024, South Africa's fresh fruit industry generated $4.9 billion in exports—or over one-third of total agricultural export value (National Agricultural Marketing Council 2024). It is also a key source of rural employment, providing as many as 330,000 on-farm jobs and supporting an additional 1.1 million indirect jobs in supply chains and services (Fruit SA 2023).

Like other agribusiness sub-sectors, fresh fruit production is highly vulnerable to the impacts of climate change. The combination of higher temperatures, seasonal variations, and lower precipitation has led to water scarcity, land degradation, and greater exposure to pests that affect crop yield and quality. With agriculture accounting for 57 percent of national water use, changing precipitation patterns are projected to reduce yields by up to 25 percent in vulnerable regions, including fruit-producing areas (World Bank Group 2022a). Extreme weather events such as droughts, storms, floods, and fires also threaten South Africa's agriculture by damaging crops, assets, and infrastructure like irrigation systems, storage facilities, roads, and ports (World Bank Group 2022a; Cramer and Chisoro-Dube 2021; Key informant interviews). For example, flooding in the Western Cape Province in 2023 caused over $61 million in direct damage to agricultural infrastructure and crops, along with losses from disruptions in logistics and operations (Western Cape Government 2023).

Adopting more sustainable farming practices, known as climate-smart agriculture, is critical for firms to maintain productivity (Department of Environment, Forestry and Fisheries 2020; Joseph et al. 2021; Kom, et. al. 2022). For example, improved cultivars, shade netting, crop diversification, and upgraded irrigation methods can help stabilize production and build resilience against climate impacts, while small-scale renewable energy applications and lower use of synthetic nitrogen fertilizers can reduce greenhouse gas emissions.[1] While leading producers are already investing in climate-smart agriculture, the upfront costs can be high. For example, country-wide upgrades to irrigation systems are expected to require more than $24 billion in investment by 2050, with companies expected to bear a significant share of these costs (World Bank Group 2022a). Initial costs to upgrade or replace cooling systems with low-emission technologies can also be expensive, but this can reduce energy costs and consumption in the long term.

Climate change is also increasing risks for agricultural workers, with lower yields, high temperatures, and climate-related disruptions negatively impacting incomes and working conditions (Key informant interviews, fruit sector; ILO 2024b). Limited access to protective gear or water and sanitation services in the workplace can exacerbate these risks. At the same time, the shift towards climate-smart agriculture is increasing demand for higher-skilled workers in occupations such as agricultural engineering, digital technologies, and machine maintenance and operation (Cramer and Chisoro-Dube 2021; Key informant interviews, fruit sector).

Historically, women are underrepresented in skilled agricultural and related occupations, and they risk missing out on new job opportunities too. In 2021, women made up the majority of students in South Africa's TVET agricultural programs, but in 2025 they held only 23 percent of skilled agricultural jobs (Department of Environment, Forestry, and Fisheries 2024b). Greater training has not translated into equal representation in the labor market, highlighting persistent barriers to women's advancement in the sector. Companies that adopt measures to protect the welfare and livelihoods of their existing workforce, alongside inclusive recruitment and skills strategies for new and emerging occupations, can advance gender equality across the sector and secure a resilient and productive workforce to meet evolving business needs.

[1] Net emissions from fruit cultivation are relatively low compared to other agricultural activities, although fruit production has been identified as an important a source of nitrous oxide emissions globally (Gu et al. 2019).

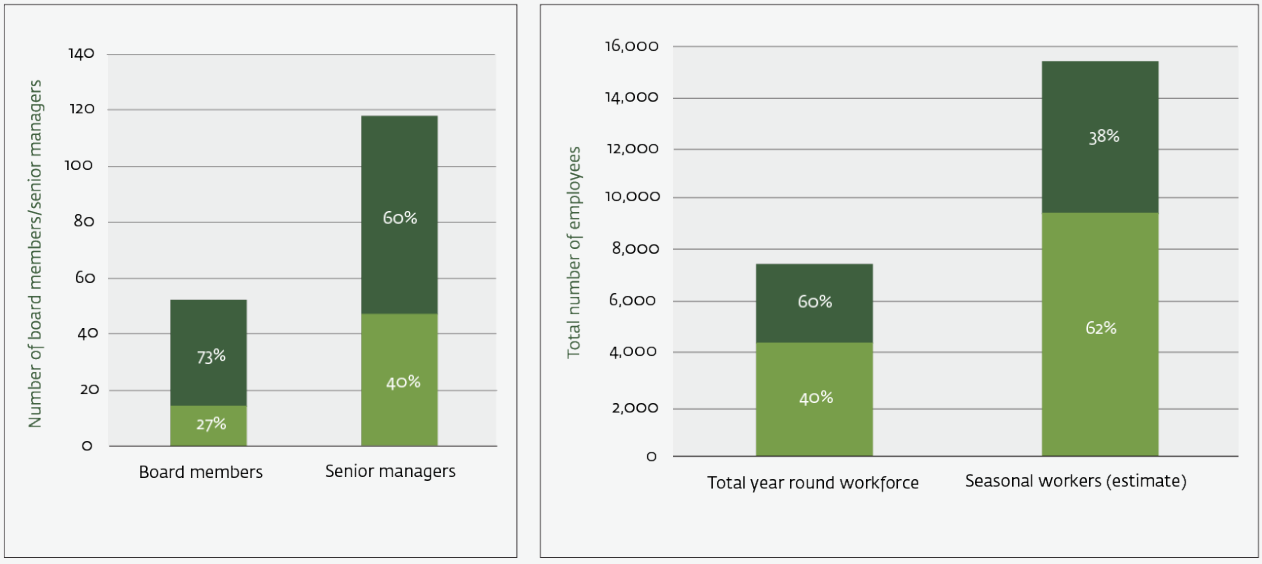
Leadership

Women are well-represented in senior management roles in the fresh fruit sector, with room for improvement at the board level where women hold only 27 percent of positions in surveyed fruit production companies. However, women account for 40 percent of senior management positions in the surveyed companies, compared to 19 percent of farm managers and 26 percent of supervisors in the wider agricultural sector, (Department of Statistics 2017) as shown in Figure 1.

Key informants identified barriers that limit women's advancement into leadership roles in the sector. For example, entrenched gender stereotypes can influence perceptions about women's suitability for senior positions, contributing to negative bias in hiring decisions. In addition, many women carry a larger share of unpaid care responsibilities, which can deter them from pursuing senior roles, particularly in companies without flexible working arrangements.

Women also tend to be underrepresented in technical positions that hold greater potential for promotion into middle and senior management roles. Findings from the company survey indicate that only a third of companies have mentoring, sponsorship, or leadership training programs with a focus on women. However, there are examples of good practice by companies such as Westfalia and United Exports, as shown in boxes 3 and 4.

Figure 1: Participation in leadership and employment in the fresh fruit sector, by sex



Source: Company survey. N=39


Photo: © Maria Fleischmann / World Bank

Box 3: United Exports puts a focus on climate action and gender equality

United Exports is a leading agricultural production and export company known for its high-quality blueberries and stone fruit. Women are central to the company's operations and long-term vision, making up 58 percent of the permanent workforce, and 75 percent when seasonal workers are included.

The company recognizes that advancing gender equality is not only a matter of fairness but also a strategic priority for sustainable growth. United Exports focuses on climate action, reducing gender inequalities, and preventing biodiversity loss as key impact areas. By integrating these priorities into its business model, United Exports is positioning itself as a forward-thinking leader in sustainable and inclusive agribusiness.

United Exports has been collaborating with IFC's Gender Equality and Returns (GEAR) Program to promote gender equality across its operations. This includes a four-month training course designed to advance women in their careers and accelerate their path into management roles. Since the partnership began, 34 women in junior and middle management positions, including supervisors, quality controllers, and human resources professionals, have completed the training.

The program has delivered encouraging outcomes for the women who took part. Participants reported noticeable improvements in their communication and management skills, with many taking on greater responsibilities or receiving promotions. Managers observed that 93 percent of the women demonstrated increased productivity, while 90 percent of participants felt more confident and better equipped to lead teams.

Recognizing the diversity of its workforce, United Exports is committed to supporting women at all levels of the organization. Most recently, the company has invested in basic literacy training for workers in lower-skilled roles, many of whom are women. Looking ahead, United Exports acknowledges that training programs will need to evolve in response to technological advancements. As innovations in real-time monitoring, management systems, and climate adaptation become more integral to the agricultural sector, the company is equipping its female workforce with the skills needed to thrive in a rapidly changing environment.

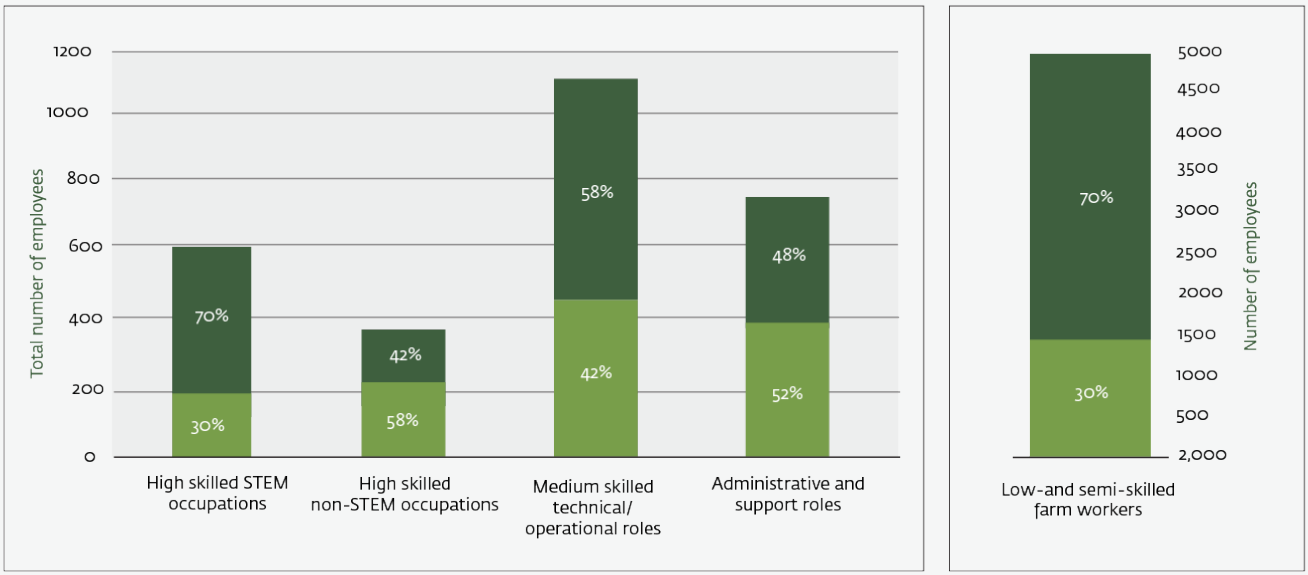
Sources: Rappai 2024; interview with United Exports.

