



## **Gender-Based Climate Justice, Labour, and Social Standards in South Africa's Citrus Industry: A Policy Submission**

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### **Executive Summary**

This policy submission highlights the ways in which climate change is intensifying existing inequalities in South Africa's citrus industry, with a particular focus on farm workers in the Sundays River Valley. It argues that rising temperatures, extreme weather, and climate variability are worsening already precarious labour conditions – characterised by low wages, insecure employment, weak bargaining power, and inadequate social protections – while those least responsible for emissions bear the greatest burden of climate impacts.

The citrus sector exemplifies a broader climate injustice: although it is a high-performing, export-driven industry generating significant revenue and global competitiveness, these gains are not shared equitably. Structural inequalities persist across the value chain, with workers – especially women and migrants – facing segmented labour markets, unsafe working conditions, and limited access to basic services and opportunities. Climate change amplifies these vulnerabilities through heat stress, reduced working hours, and declining income stability, threatening both worker wellbeing and long-term sector resilience.

The submission highlights critical decent work deficits, including unsafe and physically demanding labour under extreme heat, widespread non-compliance with health and safety standards, exploitative wage systems (notably piece-rate pay), and weak worker interest representation. Gendered inequalities are particularly severe: women workers face reproductive health risks, inadequate workplace protections, and systemic sexual exploitation and coercion in hiring practices. Migrant workers experience additional layers of precarity and exclusion.

Current policy approaches to South Africa's Just Transition have largely prioritised the energy sector, neglecting agriculture's dual role as both a contributor to emissions and a sector highly vulnerable to climate change. This omission risks entrenching inequality and undermining climate resilience in rural economies.

To address these challenges, the submission calls for a gender-responsive climate justice approach embedded within the Just Transition framework. It emphasises the need for:

- \* Strengthened and climate-adapted labour protections, including heat regulations, occupational health and safety enforcement, and improved working conditions.
- \* Transformation of labour relations through genuine worker participation, collective bargaining, and democratic representation.
- \* Equitable wage reforms, including movement toward a living wage and the abolition of exploitative piece-rate systems.
- \* Targeted social protections for seasonal, migrant, and women workers, including income support and access to services.
- \* Value chain accountability, requiring retailers, exporters, and employers to adopt and fund enforceable labour and climate standards.
- \* Investment in climate-resilient worker communities, including housing, healthcare, and skills development.
- \* Establishment of climate shock funds and coordinated adaptation strategies to support workers through climate-related disruptions.

Ultimately, the submission argues that achieving a truly Just Transition in agriculture requires confronting structural inequalities in the citrus value chain and centring the lived realities of workers. Without deliberate, redistributive, and participatory interventions, climate change will deepen existing injustices rather than transform them, undermining both social equity and sustainable development.

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## 1. Introduction

This policy brief highlights how climate change – particularly rising temperatures, heatwaves, and extreme weather – is intensifying existing vulnerabilities in South Africa’s agricultural sector, especially for farm workers who already face low wages, weak bargaining power, and poor working conditions. Research is increasingly drawing attention to the heightened vulnerabilities of farm workers’ exposure to intense heat, because of the nature and outdoor setting of agricultural work, combined with their weak bargaining power in the employment relationship, low wages, and the deficits in decent work indices (El Khayat *et al.*, 2022; de Lima *et al.*, 2021; Tigchelaar *et al.*, 2020; TIPS, 2020). Reinforcing this vulnerability, the ILO (2024) has singled out farm workers as one of the most high-risk categories of workers to heat stress and climate variability, having major implications for their capacity to achieve climate resilience.

Despite contributing minimally to carbon emissions, these workers are disproportionately exposed to climate risks, with African labourers among the most affected globally. The impacts are uneven across sectors and worker groups, requiring tailored, rather than one-size-fits-all, labour and social protections. Focusing on the citrus industry in the Sundays River Valley, the submission draws on worker experiences to show how an export-driven yet unequal sector faces deep decent-work deficits and growing climate pressures. It argues that without stronger labour protections, transformed labour relations, and a gender-based climate justice approach within South Africa’s Just Transition framework, climate change will worsen inequalities, particularly along gender and nationality lines, undermining efforts to build resilient workplaces and communities.

