THE BEEF WITH CLIMATE CHANGE: GROWTH, EQUITY, AND A JUST TRANSITION IN THE BEEF SECTOR IN SOUTH AFRICA

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Abstract

This Guidance Memo critically examines the planned growth of beef production and export in South Africa. **The central focus is on whether the red meat industry's growth strategy can achieve a just transition through broadscale Black smallholder farmer inclusion, creation of decent work and equitable livelihoods, and ensuring ecological regeneration and resilience.** It finds that there appears to be a tension between the economics of the beef industry (which seeks output maximisation, has been increasing in concentration, and operates under intense competitive pressures) on the one hand; and inclusion and ecological goals on the other. That is, current economic patterns pose challenges to shifting to a system that aligns multiple objectives and is broadly inclusive and fair, in terms of widescale decent work and equitable livelihoods, sustainability and healthy landscapes, and the right to food. The report briefly considers interventions that could be more effective in moving towards a just transition, and makes initial actionable recommendations to begin the process of dialogue to get there.

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INTRODUCTION

01

1. Introduction

In this Guidance Memo we focus on the question of **beef production in South Africa in the context of climate change and concerns for a just transition.**

Key Takeaways:

i

Red meat consumption, and beef in particular, has the highest environmental footprint in the food system, including greenhouse gas emissions.

ii

This Guidance Memo investigates the South African red meat industry's strategy to grow production and exports, specifically of beef.

iii

It assesses whether it is an inclusive approach for smallholders, ecologically viable, and can achieve a just transition for workers and smallholders.

iv

A food system just transition should achieve environmental sustainability, equitable livelihoods and decent work, and the right to food and improved nutrition.

1.1. Concerns with meat consumption and production

Global levels of meat consumption are expected to increase steadily into the future with urbanisation, rising incomes, and industry demand-creation strategies. However, its production and consumption, especially of red meat like beef, is associated with significant environmental impacts like climate change, deforestation, pollution, and water usage. High consumption of meat, and associated intensification of production, also raises human health and animal welfare concerns.

The sustainability dimensions of red meat production have entered global sustainability discussions most prominently in relation to climate change, because of the extremely large contribution that livestock make to human-caused greenhouse gas (GHG) emissions. The consumption and production of beef has been of particular attention, because it has the largest climate and resource impact.

1.2. Concerns with South Africa's red meat industry's growth strategy

In 2022 the red meat industry in South Africa released a strategy to decisively grow the industry beyond its already significant economic size by **targeting exports, with beef the core focus of this growth.** In order to supply the stock for this growth, **key in the strategy is to intensify the integration of Black emerging and smallholder farmers into commercial beef value chains.**

Industry bodies have begun linking this strategy to a just transition, which is associated with growth in jobs and livelihoods as a result of industry growth, together with addressing environmental concerns through technology.[1]

However, the global concerns about the environmental impacts of beef production, and the urgent need to address South Africa's unemployment and poverty crises, raise deeper questions about the place of growing beef production in a just transition for the country.

[1] SAFA (2022)

1.3. The notion of just transition

The 'just transition' has become prominent in framing the technical and societal shifts required to move to zero carbon societies and ensure adaptation to climate impacts, in ways that do not harm but **actively benefit the livelihoods of workers and communities.** It is increasingly coming to frame thinking about change in food systems, given their extensive environmental impacts, including contributing about a third of global GHG emissions, and their vulnerabilities.[2]

A food system just transition should achieve environmental sustainability, equitable livelihoods and decent work, and the right to food and improved nutrition. These three concerns run through this Guidance Memo by considering the environmental impacts and adaptation needs associated with beef and livelihoods, the economic and agrarian patterns and power relations in the sector, and consideration of dietary dimensions through the lens of inequality, respectively.

1.4. Methods and Objectives of Guidance Memo

This report draws from relevant academic literature, grey literature, industry documents, official statistics, and interviews with smallholder farmers, workers, commercial farmers, industry bodies, and civil society.

