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TOWARDS A JUST TRANSITION IN THE SOUTH AFRICAN FOOD SYSTEM – KEY ISSUES AND COMPETING PERSPECTIVES

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EXECUTIVE SUMMARY

The purpose of this discussion paper is to describe the deep ecological and social challenges associated with the South African food system, and the consequent need for a comprehensive approach to adaptation that builds resilience in socially just ways. It therefore emphasises the need for a holistic just transition agenda for the food system in the form of: policy and public discourse, the approach to sustainability, and in the procedures of participation through which such an agenda is formulated and enacted.

Any transition in the South African food system would have to grapple with the fact that it currently demonstrates significant social inequalities, with close to a fifth of households considered food insecure. This is despite the fact that South Africa is considered a food secure country, in that the agricultural sector produces enough food to feed the population at a national level. Thus our food system currently does not adequately meet most of the population's social needs in terms of food accessibility, affordability, and nutritional sufficiency. This undermines the potential for adaptation that achieves ecological and social resilience.

These inequalities are partly rooted in a highly unequal agro-food system of production and ownership. A mere 15 000 large-scale farms produce the bulk of the food supplied to commercial markets, while some 2.3 million (largely Black) smallholder farmers produce food for subsistence and markets. Labour in the agro-food system is often precarious and low-paid, highlighting the urgent need for a decent work agenda, as well as agrarian reform, in a transition.

At the same time, the food system is deeply vulnerable to climate change: the Southern African region is a climate change "hotspot" and is forecast to heat at double the global average, while significant declines in food production are predicted due to climate impacts. As a major consumer of fossil fuels, South African agriculture's vulnerability is further deepened by rising energy costs, as well as load shedding. In parallel to this, the agricultural sector impacts significantly on the environment and is a significant contributor to the country's GHG emissions; thus necessitating both mitigation and adaptation.

We identify a range of existing approaches to the transition in the food system put forward by different actors including agroindustry, food justice advocates, policy advocates, and NGOs and social movements: market-centred, greening the system, food justice, and systemic change approaches. These approaches are largely aligned to varying economic and political interests. While the market-centred remains prevalent in policy approaches and political influence, approaches that centre more far-reaching ecological changes to production and consumption, combined with structural changes for distributional and social justice, need to play a greater role in informing policy making. This is otherwise known as a *deep* just transition.

However, a just transition in these terms will face powerful incumbent interests in the food system resistant to change. A key challenge is, therefore, how to build a viable coalition around a developmental strategy that can drive long-term change in the face of trade-offs, costs, and countervailing forces. The current institutional and policy inertia in initiating a just transition towards sustainable food systems also points to the necessity of strengthening a broad and progressive social coalition. This coalition can be empowered to instigate necessary pressure and shifts towards a food system that reflects a rights-based economic model that centres care, and social and environmental wellbeing.

These proposals could further the agenda of a just transition in South Africa's food system, prioritising the needs of communities and social partners, while simultaneously identifying the strategic demands and pathways to developing transformative resilience in our food system.

A strong coalition for transformative change would need to be supported through research which identifies the existing and potential threats to social equity arising through the differing sustainability transition pathways in the agro-industries. This includes further research aimed at understanding existing adaptation strategies by main actors in specific agro-industries and what their impacts, particularly on workers in those value chains, are. Such research can therefore inform rights-centred thinking on policy options and development strategy for a just transition in the agro-industries. A just transition framework may further complement these efforts, especially if its exact principles and criteria applicable to people's struggles and the South African context are further elaborated in a bottom-up and collaborative way. These proposals could further the agenda of a just transition in South Africa's food system, prioritising the needs of communities and social partners, while simultaneously identifying the strategic demands and pathways to developing transformative resilience in our food system.

Woman planting Onions on Suikerbossie farm, Koue Bokkeveld / Cedarberg region, South Africa.
(Photo: Cheryl-Samantha Owen / Alamy Stock Photo)

1 INTRODUCTION

Food systems globally are one of the largest contributors to the emissions causing climate change (Tubiello *et al*., 2021), and are the single largest cause of the global biodiversity crisis (Benton *et al.*, 2021). They are also deeply vulnerable to climate change impacts. South Africa is no exception. Global and local developments in the climate policy space reflect an increasing awareness of the urgent need to address the climate impacts and vulnerabilities of food systems. Together, these raise questions about how to achieve a just transition in the South African food system, towards a food system that decarbonises, improves nutrition, builds equitable livelihoods, and is ecologically harmonious. Such questions are inadequately answered by South African government policy. The Just Transition Framework developed by the Presidential Climate Commission (PCC) recognises agriculture as an 'at risk' sector. However, it lacks a holistic perspective of the food system. Current government policy provides little direction for what kind of outcomes a just transition in our food system should yield, or indeed what constitutes a transition that can be commonly experienced as 'just' by the breadth of constituencies affected.

The purpose of this discussion paper is to describe the social and ecological challenges associated with the South African food system. Consequently, it emphasises the need for a comprehensive approach to adaptation that builds resilience in socially just ways. Adaptation refers to the ecological, social, and economic adjustments to increase the capacity of a system to cope with climate change impacts (UNFCCC, 2015). However, adaptation should build *transformative* resilience: deep transformations of our social, economic, political, and ecological systems to enhance the ability of those systems to anticipate, prepare for, and respond to hazardous events, trends, or disturbances (Baloyi et al, 2022). This points to the need for a holistic just transition agenda for the food system to be embedded in government policy and public discourse, concrete approaches to sustainability in the food system, and in the procedures of participation through which such an agenda is formulated and enacted.

Cattle grazing near Elliot, Eastern Cape, South Africa.
(Photo: David Keith Jones / Alamy Stock Photo)

While some technologies and existing capacities for greening of production processes are key to a transition, ensuring these are subordinated to measures to achieve the right to food and address prevailing power and social inequalities will be critical to achieving a transition that is just and transformative.

The notion of the 'just transition' refers to the process of shifting an ecologically harmful industry towards a sustainable set of practices and processes in ways that do not burden workers and communities who depend on those existing industries with the consequent costs. A just transition also ensures broad social inclusion and equality in the transition's benefits (IEJ, 2022). Much of the prevailing just transition discourse and policy has focused on the energy system. This is unsurprising given the dominant contribution that the country's polluting, coal-fired energy system makes to its carbon emissions, the number of jobs at stake in the necessary transition away from coal, and the on-going energy crisis manifested in rolling blackouts. However, given the deep social inequalities in the food system, its ecological impacts, and its extensive vulnerabilities to climate change, there is an urgent need to transition to a food system that achieves equitable livelihoods and decent work, environmental sustainability, and nutritious diets for all. This will require deep and multifaceted shifts in that system.

The discussion paper is structured as follows. Section 2 shows that the South African food system is embedded in, and reproduces, deep social inequalities and injustices, seen in issues like persistent levels of food insecurity and malnutrition, and low-wage and precarious work in agro-industries. Section 3 shows that agriculture and associated agro-industries are extremely vulnerable to climate impacts, which raises the need for adaptation. However, the system also contributes to emissions causing climate change and other environmental problems, and so mitigation strategies are also needed. These two sections therefore illustrate the nature of the ecological and social problems in the food system, which urgently call for a just transition that builds adaptation and resilience through addressing the social and economic drivers of inequality. This raises questions of what the current momentum is regarding sustainability issues in the food system, and what the balance of power between different sustainability approaches is. Section 4 therefore turns to interrogating the prominent approaches to transition in the food system, particularly as it relates to discussions in the South African context. We identify a spectrum ranging from "market-centred", to "greening of production", to "food justice", to calls for deeper "systemic change" of social and ecological relations as a basis of transition. We assert that simply tweaking the existing system, or providing green modifications to it, risks reproducing and entrenching existing social inequalities. While some technologies and existing capacities for greening of production processes are key to a transition, ensuring these are subordinated to measures to achieve the right to food and address prevailing power and social inequalities will be critical to achieving a transition that is just and transformative. Section 5, therefore, discusses the need to continue strengthening coalitions for change in the context of entrenched interests opposed to a just transition. Section 6 points to research and advocacy needs aimed at strengthening the case for, and social force needed to advance, a just food system transition.

2

THE SOCIAL INEQUALITIES AND INJUSTICES OF SOUTH AFRICA'S FOOD SYSTEM

Without pre-emptive action, the impacts of climate change are likely to reproduce and deepen social inequalities (Oxfam, 2020). Crucial to a just transition, therefore, are measures to confront inequality. Currently, the South African agro-food system reflects, is shaped by, and reproduces the country's sharp social and economic inequalities. This section gives a brief introduction to the country's agro-food system and examines its inequalities seen in the agrarian production structure, in patterns of consumption, food insecurity, and malnutrition, and in the conditions of labour in the existing agro-industries.

2.1 Agro-economic context

South African agriculture makes significant contributions to the economy, employment and livelihoods. The sector contributed about 3.2% to GDP in 2021. This is an increase from the previous ten years where the contribution consistently remained between 2-2.5% (StatsSA, 2021; World Bank, 2021). Alongside this contribution to GDP, the agricultural sector plays an important role in the economy in a range of other ways. Firstly, its employment impact is high relative to its contribution to GDP. In 2020 it was responsible for 6% of formal employment in the country (Makgetla, 2020). Including seasonal and impermanent jobs, it employs a total of approximately 860 000 people (varying seasonally), of a total of approximately 15.9 million jobs nationally (NAMC, 2023; StatsSA, 2023). The employment it creates is located largely in rural areas where there are high levels of poverty and few other job opportunities. Secondly, it has downstream linkages to food processing and beverage industries. Agro-processing of food products made up approximately another 2.6% of GDP in 2021 and is one of the largest components of the manufacturing sector by employment, providing approximately 20% of formal manufacturing jobs in the same year (between 300 000 to 451 000 jobs in total) (DALRRD, 2021; TIPS, 2020). Thirdly, agriculture made up approximately 10% of export revenues in 2022 (***IOL***, 2023; CEIC Data, 2023), thereby being a significant contributor to foreign exchange earnings. This largely comes from citrus, wine, grapes, corn, and wool, with citrus accounting for the largest share of 42.2% of agricultural export earnings in 2021, followed by table grapes at 19.1% (Absa, 2022).

TEXTBOX 1

Defining a food system

A food system can be broadly defined as encompassing a web of actors, processes, and interactions involved in inputs, production, processing, and distribution and consumption of food, which interact with the environmental, political, social, and economic contexts. Food systems operate at multiple scales: the local level is influenced by national, regional, and international policy, while national food systems' architectures are influenced by local and international practices and pressures (HLPE, 2017).

Black women farmers control less than 1% of the water used in agriculture (Tekwa and Adesina, 2023). Yet, estimates by Aliber and Mdoda (2015) suggest that the food that smallholders produce equates to about 20-25% of the value-added of the large-scale commercial agriculture sector.

Finally, agricultural production in South Africa is diverse and the country does not need to import most fruits or vegetables to meet dietary needs, although high amounts of wheat and poultry, which are important in the make-up of current diets, are imported (FAO et al, 2022). Agriculture also makes up the largest share of South Africa's land (38%) and water (60%) use, and therefore has a disproportionate spatial and environmental impact (StatsSA, 2020; Baleta and Pegram, 2014). In macro terms, agriculture and the broader food system are therefore an important economic sector. But it is riven with social inequalities and injustices - questions with which any perspective and action on the food system in the context of climate change would have to grapple. This starts with the reproduction of a sharply unequal production and ownership structure.