Employment

This diagnostic found that women hold 60 percent of year-round jobs in fresh fruit production, which is notably higher than women's 32 percent share of total agricultural jobs (Statistics South Africa 2024).[2] However, according to the survey results, women occupy up 70 percent of low-paying, low- and semi-skilled farm positions, the largest occupational category in this sector. In contrast, women hold less than third of high-skilled STEM roles, including agronomists, geneticists, food scientists, and data scientists, and 42 percent of medium-skilled technical jobs, such as skilled farm workers, machine operators, and drivers. Women's presence is stronger in non-STEM roles, where they hold just over half of high-skilled positions in areas such as finance, law, marketing, and human resources.

Between 2023 and 2024, surveyed companies employed over 15,000 seasonal workers, 62 percent of whom were women. Seasonal workers and low-skilled farm workers employed year-round have little job security and few alternative income-generating opportunities in the local market, making them especially vulnerable to job losses arising from climate shocks and operational disruptions (Key informant interviews, fresh fruit production sector).

Figure 2: Employees in the fresh fruit sector across occupational groups, by sex



Source: Company survey. N=39 Women Men

[2] The survey did not collect data on race. However, approximately 90 percent of the wider agriculture workforce are Black Africans or people of color (Simbi and Aliber 2000).

Recruitment

Most companies did not report significant challenges in recruiting women and noted the high share of women in the sector's overall workforce. However, some cited barriers in attracting more women into STEM roles, including the low number of women applicants with relevant qualifications. Industry stakeholders also highlighted how the adoption of sustainable farming practices, including technology-driven production methods, is likely to increase demand for STEM skills, and that attracting more women to relevant careers is a priority for the sector (Key informant interviews, fresh fruit production sector).

However, companies noted broader challenges in attracting higher-skilled workers to the sector, including specific barriers to recruiting more women. They reported that many women and younger candidates, especially those with high-level qualifications, are deterred by perceptions that the sector involves physically-demanding work and offers poor and insecure returns. Concerns about personal safety and remote worksites, as well as the limited availability of affordable childcare options, are additional barriers to recruiting higher-skilled women, according to key informants in the fresh fruit production sector.

Box 4: Westfalia Fruit: Supporting women to take on technical roles

Westfalia Fruit is a leading multinational agricultural company that specializes in avocados and other agricultural produce. Westfalia's sustainability efforts are firmly rooted in the company's culture and operations, which began with conserving the land on which they farm. Today, their sustainability efforts extend to water management, solar energy investments, and addressing climate change risks in their operations. These approaches are regarded as critical to its survival and future profitability. Westfalia also has extensive engagements and commitments related to youth and women, for example:.

- **Workforce diversity:** Women constitute just over half of Westfalia's workforce in orchards and packing facilities. The company actively recruits and promotes women into leadership and specialist roles. As a result, Westfalia has seen a rise in women in senior and technical positions that are integral to climate adaptation, including in water management and ESG.
- **Childcare support:** Westfalia recognizes that a lack of childcare is a barrier to women's employment in the sector, particularly for jobs located in remote rural areas with few childcare facilities. To support its female seasonal workers and employees, Westfalia has several measures in place, including a subsidized kindergarten that provides reliable childcare support. The company also allows nursing mothers to take an hour each day to express milk or nurse their children, and pays staff on maternity leave, which is beyond statutory requirements.
- **Inclusive leadership:** Westfalia runs a graduate program that is a pipeline for women to move into leadership positions. The program's 22 participants spend 18 months in company divisions across South Africa and complete a course at Wits Business School before entering full-time jobs at Westfalia. Westfalia noted that the performance and dedication of women graduates has propelled them into leadership positions.
- **Longer-term approach to recruitment:** Westfalia says many younger people view agriculture as an unattractive career. To address this, the company has made significant efforts to attract and upskill younger female workers, for example by offering bursaries to people of color, with at least half reserved for women. Most students study technical topics such as agri-related courses and engineering. The company also invests in career exhibitions at schools to attract students, including for roles that will grow in demand, such as sustainability, e-commerce, and export logistics roles.

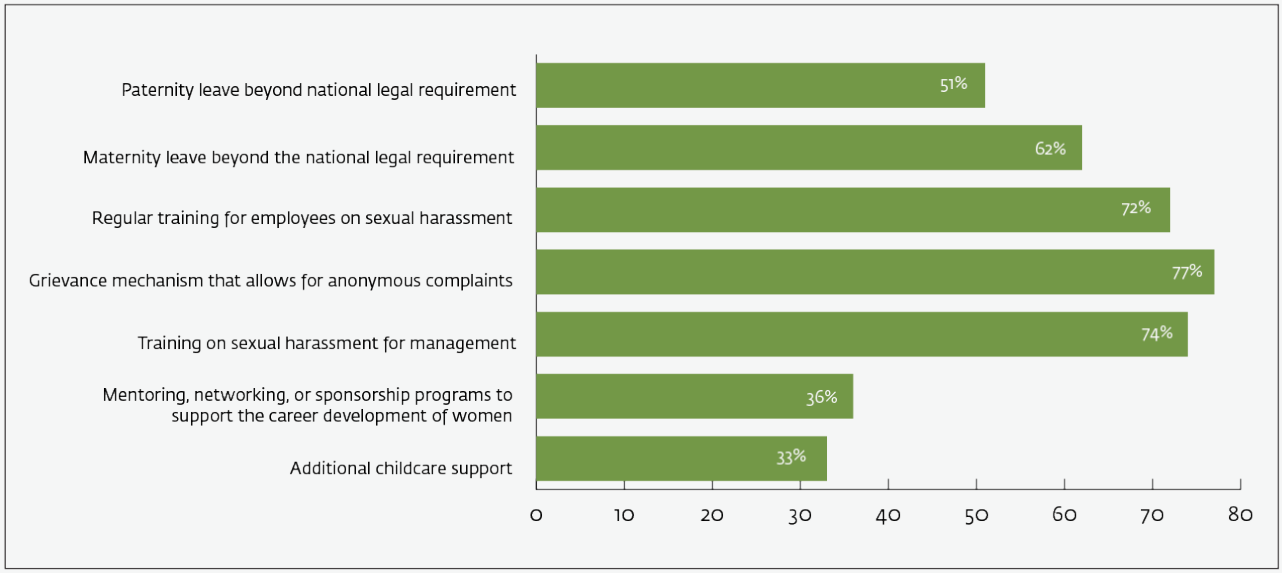
Source: Interview with Westfailia Fruit

Inclusive policies and practices

Most surveyed companies have policies that support gender inclusion in the workplace. As shown in Figure 3, most surveyed companies have measures to prevent and respond to gender-based violence and harassment, including those that go beyond legal requirements, such as options for anonymous reporting and regular training on sexual harassment for employees and managers.

The majority of companies also offer progressive maternity and paternity leave policies. For example, 62 percent of surveyed companies offer women more than the four months of maternity leave required by law, while just over half offer men more than the required 10-day legal minimum. However, only about one third of companies offer additional childcare support, such as on-site childcare facilities or subsidies for external childcare.

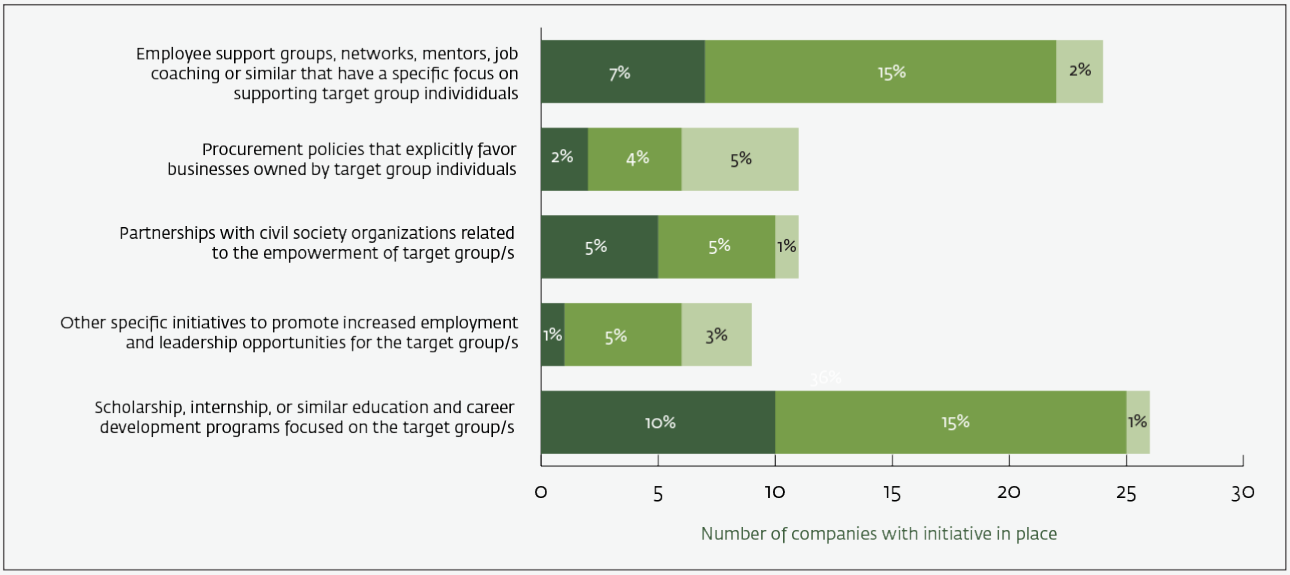
Figure 3: Inclusive policies and practices by share of fresh fruit production companies



Source: Company survey. N=39

Most surveyed companies include a specific focus on women as part of their broader employment equity initiatives, as shown in Figure 4. Among surveyed firms providing mentoring and career development support to Black employees, 71 percent included a focus on women, while 62 percent of education and training initiatives focused on women. In addition, 82 percent of inclusive supply chain measures, such as preferential procurement policies, included an intentional focus on women and almost half exclusively focused on Black women.

Figure 4: Employment equity initiatives in the fruit production sector, by target group



Note: The definition of 'Black' follows the B-BBEE Act (2003) as a generic term for Africans, mixed-race persons, and people of color.

Source: Company survey. N=39

Targets Black women and men, but no specific focus on women

Targets Black women and men, including a specific focus on women

Targets Black women exclusively

Survey data reveal only a weak correlation between the broader employment equity initiatives in Figure 4 and the dedicated gender policies in Figure 3. This suggests that while the Broad-Based Black Economic Empowerment framework provides a valuable foundation for employment equity, strong performance against its criteria may not be sufficient to address the most critical barriers to women's advancement in agribusiness.