Based on this, it has five objectives:

01 First, we provide an overview of the economics of the beef sector and how it shapes livelihoods and prospects for broad-based inclusion;

02 Second, in the above context, we examine some of the existing experiences and challenges of seeking to integrate smallholder cattle farmers into commercial beef value chains;

03 Third, we link this to an ecological examination of the beef sector predominantly in terms of contributions and vulnerabilities to climate change; how these intersect with existing patterns of agrarian inequalities; and advance considerations on the relationship between equity and emissions that could inform possible solutions;

04 Fourth, we assess some of the solutions that have been advanced in addressing the ecological problems of beef production and locate them in the South African context;

05 Last, we make five recommendations that are aimed at helping initiate a cross-sectoral conversation about shifting the beef sector towards a just transition.

A notable element to the recommendations is the need to fill knowledge gaps. This is because, as noted throughout the Guidance Memo, these relate to a fuller picture of environmental impacts (especially of intensive production), and to more comprehensively understanding the range of production alternatives and their potential to contribute to a sustainable and just sector.

[2] Crippa et al. (2021)

CATTLE IN THE ECONOMY AND LIVELIHOODS

02

Image credit: Yurii Zushchyk / Alamy Stock Photo

2. Cattle in the Economy and Livelihoods

Key Takeaways:

i

Cattle are central to South Africa's agri-food system, in terms of consumption, jobs, and livelihoods. However, there are high levels of inequality in both consumption and production.

ii

Beef production exhibits 'dualistic' inequalities. Addressing these inequalities is a longstanding policy goal, through market-based measures.

iii

The commercial industry faces multiple economic challenges including stagnant domestic demand, biosecurity, cost pressures, and increasing consolidation.

iv

Policy and industry strategy aims to grow output and address dualistic inequalities through increasing exports and incorporating smallholder farmers into the main commercial value chain.

2.1 The importance of beef in South Africa's agri-food system

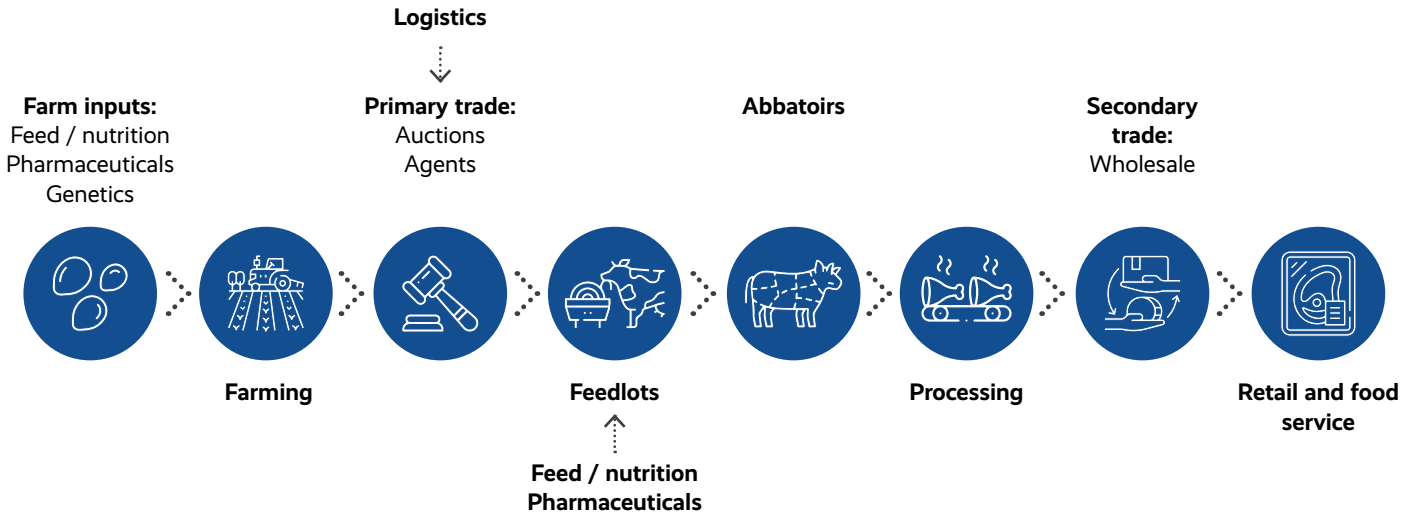
Beef production is centrally important to South Africa's agri-food system. In consumption, it plays a major role in diets as the second most important source of meat after chicken. In production, it underpins hundreds of thousands of jobs and supports the livelihoods of many more people.