2.2 An unequal production and ownership structure

The South African agro-food system exhibits an apparent dualistic structure that is a key foundation of inequalities. On the one hand, there are about 40 000 officially-recorded (tax registered) commercial farm units in the country, but most of our food is produced by around 15 000 commercial farm units, mostly white-owned (Hodge *et al.*, 2021). This food is then provisioned primarily through a corporate-controlled distribution, processing, manufacturing, and retailing network. On the other hand, about 2.3 million Black smallholder farmers still produce food for their own households and supplementary local sales, and a further 230 000 or so Black smallholders produce for markets (Greenberg, 2015). They generally do so with little support and restricted access to productive resources. For example, only 5% of water used by the agricultural sector is used by smallholder Black farmers (DWS, 2018). These patterns of water use are also gendered - Black women farmers control less than 1% of the water used in agriculture (Tekwa and Adesina, 2023). Yet, estimates by Aliber and Mdoda (2015) suggest that the food that smallholders produce equates to about 20-25% of the value-added of the large-scale commercial agriculture sector. A failed post-apartheid land and agrarian reform programme has largely left this unequal agrarian structure, with its intersecting race, class, and gender inequalities, intact.

Such inequalities are rooted in historical land dispossession and the architecture of support built for the commercial agricultural sector under apartheid. After 1994, the ANC government sought to deepen the deregulation and liberalisation of agriculture that had begun in the 1980s (De Klerk, 1996), culminating in the Marketing of Agricultural Products Act (Act 47 of 1996). This was done on the belief that the Act's removal of the various policy and support measures that propped up white agro-food capital would result in a more level playing field in relation to Black farmers and entrants. However, the opposite seems to have happened: as a result of dismantling of support measures and increased competition, between 1990 and 2008 the number of commercial farm units in the country declined by 76% (Vink and van Rooyen, 2009). Agricultural production has thus become more concentrated as farm business consolidation has become a key response to the competitive environment. Similarly, liberalisation allowed for institutions such as cooperatives that had built up significant value and market position through decades of state support to turn this into privatised market power. Thus today, food storage, processing, and manufacturing is highly concentrated in corporate hands (Greenberg, 2015). In the dualities of this system, while commercial agriculture has largely developed its own privatised forms of support, Black smallholders continue to suffer under the constraints of a lacklustre land and agrarian reform programme and inadequate state support (Cousins, 2013).

These patterns of inequality continue along various stages of the agro-food system. For example, the grocery retail sector is highly concentrated, with only five corporate retailers cornering 64% of the grocery retail market in 2019 (Competition Commission, 2019). The informal economy accounts for only 30% of food retail sales, but the number of informal retail outlets far outnumber those of formal retail: by 2014 there were about 100 000 spaza shops and 650 000 street traders in the country, a predominant proportion of whom sell food (Masojada, 2019; Rogan and Skinner, 2017). While the corporate retail sector enjoys high levels of power in the food system, the informal food retail sector therefore still provides livelihoods to significant numbers of people. It also supports the dominant agro-food sector through being an outlet for its products, and it plays an important role in food access by the urban poor (Battersby *et al.*, 2016). However, it is poorly supported by the state and, as Battersby (2020) and the Competition Commission (2019) have noted, is often actively undermined by state policy and action.

These inequalities in the food system extend to questions of consumption and nutrition, where the profitability and productive power of the dominant agro-food apparatus contrast with persistently high levels of food insecurity and malnutrition.

2.3 Inequalities in consumption and nutrition

Household food insecurity[1] is pervasive in South Africa, despite the country being considered food secure at the national level, in that it produces enough to feed the population (and a wide diversity of foods) (FAO et al, 2022). StatsSA (2022) estimates that 23.6% of South Africans were affected by moderate to severe food insecurity in 2019, with women and Black Africans more likely to be affected. The pandemic's impact on chronic unemployment deepened food insecurity and hunger (van der Berg *et al.*, 2021; Hart *et al.*, 2022). In addition to this, the energy and loadshedding crisis (Engineering News, 2023) amongst other challenges, continues to place pressure on production, processing, and consumption, contributing to food price inflation, which hits the poor hardest.[2]

Malnutrition is also a key public health challenge in South Africa. Malnutrition arises from the under-consumption of nutrient-rich foods, particularly fresh fruit and vegetables, and over consumption of energy-dense starches and ultra-processed foods high in salt, sugar, and fat (FAO *et al.*, 2022; Haggblade *et al.*, 2016; Pereira, 2016). Consumption of sugary, salty, and ultra-processed foods are also increasing, with significant implications for rates of non-communicable diseases (NCDs) and obesity (FAO *et al.*, 2022). Thus 21 million people are estimated to be overweight or obese - 68% of women and 31% of men (FAO *et al.*, 2022). Furthermore, in 2016 almost 27% of children under five were reported as stunted, where their growth and development is impaired as a result of poor nutrition (SADHS, 2016).

Child and maternal hunger have important developmental implications. While limited longitudinal data is available on the challenge of maternal hunger, the 2020 CoCare Maternal Support study revealed 39% of pregnant and post-partum mothers surveyed reported going to bed hungry at least once in the past week (Mabaso *et al.*, 2021). The MATCH study found that of the 2 214 pregnant and new mothers surveyed, 16% reported that they had gone to bed hungry at least once in the last week (Hunt *et al.*, 2021). These deprivations in the first years of life have significant implications for the ability of children to reach their full physical and cognitive potential. They thus reproduce the deep, racialised inequality in our society, as the risk of stunting, obesity, and diet-related NCDs is disproportionately carried by poor, Black populations. These class inequalities are also reproduced through the conditions of labour across the agro-industries.

1. Food security refers to "a state which exists when all people, at all times, have physical and economic access to sufficient, safe, nutritious food to meet their dietary needs and food preferences for an active life" (StatsSA, 2019).
2. According to the January 2023 Household Affordability Index (PMBEJD, 2023), the average cost of the foods prioritised and bought first in the household food basket increased by R367.30 (15.7%) from R2 338.83 in January 2022 to R2 706.13 in January 2023.

Temporary workers often have no contract, or are unable to understand, or not empowered to negotiate, their contract. Female farmworkers often receive the lowest wages, and are most at risk of casualised working conditions, reduced hours, and retrenchment (Visser and Ferrer, 2015).

2.4 Precarious and low wage labour

While the South African food system is highly productive, produces a wide diversity of foods, and employs a significant number of people, it is characterised by high rates of exploitation and precarity of workers. Workers in the agricultural sector experience some of the highest levels of precarity in the country, yet organisational representation and power is also low - it has been estimated that only about 10% of agricultural workers are unionised (TCOE, 2016). Until recently, farm workers received a lower minimum wage than other sectors and even with the new minimum wage (R25.42 per hour), workers struggle to make ends meet, thus also displaying high levels of food insecurity (Devereux *et al.*, 2019; Ledger, 2016).

Employment is often seasonal, casualised, and conducted through labour brokers. Decreased state support for agriculture since the early 1990s and liberalisation of trade, which increased the power of both domestic and retail buyers in the global north in relation to farmers and the former's ability to accrue greater shares of value at the expense of the latter, led farmers to adjust labour costs through greater casualisation and greater employment of impermanent labour (Visser, 2016). Temporary workers often have no contract, or are unable to understand, or not empowered to negotiate, their contract. Female farmworkers often receive the lowest wages, and are most at risk of casualised working conditions, reduced hours, and retrenchment (Visser and Ferrer, 2015). This level of precarity and low income of agricultural workers contrasts with the incomes of economic actors in the agricultural value chain like farm owners. Makgetla (2020) finds that worker remuneration accounts for just a quarter of sectoral value added in agriculture, while for the rest of the economy it is half.

Extensive casualisation and precarity has also defined the conditions of labour in the agro-industries beyond farming. The restructuring of the labour process in the manufacturing sector in South Africa, especially through labour brokering, accelerated since the 1990s, including in food processing and manufacturing. However, the formal trade union movement has been unable to develop an effective response to this restructuring. This is seen in declining union density in the overall manufacturing sector: in 1990, 70.16% of manufacturing workers were unionised, but this declined to just 29.8% in 2017 (Dor, 2019). Precarious work has thus become embedded at the heart of manufacturing production, food manufacturing included. This has also been accompanied by a deskilling of work to allow for more flexible and precarious employment arrangements in the pursuit of corporate profitability, and has deepened the political fragmentation of workers in the factory and weakened the power of trade unions in food manufacturing (and across the manufacturing sector) (Dor, 2019).

The South African Food system is therefore deeply unequal and unjust. This inequality exists at the level of material resources - between those who cannot afford a nutritious diet and those who can; and between working people (those of hungry households, smallholder farmers, informal traders, and precarious workers) and the dominant, concentrated set of corporate actors that illustrate consistent profitability and economic dominance. This inequality also relates to power in the food system, in terms of working people and their economic marginality, weak collective power in relation to the state and dominant corporate actors, and the lack of supportive state policy and action on the one hand; and the economic and political power of dominant food system actors to shape the system through market power and state policy, on the other (Ledger, 2016). These are some of the social features that any sustainability transition in the food system, if left unaddressed, would interact with. We now turn to exploring the ecological features of the South African food system in relation to climate change, illustrating why a transition in terms of adaptation and mitigation is necessary.

3

FOOD, CLIMATE CHANGE, AND SUSTAINABILITY: KEY CHALLENGES FOR A JUST TRANSITION

Globally and in South Africa, food systems are one of the principal contributors to the emissions causing climate change, but they are also vulnerable to climate change impacts. This calls for mitigation measures in the food system to lower its emissions as part of the overall reductions required, through changes in production and consumption practices. However, food system vulnerabilities to climate change in South Africa call for comprehensive adaptation measures in a food system transition as well, an issue we now turn to, before discussing that same vulnerable system's contributions to climate change and environmental degradation. Key to consider is the ways in which these impacts could further reproduce and deepen the social inequalities described above.

3.1 Food system vulnerabilities to climate change

The South African food system is already subject to multiple stressors and has low adaptive capacity (the ability to adjust in order to cope with climate impacts), and thus is vulnerable to the effects of climate change (Carter and Gulati, 2014). The broader Southern African region is a climate change 'hotspot' and is forecast to heat at double the global average (Hoegh-Guldberg *et al.*, 2018). Climate change predictions for South Africa show high confidence for a hotter climate in the future, while rainfall predictions suggest an overall increase in water stress in Southern Africa (MacKellar *et al.*, 2014). This is likely to be compounded by extreme weather events, such as heatwaves and flooding. In this context, and with some of the highest global rates of food insecurity, Southern Africa is also expected to experience some of the greatest declines in food production (John Hopkins, no date). With most arable land being rainfed in South Africa, increasing rainfall variability will have dire effects on livelihoods, food availability, and prices (and therefore accessibility of food) (Johnston *et al.*, 2013).