How fresh fruit production companies can benefit from a gender-inclusive green transition

Strengthen workforce stability by supporting and upskilling seasonal women workers: As noted, seasonal workers, many of whom are women, are critical to harvest and post-harvest operations, yet their employment is often insecure and vulnerable to climate shocks. Over time, this may lead to seasonal workers migrating away from rural areas to seek more stable incomes in other sectors. Companies can build and retain a reliable, skilled, and productive workforce by improving working conditions and offering more stability to seasonal workers through social protection, multi-year contracts, improved health and safety policies, skills training, and providing or subsidizing childcare support.

Increase women's participation in higher-skilled agribusiness roles by addressing recruitment barriers and investing in training for existing employees: The shift to resilient, sustainable agriculture and the adoption of new technologies is increasing demand for skilled workers, particularly in technical and STEM fields. Proactive outreach and recruitment of women, training of existing employees for higher-skilled roles, and family-friendly policies can tap into a valuable pool of women workers and counter negative perceptions of career prospects in agriculture.

Drive innovation and climate resilience through diverse leadership: Women are underrepresented on boards and in technical STEM roles. This limits the diversity of perspectives shaping business decisions, including strategies to address climate risks. Diverse leadership fosters innovation and helps build strong relationships with local communities that provide critical labor and services.

Leverage gender inclusion alongside climate action to secure market opportunities: A growing number of international fresh fruit buyers are prioritizing environmental and social sustainability in their sourcing decisions. This is part of a wider risk-based approach to sourcing, partly due to emerging legislative requirements such as the European Union's Corporate Sustainability Due Diligence Directive (Husseini 2025). Companies with strong gender equality and environmental practices are better positioned to secure long-term partnerships, especially with international buyers, and access high-value markets.

Use existing workplace diversity frameworks to advance gender equality: Firms already engaged in employment equity or Broad-Based Black Economic Empowerment initiatives may find it easier to expand and strengthen gender inclusion in their existing policies. They can also link dedicated programs to support women's employment to these broader equity initiatives. This creates opportunities to advance gender equality alongside other social inclusion efforts, including racial equity.


Photo: © Shutterstock

5. Solar Energy

Sector Snapshot

South Africa's solar sector is projected to create up to 140,000 new jobs, largely in specialist vocational and high-skilled STEM fields, underscoring the need for a skilled workforce to meet decarbonization goals. Women already play key roles in leadership and STEM, but expanding equal opportunities in recruitment, training, and workplace policies will be critical to ensure both women and men fully benefit from this growth.

Women's Representation in the Solar Energy Sector in South Africa

Leadership

31%
of board members

45%
of senior managers

Employment

33%
of the total workforce

Occupations

39%
of high-skilled STEM workers

45%
of high-skilled non-STEM workers

30%
of medium-skilled technical operational roles

39%
of administrative and support roles

Source: Forty-eight surveyed solar energy companies, with a total workforce of 2,044.

Industry and climate context

The solar energy sector is central to South Africa's goal to reach net-zero by 2050, and efforts to retire aging coal plants, resolve ongoing electricity shortages, and meet climate targets are already driving rapid investment in renewable energy.[3] An additional 30 GW of wind and solar power will be needed for South Africa to achieve a carbon mitigation outcome at the lower end of its Nationally Determined Contribution, which commits the country to reducing greenhouse gas emissions to between 350 and 420 megatons by 2030. In the longer-term, the country will need to add more than 100 GW of dedicated renewable energy capacity by 2050 to achieve its ambitious targets for green hydrogen development, as discussed in section 6.[4] This makes solar energy a major investment opportunity, with an estimated $12 billion needed for new solar infrastructure between 2023 and 2027. Most of this investment is expected to come from the private sector (Presidential Climate Commission 2023a).

The sector is expected to become South Africa's leading renewable energy employer over the next five years, with 140,000 new jobs forecast across off-grid and large-scale solar generation. Around 40 percent of these jobs will be low or semi-skilled occupations linked to construction and maintenance, while 30 percent will require medium-level skills such as panel installation and electrical work. Another 20 percent of new jobs will involve administrative roles like project management, and 10 percent will be in specialized technical fields, such as engineering (FSD Africa 2024). This job growth will position the solar sector as an entry point for new talent in South Africa's emerging low-carbon economy. It may also help to absorb workers transitioning out of the coal industry, including the 3,000 to 9,000 jobs projected to be lost in Mpumalanga Province between 2020 and 2030 (Presidential Climate Commission 2023a).

Women's participation in the solar energy sector is stronger than in other renewable and conventional energy industries—notably in leadership and high-skilled positions, including STEM roles.[5] This enables the sector to serve as a model for more inclusive growth, while demonstrating the wide range of high-quality employment and career opportunities available to both women and men. However, most of the sector's projected new jobs will be concentrated in medium-skilled technical and operational roles in which women are currently underrepresented. Providing women and men with equitable access to jobs at all levels, along with skills development opportunities, is key to ensuring patterns of gender inequality in the conventional energy sector are not replicated in the solar sector.

[3] The Integrated Resource Plan predicts that solar PV will contribute 5.2 percent of the primary energy mix in South Africa by 2030, while the Council of Scientific and Industrial Research estimates that this will reach 9.4 percent by 2050.
[4] Despite the relatively small share of total electricity generation attributed to renewable energy, installed capacity has increased from around 1 percent in 2013 to the current 8.4 percent. Solar PV rose from 19 GWh in 2023 to 4,777 GWh in 2022, and wind from 37 GWh in 2013 to 9,689 GWh in 2022 (International Energy Agency n/d).
[5] For regional and global comparisons, see: IRENA 2022; IRENA 2020; and IRENA 2019.

Leadership

Across the surveyed solar energy companies, women hold 45 percent of senior management roles and almost a third of board seats, as shown in Figure 5. These figures surpass the global average for the solar energy sector, which is estimated at just 17 percent of top management positions (IRENA 2022). Survey data also indicate that women hold 39 percent of high-skilled STEM positions, and in technological advanced industries such as solar energy this expertise is often considered a prerequisite for senior leaders (Key informant interviews, solar energy). However, qualitative insights from key informant interviews highlight a potential gender bias: industry experts say there is a limited pool of women with relevant STEM skills and experience and identify this as a key barrier to advancing women into senior management.

Interviewees noted that senior positions often require relocation to remote sites, making them unattractive to many mid-career women with families, while male-dominated leadership teams can deter women from applying for senior roles. When recruiting women, South African solar energy firms also face increasing competition from international independent power producers offering higher salaries (Key informant interviews, solar energy sector). See Box 5 for an example of a South African solar company building gender diversity in its leadership team.

Figure 5: Participation in leadership and employment in the solar energy sector, by sex

Photo: © Kelley Lynch / World Bank

Box 5: SOLA: Building gender diversity in leadership and STEM roles

SOLA is a solar energy infrastructure, generation, and storage company that has made significant strides in fostering gender diversity in its workforce. It is now focused on nurturing diverse talent into executive roles through inclusive leadership development programs. For example, its Women in Leadership program provides coaching for senior women to advance in their careers. SOLA also identifies diverse talent within the business and fast-tracks these individuals into senior positions, helping build an inclusive leadership pipeline.

Through these efforts, SOLA has increased the number of women across the company, including in engineering, STEM, and operational roles. Women are estimated to represent about 40 percent of SOLA's South African workforce. This growth is also supported by SOLA's broader diversity initiatives that aim to bring diversity and strengthen inclusion at all levels of the business, including site-based operations and among key contractors.

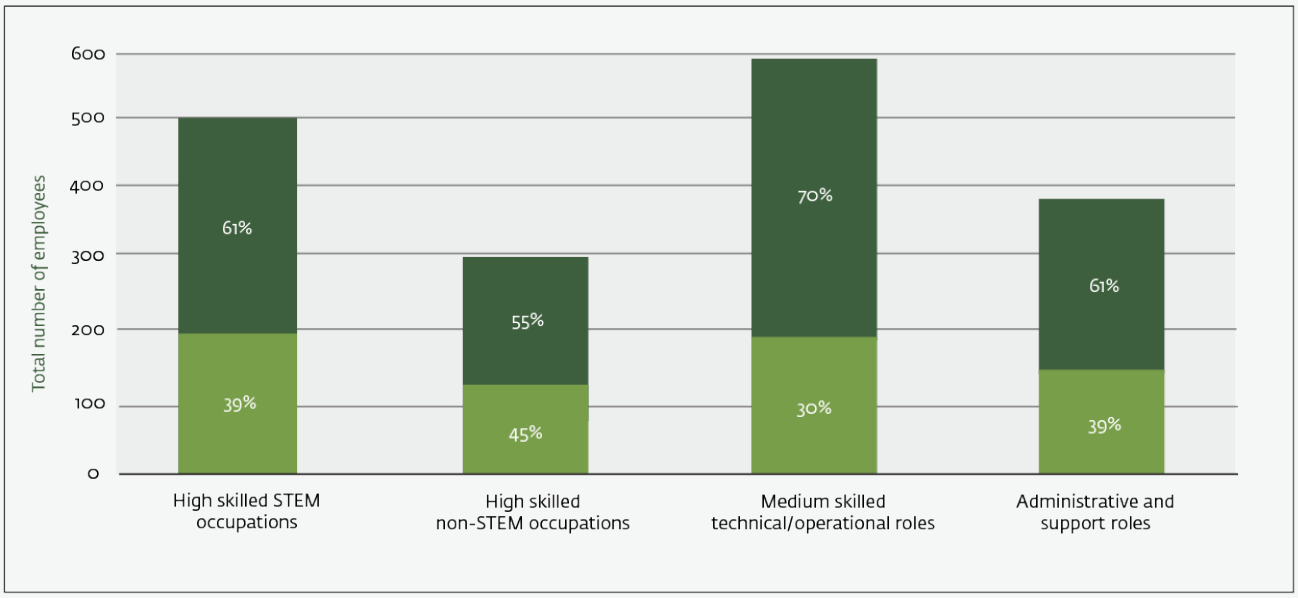
Source: Interview with SOLA

Employment

Medium-skilled technical and operational roles, such as installation or maintenance technicians, account for 29 percent of all jobs at surveyed solar companies. High-skilled STEM occupations requiring university degrees account for one quarter of the workforce. Administrative and support roles, such as assistants or office maintenance staff, represent roughly one-fifth of the sector's employment, with the remaining jobs in high-skilled non-STEM fields like legal, finance, and policy.

Women account for a third of the total solar energy workforce, compared to 40 percent for the global solar sector and the regional average for Africa of 38 percent. A deep dive into occupational categories shows women are better represented in high-skill occupations. They hold 39 percent of high-skilled STEM jobs and 45 percent of high-skilled non-STEM jobs, as shown in Figure 6. However, women's representation is 30 percent in medium-skilled technical and operational roles, which is currently the largest single occupational category in the sector and the main area of projected future jobs growth.