Importance to production:

- **South Africa is a major beef producer,** the 14th largest in the world in 2022 with output just over 1 million tons.[3]
- **Cattle and calves slaughtered generated 11% of overall agricultural production value** in 2021 (R36bn), the largest animal product after poultry.[4]
- Though precise figures are unavailable and estimates differ, there are between 12,000-30,000 formal commercial cattle farmers.[5] Commercial livestock farmers employed 138,000 people in 2021, according to government figures.[6]
- **There is also a large informal sector.** DALRRD states that around 3 million households own cattle, which support rural livelihoods.[7]
- **Cattle farming connects to a range of other agro-industrial activities in the value chain, such as feed production and meat processing** (Figure 1). Beef production is a major consumer of maize and soya.
- **These linked agro-industrial activities generate much additional economic value and employment.** For example, in the manufacturing sector the production, processing and preserving of meat generated revenue of R63bn and employed over 37,000 people in 2021.[8]

[3] FAOStat: Item Code (CPC) 21111.01.
[4] Author's calculations, DALRRD Abstract 2021
[5] (StatsSA, 2020); WoW (2023); IB2, interview, 2022; DALRRD, 2021; BFAP, 2021.
[6] (DALRRD, 2021)
[7] Ibid
[8] StatsSA (2023)

Figure 1: Simplified representation of the commercial beef value chain in South Africa



Graphic by: Authors' formulation based on van der Burgh et al 2022

Importance to consumption:

- **The South African beef industry is domestically-oriented:** around 95% of beef produced is consumed domestically.
- This makes beef the most consumed meat after poultry.[9]
- **On a per-capita basis South Africans consume fairly large amounts of beef by international standards.** The 18kg per capita available for consumption per annum in 2020 compares to a 21kg simple average for high-income countries, 11kg for upper-middle income countries, and 4kg for low-income countries.[10]
- Beef is also culturally significant, featuring in key convivial and ceremonial cuisine.[11]

2.2 'Dualism' in the beef industry

The beef industry exhibits 'dualistic' inequalities common to much of South Africa's agrarian economy.[12]

On the one hand there is commercial beef production. This involves large-scale, capital and input intensive (advanced genetics, feed, veterinary medicines) farming, which is predominantly white-owned. Herds are typically large, with an average of around 400 head of cattle.[13]

Commercial beef farmers sell to feedlots, where animals are fed intensively for a few months before slaughter and industrial processing. Most commercial cattle farming is in Free State, Mpumalanga, Gauteng, and North West Provinces. Major feedlots are predominantly situated close to maize production in these provinces.

Workers employed on these farm are generally in a low-waged, secondary labour market, characterised by poor wages and working conditions, low bargaining power, and gender segmentation.[14] Little data appears to be available on working conditions in mid- and downstream activities like feedlots and processing.

On the other hand, there is a diverse and complex smallholder cattle farming system, in which predominantly black small-scale cattle farmers operate using limited commercial inputs, mainly on communal land, commonage, or land-reform farms. Black cattle farming is highly differentiated: many are non or quasi-commercial, with small herds of a few animals, with cattle sold occasionally when cash is needed.

[9] DALRRD (2021)
[10] https://ourworldindata.org/grapher/per-capita-meat-type?tab=table
[11] Erasmus & Hoffman (2017); Magano et al. (2023)
[12] Sihlobo (2023)
[13] OABS Development (2018
[14] Bennie et al (2024))

Black 'emerging' farmers have larger herds and seek commercial growth: DALRRD states there are around 240,000 such farmers.