## **2. Climate Change, Climate Inequality, and Citrus Workers**

Rising temperatures and extreme heat has increased, with more regular and prolonged heatwaves and a simultaneous drop in extreme cold temperatures on the African Continent in the past decades (Craig *et al.*, 2022). Excessive heat is an increasingly prevalent climatic phenomenon in South Africa, with heatwaves occurring more frequently across the country. Projections further suggest that temperatures in South Africa are rising at a faster rate than in many other regions globally (Department of Environment, Forestry and Fisheries, 2019). Average temperatures are expected to increase by as much as 4°C, contributing to a heightened frequency and intensity of heatwave events (Wright *et al.*, 2023).

Although felt on the world stage, climate change reflects deep structural inequalities in both contribution and impact across global, regional, and sectoral levels. While Africa contributes minimally to global greenhouse gas emissions, it remains the most vulnerable to climate variability, extreme weather, and food insecurity (Awe Tachegea *et al.*, 2025). South Africa stands as a continental outlier with relatively higher emissions due to its coal-based economy, yet its overall global contribution remains modest (Hayo and Hasegawa, 2024). Agriculture embodies this paradox: it contributes significantly to emissions, particularly methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O), while simultaneously being highly vulnerable to climate shocks such as droughts, floods, and rising temperatures. These pressures have already reduced agricultural productivity and threaten food security, rural livelihoods, and economic stability (Ortiz-Bobea *et al.*, 2021). Despite this, climate policy and Just Transition debates have largely prioritised energy over agriculture, overlooking the sector's dual role and its critical importance for equitable climate adaptation.

Within the citrus value chain, inequalities in both emissions and climate impacts are stark and unevenly distributed. Farmers and growers contribute through fertiliser use, irrigation, and land management practices; agri-processing and cold-chain systems add emissions through energy-intensive operations; and retailers and export markets drive high-emission production and logistics through stringent standards and global demand patterns. Yet these upstream and downstream actors possess greater resources and adaptive capacity. In contrast, farm workers, who contribute negligibly to emissions, bear the greatest burden of climate change through heat stress, insecure employment, and limited bargaining power. Their exposure is intensified by pre-existing inequalities in wages, labour conditions, and social protections. This imbalance highlights a clear case of climate injustice: those who contribute least to emissions benefit the least and are most vulnerable, underscoring the need to disaggregate climate responsibility and impact across the value chain and centre worker-focused, equitable adaptation strategies.

## **3. Citrus Production**

Post-apartheid restructuring liberalised South African agriculture and integrated it into global value chains, enabling export growth and creating high-income opportunities for a segment of commercial farmers and agri-businesses. By 2016, a third of formal agricultural employers were in the top income decile and half in the top 30 per cent though these gains were racially skewed (Makgetla *et al.* 2019: 94) and sharply contrasted with low farm worker wages. The citrus sector exemplifies this

transformation: once state-controlled, it is now globally competitive, export-driven, and highly consolidated, with around 1,200 growers dominating export production and value chain activities. South Africa has become the world's second-largest citrus exporter, with exports rising from R28.3 billion in 2022 to R33.9 billion in 2023 (NAMC 2024: 2), still rising to R44.9 billion in 2025 (Reuters, 2026). Production has expanded to over 101,000 hectares, and export volumes reached a record 203.4 million cartons in 2025, with projections of 215 million cartons for 2026 (Ntshabele, 2025), reinforcing citrus as the country's highest-value agricultural export sector.