Maize and wheat are South Africa's staple foods, and with projected warming and rainfall patterns, the production of both will suffer significant losses. Maize is particularly sensitive to temperature and rainfall changes (Johnston *et al.*, 2013). For example, climate change will significantly reduce the growth duration of maize, which means it has less time to accumulate biomass (and hence yield). Under a scenario of 2°C of global warming above pre-industrial levels, by 2090 maize will take 27 less days to reach maturity compared to the 1995-2014 period, and 61 less days under an extreme global warming scenario of 3.6°C above pre-industrial levels. This makes South Africa the second most impacted country globally, in this regard, after Lesotho (Cloete, 2023).

Outlined below are the further impacts of climate change on the agricultural sector. Each of these phenomena are expected to have marked effects on different agricultural sub-sectors.

- **Heat waves and extremely hot days have the following impacts:**
  - » Heat stress can cause physical ailments for workers such as increased heart rates, cramps, dizziness, fatigue, and nausea. This could have severe impacts on the health and wellbeing of farmworkers, as indicated by the death of seven workers in the Northern Cape due to heat stroke during the heatwave of January 2023 (***EWN***, 2023). On the production side, this may cause a drop in the amount of food produced per worker due to lowered physical labour capacity at high temperatures. In South Africa, 7% of working hours could be lost by 2030 which amounts to 13 000 full-time jobs (Global Change Institute, 2020).
  - » We could see a reduction in the quality and quantity of milk and meat produced by cows and sheep. In cases of extreme heat it could lead to animal death (Global Change Institute, 2020).
  - » A reduction in crop yields due to changes in season timing, shifts in growing location, and length of the growing season. This will also impact harvesting and planting dates (Johnston, 2016) and therefore also the employment patterns of seasonal workers (in the context of labour casualisation).
- **Aridity/droughts could have the following impacts:**
  - » Less water may be available for agricultural production, resulting in severe stress on farming (we have already seen some of the impacts of this due to load shedding; see Text Box 2 'Load shedding: Deepening food system vulnerabilities').
  - » Livestock will be affected directly as they require water to survive, with indirect impacts of limited grazing fodder in response to drought. This would be worsened in cases of fire (TIPS, 2020).
  - » Livestock may also be affected by the impacts of drought and increased temperatures on crop production, as most livestock diets are dependent on, or supplemented with, maize and soy feed, especially those in commercial feedlots.
  - » Smallholders are more vulnerable to these problems as they already face limited water access, and are less likely to be able to afford modern machinery and inputs or technologies that may assist with adaptation. In addition, they have less access to insurance or forms of financial security (Ortmann and King, 2007).

Xhosa huts and a cattle kraal along the Mazeppa Bay.
(Photo: Eric Nathan / Alamy Stock Photo)

- **Extreme rainfall events have the following impacts**
  - » Extreme rainfall can destroy harvests and negatively affect yield levels and quality. Farm workers report that flooding can destroy harvests by washing away seeds.
  - » Hail storms can destroy already grown produce, making it almost impossible to sell.
  - » Soil depletion and erosion can change the kind of vegetation that grows in an area, with an increase in plants that animals do not eat, affecting grazing (DAFF, 2015).

Climate change impacts may therefore include crop failures, rising production costs, and rising food prices. This will impact workers through their working conditions, as well as by changing production arrangements as farmers respond to weather shifts.

TEXTBOX 2

Loadshedding: deepening food system vulnerabilities

South Africa's highly commercialised and concentrated agricultural system is responsible for only 2% of South Africa's energy use (DMRE, 2021), but it is highly dependent on electricity and the use of fossil fuels to function. Diesel and petrol supply 68% of the energy in the sector, mostly for transport of inputs, feed and products to market, and to power farm machinery such as tractors and harvesters. Electricity is 38% of the energy used in the sector (DMRE, 2021). Electricity is used to power water pumps for irrigation and to pump water for livestock to drink, to refrigerate produce and animal vaccines, to provide clean water for the washing of produce, and is also necessary in the packaging process. Given that much of the country's best produce is shipped overseas (especially fruit), electricity is also used for refrigeration to keep produce fresh for long-distance trade, for pest control, and for other phytosanitary reasons.

Given the system's energy dependency, when electricity supply breaks down, this has a number of ripple effects on a food system that, we have shown, is already unequal and unjust. Inconsistent electricity has reportedly led to crop losses due to inability to irrigate, lower crop yield due to lower irrigation, and farmers are reported to be planting less area in order to avoid losses when they cannot irrigate (Child, 2023; Papayya, 2022).

In January 2023, annual consumer inflation had decreased to 6.9%, but food price inflation had increased to 13.4%, the highest rate of increase since 2009 (StatsSA, 2023b). In South Africa's globalised food system, a number of factors are behind these food price rises, including the weakening of the Rand since September 2022, global supply chain disruptions since Covid-19 and Russia's invasion of Ukraine, rising fertiliser and input costs, and adverse growing conditions in other parts of the world that have raised the global price of grains and cereals. However, load shedding has led to lower food supply and higher production costs and so because of this, even if the effects of the other factors behind food price rises ease, high-food prices are expected to remain in the months to come (BFAP, 2023a; Mare, 2023).

Working class households are particularly hard hit by rising food prices. For the poorest, a much larger proportion of the household budget is spent on food than those in higher-income deciles. This means food price rises hit them particularly hard. Such households have little choice but to respond to higher food prices (and rising costs of other necessities like electricity and transport) by reducing overall food consumption and/or reducing consumption of higher-nutrient and more expensive foods in favour of more bulky, starchy foods with lower nutrient content (PMBEJD, 2021a and 2021b). Load shedding is thus a further national dynamic that is deepening the intersecting energy and food crises. In the context of persisting inequality, it is also aggravating the impacts of low wages and high unemployment, further undermining the Constitutionally-enshrined right to food.

3.2 Indirect climate impacts on the agro-industries

Alongside these direct impacts, anticipated shifts in demand by consumers and regulation by governments in response to climate change may fundamentally reshape food systems, and so the livelihoods of workers, especially in agricultural export sectors. This could occur through increased environmental provisions in preferential trade agreements (Brandi *et al.*, 2020). An increased consumer focus on embedded water/ CO_{2e} intensity of food production in destination markets could become further reflected in the private standards that retail buyers in markets like the European Union require of South African producers. While the European Union's Carbon Border Adjustment Mechanism (CBAM) does not yet include food imports, it seems that agricultural exports from South Africa could face tougher environmental standards in the future, impacting export market access. Parallel to climate impacts, certain geopolitical interventions related to shifts in energy markets have also been shown to have dire consequences for certain commodity value chains (the Russia-Ukraine war being one example). The rising costs of artificial fertiliser (as a result of rising gas prices), fuel, and chemicals have been putting increasing pressure on producers and food prices (BFAP, 2023b). Sudden spikes in agricultural commodity prices, for example due to shortages, can put strain on processors, which could place downward pressure on wages. More research needs to be done to better understand the impacts of these changes on workers in specific agro-industries.

A further area where climate may impact workers and livelihoods is through shifting diets. For example, there is increasing momentum globally for major changes in diet which (if enacted) will severely impact animal-based foods, because of their key contribution to climate change emissions (see Section 3 below). The EAT-Lancet Commission (2020) suggests that overall red meat consumption is required to fall by 50% globally by 2050, alongside a wider decline in the consumption of animal-sourced products, in order to reduce emissions related to agriculture. This particularly includes a reduction in the consumption of beef, the intensive production of which has an ultra-high ecological impact (see Willet *et al.*, 2019). In broad terms, such factors would suggest the need for the shrinkage of the livestock industry for red meat consumption in order to reduce emissions and ecological impacts, with efforts to reduce demand being a key lever (Lohman, 2023).

If such shifts were to take place in South Africa, a significant number of livelihoods would be impacted. The livestock industry, while exhibiting a low labour-intensity, employs a large number of people (an estimated 21.4% and 24.5% of total agricultural employment in commercial and mixed farming respectively) (StatsSA, 2020). Livestock also plays an important role in household agriculture, conducted predominantly by Black families. In 2019, an estimated 1.1 million households engaged in livestock farming (StatsSA, 2020). However, ownership of particularly large animals such as cattle is highly gendered, in that they tend to be owned and controlled by men (DALRRD, 2021). The meat industry more broadly is important for incomes, contributing more than 50% of agricultural incomes in six of South Africa's nine provinces (Makgetla *et al.*, 2021). Once limited to discussions about fossil fuel-related industries, the 'stranded asset' problem (infrastructure and assets that no longer attract investments and returns) is an increasing matter of concern in agricultural policy circles too. However, given these features of livestock in South Africa, and the varying livelihood roles played by livestock in the country's unequal agrarian structure, lowering livestock's contributions to emissions is more complicated than simply lowering meat consumption and livestock numbers (one aspect of this, inequality in meat consumption, is explored in Text box 3).

The South African food system's vulnerabilities to climate change therefore call for extensive and planned adaptive measures that not only increase the system's climate resilience and protects jobs, but takes a contextually-specific approach to justice that increases and enhances the quality of jobs and livelihoods, and ensures the right to food. This is also necessary in light of the need to mitigate emissions from the food system, to which the next section turns.

Food production can shape and constrain consumption outcomes in powerful ways, and to the extent that the foods people eat are not simply a product of personal taste and behaviour (Bayliss and Fine, 2021). Most importantly this happens through what types of food are made affordable and easy for consumers to access and what types are not.

TEXTBOX 3

Social inequality and the environmental impacts of meat consumption

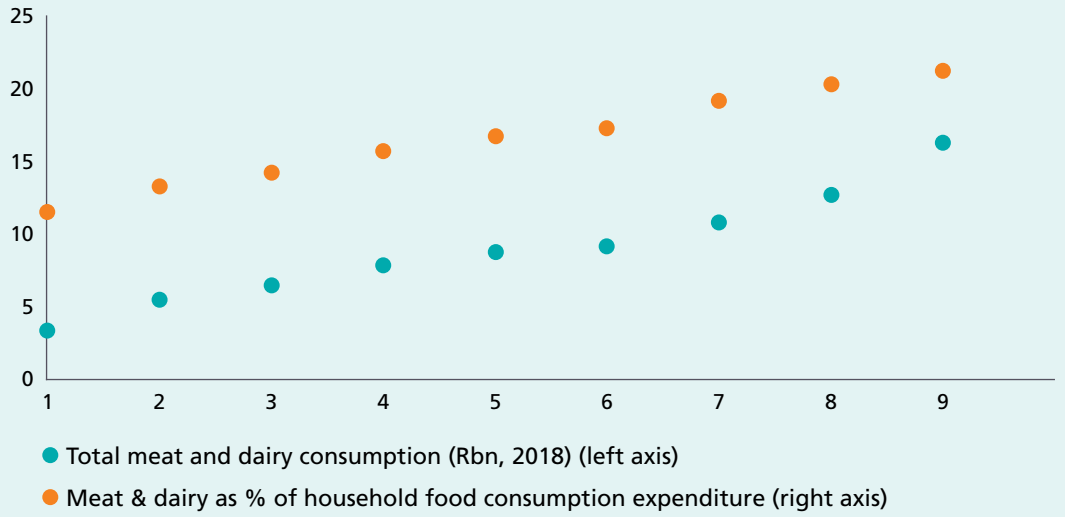
The environmental impacts of food production and consumption are shaped through existing social inequalities, which meat consumption illustrates. By international standards South Africa is a major meat consumer. On a per-capita basis, South African meat consumption is among the highest in Africa (approximately 60kg per capita per annum) and approximately double that of African countries with similar GDP per-capita such as Botswana (25kg), Morocco (34kg), and Egypt (26kg) (FAO, 2017). For context, the South African Food-based Dietary Guidelines recommend consumption of around 33kg of lean meat per year (which averages to 90g per day) (BFAP, 2021). Added to this, South African meat consumption is slanted heavily towards beef consumption and accounts for around a quarter of meat consumed, while there is relatively little consumption of plant-based proteins and fish by international standards (BFAP, 2021) Meat and livestock has been among the faster-growing sub-sectors of the South African food system, and it is expected to continue growing in the coming decade, with an expected 13% increase for beef, 20% for chicken, and 22% for pork (BFAP, 2021)

However, the consumption of high ecological impact foods reflects broader social inequalities. The main problem is excess consumption among the rich. As Figure 1 below shows, wealthier consumption deciles consume more meat and dairy, both relatively and absolutely, with the top income deciles spending around half of their total food consumption expenditure on this, compared to around a quarter for the poorest. These inequalities are particularly stark for beef, with the poorest income decile spending 14 times less on beef than the richest decile.