Cattle owned by smallholder farmers are estimated to represent around 40-50% of the national herd, around 5-6 million animals.[15] The contribution to commercial markets is commonly viewed as considerably lower, with 10% frequently stated but reliable figures unavailable.

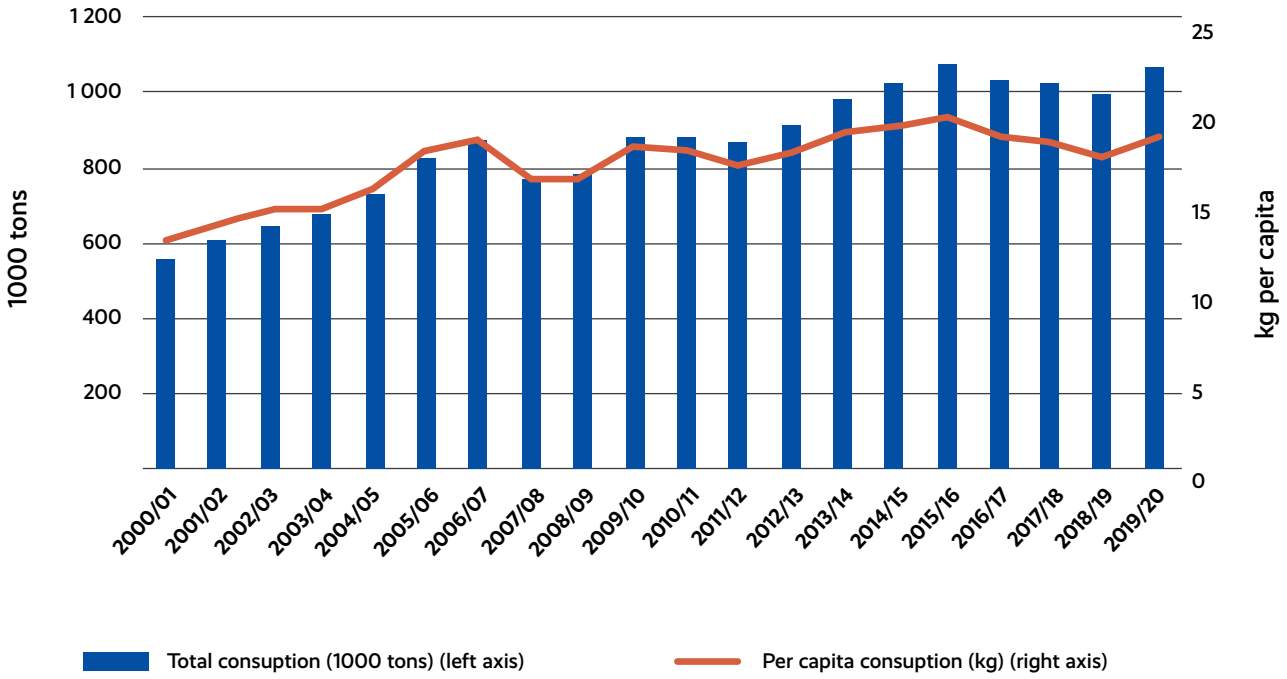
These racialised inequalities have deep historical roots in colonialism and apartheid. Addressing them by integrating smallholder farmers into the commercial beef value chain has been an enduring policy aspiration.

2.3 Export-led inclusive growth aspirations

The industry faces major challenges with weak domestic demand, and is seeking export-led growth.

South African beef consumption grew strongly in the 2000s when the South African economy grew rapidly, but growth stalled in the mid-2010s alongside wider economic stagnation (Figure 2). A major difficulty for the industry is that beef is (though cheap by international standards) a relatively expensive form of meat, particularly compared to poultry.