Regionally, the Eastern Cape plays a central role, contributing about 27 per cent of national production and generating billions in export revenue, while the Sundays River Valley stands out as a key hub driving growth, particularly in lemons. The area combines favourable climatic conditions, strong logistics, and high-quality production, with major firms like the Sundays River Citrus Company packing millions of cartons annually and employing thousands of workers. Despite this success, climate change poses growing risks to production and fruit quality, requiring ongoing adaptation measures. Crucially, the sector's "high-road" success in markets and production contrasts with persistent inequalities in labour conditions, wages, and worker security, highlighting a disconnect between rising export income and the precarious realities faced by the workforce.

#### **4. Labour Markets: Secondary, Segmented, and Sweated**

The labour markets supplying employees to the citrus industry in South Africa reflect entrenched inequalities and forms of sweated labour, which are best explained by segmented labour market theories. Historically, farm workers were excluded from legal protections, creating a repressive labour regime that entrenched employer power and cheap, unfree labour. Although post-apartheid reforms and integration into global value chains introduced labour standards and formal protections, their impact has been uneven. The citrus sector is characterised by a secondary labour market, characterised by low wages, precarious employment, and limited mobility. Drawing on Amartya Sen's capabilities approach, workers lack both basic (housing, food, services) and enhanced (education, training) capabilities, restricting their ability to improve their livelihoods. These structural conditions, combined with weak bargaining power and limited unionisation, reinforce deep inequalities in the labour market.

Segmentation also shapes inequality within the citrus sector, producing differentiated outcomes along racial, gender, and national lines. White (mostly male) ownership and management contrasts sharply with a predominantly African workforce, where men are more likely to secure permanent roles and women are concentrated in seasonal, insecure jobs. Migrant workers from neighbouring countries face additional precarity, low wages, and social isolation. Employment is often informal and uncertain, relying on networks or seasonal rehiring with no guarantees. Workers endure short employment cycles (4-6 months), followed by periods of severe income insecurity, hunger, and reliance on social grants. Poor living conditions – especially in informal settlements vulnerable to flooding and extreme weather – highlight their exposure to climate risks. Limited access to education and skills development further entrenches their position in low-skilled work, undermining their ability to transition to alternative employment as climate policies reshape agriculture. These realities illustrate how

labour market segmentation, combined with poverty and weak social protections, heightens vulnerability and demands a climate justice and Just Transition approach that centres workers' lived conditions.

To support a Just Transition, policy must directly address these structural inequalities and build resilience among citrus workers. Key recommendations include:

- Ensure Unemployment Insurance Fund coverage for seasonal and migrant workers is effective and functional.
- Introduce income support mechanisms that are gender responsive and flexible for women citrus workers.
- Create climate resilient farm worker communities with the expansion of proper housing and service, health care facilities, educational and training centres, among other services and resources.
- Introduce a climate shock fund with contributions from retailers, exporters, employers, and the state to support programmes to create climate resilient farm worker communities and to invest in farm worker skills training and development that prepare them to participate in labour markets in the transition and adaptation phases of climate change.

## **5. The Nature of Citrus Work, Employment Conditions, and Standards**

Citrus production and packaging are intensely demanding work, defined by physically strenuous tasks, relentless pace, and increasingly harsh environmental conditions. As the sector celebrates record export growth, these achievements are underpinned by labour performed under rising temperatures that strain human endurance. Both orchard and packhouse work generates significant metabolic heat through heavy exertion, compounded by external heat from the sun, machinery, and lighting. Workers consistently describe the labour process as exhausting and fast-paced, requiring constant movement, lifting, bending, and standing for long hours. As climate change drives higher temperatures, the sector faces a critical contradiction: expanding production while relying on a workforce already operating at the limits of physical capacity, with minimal adjustments to protect their health or sustain productivity.