Food production can shape and constrain consumption outcomes in powerful ways, and to the extent that the foods people eat are not simply a product of personal taste and behaviour (Bayliss and Fine, 2021). Most importantly this happens through what types of food are made affordable and easy for consumers to access and what types are not. This is not always an outcome of thrift in production, but also about the way that powerful actors in the food system may – intentionally or otherwise – weaken or eliminate alternative food provisioning systems through their own growth strategies. A key example is the spread of supermarket retailers' discounting stores into new rural and township markets over recent decades, which has important implications for the capacity of small enterprises to access markets (Bowman, 2021; Greenberg, 2017). Powerful business actors in the food system may also shape regulation and governance of food through lobbying, and shape norms about what types of food are desirable through marketing and product innovation (IPES-Food, 2017; Howard, 2016). Addressing the ecological impacts of meat consumption in South Africa would therefore call for a multi-pronged approach that centres distributional equality, improved nutritional outcomes, and associated regulations.

FIGURE 1:

Meat and dairy consumption by household income decile.



Source: Institute for Economic Justice, 2018

3.3 Food system contributions to climate change and emissions

The global food system is responsible for approximately one third of anthropogenic greenhouse gas (GHG) emissions (Tubiello *et al.*, 2021). This occurs through land use change, agricultural production, energy use, and transport across the value chain, as well as waste production. In South Africa, the agro-food system as a whole was estimated in 2021 to contribute close to one-fifth of the country's GHG emissions, at approximately 18% (Crippa et al, 2021). Of this, farm production is responsible for the largest single share at about 6.7%, land use change about 1%, and pre- and post-production processes (input manufacturing, processing, packaging, retail, and consumption) about 10% (*ibid*). These statistics are shown in Table 1, alongside the statistics for the global food system.

TABLE 1

Food systems emissions as a percentage of total GHG emissions, global and South Africa, 2021

Global		South Africa	
Farming	14%	Farming	7%
Land use change	11%	Land use change	1%
Pre- and post-production processes	9%	Pre- and post-production	10%
Food processing and packaging	2.9%	Food processing and packaging	0.9%
Food transport	1.6%	Food transport	1%
Food retail	1.3%	Food retail	1.2%
Consumption	0.9%	Consumption	5.6%
Food waste disposal	2.9%	Food waste disposal	1.3%
Total	34%	Total	18%

Sources: Crippa et al. (2021) and Tubiello et al. (2021).

While nitrogen is also produced by natural processes, human activities have increased its concentration in the atmosphere by 30% in the past 40 years through the production and use of synthetic fertilisers (Tian et al., 2020).

The main sources of greenhouse gas emissions (GHGs) from the food system are

Methane (CH_4) is the dominant gas emitted by the agricultural sector. It has greater heating effects than carbon dioxide (CO_2) but a much shorter lifespan in the atmosphere. Methane gas in this sector is predominantly produced by a process called enteric fermentation, which happens in the digestive system of certain animals such as cows, sheep, and goats and is exhaled or burped out by the animals. This natural process is compounded by intensive farming practices (such as concentrated feedlots) which result in more methane produced than with extensive livestock grazing (where animals are raised through their lifecycle on open grazing land) (Paustian et al, 2006; Vigne and Mathieu, 2014). The livestock sector is thus by far the biggest contributor to methane emissions from agriculture in South Africa at 49% (DFFE, 2022).

Fertiliser and manure management Nitrogen-based fertilisers produce N_2O, a long-lived GHG which is the third largest contributor to global climate change after carbon dioxide and methane. These types of fertiliser are also very energy intensive to produce, accounting for an estimated 1.3 to 2% of global CO_2 emissions (IEA, 2021). While nitrogen is also produced by natural processes, human activities have increased its concentration in the atmosphere by 30% in the past 40 years through the production and use of synthetic fertilisers (Tian *et al.*, 2020). This is not only a source of GHG emissions, but also has a polluting effect on water sources. Fertilisers in run-off from cultivated land can also contribute to eutrophication[3] of water resources, impacting negatively on biodiversity.

Energy Carbon dioxide is emitted through the use of electricity as well as fuel for machines, cooling, and transport throughout the different stages of the value chain, with the latter contributing approximately 19% of the total food systems emissions globally (Li *et al*, 2022). Global trade contributes significantly to total food-miles, especially for fruits and vegetables using cold-chain logistics (ibid) (a significant export sector of South African agriculture).

Land conversion influences GHG emissions When land is converted, for example from natural grassland or forest to cropland, this changes the amount of CO_2 that the land and vegetation absorbs, stores, or releases. The release of GHG emissions is increased when grassland is converted to cropland, whereas the conversion from grassland to forest decreases the amount of GHG emissions (DFFE (2022). Currently land use change is responsible globally for 11% of emissions from the food system, and about 33% of total human-sourced emissions (Crippa *et al.*, 2021).

Agricultural production Production of field crops contributes 11% of total agricultural emissions in South Africa. Of these field crop emissions, 57% comes from the application of synthetic fertilisers, while the application of lime contributes a further 30%, and crop residues retained in the field another 13% (Tongwane *et al.*, 2016). The largest proportion of crop contribution to GHG emissions are from the growing and harvesting of maize, wheat, and sugarcane production, largely because they are the most extensively cultivated, while industrial production of vegetables have the highest rate of GHG emissions per tonne (Tongwane *et al.*, 2016). Livestock raising is the single largest source of agriculture-related GHG emissions, at 70% of the total derived from agricultural production, due in large part to the process of enteric fermentation, which is responsible for 49% of methane emissions alone (DFFE, 2022).

3. Eutrophication refers to excess growth of algae and plant matter in water bodies when excess nutrients, as a result of pollution from nitrogen fertiliser for example, which leads to oxygen depletion and substantial ecological degradation in the water, impacting other biodiversity.

Food waste In South Africa, estimates suggest approximately 10.3 million tons of food is wasted per year, equating to 34.3% of local produce, and 45.4% of all available food (Oelofse *et al.*, 2021). Approximately 82% of the waste is produced between the production and distribution phases in food supply chains, with almost half occurring during processing. This is largely due to the fact that this is where much of the value is added and involves processes of peeling, cleaning, getting rid of skin and bones, and so on. The most recent statistics show that 18% of waste occurs during consumption (in households and restaurants) (Oelofse *et al.*, 2021).

While the South African food system's contributions to greenhouse gases causing climate change are not as high as the global average, it nonetheless constitutes a significant source (the proportion of which would increase if left unchecked while the energy system was decarbonised). Furthermore, if measures to address social inequality were enacted in a transition, which could increase demand for healthy food such as vegetables, it would be necessary to ensure that it is met through sustainable production techniques that do not lead to increased GHGs or other ecological impacts. The South African agricultural sector is thus an important target for mitigation measures.

This Section has described some aspects of the contributions of the South African food system to climate change and environmental degradation, which calls for measures to mitigate these contributions by lowering emissions. Given the vulnerability of the food system to climate change impacts, adaptation measures are also necessary. Any sustainability transition would also need to address the inequalities of the food system, which also reflect wider societal inequalities. With growing global awareness of the ecological problems of food systems there is also growing momentum for effecting sustainability transitions in food systems. But approaches to sustainability are not uniform, and reflect differing economic and institutional interests, and prevailing power relations. We turn to explore some of these now.

Riebeek West, Swartland region Western Cape, South Africa.
(Photo: Peter Titmuss / Alamy Stock Photo)

Nutrition, consumption, and more broadly the food system, are inevitably deeply affected by any shifts in employment, household incomes, and cost of living (including shifts in energy costs).

4

CONTRASTING VISIONS OF SUSTAINABILITY TRANSITION IN THE FOOD SYSTEM

In the South African context, the term 'just transition' has been most commonly used in discussions of the energy transition, and rarely in relation to the food system. For South Africa to successfully lower emissions and move towards a just, sustainable, and climate-resilient economic pathway, the impacts and opportunities of transition must be considered across sectors. Further, whereas the energy system has been the primary focus of a just transition, an economy-wide approach to a deep just transition is needed (IEJ, 2022). This requires a consideration of the connections between sectors in an overall transition. For example, the potential for agriculture and land reform to create jobs and absorb some of the job losses from the coal sector. Furthermore, nutrition, consumption, and more broadly the food system, are inevitably deeply affected by any shifts in employment, household incomes, and cost of living (including shifts in energy costs). Therefore, to ensure that justice and livelihoods are prioritised in South Africa's just transition, the notion must be expanded to include the agricultural sector and the food system. Thinking about a 'just transition' framework specific to food system change is nascent (see, for example, Kaljonen *et al.*, 2023). However, approaches to sustainability in the food system have pre-dated the prevalence of the just transition concept, in practice and thinking. This section will therefore lay out the major existing approaches to food system change as relevant to South Africa's food system, how they relate to the ecological question, and examine alignment with a just transition framework that aims to support deep, systemic change and justice in South Africa's just transition.

4.1 Approaches to transition in the food system

Earlier in the paper we suggested that adaptation in the food system needs to build transformative resilience, which understands the interconnected technical, social, ecological, and economic changes that need to underpin true resilience. This is made especially important by the prevalence of social and power inequalities across all aspects of the food system. Predominant approaches to change in the food system are not uniform, and so here we show that assessing approaches in relation to questions of technical, social, and ecological change, and their key actors, gives rise to four broad approaches: 'market-centred', 'greening the food system', 'food justice,' and 'systemic change'. It is important to note that these categorisations occur along a spectrum, with some approaches and proponents lying at intersections between the broad categorisations. However, the approaches can broadly be identified with varying interests, institutions, and constituencies, all existing in varying positions to prevailing, unequal power relations.

TABLE 2

Contextual framing of varying approaches to sustainability transition in South Africa.