Figure 6: Employees across occupational groups in the solar energy sector, by sex



Source: Company survey. N=48 Women Men


Photo: © Stephan Gladieu / World Bank

Recruitment

A third of surveyed solar companies reported challenges in recruiting women. This is despite the relatively strong representation of women in the solar energy workforce of surveyed companies, at least in higher-skilled roles. The challenges cited most frequently include a lack of women applicants and low acceptance rates among women offered jobs. One investor noted that many solar energy companies fail to achieve their women's employment targets, even when companies implemented targeted recruitment measures (Key informant interviews, solar energy).

The low number of women studying university degrees in relevant STEM fields is likely linked to these recruitment challenges. The latest available data show women account for 34 percent of students across all university-level STEM programs and just 27 percent in engineering, one of the main pipelines for high-skilled solar occupations (Statistics South Africa 2019). This has led to competition between companies seeking to recruit female graduates, which may account for high rates of declined job offers. Interviewees highlighted the importance of outreach to secondary students to challenge misconceptions about the sector and encourage more girls to consider careers in renewable energy. Without this early exposure, many girls choose academic paths that limit future tertiary-level STEM studies (Key informant interviews, solar energy sector).

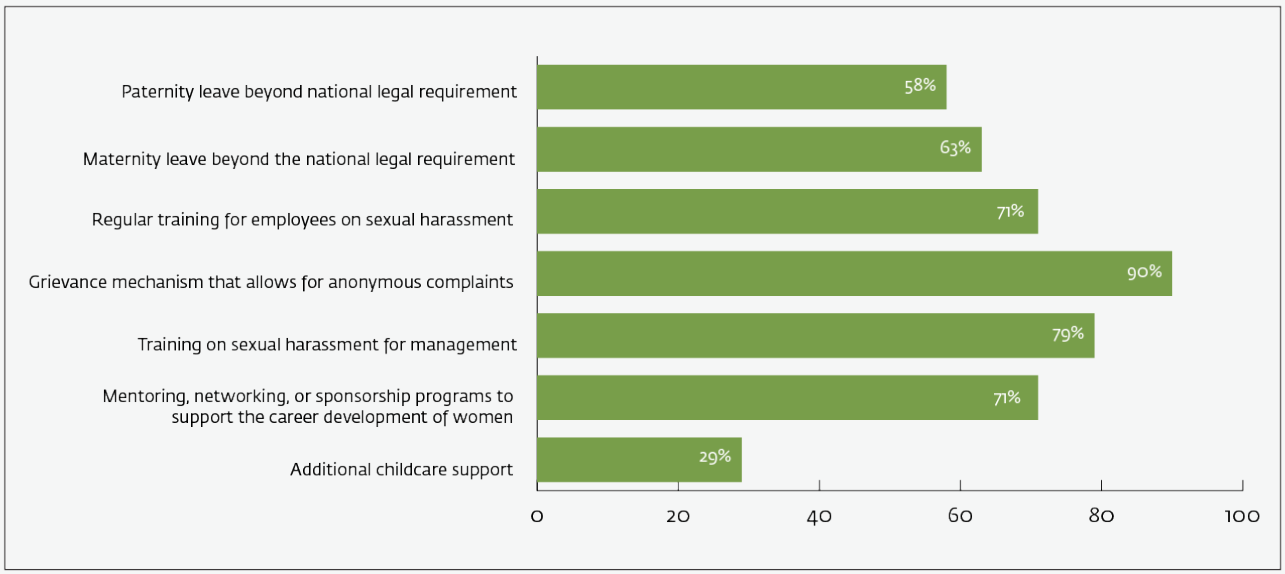
Wider misperceptions about the nature of work in the solar energy sector are a further barrier to increasing women's participation. For example, industry practitioners reported that many people believe jobs in renewable energy, including solar energy, involve harsh working conditions and physically-demanding labor, and as a result, these workplaces are better suited for men. This may deter women from pursuing careers in solar energy, especially in medium-skilled technical and operational roles (Key informant interviews, solar energy). Countering these negative perceptions is critical to address gender imbalances in the workforce and for companies to attract more women to take up jobs across the full range of occupations.

Inclusive policies and practices

Most surveyed companies promote gender-inclusive workplaces, as shown in Figure 7. As with fresh fruit production, the most widely adopted policies relate to anti-sexual harassment. Ninety percent of companies have anonymous grievance mechanisms, 79 percent regularly train managers, and 71 percent go beyond legally mandated requirements. A high share of surveyed companies also have initiatives to support women's career advancement and more than half offer maternity and paternity leave above legal requirements.

However, less than 30 percent of companies offer childcare support. Interviewees, including senior corporate leaders, emphasized the need for more flexible work arrangements, where operationally feasible. The lack of family-friendly policies was seen as a significant barrier to attracting more women to the sector and a key factor limiting their career progression (Key informant interviews, solar energy).

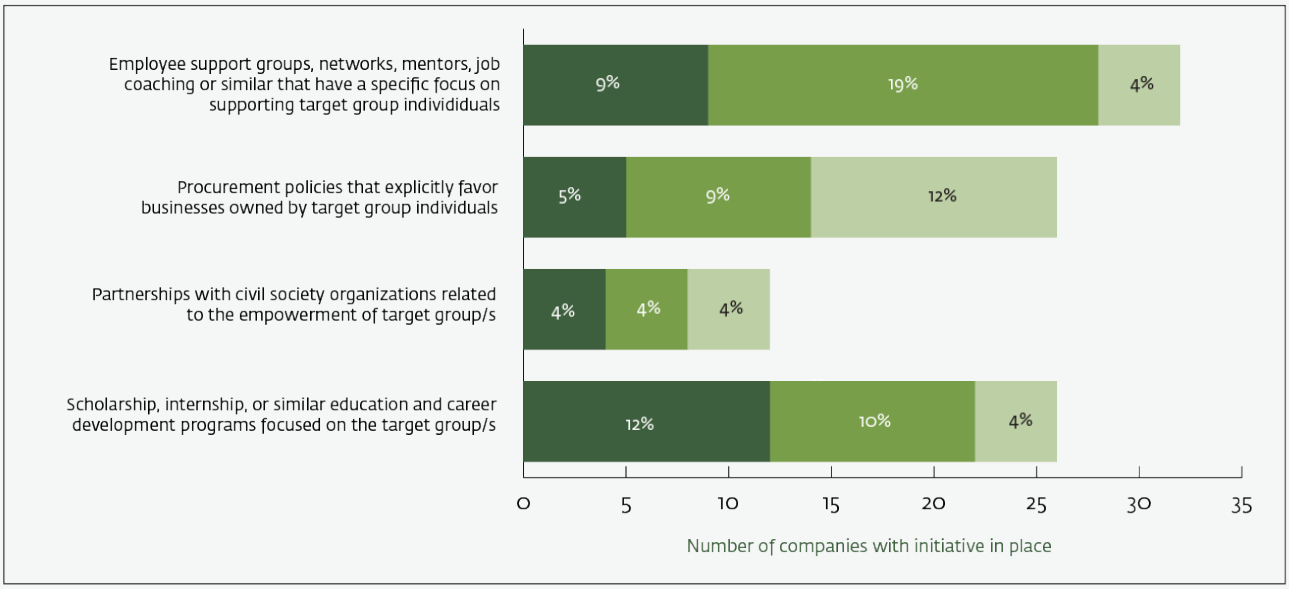
Figure 7: Inclusive policies and practices by share of surveyed solar energy companies



Source: Company survey. N=48

As in the fresh fruit sector, most solar energy companies have initiatives aimed at addressing racial inequities, as shown in Figure 8. Of mentoring and networking initiatives to support Black employees, 72 percent include a focus on women, while 81 percent of supply chain initiatives to support Black-owned enterprises include a gender element and 46 percent target Black women exclusively. However, only half of companies' education and training initiatives—such as scholarships, internships, and similar programs—incorporate a gender inclusion focus, representing a potential gap given the skills-related barriers women face in accessing and advancing in the solar sector.

Figure 8: Employment equity initiatives in the solar energy sector, by target group



Note: The definition of 'Black' follows the B-BBEE Act (2003) as a generic term for Africans, mixed-race persons, and people of color.

Source: Company survey. N=48

- Targets Black women and men, but no specific focus on women
- Targets Black women and men, including a specific focus on women
- Targets Black women exclusively

Box 6: Decommissioning the Komati Power Station

Women make up a sizable proportion of informal coal workforce in South Africa, and the transition to a low carbon economy threatens their employment and incomes. Because the formal coal workforce is dominated by men, policies and programs designed to absorb workers into alternative sectors are less likely to address the gendered impacts of the transition (World Bank Group 2022b). However, the decommissioning of the Komati power station offers an example of how companies, both public and private, can engage with communities and upskill vulnerable workers.

The Komati coal-fired power plant was shut down in 2022 by Eskom. Eskom is receiving support from the World Bank for a broader project that includes repurposing the site with renewable energy infrastructure (hybrid solar, wind, and battery storage system), as well as providing socio-economic support to affected workers and communities.

As part of South Africa's Just Transition Framework, the Presidential Climate Commission has played an important role in convening local government, civil society, donors, and other stakeholders to strengthen community engagement and coordinate efforts. Direct outreach to women's groups, skills training, and job-readiness programs have been led by Eskom. These include training local community members in the installation and mounting of solar panels, and providing women and unemployed youth with skills in business plan writing, financial literacy, leadership, and communication.

Sources: Presidential Climate Commission 2023b; interview with Presidential Climate Commission

How solar energy companies can benefit from gender-inclusion in the green transition

Companies in this rapidly-growing sector can strengthen their leadership capacity and secure skilled workers to meet their evolving business needs by supporting women's career development at all levels. This will require coordinated action across the sector and its value chain, underpinned by clear responsibilities for developers, construction and engineering firms, and training providers.

Attract top talent through inclusive people management policies: As the sector grows, companies have an opportunity to leverage the existing pool of female leaders to inspire more women to enter leadership roles, while positioning solar energy as a progressive space that advances gender equality. Amid rising competition from other emerging low-carbon sectors, solar energy companies can enhance their value proposition to attract more qualified women and men by strengthening inclusive workplace practices, such as family-friendly working arrangements, and offering leadership training and mentoring programs.

Build the STEM pipeline through proactive outreach to women: Although women hold 39 percent of high-skilled STEM roles across the surveyed companies, senior leaders and investors still report a shortage of women with STEM education and training as a key challenge. In South Africa, women remain underrepresented in several vital university-level STEM programs, such as engineering. Companies can help build a more inclusive STEM pipeline by targeting outreach to girls and young women at an early stage and encouraging them to pursue academic pathways that can lead to relevant STEM qualifications. Companies can also partner with educational institutes to offer placements and apprenticeships to women and expand their recruitment reach among students training in critical fields of study.