Workers' testimonies reveal the severe and often dangerous conditions they endure, alongside a stark absence of effective protection. Orchard workers report direct exposure to extreme heat without shade, protective clothing, or adequate access to water, leading to fainting, sunburn, rashes, nosebleeds, and even job loss when they collapse. One worker explained that fainting is treated as being "unfit to work," resulting in dismissal. Packhouse workers similarly describe heat from machines and lighting, causing dehydration, dizziness, headaches, and blurred vision, while strict clothing rules intensify discomfort. The work itself – lifting heavy boxes, repeating tasks at high speed, and standing all day – results in swollen feet, back pain, and abdominal strain. Testimonies also highlight exposure to loud noise and forklift fumes, with limited or inconsistent access to protective gear such as earplugs, which are often only provided during audits. In both settings, workers emphasise the lack of employers' responses to rising temperatures: no adjustment of working hours, limited breaks, and strict time limits on hydration. These accounts collectively demonstrate that citrus work

is not only strenuous but also increasingly unsafe, with climate risks exacerbating already strenuous labour conditions.

To address these conditions and align the sector with principles of climate justice and a just transition, urgent policy interventions are required to climate-proof labour standards and protect workers' health and livelihoods. Key policy recommendations include:

- Legislating and enforcing maximum working temperature thresholds in orchards and packhouses.
- Establishing joint employer-worker protocols to monitor temperatures and prevent heat-related illnesses.
- Mandating regular rest and hydration breaks, with accessible water stations and shaded areas and/or other protections against excessive heat.
- Installing effective ventilation systems in packhouses to reduce heat from machinery and lighting.
- Integrating climate risks into occupational health and safety regulations, including private compliance systems.
- Adjusting or reducing working hours in response to extreme weather and climate variability.
- Ensuring that any changes to working time and conditions are negotiated with workers to reflect their needs and realities.

Together, these measures are essential to safeguard workers, sustain production, and ensure that the transition to a climate-resilient agricultural sector does not come at the expense of those whose labour underpins it.

## **5.1 Women Workers**

Women workers in the citrus sector face particularly harsh and gendered forms of labour exploitation, layered onto already strenuous and fast-paced work. Beyond the general physical demands of packing and orchard work, women report serious reproductive health risks, including irregular menstruation, pregnancy complications, and miscarriages linked directly to the intensity of labour. Testimonies describe traumatic incidents, such as a pregnant worker miscarrying mid-shift after hours of physically demanding work, with no preventative measures in place. Despite clear evidence, supported by research highlighting agriculture as a hazardous sector for pregnant women, employers largely deflect responsibility, framing continued work under dangerous conditions as a "choice." Even where protections appear to exist, they are inconsistently applied, often only during audits, exposing a gap between formal compliance and lived realities. Basic needs, such as access to toilets or sanitary support, remain inadequate, further intensifying women's vulnerability and reflecting deep deficits in decent work standards.

The testimonies also expose pervasive and institutionalised forms of gender-based exploitation, particularly the coercive exchange of sex and bribes for employment. Women workers consistently report that supervisors and line managers, who control hiring, demand "a drink," a euphemism for sexual favours or money, in exchange for job opportunities. Refusal often results in exclusion from employment, while desperation driven by poverty and unemployment pushes some women into

exploitative situations. Accounts indicate that this practice is widespread, occurring even before recruitment queues form, with those unable to pay or comply being turned away. Bribery is equally entrenched, with workers required to pay cash and provide alcohol, sometimes repeatedly, to secure or retain jobs. Migrant workers are especially vulnerable to these practices. Formal grievance systems, such as complaint boxes, are widely viewed as ineffective and compromised, with reports of complaints being ignored or destroyed by those in power. This entrenched abuse reflects profound power imbalances and a systemic failure by employers to enforce legal protections, undermining both dignity and access to work for women.