Approach	Market-centred	Greening the food system	Food justice	Systemic change
Description	• Increase production output to address food crises. Market incentives for sustainable practices. • Technology-centred, limited consideration for social justice and transformation.	• Green production methods to work with nature. • Limited consideration for consumption and justice elements.	• Right to food. • Decent work. • Justice in production and consumption.	• Advocate for fundamental, structural reform in the food system, and includes objectives of distributive and procedural justice in production.
Outlook on food system change	• Economic efficiency. • Ecological modernisation: sustainability through adoption of new technology/ technofixes.	• Production that works with nature. • Develop new markets.	• Human rights and justice. • Improved food access and nutrition.	• Address fundamental inequalities in the food system. • Link to broader economic and land inequities. • Climate justice.
Problems identified	• Low productivity and yield gaps. • Economic and production inefficiency. • Compounded by environmental impacts.	• Ecological impacts of industrial production. • Health impacts.	• Poverty. • Food insecurity, malnutrition. • Inequality. • Poor policy governance for rights realisation.	• Systemic contradictions and inequalities. • Dispossession. • Corporate power.
Solution	• Raise productivity. • Bring capital and markets to bear. • Technological intensification to raise productivity and resource efficiency.	• Organic and regenerative innovation. • Expansion and mainstreaming of organic production. • Green entrepreneurialism.	• Social wage and protection. • Food security policy.	• Systems change. • Social justice as preconditions for addressing structural problems. • Agroecology and food sovereignty. • Redistribution of power and resources.
Agents of change	• Large agribusiness and agritech firms. • Those who shape consumer choice.	• Private sector. • Farmers. • Organic pioneers.	• State (policy, regulation). • Social justice actors.	• Movements and progressive civil society. • Democratised state and state bodies.
Examples and actors	• Climate smart agriculture. • Sustainable intensification. • Incumbent actors in food system: Agri SA, Red Meat Producers Organisation (RPO), Red Meat Industry Forum, Agricultural Business Chamber.	• Regenerative farming. • Conservation agriculture. • Organic farming. • Regenerative Agricultural Association of South Africa, SA Organic Sector Organisation (SAOSO).	• Urban and rural food justice movements and worker organising platforms.	• Global: La Via Campesina. • SA: Agroecology NGOs, Food Sovereignty Campaign, Inyanda National Land Movement, Rural Women's Assembly.

Source: Authors' construction, including drawing some thinking from those like Gimenez and Shattuck (2011), Haysom (2014), Borras et al. (2021), and PLAAS (2022).

The first is a market-centred approach, which centres the role of markets and economic efficiency as the basis for environmental sustainability. Key in this market-centred approach is the role of technology (rather than changes in ecological, social, and economic relations) in solving ecological problems. While certain kinds of technology will play an important role in any transition, the reduction of social and ecological problems to purely technical solutions has been termed a 'technofix'. This approach therefore tends to centre technofixes like more efficient feeds to reduce methane emissions from livestock, genetically modified crops to cope with drought and enhance yield, or digital technologies for fertiliser application, soil monitoring, and so on. Such approaches generally reinforce the interests of private sector-held technologies, so further creating markets for proprietary products (Borras *et al.*, 2022). This approach can include those who favour a reliance on the voluntary initiative of the private sector, and those that seek to pro-actively regulate markets to increase the incentives to adopt purportedly sustainable practices, for example through carbon taxes. This neoliberal approach to the environment extends to the question of food security: food security is posed as a function of production efficiency and scale in output. Key actors in such an approach are the private sector in general, and incumbent dominant actors in agro-industry. It therefore reinforces existing agrarian, social, and economic relations that, as discussed above, underpin the contours of hunger and food insecurity in South Africa, leaving them unaddressed. This is generally the approach adopted by powerful, entrenched actors in South Africa's agro-industries, such as Agri SA and the Red Meat Producers Organisation (RPO).

An example of this market- and technology-centred approach is the notion of sustainable intensification. Sustainable intensification is grounded in the argument that in the context of population growth and climate change, more food needs to be grown on less land. Productivity therefore needs to be significantly increased, with technology a key means to do so. Although the term 'sustainable intensification' was initially associated with practitioners and thinkers like Pretty (1997), their initial proposals were more aligned with agroecology principles (see below). However, today sustainable intensification has become associated with the powerful corporate actors of the unsustainable global food system, and hence promotes privately-held technologies as the means to sustainability. As such, it has been critiqued as a way to sustain the industrial food system, rather than transforming it, and to sustain markets and profitability for corporate interests (Newell and Taylor, 2018; Borras *et al.*, 2022).

The second approach takes the perspective of 'greening' existing production and consumption relations through the adoption of more ecologically harmonious production methods; for example, by implementing practices that work with, rather than against, nature in how water is used and managed, building up the natural fertility of the soil rather than relying on external inputs like artificial fertilisers and pesticides. Key examples are organic and regenerative agriculture practices by, for example, large-scale farmers. However, it also includes welfare programmes implementing organic agricultural practices in poor communities. However, while such sustainable agricultural efforts in poor communities respond to food security needs of the marginalised, they can take place without an emphasis on the wider social transformations needed to ensure justice and equality. Furthermore, this approach advances practices of sustainable food production that are critical to a transition, but they largely occur through existing social relations. On their own they therefore do not address the deeper systemic social problems in the food system discussed above, related to the causes of hunger and food insecurity, the generally marginalised conditions of labour across the food system, and the patterns of control and accumulation that reproduce economic inequality in the food system.

The third approach can be labelled 'food justice', and involves organisations, researchers, and policy advocates that focus on the ability of households to access safe, nutritious, and affordable food. The starting point is that food is a human right, as reflected in the South African Constitution. Measures therefore need to be put in place to ensure poor and working class households' food security, such as through social security measures, improved wages, intervening in food prices, and decommodifying basic services to reduce household costs (see PMBEJD, 2021a), and tends to focus less on production and distribution systems. This category also extends to organisation and representation of food and farm workers, focusing on wages and working conditions. Food justice activism in South Africa has engaged unevenly with the ecological question. However, it is included here because it includes objectives and perspectives that

are crucial to any just food system transition, which is that it should achieve the right to food for all, and decent work for workers in the food system. Furthermore, the factors underpinning injustices regarding workers in the food system (such as pervasive casualisation and precarity, and associated political fragmentation of workers) highlight important complexities that any progressive approach to ecological transition in the food system would have to grapple with.

The fourth category tends to focus on the deeper systemic changes in production and consumption systems needed to achieve sustainable and just food systems, most prominently in the frame of food sovereignty. Food sovereignty refers to the right of people to produce and consume food in ecologically and culturally appropriate ways, and to define their own food systems, as against the inordinate power of corporations and markets to do so (Nyeleni Forum, 2007). It is therefore about practices and policies that are seen to democratise the food system, such as government policies that centre the needs of smallholder food producers and the health and nutrition needs of consumers, rather than the economic priorities of powerful incumbent interests such as food corporations. Central to the systemic change approach is a food system that works with nature, and so it is often positioned against industrial agriculture, which depends on high levels of fossil fuel use, long distance trade, environmentally destructive monoculture production that reduces agricultural biodiversity, and high usage of chemical fertilisers and pesticides that undermine soil fertility and biodiversity (Giraldo and Rosset, 2018). As alternatives, these advocates promote more localised food systems, based on smaller-scale farms, closer links with local and regional markets, and farmer-controlled seed systems to preserve agricultural biodiversity and prevent corporate takeover of seeds, and farm and community level nutrient, water, and seed re-circulation so as to sever farmer dependence on corporate input markets.

A crucial technique for systemic change advocates is agroecology, a system of production that works with the principles of nature, recycles nutrients and resources, minimises the use of external agricultural inputs, and prioritises ecological health and human nutrition. However, beyond only a production technique, agroecology is also seen as a science that combines farmer and indigenous knowledge with formal science, as well as a social movement that emphasises justice in agrarian and societal relations (Gimenez and Shattuck, 2011). The systemic change approach therefore centres the redistribution of property, resources, and power as a basis for addressing hunger and building a sustainable food system.

In South Africa, there are a number of social movements, small-scale farmers, and farm worker and civil society organisations calling for the adoption of agroecology (and of food sovereignty more broadly). This includes calling for state support for agroecological food chains through inputs, production practices, and localised markets to link producers and consumers. Such movements also often link agroecology to calls for wider systemic change, such as through agrarian reform and measures to challenge corporate power in the food system.

Pavement traders in a small South African town in Limpopo province.
(Photo: Paul Gregg / Travel Africa / Alamy Stock Photo)

4.2 Relating these approaches to principles for a deep, transformative just transition

Given these different approaches to transition in the food system, their association with particular power relations, and fragmentation of organisation from below, we now turn to how they can be understood in relation to the notion of just transition. In turn, this implies also exploring how a deep and transformative notion of just transition might provide a framework of thinking and action amongst progressive actors in the food system, and to counter market-centred, technofix solutions to the just transition that reinforce existing patterns of ownership, control, and inequality.

The Institute for Economic Justice has proposed an approach to the just transition that is deep and transformative (IEJ, 2022). This is aimed at moving beyond market-centred and technofix proposals widely proffered by portions of the private sector and endorsed by the state, to a just transition informed by principles and measures to achieve systemic, transformative change. IEJ outlines six guiding principles in this regard:

1. A just transition should aim for a caring rights-based economy that centres human and planetary wellbeing. This means looking beyond simply the narrow pursuit of economic growth as a fix-all, to investing in social reproduction needs and infrastructure, and in meeting ecological needs.
2. A transition needs to take an economy-wide approach to achieving a low carbon and climate resilient economy. It should be systemic in nature, and consider the relations between sectors.
3. Transformation of ownership, distribution, and access to resources is necessary to consider the kinds of ownership and systems of provision that can ensure needs are met and well being achieved.
4. The process of planning for, and enacting, a just transition needs to be democratic, empowering and context-specific. It must ensure that decision making is democratic and participatory, and it leads to concrete improvements in social conditions informed by such democratic decision making.
5. Given that even participatory decision making is affected by unequal power relations, and that these relations also determine the distribution of costs and benefits of a transition along lines of gender, class, and race, an intersectional feminist lens is necessary to address imbalances of power in decision making and outcomes.
6. Given that South Africa's social and economic order is still shaped by racialised dispossession, a just transition must also be informed by the kinds of restoration needed to work towards equality.

These principles are underpinned by a justice lens, which is critical to tackling climate change as a system-wide challenge. Such a lens is also relevant to the South African food system, given its social inequalities and injustices described in this paper. The guiding frame of justice would therefore be a key link in framing the actions to move from where we are now, to the outcomes that a transition in the food system should achieve: improved nutrition, equitable livelihoods, and ecological harmony (Ambikapathi, 2022). The principles above point to the need for, firstly, distributional justice, which should seek to reconcile sustainability with social equity in the distribution of risks and benefits in the transition process. On one level, this requires the design of effective industrial policy, social policy, and regulatory mechanisms that minimise distributional trade-offs, compensate losers, adapt existing industries in an inclusive manner, and support innovation, and job creation in, and expansion of, more ecologically sustainable activities. On a deeper level as well, given the contours and injustices of the current food system in South Africa, a transition would need to also confront existing inequalities and patterns of worker exploitation and precarity, suggesting deep distributional questions related to power, income, land and means of production.