Reach out to women and men to raise awareness about the full range of solar energy career opportunities: The sector's expansion will generate jobs for project managers, occupational health and safety specialists, policy and legal advisors, experts in finance and investor relations, and more—and these may offer more immediate pathways for women. By actively promoting a range of occupations, companies can attract a broader pool of talent and showcase solar energy as an inclusive and dynamic sector. Strategies include showcasing women in recruitment and communications materials, engaging in career fairs, and visiting schools and universities to inspire students about careers in solar energy.

Create new and inclusive pathways for retraining and upskilling: More than half of new solar jobs will be at lower and medium skill levels, especially in technical and operational roles linked to construction, installation, maintenance, and repair of solar facilities. This opens new entry points for women and men with less advanced formal qualifications, including workers transitioning from the coal industry. Companies can improve recruitment outcomes for this critical workforce segment through upskilling and reskilling. For instance, companies can actively recruit from government-backed programs to retrain coal workers in renewable energy skills and include recruitment targets for women. Solar project developers could also act on community development targets in the Renewable Energy Independent Power Producer Procurement Program to sponsor skills development and training for rural women.

Unlock access to capital through strong gender and environmental, social, and governance standards: Solar energy projects are capital-intensive, and many institutional investors, including multilateral development banks and international climate funds place an emphasis on environmental, social, and governance performance, including gender equality. Companies that demonstrate strong practices, including initiatives to promote women's leadership and employment, are better positioned to secure investment and favorable financing terms, helping to close the funding gap and meet South Africa's renewable energy targets.

Photo: © Mariana Kaipper Ceratti / World Bank

6. Green Hydrogen

Sector Snapshot

South Africa's green hydrogen sector offers significant potential to reduce greenhouse gas emissions and contribute to national decarbonization goals, while creating as many as 2.5 million new jobs. As a nascent industry, there is a unique opportunity to embed equal opportunities into business strategies from the outset, including measures to address systemic skills gaps that hinder women's participation in relevant STEM and technical fields. Strong performance on social inclusion, including gender equality, can help green hydrogen companies develop and attract new talent to the sector, and access critical government and concessional finance.

Industry and climate context

Green hydrogen is produced when renewable energy is used to split water into hydrogen and oxygen. The resulting hydrogen provides zero-emission fuel, while the oxygen byproduct can be used in industrial processes or released back into the atmosphere, creating a carbon-free energy cycle that offers a potential replacement for fossil fuels. It is estimated that green hydrogen will need to account for 10 to 20 per cent of the global energy mix for global warming to be limited to less than 1.5°C (Presidential Climate Commission 2023a).

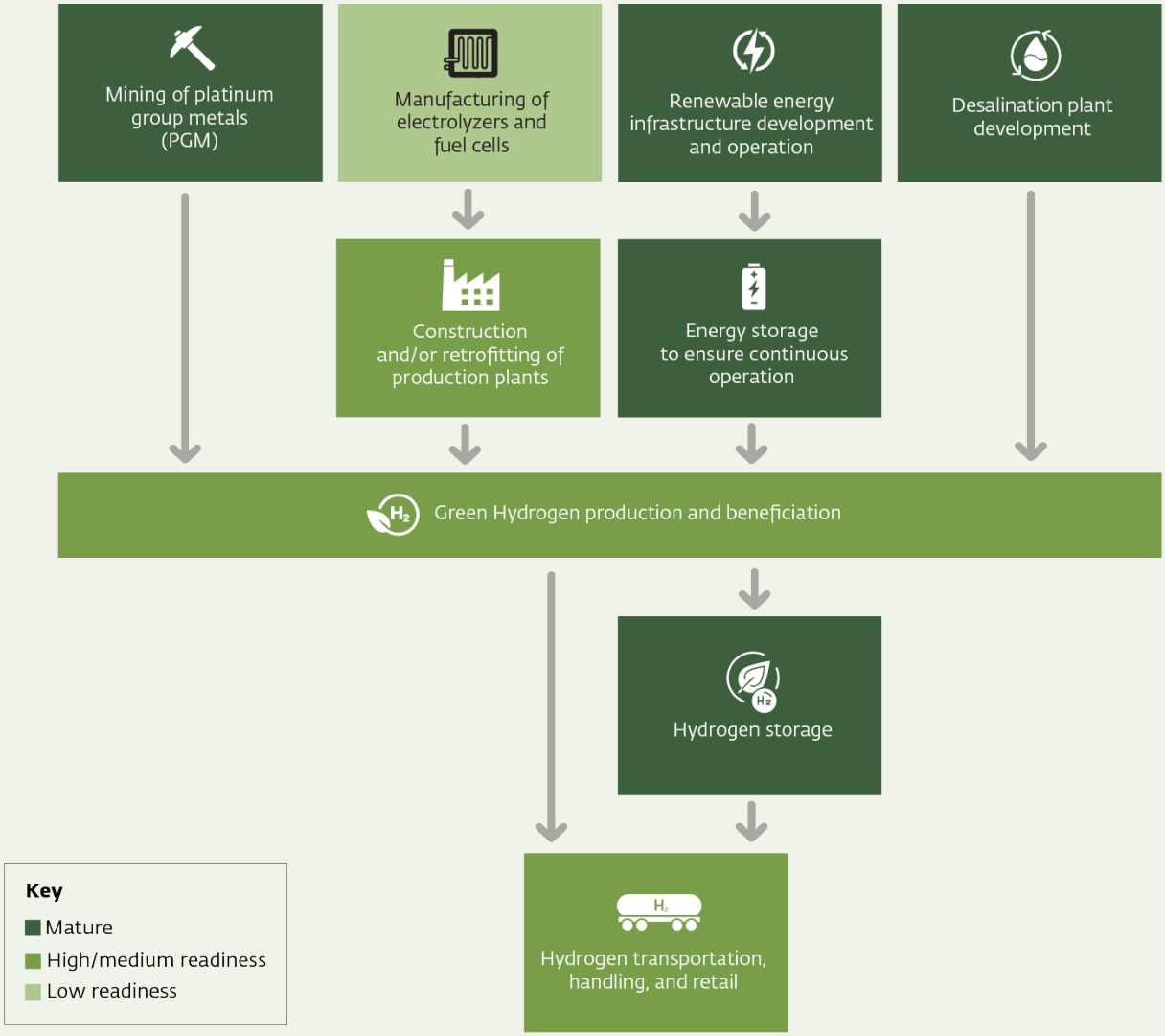
The maturity of South Africa's green hydrogen value chain varies, as shown in Figure 9. However, the government has identified green hydrogen as a priority sector in its decarbonization efforts and estimates it could reduce the country's greenhouse gas emissions by 15 percent by 2050 (Presidential Climate Commission 2023a). It plans to create a 'Hydrogen Valley' that will aggregate demand around three key industrial hubs: Mogalakwena/ Limpopo, Johannesburg, and Durban/Richards Bay (Department of Science and Innovation 2021b). In addition, South Africa's extensive renewable energy and mineral resources, low production costs, and strategic export locations mean it could capture between 7 to 30 per cent of the global green hydrogen market by 2050 (Department of Trade, Industry, and Competition 2022).

Most of the jobs generated by growth in green hydrogen production will be in upstream mining sectors and in downstream industries that are end-users of green hydrogen. This includes over 1.5 million projected jobs across the iron, steel, and platinum group metals sectors (South African Institute of International Affairs 2022). However, the government's strategy to develop the sector, the Hydrogen Society Roadmap, aims to also generate at least 30,000 high-quality, sustainable green jobs annually by 2040. It is supported by a trade and vocational education and training (TVET) framework that seeks to align offerings with the sector's future workforce needs.

Initially, most of these green jobs will be high-skilled roles, such as specialist engineering occupations. The sector is expected to create a wider range of opportunities as it matures, and many of these will still require advanced STEM or specialist technical skills (South African Institute of International Affairs 2022). Supporting women's skill development in these fields can help build local workforce readiness and ensure both women and men benefit from these new opportunities.

Both the roadmap and the TVET framework make explicit commitments to gender equality and inclusion. For example, the roadmap recommends that the government and private sector promote highly visible role models of successful women entrepreneurs and leaders in the green industry. These role models can help attract other women and girls to join the sector, while networking events and mentoring programs with female professionals provide opportunities to share experiences and advocate for women's inclusion in the green transition. (Department of Science and Innovation 2021a).

Figure 9: Maturity of South Africa's green hydrogen value chain



South Africa is well-positioned to scale green hydrogen production, leveraging its advanced renewable energy sector, established platinum group metal mining industry, and mature technologies. These factors could make South Africa one of the lowest-cost producers globally, at an estimated $1.60 per kilogram by 2030 (National Business Initiative 2021). The country's strong industrial base also provides many of the products and services needed for production and downstream activities, including engineering, automation, storage, and plant maintenance. However, South Africa has limited technological and skills capacity in manufacturing core components such as fuel cells and electrolyzers, with only a few players with presence in South Africa like HyPlat and CHEM Energy beginning to test products in global markets.

Source: GIZ and H2.SA 2023

Leadership

Key informants report that women are underrepresented in senior leadership roles within the emerging green hydrogen sector. Many green hydrogen companies are subsidiaries of larger firms in the energy, mining, or chemical sectors, where women have historically been underrepresented in senior roles. As a result, companies tend to recruit leaders from a talent pool that already lacks gender diversity. Key informants cited challenges commonly found in other renewable energy sectors. These include a limited number of experienced women in relevant STEM fields, negative perceptions about opportunities for women in the sector, and a lack of role models, leadership training, and mentoring programs to support women's career growth.

> *"We need more encouragement, more training, and more platforms where women can come together and speak about the industry as a whole."*
>
> *HDF Energy*

However, some industry experts noted growing interest in attracting female talent, and a representative from one energy company with broad sector insights said the share of women leaders in green hydrogen may already exceed other renewable energy sectors. Key informants noted that women are also better represented in senior roles in public institutions involved in the development of the green hydrogen sector. Given the importance of public-private partnerships and policy alignment, this could create a pipeline of future private sector female leaders (Key informant interviews, green hydrogen sector).

Employment

Green hydrogen is an emerging field, and there are currently no dedicated education or career pathways specific to the sector. As noted, most workers are drawn from other energy subfields, particularly for specialized technical or STEM roles. The lower number of women working in adjacent sectors will likely contribute to women's limited representation in core production segments of the green hydrogen value chain. One industry professional noted that women are better represented in upstream segments, such as consulting, research and development, and public policy (Key informant interviews, green hydrogen sector).

Key informants cited low numbers of women pursuing tertiary education and careers in relevant STEM fields, such as engineering or chemistry, as barriers to their employment, as well as gender-based occupational stereotypes, which can lead to bias against women even when they hold required qualifications. Like other sectors in this report, interviewees pointed to a lack of family-friendly workplace policies as a significant barrier to retaining and advancing women, particularly those with caregiving responsibilities (Key informant interviews, green hydrogen sector).