Addressing these conditions requires urgent, gender-responsive interventions that confront both climate-related vulnerabilities and structural inequalities in the workplace. Key policy recommendations include:

- Enforcing the Employment Equity Act (1998) and the Code of Good Practice on the Prevention and Elimination of Harassment (2022) through coordinated action by government and employers.
- Introducing immediate and effective protections for pregnant workers, including adjusted duties and safe working conditions.
- Developing and strictly enforcing workplace policies that prohibit sexual favours and bribery in recruitment and employment.
- Strengthening independent oversight and inspections by labour authorities and private auditors to ensure compliance.
- Promoting women's access to permanent employment and increasing their representation in supervisory roles.
- Providing accessible counselling and support services for survivors of sexual harassment and abuse, alongside punitive interventions for perpetrators.
- Reforming hiring practices by removing recruitment powers from supervisors and ensuring transparent, employer-led processes with safeguards against corruption.
- Regulating labour brokers and ensuring equal treatment for all workers, including migrants and seasonal employees.
- Establishing effective, secure, and independent reporting mechanisms that protect workers from retaliation.

These measures are essential to creating a labour market where women can work without coercion, violence, or exploitation, and where dignity, safety, and equality are foundational rather than aspirational.

## **5.2 Wages**

Wages in the citrus sector remain structurally low, with statutory minimum wages often functioning as a ceiling rather than a floor due to weak worker organisation and employer dominance in wage-setting. In orchards and packhouses, fragmented systems – especially piece-rate and incentive-based pay – shift risk onto workers while intensifying labour demands. Workers consistently describe these wages as insufficient for basic survival, noting that even reaching the minimum wage requires meeting extremely high and often unattainable production targets. The system reflects deep inequalities in labour relations, where employers unilaterally determine rates,

conditions, and targets, reinforcing precarity across seasonal and migrant labour forces.

Workers' testimonies reveal the harsh realities behind these wage systems. Orchard workers describe being forced into large teams where earnings per crate are split, making it difficult to secure a decent income; one worker explained that to reach the minimum wage, they would need to fill up to 60 crates under physically exhausting conditions. Others highlighted long unpaid waiting periods in the mornings due to the weather, resulting in extremely low fortnightly earnings (as little as R1000). In packhouses, workers face intense daily targets – such as packing 15,000 oranges in a few hours – with incentives contingent on perfect consistency, creating constant stress and fear of penalties or dismissal. Across both settings, workers report skipping water and toilet breaks to maintain productivity, while migrants and women face even greater vulnerability through lower wages and harsher conditions. These testimonies underscore a system marked by unpaid labour, relentless pressure, and deteriorating physical and mental health.

Climate change is compounding these injustices by intensifying heat exposure, reducing fruit quality, and cutting working hours and incomes. Workers report that extreme heat damages crops, leading to fewer hours in packhouses and lost earnings, while also directly affecting their health and productivity. The piece-rate system exacerbates these risks by incentivising overwork and discouraging rest, even under dangerous conditions. This highlights the urgent need for scholarly and policy engagement in reconceptualising wages within frameworks of climate justice and the just transition – viewing wages not merely as compensation, but as central to workers' resilience, dignity, and adaptive capacity in the face of climate shocks. A shift toward living wages and equitable labour standards is essential for a just and sustainable agricultural system and must include the following recommendations:

- Review production targets in line with climate variability and human physical limits.
- Abandon piece-rate systems for orchard workers.
- Establish joint wage-setting mechanisms and implement a living wage.
- Enforce equal pay across gender and nationality in orchards and packhouses.
- Increase the statutory minimum wage.

### **5.3 Night Shift Work**

Night shift work in orchards and packhouses is marked by unsafe conditions, weak enforcement of labour protections, and significant risks to workers' health and safety. Although legal frameworks require regular medical checks, workers report that these are largely absent, with employers citing costs as a reason for non-compliance. Testimonies highlight exhausting and hazardous conditions: forklift drivers work while fatigued and “sleepy,” often driving recklessly without adequate rest or health monitoring; truck drivers and loaders are pressured by tight export deadlines, leading to skipped or shortened breaks; and orchard sprayers operate open tractors at night, exposing themselves to harmful pesticides that affect their eyes and lungs. Workers also report that production pressures override basic safety practices, leaving them vulnerable to accidents and long-term health damage. Women on night shifts face additional dangers, expressing fear over unsafe travel in the dark amid high levels of

crime and gender-based violence. Overall, workers' accounts reveal a system where night labour is essential to production but sustained through inadequate protections, neglected health measures, and constant pressure to meet demanding targets.