Secondly, the principles point towards procedural justice, which should ensure equal opportunities for all people to participate in decision-making that concerns them. This also requires that power asymmetries, disparities in capacity, and inadequate engagement processes are addressed. These challenges also point

Recognition justice is grounded in the understanding that while procedural justice is critical, gender, class, race, and institutional hierarchies can deprive certain people of equal opportunity to participate in societal conversations and decision making.

to a third necessary form of justice that should guide a just food system transition process (and that the principle of an intersectional feminist lens points to), which Tribaldo and Kortetmäki (2022) refer to as 'recognition justice'. Recognition justice is grounded in the understanding that while procedural justice is critical, gender, class, race, and institutional hierarchies can deprive certain people of equal opportunity to participate in societal conversations and decision making. The importance of recognition justice can be seen with the example of farmworkers. Many of them still live under far-reaching controls exercised by farmers over their working and living conditions, they often live in relative rural isolation with poor infrastructure, and their voices remain "at the fringes of national priorities" (Naidoo *et al.*, 2017: 188). Women farmworkers are particularly vulnerable to precarity and exploitation, and the silencing of their voices (Visser, 2016). Ensuring that cultural and economically marginalised actors have a voice are therefore important in shaping a just transition.

Running through these forms of justice is a fourth element, related to capacities. In addition to ensuring the various forms of justice-guided transition implementation, capacity building is also required to bolster the adaptive capacity of relevant actors to respond to the demands that both climate change and transition may put on food production and consumption, and to actively engage in decision making processes and confront powerful interests (Tribaldo and Kortetmäki, 2022). Such a suggestion for capacity building is not simply a technicist proposal, but is inherently political when interwoven with measures to ensure distributional, procedural, and recognition justice.

This brings us back to the four broad approaches to transition in the food system in South Africa that we have outlined. Many of these principles and elements of justice are already displayed and advocated for by some of them. The systemic approach highlights the need to change unsustainable and unfair structures and outcomes of the existing food system, so pointing to distributional justice. In addition, agroecology and food sovereignty movements' calls for the democratisation of food systems, at the levels of decision-making, knowledge, and policy, point to important elements of procedural and recognition justice (Tribaldo and Kortetmäki, 2022). Similarly, the food justice approach emphasises the pursuit of equality in access to and consumption of healthy food, and so addressing class, race, and gender inequalities as a precondition for achieving improved nutrition (Tribaldo and Kortetmäki, 2022). By emphasising the rights and wellbeing of food and farm workers, food worker justice also points to a key challenge to be addressed in achieving improved nutrition and equitable livelihoods. Institutions and actors advancing the greening of the food system have important capacities necessary to a sustainability transition, but are not necessarily grounded in justice. Some in this stream will lean politically towards the market-centred approach, but there may be those leaning towards a justice approach, and would have to be identified, potentially as part of a coalition building process.

In this section we have pointed to principles of a general just transition approach and forms of justice that can inform such a transition. The climate crisis is heightening, powerful interests are responding to the climate crisis at the global and policy level, there is the threat of local actors adapting to climate impacts in ways that may harm the interests and needs of working people, and government policy often reflects the organisation of dominant interests in particular sectors (such as in agriculture) and adopts limited notions of resilience and adaptation. This raises the question of coalitions able to advance progressive arguments and action for change in the food system.

5

COALITIONS FOR CHANGE: ALIGNING APPROACHES TO A JUST TRANSITION FRAMEWORK?

The above approach to the just transition recognises that achieving aspirations for just transitions involves addressing not simply technocratic challenges but political ones. That is, the key challenge is not only designing the right policies and instruments, but also how to build a viable coalition around a developmental strategy that can drive long-term change in the face of difficult trade-offs, costs, and countervailing forces. The institutional and policy inertia in terms of a just transition towards sustainable food systems points to the necessity of a broad, progressive social coalition able to advance concrete proposals for socially just decarbonisation and adaptation, and instigate the necessary pressure and shifts. Indeed, research has shown how institutional action towards sustainability transitions usually happens as a result of strategic engagement emerging from prior collective organising and building from below (IPES-Food, 2018).

There are various forms of critical organising from below happening in various parts of the food system, as discussed in Section 4. However, the balance of power still swings in favour of organised commercial agriculture and dominant corporate food actors. This appears to be illustrated, for example, in the main tenets of the Agriculture and Agro-Processing Master Plan (AAMP), which largely reproduces the existing model of agriculture and large-scale commercial farming interests. Furthermore, corporate concentration and power in the food system plays an important role in determining the conditions of agricultural production, and shapes the market, as well as nutritional outcomes. Since 1994, the state's role has largely been one of "abdication in governing the food system" (Adeniyi *et al.*, 2021: v) as a result of the choice to deregulate the food sector in favour of market coordination, principally through the Marketing of Agricultural Products Act of 1996. As a result, powerful corporate actors play a key role in food system governance, and shape consumer norms and the consumer food environment through marketing and imposing their own food standards, and they play a significant role in shaping policy interventions (Adeniyi *et al.*, 2021). There are thus significant vested interests entrenched in the current economic and political arrangement of the food system.

There is currently policy momentum in South Africa related to climate change and the just transition; for example, with the Presidential Climate Commission, the Just Energy Transition Partnership, and the prerogative to develop sector adaptation plans as required by the Climate Change Bill. The PCC's Just Transition Framework has a limited framing for the just transition in agriculture (including not taking a wider food systems focus), and other policies may continue to reflect stances that are both shallow and that reinforce the economic status quo. These policy processes may provide an opportunity for a coalition of progressive actors in the food system to mount a challenge to the current policy bias in favour of the prevailing food system structure and incumbent interests.

Progressive constituencies in the food system, spanning systemic change and food justice perspectives, include NGOs, movements and campaigns that support smallholder farmers and the landless in the frame of agroecology and food sovereignty such as Surplus People's Project, Biowatch, Trust for Community Outreach and Education, and the Climate Justice Charter Movement; formations organising rural women over seed and food sovereignty such as Rural Women's Assembly; trade unions such as AFADWU, FAWU, and SACCAWU organising workers in the food system (mostly in food processing and manufacturing) and formations outside of the formal union movements such as those supported by Casual Workers Advice Office and Women on Farms Project, and farm worker committees supported by the Eastern Cape Agricultural Research Project; and informal traders associations such as the SA Informal Traders Association and Informal Economy Development Forum. However, two possible challenges arise here in relation to a just food system transition. The first is the unevenness in terms of conceptualisations and capacities on the connections between their constituencies, the food system structure, and climate change. For example, formal trade unions may organise workers in relation to wages and working conditions, but this may not yet be connected to contesting wider injustice embedded in the structure of the food system, or its climate change contributions and vulnerabilities. The second is political fragmentation. This relates to the state of organisation of some constituencies from below linked to the divisions incited by the economic and power dynamics in the sector, but also to the extent to which actors like smallholder farmer associations, unions and other forms of worker organising, and informal traders, have found common ground to advance a common agenda in the food system.

In this context, we suggest that there is a need for a progressive framework to address policies related to sustainability in the food system, and that just transition could provide this. Scholars like Tribaldo and Kortetmäki (2022) have suggested a framework of principles and criteria for food systems just transitions. But consolidating such a framework in South Africa calls for further deliberation amongst progressive actors representing and supporting working people in the food system (and in other sectors requiring transition) to further define and elaborate principles and measures in an ongoing, collaborative, and democratic way, and from the vantage points of the different constituencies in the food system. This deliberation could lead to a framework for assessing the justness of government (and private) policies and programmes, and for some level of coordination and collaboration in policy and political action. Such an endeavour would also call for ongoing linkages between research, coalition building, and advocacy.

Farm workers harvesting onions on Suikerbossie farm, Koue Bokkeveld / Cedarberg region, South Africa. (Photo: Paul Gregg / Travel Africa / Alamy Stock Photo)

6

RESEARCH AND ADVOCACY GAPS

Research can potentially play an important role in building the needed conceptual and political frameworks and in supporting coalitions. In a growing body of research on just transitions, the existing agro-industries (such as commercial horticulture, wine, livestock, grains etc) have received relatively little attention to date. In research relating to South Africa specifically, agro-industries are commonly recognised as a critically important sector for the achievement of a just transition,[4] but less work has been done on the actual mechanics of a transition in specific agro-industries compared, for example, to the amount of work that has been done on the energy industry.[5] Drawing from these and other gaps identified in the previous sections, we close this paper by suggesting that the following broad areas could benefit from further research and associated advocacy.

6.1 Identifying how to support workers, communities, and women in line with a just transition in the food system

This paper has identified injustices in the food system embedded in its political and economic dynamics, and within broader societal inequalities. Further research is necessary that seeks to better understand the links between climate change, production, consumption, and working and living conditions in value chains and, consequently, pathways to just transition. This would be necessary to also inform capacity building and mobilisation from below to advocate for concrete principles, measures, and proposals for just transition within particular agro-industries and across the food system. Key in this would also be ongoing horizontal learning and dialogue across various civil society and trade union sectors, to identify the bases of such dialogue and connection, in order to be able to further strengthen a coalition for adaptation and transformative resilience in the food system. This could also include creating platforms for ongoing sharing, learning and collaboration.

6.2 Addressing the configurations of power, institutions, and finance which 'lock in' unsustainable practices in the agro-industries

This would involve unpacking the current status quo in policy and implementation that does not serve and support environmentally just practices, equitable and fair labour practices, and equitable land and market access between agroindustry and small scale producers. It would require that, firstly, we examine policy coherence and alignment with practices on the ground. This would also entail aligning policy proposals across areas, such as social policy (including a universal basic income grant), agricultural policy, agrarian reform, food security policy, and gender equality.

Secondly, it calls for deeper examination of how public funding is currently allocated and how it could be reallocated within a more coherent policy framework that encompasses the ambitions of a just transition in our food

4. For example, COSATU (2011); Parr et al. (2018); and Swilling et al. (2016).
5. For example, Winkler (2020); Burton (2018); Ward (2018); and Semelane et al. (2018).

system. This should link to advocacy and dialogue which creates greater connection between experiences and learnings across different popular constituencies (such as workers along value chains, rural women, smallholder farmers, and informal traders) related to sustainable and just food system interventions on the ground, and policy.

6.3 Prioritising a transformative climate adaptation vision and resisting neoliberal responses to climate adaptation

A strong coalition for transformative change would need to be supported through research which identifies the existing and potential threats to social equity arising through the differing sustainability transition pathways in the agro-industries. This includes further research aimed at understanding existing adaptation strategies by main actors in specific agro-industries and what their impacts, particularly on workers in those value chains, are. This is necessary in order to understand the food system-wide consequences of leaving adaptation to the market instead of developing and implementing a holistic policy approach to adaptation that centres the needs and rights of ordinary communities, workers, and women.

Such research can therefore inform rights-centred thinking on policy options and development strategy for a just transition in the agro-industries. This can include identifying key strategic levers to instigate change towards engendering transformative resilience in the food system in the face of climate change. This could also be linked to the development of stronger connections between progressive narratives on energy justice and transition, and food justice, in light of the ongoing energy crisis and neoliberal financing regime. This points again to the need to pursue an objective of building conceptual, political, and advocacy alignment between various layers of working people in the food system, impacted communities and environmentalists. A just transition framework may help with this, especially if its exact principles and criteria applicable to people's struggles and the South African context are further elaborated in a bottom-up and collaborative way.