Despite these challenges, interviewees said several promising practices are emerging, such as internships to help female graduates transition into the sector's workforce, as well as company-level guidance on strengthening equal opportunity policies. Initiatives like the Women in Green Hydrogen Network, which has an active South African chapter, are also helping to raise the visibility of women in the sector and build their professional networks, as discussed in Box 7.

> *"These women are extremely qualified; they just aren't getting the position because they are female. If more companies put trust in women, that will encourage other companies to follow suit."*
>
> *HDF Energy*

Photo: © Dominic Chavez/International Finance Corporation

Box 7: H2.SA: Advancing women's inclusion in the green hydrogen sector

Promoting a South African Green Hydrogen Economy, or H2.SA, is a bilateral technical cooperation program commissioned by the German Federal Ministry for Economic Cooperation and Development in 2021 and implemented by the German Corporation for International Cooperation (GIZ GmbH). The program aims to build national expertise, capacity, and resources in this emerging sector, and promotes women's inclusion in both technical and non-technical roles.

H2.SA runs an internship program for young women graduates, who gain valuable industry experience and attend events that help them network and meet women role models. The program also promotes women's leadership through targeted outreach across the energy sector, and it has consistently met its target participation rate of at least 30 percent women in decision-making roles and in leadership training (key informant interview, GIZ).

In 2024, the program helped the Women in Green Hydrogen Network launch an Africa chapter, which includes South Africa. The network maintains an online database of women experts who can speak at events and offers networking opportunities and a global mentorship program for women entering the field. In its first year, South Africa worked to include local women in the database and hosted six networking events, including a side event at the Africa Green Hydrogen summit in June 2025, which attracted female professionals from across the region from both the green hydrogen and broader renewable energy sectors.

In 2025, H2.SA launched a Gender Response Guide offering practical ways to increase the participation of women in South Africa's green hydrogen sector. These include setting targets for women's representation in leadership and technical roles, creating pathways for women-owned enterprises, supporting the uptake of STEM studies among young women, and establishing sector-wide platforms for women's networking and mentorship. The guide also promotes family-friendly workplace policies, gender-sensitive recruitment, and transparent pay structures, with the aim of removing systemic barriers and building an inclusive green hydrogen workforce and value chain.

Sources: GIZ and H2.SA

How companies can benefit from gender-inclusion in the green hydrogen sector

Shape inclusive business models from the outset: As a nascent industry in South Africa, green hydrogen offers a unique opportunity to embed gender equality into business strategies, workplace policies, and organizational cultures. This can help to avoid replicating gender-based imbalances seen in adjacent sectors, such as energy, mining, and chemicals, and enable companies to attract the talent needed for expansion.

Align with policy and funding requirements on inclusion: Companies that demonstrate a strong commitment to gender equality will be better positioned to secure the public, multilateral, and blended financing needed for capital-intensive hydrogen projects. Major funding initiatives, like South Africa's Just Energy Transition Partnership, are expected to mobilize at least $8.5 billion from international partners. These explicitly require that investments lead to a just transition that protects vulnerable workers and supports women and youth. Similarly, gender equality and social inclusion are among the major objectives of the government's Green Hydrogen Commercialization Strategy.

Broaden leadership pipelines by leveraging cross-sector talent: As a nascent industry facing a complex growth path, green hydrogen companies will benefit from diverse senior leadership teams with a wide range of perspectives, experiences, and networks. While women remain underrepresented in technical leadership roles, there is a growing pool of qualified women professionals in relevant fields such as public policy, community engagement, investor relations, and project management (Presidential Climate Commission 2023a). These areas are critical to green hydrogen's development and offer companies the chance to diversify leadership teams with broader expertise and perspectives.

Improve recruitment outcomes by promoting equitable access to high-skilled roles: Currently, labor demand is greatest for high-skilled roles requiring graduate or postgraduate qualifications, where women are already well-represented across many disciplines (IFC 2019). Inclusive recruitment strategies such as hiring quotas, childcare support, and flexible working arrangements can help companies tap into a strong pool of female talent for both STEM and non-STEM occupations.

Create employment pathways for women in support roles: As the sector grows, the number of non-technical and support roles will expand, especially in rural areas along the Hydrogen Valley. These roles can offer critical entry points for local communities, particularly for women with limited formal education. Companies should ensure that recruitment and workplace policies consider and address barriers such as mobility, safety, and access to childcare. Recruitment quotas, targeted outreach, and training initiatives can also develop a broad pool of local labor and services to support green hydrogen projects.

Photo: © Kelley Lynch / World Bank

7. Call to Action

Energy decarbonization is central to South Africa's climate and economic agenda, and renewable energy sectors such as solar energy and green hydrogen will be critical to achieve a just transition. Agribusiness is another key driver of the economy that provides jobs for many vulnerable workers. For this sector, adaptation that strengthens resilience to the impacts of climate change is vital.

In an era of rapid change and climate uncertainty, diverse leadership teams can help companies in all sectors improve sustainability outcomes, decision-making, and risk management. A stronger focus on gender equality can also lead to a more innovative and resilient workforce and better business performance. Businesses can take practical actions to strengthen the connection between gender equality, inclusion, and climate action by drawing on findings and good practice examples from the fresh fruit production, solar energy, and green hydrogen sectors.

Promote women's leadership and participation in key industries for the green transition

Women are underrepresented in leadership roles across the surveyed companies and the South African private sector more broadly, indicating that companies are missing out on the well-documented benefits of diverse leadership, including in climate action. Steps to address this include:

- **Create pathways to support women's career advancement at all levels of the organization.** Companies can introduce leadership, career development, and mentoring programs for women, or encourage greater participation of women in existing leadership programs.
- **Collect, analyze, and report on gender-disaggregated data to identify and close gaps in leadership.** The Employment Equity Act already requires many South African companies to collect workforce data on gender, race, disability, and nationality. Companies should leverage this data to create meaningful progress in women's career progression, incorporate gender-disaggregated data on leadership into public reporting, and establish mechanisms to collect anonymous feedback on potential barriers to women's career development and promotion.
- **Establish and communicate clear, unbiased promotion processes and criteria.** Clear, consistent promotion processes reduce the impact of gender bias, especially in male-dominated sectors and occupations. Companies can develop or review promotion criteria to ensure they are truly objective and merit-based, with no room for misplaced assumptions about women's professional goals or family responsibilities. Unconscious bias training for managers can also improve promotion decisions.

Expand active recruitment and retention of women

As South Africa's green transition accelerates, competition for skilled workers will intensify. Women represent an underutilized pool of talent, and practical steps to expand their recruitment and retention include:

- **Review and map workforce and skills data to identify and tackle gender gaps.** A sound understanding of where and how women participate in the workforce is vital to determine baselines, set goals, and monitor progress. Mapping future skills needs can identify where more proactive measures are needed to develop the talent pipeline. This may include efforts to increase the uptake of studies and career paths among women that are relevant to climate action. This is particularly relevant for roles linked to new climate-smart technologies in both agribusiness and renewable energy.

- **Design recruitment processes and outreach to proactively attract more women into roles where they are under-represented.** Companies can tackle negative stereotypes by placing explicit commitments to gender equality in job advertisements, though unconscious bias training for recruitment teams, and by revising traditional selection criteria—without compromising inherent job requirements—to attract a wider pool of candidates.

- **Collaborate with government and education institutions to provide upskilling, reskilling, and work-based learning opportunities for women.** Practical work experience is critical to bridge the gap between classroom learning and industry needs. Upskilling and reskilling initiatives can target women already in the workforce or those who wish to enter new sectors, including workers transitioning away from coal-intensive industries. Companies should consider opportunities for workers at all levels, including those in lower-income jobs. Reach out to women and girls to encourage studies and careers in climate-related fields, including STEM. In South Africa, companies may benefit from engaging with education and training authorities to access funding, accredited training, and upskilling programs tailored to different sectors. The green hydrogen sector provides important examples of internships for young women.

- **Support more stable incomes for workers affected by climate change.** Many agribusiness firms rely heavily on their seasonal, predominantly female workforce. However, as climate change makes agricultural incomes more unpredictable, there is a growing risk that seasonal workers may leave the sector permanently in search of more stable livelihoods. Companies can increase retention by offering ongoing support, such as access to healthcare, redeployment to other jobs in the business, and training or credit to support independent off-season income generation.

Build inclusive and respectful workplaces

Family-friendly, anti-harassment, and racial equality policies underpin stronger recruitment and retention outcomes. They can also improve company reputation among workers, consumers, government stakeholders, and investors. Most surveyed companies have at least some of these policies but there is scope to strengthen them, particularly employer-supported childcare and racial equality initiatives. Recommended actions include:

- **Support workers with care responsibilities.** Measures should be tailored to attract and retain women workers, who are more likely to have a higher share of care responsibilities. For example, on-site childcare may be the most valuable form of support in remote locations, while office-based staff may need flexible hours or work-from-home arrangements, where operationally feasible. Extended parental entitlements including paternity leave, access to healthcare for dependents, and short-term emergency leave can help to alleviate women's care responsibilities.

- **Consult with Black women workers when developing policies.** Companies should tailor policies to the needs of different groups of women, including Black women. Policies supporting Black South Africans should also incorporate an explicit gender element, including in leadership programs and skills development.

- **Prevent and address gender-based violence and harassment in the workplace.** In line with South African law, most surveyed companies have these policies in place, but risks should be actively monitored. Companies should ensure reporting mechanisms are safe and confidential, offer referrals to support services for survivors, and provide regular training for workers and managers on different forms of violence and harassment, prevention, and bystander intervention strategies. Sector-specific measures may also be needed, such as employer-supported transport to and from work in remote or rural areas.

Integrate gender into green transition strategies

A fragmented approach can dilute the effectiveness of gender and climate initiatives, leaving women more vulnerable to climate-related shocks. Practical steps to enable women and men to equally participate in—and benefit from—the green transition include:

- **Embed gender in climate and sustainability strategies, goals, metrics, and reporting.** Regular reporting of sex-disaggregated data to board members, senior leaders and investors can influence cultural change at the top.
- **Set clear targets to ensure women and men have equal access to reskilling programs and emerging green job opportunities.** Offer training in both technical and non-technical roles, actively recruit women into upskilling initiatives, and track participation rates to close gender gaps in the low-green transition.
- **Consider gender within climate risk assessments.** Apply a gender lens to understand how climate impacts affect women and men differently. For example, women perform a high proportion of seasonal agricultural work, which can result in greater exposure to heat stress or income losses during climate-related disruptions. These insights enable companies to better tailor supports such as shaded rest areas and cooling systems, income protection during climate shocks, and gender-appropriate protective equipment.