Figure 2: South African Beef Consumption



Limited domestic demand and the threat of substitution for chicken combine with a range of other challenges (discussed below) to create harsh economic conditions in the domestic market. Plans for future growth therefore rest on exports, in particular to Asia and the Middle East. The *Agriculture and Agro-Processing Masterplan* (2022)[16] and the *Red Meat Industry Strategy 2030* (2022)[17] aim to raise exports from 5% currently to 'at least' 24% of production, with overall output growth of 35%.

[15] DALRRD (2021)
[16] NAMC (2022)
[17] van der Burgh et al. (2022b)

This export-led expansion is expected to create opportunities for 'inclusive' growth that addresses dualistic inequalities. This would involve increased commercialisation of black smallholder farmers, involving them in the commercial value chain **supplying weaners to feedlots.**[18] The *Masterplan* targets an extra 250,000 weaners from communal farmers to feedlots by 2030.

2.4 The characteristics of commercial beef production in South Africa

Commercial beef production has become increasingly intensive and industrialised, and this means it will be very challenging to realise inclusive growth aspirations. Commercial beef production is a complex and demanding activity, requiring advanced skills, technology, and access to capital. Economic conditions in the industry create powerful pressures towards intensification, economies of scale, and concentration. These factors combine to create significant barriers to entry for smallholders.

High feedlot quality standards

Most commercial beef (~75%) passes through feedlots, and farmers must meet their quality standards to achieve higher incomes. Feedlots are extensively vertically integrated into abattoirs and meat processing and are the most powerful actors in the value chain. **Feedlot requirements shape farming.**

A feedlot is a form of confined animal feeding operation (CAFO): weaners are bought at 6-9 months old, kept in pens and fed a specialised diet under controlled conditions to accelerate growth, and slaughtered around three months later.[19] This makes feedlots major consumers of grains, particularly maize and soya.

Feedlots apply advanced science and technology to drive productivity increases. Different cow breeds are more or less suited to feedlots by virtue of their 'feed conversion rate': how efficiently they turn feed into muscle growth. While a variety of different cattle breeds may be found in feedlots, the major commercial operations predominantly seek breeds which have been optimised for feedlot conditions.

Management of biosecurity risks

The South African beef industry has struggled in recent years with disease outbreaks, in particular foot and mouth disease. This has hampered access to export markets.

Feedlots are particularly sensitive to disease outbreaks given the large number of animals in close proximity. **Feedlots have thus become increasingly discerning in their procurement, seeking suppliers from areas free of diseases and with strong biosecurity measures in place.**

Input-intensive farming

Competitive commercial farming that meets feedlot standards requires use of a range of expensive inputs, all of which require advanced skills to deploy effectively. These include:

- **Animal genetics** to produce healthy weaners from cattle breeds suited to feedlots, which fetch the best prices.
- **Feeds and nutritional supplements** to complement grazing and ensure healthier cows and calves, and raise calving rates.
- **Veterinary medicine** including vaccinations, dips for ticks, deworming etc. This controls diseases which otherwise limit growth and reproductive efficiency, and ensures weaners meet feedlots' strict biosecurity requirements.
- **Pasture management** will commonly involve irrigation and fertilisers.[20]
- **Mechanised equipment** for commercial-scale operations, requiring large amounts of diesel.

[18] IB1, interview, 2022
[19] IB1, interview, 2022; IB2, interview, 2022
[20] Phohlo et al. (2022)

High costs associated with these inputs means there are economies of scale – average herd sizes are estimated to be around 400.[21] Furthermore, **rising input costs have been creating major pressures on farm profitability, a key driver of concentration** (see below).