There is growing consensus on the need for a transformation in the way food is produced, processed, distributed, and consumed (D'Alessandro *et al.*, 2021). These proposals could further the agenda of a just transition in South Africa's food system, prioritising the needs of communities and social partners, while simultaneously identifying the strategic demands and pathways to developing transformative resilience in our food system.

Farm workers harvesting oranges.
(Photo: AfriPics.com / Alamy Stock Photo)

BIBLIOGRAPHY

Absa. 2022. *AgriTrends 2022*.

Adeniyi, D.A., Losch, B. & Adelle, C. 2021. 'Investigating the South African Food Insecurity Paradox: A Systematic Review of Food System Governance in South Africa.' Food Security SA *Working Paper Series*. Working Paper 009.

Aliber, M. and L. Mdoda. 2015. 'The direct and indirect economic cowntribution of small-scale black agriculture in South Africa', *Agrekon* 54(2), pp. 18-37.

Ambikapathi, R. *et al.* 2022. 'Global food systems transitions have enabled affordable diets but had less favourable outcomes for nutrition, environmental health, inclusion and equity', NatureFood 3, pp. 74-779.

Azomahou, T. T. *et al.* (2022). 'Transition and persistence in the double burden of malnutrition and overweight or obesity: Evidence from South Africa', Food Policy, 102303.

Baleta, H. and Pegram, G., 2014. Water as an input in the food value chain: Understanding the Food Energy, Water Nexus. WWF-SA. Available at: https://www.dffe.gov.za/sites/default/files/docs/waterasaninputintothefoodvaluechain.pdf.

Battersby, J. 2020. 'South Africa's lockdown regulations and the re-inforcement of anti-informality bias', *Agriculture and Human Values*, 37, pp. 543-544..

Battersby, J., M. Marshack and M. Mngcibisa. 2016. 'Mapping the invisible: The informal food economy of Cape Town, South Africa'. Urban Food Security Series No. 24, African Food Security Urban Network (AFSUN), University of Cape Town.

Bayliss, K. and B. Fine. 2020. *A Guide to the Systems of Provision Approach*. Springer International Publishing.

Benton, T.G. *et al.* 2021. Food System Impacts on Biodiversity Loss: Three Levers for Food System Transformation in Support of Nature. Chatham House.

BFAP (Bureau for Food and Agriculture Policy). 2021. *BFAP Baseline: Agricultural Outlook 2021-2030*. Pretoria: BFAP.

BFAP (Bureau for Food and Agriculture Policy). 2023a. 'Food inflation brief'. Pretoria: BFAP.

BFAP (Bureau for Food and Agriculture Policy). 2023b. 'Perspectives on agriculture's performance in Q4 of 2022'. Pretoria: BFAP.

Borras, S.M. Jr., I. Scoones, A. Baviskar, M. Edelman, N.L. Peluso and W. Wolford. 2022. 'Climate change and agrarian struggles: an invitation to contribute to a JPS Forum', *The Journal of Peasant Studies* 49:1, 1-28.

Bowman, A. 2021. 'Inclusive industrialisation in agro-processing: challenges faced by small and medium-sized maize processors in South Africa'. IIAP working paper.

Burton, J. *et al.* 2018. 'Coal transitions in South Africa: Understanding the implications of a 2°C-compatible coal phase-out plan for South Africa'. IDDRI and Climate Strategies.

Business Day. 2023. 'Power cuts are sowing the seeds of food crisis, say farmers', 12 January. https://www.businesslive.co.za/bd/national/2023-01-12-power-cuts-are-sowing-the-seeds-of-food-crisis-say-farmers/

Carter, S. and Gulati, M. 2014. *Climate change, the Food Energy Water Nexus and food security in South Africa. Understanding the Food Energy Water Nexus.* WWF-SA, South Africa.

CEIC Data. 2023. 'South Africa exports'. https://www.ceicdata.com/en/south-africa/exports-incl-blns-sars-by-region/exports.

Child, K. 2023. 'Power cuts are sowing the seeds of food crisis, say farmers', 12 January. https://www.businesslive.co.za/bd/national/2023-01-12-power-cuts-are-sowing-the-seeds-of-food-crisis-say-farmers/#. Accessed 28 February 2023.

Cloete, B. 2023. 'Climate vulnerability of southern Africa'. Economic Research Southern Africa and CVF V20.

Competition Commission. 2019. *The Grocery Retail Market Inquiry: Final Report.* Pretoria: Competition Commission.

COSATU. (Congress of South African Trade Unions) Policy Framework on Climate Change. 2011.

Cousins, B. 2013. 'Land reform and agriculture uncoupled: The political economy of rural reform in post-apartheid South Africa', in P. Hebinck and B. Cousins (eds.) *In the Shadow of Policy: Everyday Practices in South African Land and Agrarian Reform.* Johannesburg: Wits University Press.

DAFF (Department of Agriculture, Forestry and Fisheries), 2015. Draft Climate Change Adaptation Adaptation And Mitigation Plan For South African Agricultural And Forestry Sectors. Available at: https://static.pmg.org.za/150603climatechangeadaptation.pdf.

D'Alessandro, C, Bizzotto Molina, P, Dekeyser, K and Rampa, F (2021) 'Understanding and managing trade-offs in food systems interventions: the case of nakuru county, kenya' ECDPM Discussion Paper No. 293

DALRRD (Department of Agriculture, Land Reform and Rural Development), 2021. Agriculture and Agro-processing Master Framework Agreement: Draft version 6 March.

De Klerk, M. 1991. 'The accumulation crisis in agriculture', in S. Gelb (ed.) *South Africa's Economic Crisis.* London and New York: Zed Books.

Department of Forestry, Fisheries and the Environment (DFFE). 2022. *National GHG Inventory Report 2000- 2020.*

Devereux, S., R, Hall and C. Solomon. 2019. 'The farm workers who produce our food are the most vulnerable to hunger', *Mail and Guardian,* 8 October. https://mg.co.za/article/2019-10-08-00-the-farm-workers-who-produce-our-food-are-the-most-vulnerable-to-hunger/.

DMRE (Department of Mineral Resources and Energy). 2021. *The South African Energy Sector Report 2021.* Pretoria: DMRE.

Dor, L. 2019. 'Precarious workers and the labour process: A multi-sited case study of management control and worker resistance'. Unpublished MA Dissertation, University of Johannesburg, Johannesburg.

DTI (Department of Trade and Industry), 2021. Agro Processing – The Department of Trade Industry and Competition. [online] Available at: http://www.thedtic.gov.za/sectors-and-services-2/industrial-development/agro-processing/.

DWS (Department of Water and Sanitation). 2018. *National Water and Sanitation Master Plan: Volume 2: Plan To Action (Version 2).*

EAT-Lancet. 2020. 'Healthy diets from sustainable food systems' https://eatforum.org/eat-lancet-commission/eat-lancet-commission-summary-report/.

Engineering News. 2023. *An Energy Crisis is Seeping Into South Africa's Food Supply.* https://www.engineeringnews.co.za/article/an-energy-crisis-is-seeping-into-south-africas-food-supply-2023-01-18/rep_id:4136

EWN (Eye Witness News). 2023. 'Northern Cape farmworkers' deaths over heatstroke could've been avoided: union', 22 January. Northern-cape-farmworkers-deaths-over-heatstroke-could-ve-been-avoided-union. Accessed 25/01/2023.

FAO. 2017. Regional overview of food security and nutrition - Building resilience for in times of conflict and crisis: food security and nutrition a perspective from the Near East and North Africa (NENA) region, Cairo. 62 pp.

FAO. 2021. FAOSTAT: Emissions Shares [South Africa]. https://www.fao.org/faostat/en/#data/EM.

FAO, European UNion, CIRAD and DST-NRF Centre of Excelence in Food Security (CoE-FS). 2022. *Food Systems Profile - South Africa: Catalysing the sustainable and inclusive transformation of food systems.* https://foodsecurity.ac.za/publications/food-systems-profile-south-africa-catalysing-the-sustainable-and-inclusive-transformation-of-food-systems/.

https://www.foodsystemprimer.org/food-production/food-and-climate-change/. Accessed 02/03/2023

Greenberg, S. 2017. Corporate power in the agro-food system and the consumer food environment in South Africa. The Journal of Peasant Studies. 44(2):467–496.

Giménez, E.H., & Annie Shattuck (2011) Food crises, food regimes and food

movements: rumblings of reform or tides of transformation?, The Journal of Peasant Studies, 38:1,

109-144, DOI: 10.1080/03066150.2010.538578

Giraldo, O. F., & Rosset, P. M. (2018) Agroecology as a territory in dispute: between institutionality and social movements, The Journal of Peasant Studies, 45:3, 545-564, DOI: 10.1080/03066150.2017.1353496

Global Change Institute (2020)

Greenberg, S. (2015) Agrarian reform and South Africa's agro-food system, The Journal of Peasant Studies, 42:5, 957-979, DOI: 10.1080/03066150.2014.993620

Haggblade, S., Duodu, K. G., Kabasa, J. D., Minnaar, A., Ojijo, N. K., & Taylor, J. R. (2016). Emerging early actions to bend the curve in sub-Saharan Africa's nutrition transition. Food and nutrition bulletin, 37(2), 219-241.

Haysom, G. 2014. Food System Governance for Urban Sustainability in the Global South. PhD thesis. UCT.

Hodge, J. *et al.* 2021. Measuring Concentration and Participation in the South African Economy: Levels and Trends. Summary Report of Findings and Recommendations. Competition Commission.

Hart, T. G., Davids, Y. D., Rule, S., Tirivanhu, P., & Mtyingizane, S. (2022). The COVID-19 pandemic reveals an unprecedented rise in hunger: The South African Government was ill-prepared to meet the challenge. Scientific African, 16, e01169.

HLPE (High Level Panel of Experts). 2017. *Nutrition and Food Systems: A Report by the High Level Panel of Experts on Food Security and Nutrition.* Committee on World Food Security.

Hoegh-Guldberg, O., D. Jacob, M. Taylor., *et al.*, 2018. Impacts of 1.5ºC Global Warming on Natural and Human Systems. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 175-312. https://doi.org/10.1017/9781009157940.005.

Howard, P. H. (2016). Concentration and power in the food system: Who controls what we eat?. Bloomsbury Publishing.

Hunt, X., Stein, D.J.,Spaull, N., Tomlinson, M. 2021. Hunger as a driver of depressive symptoms: Optimising responses to mental health aspects of the COVID-19 pandemic. South African Medical Journal. Vol 111. No 7.

IEA (2021), Ammonia Technology Roadmap, IEA, Paris https://www.iea.org/reports/ammonia-technology-roadmap, License: CC BY 4.0

Institute for Economic Justice. 2018. Mitigating the impact of the VAT increase: Can zero-rating help? Accessible here: https://www.iej.org.za/wp-content/uploads/2019/05/Mitigating-the-impact-of-VAT-increase-by-extending-zero-rating-IEJ-report-09-08-18.pdf. Accessed on 11 May 2023.

Institute for Economic Justice. 2022. *Towards a Just Transition for Workers and Affected Communities.* IEJ Position Paper. Johannesburg: Institute for Economic Justice.