#### **5.4 Health and Safety**

Health and safety conditions in citrus orchards and packhouses are marked by widespread non-compliance with both national legislation and private standards, including the Environment Regulations for Workplaces (1987) and SIZA requirements. Although workers are often aware of these frameworks through orientation sessions or audits, implementation is inconsistent or absent in practice. Basic protections such as protective clothing, safe working environments, and provisions for vulnerable groups (including women and pregnant workers) are frequently lacking. A striking example is the failure to provide even mandatory safety equipment such as boots, despite workplace colour codes indicating their compulsory use. Health and safety risks are further intensified by a "product-centric" management approach that prioritises production targets over worker wellbeing, including restricting access to water, limiting breaks, and placing water points far from work sites. Workers report severe dehydration risks in orchards, while in packhouses they are sometimes denied containers for drinking water, forcing them to drink directly from taps under unsafe and unsatisfactory conditions.

These systemic failures significantly undermine workers' health, safety, and ability to cope with climate stressors, particularly rising heat. Workers describe exhaustion, dehydration, chemical exposure, and heat stress as routine features of their working lives, worsened by lack of rest and inadequate facilities. Orchard and packhouse testimonies show that requests for basic necessities like water are often refused on the grounds of productivity, reinforcing a work culture that disregards human needs. This lack of compliance weakens workers' capacity to adapt to climate variability and increases their vulnerability to heat-related illness, chemical exposure, and fatigue-related accidents. It also reflects limited worker agency in enforcing existing labour protections, leaving them exposed to compounding risks from both poor labour practices and climate change impacts. Recommendations for climate justice and workplace safety must:

- Strengthen labour inspections and private audits to enforce medical checks for night shift workers.
- Require employers to fully implement and adapt the Code of Good Practice on the Arrangement of Working Time.
- Integrate climate risk (especially heat exposure) into workplace health and safety regulations.
- Ensure mandatory provision of protective equipment and enforce compliance with safety standards.
- Guarantee accessible drinking water and enforce legally mandated rest and hydration breaks.
- Improve enforcement of national and provincial occupational health and safety legislation in orchards and packhouses.

## 5.5 Worker Voice

Although the citrus-producing Valley is internationally recognised as a high-volume export zone, it is simultaneously marked by recurrent and increasingly violent labour unrest. The Portfolio Committee on Agriculture, Land Reform and Rural Development (2022) notes that the area is characterised by cyclical strikes occurring roughly every four years (2014, 2018, 2022), with severe economic and social consequences. The 2022 strike alone resulted in estimated losses of around R990 million, including lost export revenue and damage to infrastructure, while workers endured unpaid periods and heightened insecurity. Despite the presence of statutory labour protections and private standards such as SIZA, the Committee observed that the underlying labour relations system remains fragile, dominated by a unitarist model in which management retains decision-making authority and worker engagement is treated as discretionary rather than essential. This entrenched asymmetry produces a persistent bargaining gap between employers and seasonal workers, reinforcing a cycle of distrust, protest, and disruption.

A central feature of this system is the widespread non-compliance and dysfunction of private standard requirements for worker participation, particularly the establishment of worker committees under SIZA principles. Although these structures are intended to enable social dialogue in low-union-density sectors, evidence from the Valley shows that they are either absent or heavily compromised. Workers consistently report that committee members are not elected but appointed or indirectly selected by supervisors and managers, often without consultation. One worker described being unexpectedly called forward by a supervisor and informed they had been “chosen by the employer,” illustrating a lack of democratic processes. Others explain that committee members are intimidated and effectively act as extensions of management, with limited ability to raise grievances or influence working conditions. In some cases, employers bypass worker structures entirely by mandating external intermediaries such as community organisations to “represent” workers, further diluting authentic worker voice and undermining collective bargaining capacity.