The recommendations in this report are not exhaustive and companies should carefully identify and tailor actions that are most relevant to their specific business needs, skills requirements, workforce composition, and climate challenges. Consulting with diverse groups of employees, taking into account gender, race, and other personal characteristics, will increase the effectiveness of these measures. By linking and integrating gender and climate action, South African companies will be best placed to meet the challenges of climate change and the seize the opportunities of the green transition.

References & Sources

Key informant interviews

Sector	Name	Category
Fresh fruit production	Phatisa	Investor
	AgDevCo	Investor
	United Exports	Company
	Westfalia Fruit	Company
Solar energy	SOLA	Company
	Old Mutual Alternative Investments	Investor
	Inspired Evolution	Investor
Green hydrogen	Women in Green Hydrogen / GIZ	Public sector initiative / development agency
	HDF Energy	Company
	Industry practitioner	Company
	HySA Infrastructure	Research institution
Policy	Just Energy Transition Project Management Unit	Government agency
	Presidential Climate Commission	Government agency

Secondary Sources

Altunbas, Yener; Gambacorta, Leonardo; Reghezza, Alessio; Velliscig, Giulio. 2021. *BIS Working Papers No 977: Does gender diversity in the workplace mitigate climate change?* Bank for International Settlements. https://www.bis.org/publ/work977.pdf

Bhorat, Haroon; Kupeta, Tsungai; Martin, Lisa; Steenkamp, Francois. 2024. *Just Transition and the Labour Market in South Africa*. University of Cape Town. https://oms-www.files.svdcdn.com/production/downloads/reports/Just-Transition-and-the-Labout-Market-in-South-Africa.pdf

BoardReady. 2021. *Does Board Diversity Drive Corporate Action on Climate Change?* BoardReady and A Bird's Eye View: Seattle. https://abirdseyeview.global/diversity-and-climate-action/#_downloads

Cramer, Christopher; Shingie Chisoro-Dube. 2021. "The Industrialization of Freshness and Structural Transformation in South African Fruit Exports", in Antonio Andreoni, and others (eds), *Structural Transformation in South Africa: The Challenges of Inclusive Industrial Development in a Middle-Income Country.* https://academic.oup.com/book/39853/chapter/340014506

Department of Employment and Labour. 2025. *25th Commission for Employment Equity (CEE) Annual Report (2024/25).* Government of South Africa: Pretoria. https://www.sallr.co.za/wp-content/uploads/2025/05/25th-CEE-Annual-Report-Final-16-May-2025.pdf

Department of Environment, Forestry and Fisheries. 2020. *Actionable Guidelines for the Implementation of Climate Smart Agriculture in South Africa.* Government of South Africa: Pretoria. https://www.dffe.gov.za/sites/default/files/docs/strategy.framework/ccaq/csa_volume2.pdf

Department of Environment, Forestry and Fisheries. 2024a. *National GHG Inventory Report South Africa, 2000–2022.* Government of South Africa; Pretoria. https://www.dffe.gov.za/sites/default/files/legislations/unfccc_greenhousegasinventoryreport9_g50607gon4772.pdf

Department of Environment, Forestry and Fisheries. 2024b. *Draft 9th National Greenhouse Gas Inventory Report for the Republic of South Africa for Public Comment.* Government of South Africa: Pretoria. https://www.dffe.gov.za/sites/default/files/legislations/unfccc_greenhousegasinventoryreport9_g50607gon4772.pdf

Department of Higher Education and Training. *National List of Occupations in High Demand: 2024.* Government of South Africa: Pretoria. https://www.gov.za/sites/default/files/gcis_document/202404/50510gen2414.pdf

Department of Science and Innovation. 2021a. *Hydrogen Society Roadmap for South Africa.* Government of South Africa: Pretoria. https://www.dsti.gov.za/images/South_African_Hydrogen_Society_RoadmapV1.pdf

Department of Science and Innovation; Engie Impact. 2021b. *South Africa Hydrogen Valley Final Report.* Government of South Africa: Pretoria. https://www.dsti.gov.za/images/2021/Hydrogen_Valley_Feasibility_Study_Report_Final_Version.pdf

Department of Statistics, South Africa. 2025. *Quarterly Labour Force Survey: Quarter 1 – 2025.* Government of South Africa: Pretoria. https://www.statssa.gov.za/publications/P0211/P02111stQuarter2025.pdf

Department of Statistics, South Africa. 2017. *Census of commercial agriculture, 2017: Financial and production statistics.* Government of South Africa: Pretoria. https://www.statssa.gov.za/publications/Report-11-02-01/Report-11-02-012017.pdf

Department of Trade, Industry and Competition. 2022. *Green Hydrogen Commercialisation Strategy for South Africa*. Government of South Africa: Pretoria. https://www.thedtic.gov.za/wp-content/uploads/Full-Report-Green-Hydrogen-Commercialisation-Strategy.pdf

Ellix, Hannah; Farmer, Karilyn; Kowalik, Lukasz; Little, Rachel; Moonsamy, Tarusha; Mussacaleca, Marta; Ruban, Phillip; Zapata, Gisella. 2021. "Why women are leaving the mining industry and what mining companies can do about it." *McKinsey & Company*. https://www.mckinsey.com/industries/metals-and-mining/our-insights/why-women-are-leaving-the-mining-industry-and-what-mining-companies-can-do-about-it

FP Analytics. 2020. *Women as Levers of Change.* FP Analytics: Washington D.C. https://womenasleversofchange.com/#environment

Fruit SA. 2023. *2022/2023: Key Fruit Statistics*. https://fruitsa.co.za/wp-content/uploads/2024/10/A5-Fruit-SA-Booklet_2022_2023_Digital_Interactive.pdf

FSD Africa. 2024. *Forecasting Green Jobs in Africa.* AFSIA: Kigali. https://www.afsiasolar.com/wp-content/uploads/2024/07/Forecasting-Green-Jobs-in-Africa-2024.pdf

GIZ; H2.SA. 2023. *PtX Business Opportunities in South Africa: Renewable Hydrogen Market Potential and Value Chain Analysis.* GIZ: Bonn. https://greenhydrogensummit.org.za/wp-content/uploads/2024/05/WP2_PtX-Business_opportunities-REPORT_FINAL.pdf

Government of South Africa. 2020. *The South African Economic Reconstruction and Recovery Plan.* Government of South Africa: Pretoria. https://www.gov.za/sites/default/files/gcis_document/202010/south-african-economic-reconstruction-and-recovery-plan.pdf

Gu, Jiangxin; Nie, Huanghua; Guo, Haojie; Xu, Huanhuan; Gunnathorn Tongdee. 2019. "Nitrous oxide emissions from fruit orchards: A review." Atmospheric Environment, Vol. 201. https://www.sciencedirect.com/science/article/abs/pii/S1352231019300135

Honeycomb BEE. n.d. "BBBEE Codes of Good Practice." Accessed 9 Ju5. https://honeycomb-bee.co.za/what-is-bee/bbbee-codes-of-good-practice/

Husseini, Salah; Hannegan, Taylor; Greenberg, Renata. 2025. "CSDDD: Using a Risk-Based Approach to Address Human Rights and Environmental Impacts in Supply Chains." *BSR*. https://www.bsr.org/en/blog/csddd-using-a-risk-based-approach-to-address-human-rights-and-environmental-impacts-in-supply-chains

IFC. 2017. *Tackling Childcare: The Business Case for Employer-Supported Childcare.* IFC: Washington D.C. https://www.ifc.org/content/dam/ifc/doc/mgrt/01817-wb-childcare-report-finalweb3.pdf

IFC. 2019. *Creating Markets in South Africa: Boosting Private Investment to Unlock South Africa's Growth Potential*. IFC: Washington D.C. https://www.ifc.org/content/dam/ifc/doc/mgrt/201910-cpsd-south-africa-en.pdf

IFC. 2020. *Addressing Gender-Based Violence and Harassment: Emerging Good Practice for the Private Sector*. IFC: Washington D.C. https://www.ifc.org/en/insights-reports/2020/publications-gpn-addressinggbvh

IFC. 2023. *Inclusive Employment: Advancing Economic Opportunities at the Base of the Pyramid.* IFC: Washington D.C. https://www.ifc.org/en/insights-reports/2023/inclusive-employment-advancing-economic-opportunities-at-the-base-of-the-pyramid

IFC. 2024. *Gender-Responsive Climate Governance and the Role of Women Leaders.* IFC: Washington D.C. https://www.ifc.org/content/dam/ifc/doc/2024/gender-responsive-climate-governance-report.pdf

Igamba, Joan. 2023. "Climate Change In South Africa: 21 Stunning Facts About South Africa's Climate Breakdown". *Green Peace Africa*. https://www.greenpeace.org/africa/en/blogs/54171/climate-change-in-south-africa-21-stunning-facts-about-south-africas-climate-breakdown/

ILO. 2017. *Breaking barriers: Unconscious gender bias in the workplace.* ILO: Geneva. https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_dialogue/%40act_emp/documents/publication/wcms_601276.pdf

ILO. 2024a. *Heat at work: Implications for safety and health*. ILO: Geneva. https://www.ilo.org/sites/default/files/2024-07/ILO_OSH_Heatstress-R16.pdf

ILO. 2024b. *Ensuring safety and health at work in a changing climate*. ILO: Geneva. https://www.ilo.org/sites/default/files/2024-07/ILO_SafeDay24_Report_r11.pdf

International Energy Agency. n.d. "South Africa." Accessed 9 July 2025. https://www.iea.org/countries/south-africa

IRENA. 2019. *Renewable Energy: A Gender Perspective.* IRENA: Masdar City. https://www.irena.org/publications/2019/Jan/Renewable-Energy-A-Gender-Perspective

IRENA. 2020. *Wind Energy: A Gender Perspective.* IRENA: Masdar City. https://www.irena.org/publications/2020/Jan/Wind-energy-A-gender-perspective

IRENA. 2022. *Solar: A Gender Perspective.* IRENA: Masdar City. https://www.irena.org/publications/2022/Sep/Solar-PV-Gender-Perspective

Joseph S, Antwi MA, Chagwiza C, Rubhara TT. 2021. "Climate change adaptation strategies and production efficiency: The case of citrus farmers in the Limpopo province, South Africa." *Jamba 13(1),* https://pmc.ncbi.nlm.nih.gov/articles/PMC8661275/

Kom, Zongho, et al.. 2022. "Indigenous Knowledge Indicators Employed by Farmers for Adaptation to Climate Change in Rural South Africa." *Journal of Environmental Planning and Management 66 (13).* https://www.tandfonline.com/doi/full/10.1080/09640568.2022.2086854

Makgetla, N; Montmasson-Clair, G; Patel, M; Maseko, N. 2019. *National employment vulnerability assessment: analysis of potential climate change-related impacts and vulnerable groups.* Trade & Industrial Policy Strategies: Pretoria. https://www.tips.org.za/just-transition/item/4084-national-employment-vulnerability-assessment-analysis-of-potential-climate-change-related-impacts-and-vulnerable-groups