IOL (Independent Online). 2023. 'SA's agricultural export earnings rack up $12.8bn record in 2022', 28 February. https://www.iol.co.za/business-report/economy/sas-agricultural-export-earnings-rack-up-128bn-record-in-2022-ee04e06a-a8b2-48c7-83b9-c5aeaad37987. Accessed 21 March 2023.

IPES-Food. 2017. Too big to feed: Exploring the impacts of mega-mergers, consolidation and concentration of power in the agri-food sector

IPES-Food. 2018. *Breaking Away from Industrial Food and Farming Systems: Seven Case Studies of Agroecological Transition.* IPES-Food.

John Hopkins. No date. Food and Climate Change - Food Production - Food System Primer - Johns Hopkins University.

Johnston, P. *et al.* 2013. 'South Africa'. In: Southern African Agriculture and Climate Change: A Comprehensive Analysis, edited by S. Hachigonta *et al.* International Food Policy Research Institute (IFPRI).

Johnston, P., 2016. Modelling Impacts Of Climate Change On Selected South African Crop Farming Systems. Water Research Commission. Available at: http://www.wrc.org.za/wp-content/uploads/mdocs/1882-1-161.pdf.

Kaljonen, M., T. Kortetmaki and T. Tribaldos. 2023. 'Introduction to the special issue on just food system transition: Tackling inequalities for sustainability', *Environmental Innovation and Societal Transitions* 46, 100688.

Ledger, T. 2016. *An Empty Plate: Why We Are Losing the Battle For Our Food System and What We Can Do About It.* Auckland Park: Jacana.

Li, M. *et al.* 2022.' Global food-miles account for nearly 20% of total food-systems emissions', Nature Food 3, 1-9.

Lohman, P.M. 2023. 'Long-lasting impact of information on meat consumption', *Nature Food* 4, pp. 205–206.

Mabaso, M. *et al.* 2021. 'Impact of COVID-19 on wellbeing of pregnant women in 7 neighbourhoods in the Western Cape.' Johannesburg: Grow Great Campaign.

MacKellar N. *et al.* 2014. 'Observed and modelled trends in rainfall and temperature for South Africa: 1960-2010', S. Afr. J. Sci. doi:10.1590/sajs.2014/20130353

Makgetla, N., 2020. Inequality in South Africa: An overview. Trade & Industrial Policy Strategies. Available at: https://www.tips.org.za/images/TIPS_Working_Paper_Inequality_in_South_Africa_An_Overview_September_2020.pdf.

Makgetla *et al.*. 2021. National Employment Vulnerability Assessment: Analysis of potential climate- change related impacts and vulnerable groups. Trade and Industrial Policy Strategies (TIPS).

Mare, F. 2023. 'What monsters lurk in the dark? The impact of load shedding on food systems in South Africa', 14 March. https://www.ufs.ac.za/templates/news-archive-item/campus-news/202…-dark-the-impact-of-loadshedding-on-food-systems-in-south-africa. Accessed 21 March 2023.

Masojada, M. 2019. 'The South African retail landscape', in J. Lappeman, P. Egan, G. Rightford & T. Ramogase (eds.), *Marketing to South African consumers*. Cape Town: UCT Liberty Institute of Strategic Marketing & UCT Libraries.

Mazzucato, M. 2018. Mission-oriented innovation policies: challenges and opportunities, *Industrial and Corporate Change* 27(5) 803–815.

NAMC (National Agricultural Marketing Council). 2023. *Macroeconomic Digest: An Update on Selected Macroeconomic Indicators: Labour - February 2023.* Pretoria: NAMC.

Naidoo, L., G. Klerck and K. Helliker. 2017. 'Resisting accumulation by dispossession: Organisation and mobilisation by the rural poor in contemporary South Africa', in Kapoor (ed.), *Against Colonisation and Rural Dispossession*. London: Zed Press.

Newell, P., and O. Taylor. 2018. "Contested Landscapes: The Global Political Economy of Climate-

Smart Agriculture." Journal of Peasant Studies 45 (1): 108–129.

Nyeleni Forum. 2007. 'Declaration of Nyeleni'. Available at https://nyeleni.org/IMG/pdf/DeclNyeleni-en.pdf.

Oelofse, S. *et al.* 2021. 'Increasing Reliable, Scientific Data And Information On Food Losses And Waste In South Africa.' Pretoria: CSIR. Available at: https://wasteroadmap.co.za/wp-content/uploads/2021/06/17-CSIR-Final_Technical-report_Food-waste.pdf

O'Keane. 2007. 'Depression during pregnancy' *BMJ*;334:1003

Ortmann, G. F. and R.P. King. 2007. 'Agricultural co-operatives II: Can they facilitate access of small-scale farmers in South Africa to input and product markets?', *Agrekon* 46(2),219–244.

Pappaya, M. 2022. 'Food security under threat as farmers take hit from Eskom's power cuts', 22 September. https://www.businesslive.co.za/bd/national/2022-09-22-food-security-under-threat-as-farmers-take-hit-from-eskoms-power-cuts/#. Accessed 28 February 2023.

Parr, B. *t al.* 2018. 'The Paris Agreement and South Africa's just transition'. Melbourne Sustainable Society Institute, *Briefing Paper 10.*

Paustian, K. *et al.* 2006.' Agriculture's Role in Greenhouse Gas Mitigation', Pew Center on Global Climate Change available at: http://www.c2es.org/docUploads/Agriculture%27s%20Role%20in%20GHG%20Mitigation.pdf.

Pereira, L. M. 2014. The future of South Africa's food system: What is research telling us. SA Food Lab South Africa.

PLAAS. 2022. 'Climate Change and Rural Livelihoods in Southern Africa: A Research and Policy Agenda'. Bellville, Institute for Poverty, Land and Agrarian Studies.

PMBEJD (Pietermaritzburg Economic Justice and Dignity). 2021a. 'Key data in May 2021: Food, workers and children'. PMBEJD_May-2021_Media-Statement-26052021.pdf.

PMBEJD (Pietermaritzburg Economic Justice and Dignity). 2021b. 'Food poverty lines, child support grant levels, and wage increases'. PMBEJD_September-2021-Report_29092021.pdf.

Pretty, J.N. 1997. 'The sustainable intensification of agriculture', *Natural Resources Forum* 21: 247-256.

Rogan, M. and C. Skinner. 2017. 'Employment in the South African Informal Sector: Interrogating Trends, Identifying Opportunities'. In F. Fourie (ed.) *Tackling Unemployment and Poverty in South Africa: The Contribution of the Informal Sector.* Cape Town: HSRC.

Reardon, T. *t al*. 2021. 'The processed food revolution in African food systems and the double burden of malnutrition', *Global Food Security*, 28 100466.

Semelane, S *et al.* 2018. Development Of A Re-Skilling Plan For South Africa In Support Of A Just Energy Transition. RES4Africa/CSIR

StatsSA. 2019. *Towards measuring the Extent of Food Security in South Africa: An Examination of Hunger and Food Inadequacy.* Pretoria: Statistics South Africa.

StatsSA, 2020. Census of commercial agriculture 2017: Financial and production statistics. Available at:http://www.statssa.gov.za/publications/Report-11-02-01/Report-11-02-012017.pdf.

StatsSA, 2021. Gross Domestic Product: 2nd quarter 2021. Available at: http://www.statssa.gov.za/publications/P0441/GDP%202021%20Q2%20(Media%20presentation).pdf.

StatsSA. 2023. *Quarterly Labour Force Survey (QLFS) Q4: 2022.* Pretoria: Statistics South Africa.

StatsSA. 2023b. 'Inflations cools to 6.9%'. https://www.statssa.gov.za/?p=16079.

Swilling, M. *et al.* 2016. 'Developmental States and Sustainability Transitions: Prospects of a Just Transition in South Africa', Journal of Environmental Policy & Planning, 18:5, 650-672

Tian, H., Xu, R., Canadell, J., *et al.*, 2020. A comprehensive quantification of global nitrous oxide sources and sinks. Nature, 586(7828), pp.248-256.

Tekwa, N. and J.O. Adesina. 2023. 'Land, water, and gender questions in South Africa: A transformative social policy perspective', *Agrarian South: Journal of Political Economy* 12(1), pp. 72-97.

Tribaldos, T. and T. Kortetmäki. 2022. 'Just transition principles and criteria for food systems and beyond', *Environmental Innovation and Societal Transitions* 43, pp. 244-256.

Tydeman-Edwards, R., Van Rooyen, F. C., & Walsh, C. M. (2018). Obesity, undernutrition and the double burden of malnutrition in the urban and rural southern Free State, South Africa. Heliyon, 4(12), e00983.

TIPS (Trade and Industrial Policy Strategies), 2020. Sector Jobs Resilience Plans: Agriculture Value Chain. Available at: https://www.tips.org.za/images/TIPS_for_DEFF-dtic_-_SJRP_for_agricultural_value_chain_final_May_2020.pdf.

TCOE (Trust for Community Outreach and Education). 2016. *Farm Workers Speak: Hope, Heroism, Determination.* Cape Town: TCOE.

Tongwane, M. *et al.* 2016. 'Greenhouse gas emissions from different crop production and management practices in South Africa', Environmental Development 19, pp. 23-35.

Tubiello, F.N. *et al.* 2021. 'Greenhouse gas emissions from food systems: building the evidence base', Environmental Research Letters 16, pp. 1-13.

UCT News. How Hunger Affects the Mental Health of Pregnant Women.

https://www.news.uct.ac.za/article/-2017-08-21-how-hunger-affects-the-mental-health-of-pregnant-mothers. Accessed 02/03/2023.

UNFCCC (UN Framework Convention on Climate Change). 2015. 'Introduction to adaptation and resilience/loss and damage', in *The Big Picture.* https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/introduction. Accessed 21/03/2023.

van der Berg, S *et al.* 2021. Food Insecurity in South Africa: Evidence from NIDS-CRAM Wave 5. Coronavirus Rapid Mobilse Survey 2020.

Vigne, M. 2014. 'Efficiency of extensive livestock systems in harsh environments'. *Perspectives* 25.

Vink, N. and J. Van Rooyen. 2009. 'The Economic Performance of Agriculture in South Africa since 1994: Implications for Food Security'. *Development Planning Division Working Paper Series No.17*. Midrand: Development Bank of Southern Africa.

Visser, M. 2016. 'Going nowhere fast? Changed working conditions on Western Cape fruit and wine farms: A state of knowledge review'. Belville: PLAAS.

Visser, M. and Ferrer, S., 2015. 'Farm Workers' Living and Working Conditions in South Africa: key trends, emergent issues, and underlying and structural problems'. International Labour Organization. Available at: https://www.ilo.org/wcmsp5/groups/public/---africa/documents/publication/wcms_385959.pdf.

Ward, M. 2018. 'Just transitions and the green economy: Navigating the fault lines'. Working Paper, Centre for Researching Education and Labour.

Willett, W. *et al.* 2019. 'Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems', The Lancet 393 447-492.

Winkler, H. *et al.* 2020. 'Climate finance to transform energy infrastructure as part of a just transition in South Africa'. Research report for SNAPFI project. University of Cape Town.

World Bank, 2021. Agriculture, forestry, and fishing, value added (% of GDP) - South Africa. Available at: https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=ZA.

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