These labour relations dynamics have direct implications for worker health, safety, and emerging climate justice concerns. Workers describe being channelled through hierarchical grievance systems that rely on supervisors or anonymous boxes, both of which are perceived as ineffective and risky due to retaliation, including being labelled as “troublemakers” or not rehired in subsequent seasons. Testimonies also highlight coercive workplace environments where workers are shouted at to meet production targets and discouraged from raising concerns about heat stress or requesting basic relief such as water. The absence of meaningful worker voice weakens compliance with health and safety standards, including PPE provision, which is sometimes issued only to satisfy audit appearances rather than genuine protection. In the context of intensifying climate change and rising heat exposure risks, this unitarist labour regime deepens vulnerability, undermines decent work principles, and obstructs climate-resilient labour practices. The Portfolio Committee’s findings, together with worker testimonies, underscore that, without structural shifts toward genuine social dialogue and collective bargaining, the sector’s labour relations model will continue to reproduce inequality, instability, and exposure to environmental and occupational harm. Policy recommendations embedded in a climate justice framework for supporting worker voice will:

- Institutionalise worker participation in climate governance through local climate forums linked to municipal, provincial, and national climate structures.
- Establish and enforce authentic, democratically-elected worker committees monitored by statutory bodies and independent auditors to ensure compliance with labour standards.
- Protect and strengthen migrant and seasonal workers' rights to organise and participate fully in workplace and climate governance structures.

## **6. Policy Recommendations: Value Chain Accountability for Climate Justice**

- Require retailers and exporters to adopt binding gender-responsive climate justice labour and social standards across the citrus value chain.
- Establish jointly funded mechanisms with employers to progressively implement living wage frameworks for seasonal and permanent workers.
- Introduce strengthened ethical sourcing premiums and enforceable compliance mechanisms tied to labour rights, climate protections, and social standards.

## **7. Orientating Climate Resilience, Climate Justice, and the Just Transition for Citrus Workers**

The just transition and climate justice in the citrus sector are deeply contested concepts, shaped by unequal contributions to and impacts of climate change across the value chain. While employers and agribusinesses generate a disproportionate share of greenhouse gas emissions and hold the resources to invest in mitigation and adaptation, citrus workers contribute minimally yet bear the greatest burdens of climate impacts, including heat stress, income insecurity, and precarious working conditions. Although the just transition has evolved globally, from its origins in the US trade union struggles in the 1970s to a widely adopted policy framework emphasising “leaving no one behind”, scholarly work emphasises that it is not a unified or inherently equitable concept (Nightingale, 2018; Sterling, 2014; Wilgosh *et al.*, 2022). Rather, it is a contested political and normative space where competing interests shape whether transitions are genuinely transformative or merely technical adjustments that preserve existing inequalities. As such, defining the just transition and climate justice requires confronting embedded historical relations of power in capitalist agriculture and recognising that low-wage agricultural workers have been structurally excluded from decision-making processes that directly determine their exposure to climate risk.

In this context, the central concern is the tension between technocratic transition management and democratic participation. The Just Transition and climate justice cannot be achieved without addressing the asymmetrical social relations of production that define agricultural systems such as citrus production. These relations shape who defines transition pathways, whose knowledge counts, and whose interests are protected or marginalised. Without bottom-up participation, the Just Transition risks becoming a managerial tool that obscures structural inequality rather than transforming it. Strengthening democratic participation of vulnerable workers is therefore essential, particularly through meaningful labour rights, enforceable social protections, and collective voice in workplace and policy governance. Conceptual frameworks such as the capability approach and “wages in the public interest” are useful in this regard because they treat wages and social rights as conversion

mechanisms that enable workers to convert formal entitlements into real climate resilience and wellbeing. In this framing, labour standards, gender-responsive climate adaptation strategies, and enforceable social protections become central instruments for ensuring that Just Transition processes are not only inclusive in rhetoric, but materially redistributive in practice, enabling genuinely just and climate-resilient outcomes for citrus workers.

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Supported by:  Commonwealth  
Foundation