National Agricultural Marketing Council. 2024. *South African Fruit Trade Flow: Issue No. 55.* https://www.namc.co.za/wp-content/uploads/2024/09/Final-SA-Fruit-Trade-Flow-Report-Issue-55-September-2024.pdf

National Business Initiative. 2021. *Decarbonising South Africa's Power System.* NBI: Johannesburg. https://www.nbi.org.za/wp-content/uploads/2023/09/NBI-Transition-Chapter-Decarbonising-SA-power-11-Aug-2021.pdf

Pillay, Verushca; Alho, Ryan; Nhlapo, Nomathole. 2023. "South Africa: Broad-based Black Economic Empowerment Guide 2023." *Baker McKenzie,* 23 May. https://insightplus.bakermckenzie.com/bm/mergers-acquisitions_5/south-africa-broad-based-black-economic-empowerment-guide-2023

Presidential Climate Commission. 2023a. *South Africa's Just Energy Transition Investment Plan (JET IP) for the initial period 2023–2027.* https://pccommissionflo.imgix.net/uploads/images/South-Africas-Just-Energy-Transition-Investment-Plan-JET-IP-2023-2027-FINAL.pdf

Presidential Climate Commission. 2023b. *Early Lessons and Recommendations from Komati's Decommissioning and Repurposing Project.* https://pccommissionflo.imgix.net/uploads/documents/PCC-Komati-Power-Station-Recommendations-Report.pdf

Prowse, Wayne. 2025. "Analysis: Range of fruit drives South Africa's export growth." *Fruitnet.* https://www.fruitnet.com/fruitnet/analysis-range-of-fruit-drives-south-africas-export-growth/266374.article

Rappai, Sunita. 2024. "Breaking the Grass Ceiling." *IFC.* https://www.ifc.org/en/stories/2024/breaking-the-grass-ceiling

Simbi, Tracey; Aliber, Michael. 2000. *The Agricultural Employment Crisis in South Africa.* Trade & Industrial Policy Strategies: Pretoria. https://www.tips.org.za/research-archive/annual-forum-papers/2000/item/130-agricultural-employment-crisis-in-south-africa

South African Institute of International Affairs. 2022. *The South African Green Hydrogen TVET Ecosystem Just Transition Strategic Framework.* SAIIA: Johannesburg. https://saiia.org.za/wp-content/uploads/2022/06/SAIIA_SR_GreenHydrogenTVet.pdf

Statistics South Africa. 2019. *Education Series Volume V: Higher education and skills in south Africa, 2017.* Government of South Africa: Pretoria. https://www.statssa.gov.za/publications/Report-92-01-05/Report-92-01-052017.pdf

Statistics South Africa. 2024. *Quarterly Labour Force Survey: Quarter 1: 2024.* Government of South Africa: Pretoria. https://www.statssa.gov.za/publications/P0211/P02111stQuarter2024.pdf

Strumskyte, Sigita; Ramos Magaña, Sara; Bendig, Helene. *Women's leadership in environmental action.* OECD: Paris. https://www.oecd.org/en/publications/women-s-leadership-in-environmental-action_f0038d22-en.html

Sustainable Renewables Risk Mitigation Initiative. 2022. *Maximizing Socioeconomic Benefits Triggered by Renewables.* World Bank: Washington D.C. https://www.esmap.org/sites/default/files/esmap-files/Maximizing%20Socioeconomic%20Benefits%20Triggered%20by%20Renewables_Nov16-22.pdf

UN Climate Change Conference. 2021. "Political Declaration on the Just Energy Transition in South Africa." Published 2 November 2021. https://webarchive.nationalarchives.gov.uk/ukgwa/20230106144924/https:/ukcop26.org/political-declaration-on-the-just-energy-transition-in-south-africa/

Western Cape Government. 2023. *Damage to Western Cape agriculture infrastructure estimated at R1.053 billion*. https://www.westerncape.gov.za/agriculture/article/damage-western-cape-agriculture-infrastructure-estimated-r1053-billion

World Bank Group. 2022a. *Country Climate and Development Report: South Africa.* World Bank: Washington D.C. https://openknowledge.worldbank.org/server/api/core/bitstreams/52409ffd-96f7-58d4-be7f-c8114abbd4c5/content

World Bank Group. 2022b. *Just Transition for All: A Feminist Approach for the Coal Sector.* World Bank: Washington D.C. https://documents1.worldbank.org/curated/en/099405206192237419/pdf/P1711940b3d5590820b3480a4662ace12ea.pdf

World Bank Group. 2022c. *Maximising Socioeconomic Benefits Triggered by Renewables.* World Bank: Washington D.C. https://www.esmap.org/sites/default/files/esmap-files/Maximizing%20Socioeconomic%20Benefits%20Triggered%20by%20Renewables_Nov16-22.pdf

World Bank Group. 2024. P*reparing the Workforce for the Green Transition: How to promote the green transition, competitiveness, and employability by focusing on skills development in South Africa.* World Bank: Washington D.C. https://documents1.worldbank.org/curated/en/099012225210579487/pdf/P50211412fd0fb0921b00f1fbd95ecf5c3d.pdf

Annex: Methodology

Enterprise survey:

- **39 companie**s in the fresh fruit production sector
- **48 companies** in solar energy sector

Key informant interviews:

- Four in the fruit sector
- Three in the solar energy sector
- Four in the green hydrogen sector
- Two in policy

The findings of this diagnostic are based on a combination of quantitative and qualitative data. Primary data was collected via a survey of 87 firms in the fresh fruit production and solar energy sectors. The third sector, green hydrogen, was not included in the survey sample due to the sector's nascency and the limited number of local firms with an identifiable business unit or workforce focused on green hydrogen production. Over 500 companies were invited to participate in the survey, resulting in a final sample of 48 solar energy companies and 39 fresh fruit companies. Companies were distributed across the two focus sectors and included small and medium sized enterprises, as well as larger corporations. Overall, the survey covered a total workforce of 9,482 workers, including 7,438 in the fresh fruit production sector and 2,044 in the solar energy sector. The survey, conducted via telephone between October and November 2024, examined:

- Women's participation in the workforce, including in technical and non-technical roles.
- Women's participation in leadership, including in senior management and at board level.
- Potential barriers to women's participation, including in recruitment, retention, and career progression.

The research team also carried out twelve semi-structured key informant interviews (KIIs) between July 2024 and February 2025. Informants included corporate leaders, human resource managers, industry experts, and policymakers. Questions were tailored to reflect the expertise of interviewees, covering subjects such as opportunities and challenges for women in employment and leadership in the focus sectors, trends in skills development, and examples of best practice within the private sector. The findings from the survey and interviews were triangulated with secondary literature on the three priority sectors, as well as the broader South African climate transition.

Occupational levels

One section of the industry survey focused on types of occupation. They were categorized as follows:

- High-skilled STEM occupations requiring a university degree in science, technology, engineering, or mathematics. These include engineers, environmental scientists, computer scientists, or similar occupations.

- High-skilled non-STEM occupations that typically require a university degree. Examples include accountants, legal advisors, project or operations managers, consultants, and corporate social responsibility managers.

- Medium-skilled technical / operational roles that require some sort of certification, but not necessarily a university-level qualification, such as machine operators, drivers, technicians, and construction workers.

- Administrative or support roles include administrative assistants, manual laborers, and other support staff that require practical skills and experience rather than formal post-secondary qualifications.

- Seasonal workers are employed on a temporary basis at different times of the year, for example, to harvest produce or other seasonal tasks.
- Board members are at the top level of corporate governance, and may include both non-executive and executive roles and functions.
- Senior managers are the top level of management below the board. They include heads of departments and business units, and senior management roles that report directly the board.

Focus sectors

The study focuses on three sectors selected for their strategic importance to South Africa's climate transition, strong investment potential, and opportunities to advance gender equality through climate action. The selection was based on a two-step shortlisting process. Sectors were first assessed against a set of primary criteria, and then further evaluated against a list of secondary criteria to determine their relative suitability.

Primary Criteria	
High priority sectors and/or value chains, particularly as part of South Africa's transition from coal: Sectors / subsectors must meet at least one of the following criteria related to coal transition/climate impact.	
1. Transition	Sector and/or value chain is a key enabler of the transition to low-carbon and environmentally sustainable economies (e.g., renewable energy, climate finance, climate tech, and battery value chains).
2. NDC mitigation priority	Sector and/or value chain is identified as a priority sector/subsector for mitigation under the latest Nationally Determined Contribution.
3. Climate vulnerable	Sector and/or value chain is especially vulnerable to the impacts of climate change and/or environmental degradation (e.g., agribusiness, tourism).
Investor priorities in South Africa: Sector and/or value chain must meet at least one of the following criteria related to investment potential.	
1. Current priority sector	Sector and/or value chain is a priority for climate investment by IFC or other investors.
2. Investment potential	Sector and/or value chain has strong potential for expanded investment by IFC or other investors and an enabling environment for future investment.

Secondary Criteria	
Gender inclusion impact: Sector and/or value chain should have a particular relevance to women's current and potential employment and entrepreneurship opportunities, particularly as part of South Africa's coal transition.	
1. Gendered employment	A large existing female direct workforce or a large direct workforce overall in which women are especially under-represented
2. Green jobs potential	A high potential for future green jobs creation.
Feasibility: Sector and/or value chain should offer a realistic prospect for securing the data required to carry out the diagnostic.	
1. Sufficient N	Sufficient number of enterprises and/or workers in the sector and/or value chain to generate useful quantitative enterprise data. This includes the extent to which enterprises are likely to be 'accessible' for engagement. For example, focus sectors with a large number of MSMEs operating in dispersed rural areas or primarily in the informal economy may not be sufficiently accessible.
2. IFC / Project team networks	Existing IFC and/or project team networks or contacts to facilitate outreach and engagement.
3. Sector organizations	Presence of relevant sector associations or bodies that could facilitate outreach and engagement with member companies.

Limitations

A key limitation of the study was the exclusion of the green hydrogen sector from the survey sample, due to the limited number of firms currently active in this emerging sector.

Over 500 companies in the selected sectors in South Africa were invited to participate in the survey. As participation was voluntary, the resulting sample may not reflect the full population, and self-selection bias may be present, with respondents more likely to be companies already active in promoting gender equality and advancing the climate transition in the private sector.

This report was commissioned by IFC through its Gender and Economic Inclusion Department. This report has been funded by the the Climate Investment Funds' Women-Led Coal Transitions (WOLCOT) grant mechanism, as part of the Accelerated Coal Transitions program.

For more information please contact:

Franziska Deininger
Operations Officer & Inclusive Climate Lead
World Bank Group Gender Department
fdeininger@ifc.org