Intensification and concentration

A combination of price-sensitive consumers, substitution for chicken, slow growth in the domestic market, and price pressures from powerful retail chains that gatekeep access to consumers,[22] creates harsh economic conditions for producers in the beef industry. Consumer prices for beef have been relatively flat over recent years,[23] but input costs have been rising with beef production severely exposed to the increased costs of grain and energy in particular.[24]

This manifests in increased concentration at different points in the value chain:

- **The number of commercial beef farmers has been declining steadily,** by 56% over 'the last five to ten years' according to the Competition Commission.[25] Smaller farms are exiting the industry and being bought up by larger operations that benefit from economies of scale.
- **In the midstream of the value chain there are also intense economic pressures.** Meat processing in aggregate operates on extremely thin profit margins, trending downwards over time.[26]
- Interviewees stated that many feedlots struggle for commercial viability.[27] **Concentration has proceeded in feedlots as well:** the top ten largest accounted for 68.8% of revenue in 2020, up from 50.6% in 2015.[28] The major feedlots have become increasingly vertically integrated into abattoirs, feed production, meat processing, and even retail, to try and manage these pressures.[29]

The intense pressure on value chain actors to minimise costs also drives further intensification and industrialisation of production. This has created significant productivity increases.

South African feedlots have been benchmarked as among the most productive in the world.[30] Even as the national herd has shrunk by 9% over the past 20 years – losing over 1 million animals – total beef production has more than doubled to over 1m tons.[31] This has been achieved through the application of advanced technology and production techniques: increasing the meat yield per cow, and increasing turnover by increasing the reproductive rate of cows and bulking weaners to slaughter weight in a shorter amount of time.

Such productivity gains are highlighted by major players in the meat industry as a key attribute of the industrial production model, lowering prices for consumers and thus defending livelihoods in the beef cattle industry that might otherwise be lost to other protein sources such as cheap chicken imports.

However, **these trends for intensification and concentration create further challenges for smallholder producers in entering the commercial value chain.** Production costs and skill requirements increase as production becomes more technologically intensive. Power is therefore concentrated in a smaller range of firms in the midstream of the chain, whose demands must be met to access markets.

The policy aim to increase smallholder participation in the commercial sector therefore appears to be in tension with the key trends within the commercial sector itself, which have been towards increased scale and concentration. The strategy also does not address upgrading the conditions of workers in the value chain, which growth on its own will not automatically do.

[21] OABS Development (2018).
[22] Competition Commission (2023); see also Ogundeji & Maré (2020)
[23] Absa (2023); BFAP (2023)
[24] BFAP (2023)
[25] Hodge et al (2021)
[26] StatsSA (2023)
[27] IB1, interview, 17 November 2022
[28] Hodge et al (2021)
[29] OABS Development (2018); DALRRD (2021); Hodge et al. (2021)
[30] Agri Benchmark (2023)
[31] DALRRD (2021)

COMMERCIALISATION OF SMALLHOLDER CATTLE FARMING: TENSIONS AND CHALLENGES

03

Image credit: GALLO IMAGES | GETTY IMAGES

3. Commercialisation of smallholder cattle farming: tensions and challenges

In the above context, Black smallholder cattle farmers already face significant challenges. This extends to commercial market access, which we discuss in this section.

Key Takeaways:

i

Smallholders are marginalised within the commercial system, though cattle nonetheless play important roles in diversified rural livelihoods.

ii

Smallholder cattle farming differs significantly from commercial cattle production, with limited use of advanced inputs/ genetics, and reliance on limited communal land or commonage.

iii

Smallholders face major challenges selling into the highest value channel of the commercial beef value chain (weaners to feedlots). Sales are often into informal markets or to exploitative speculators.

iv

Commercialisation requires far-reaching changes to smallholder cattle production, including animal genetics, land management, increased input use, animal husbandry, and improved infrastructure: major challenges for most smallholder farmers.

3.1 Characteristics of smallholder cattle farming

Smallholder cattle farming is typically very different to commercial production, not simply in scale but in production methods and aims pursued.

It is often only quasi-commercial. Farmers keep cattle for reasons other than regular income generation. Rather, they underpin diversified livelihood strategies, with cattle herds functioning as a means of saving. Cattle also have cultural value and are used for ritual and ceremonial purposes, like funerals.

Cattle are commonly sold in response to immediate needs for cash to meet expenses, rather than to make profit for reinvestment. Sales are also commonly made when animals becomes too old or expensive to maintain, including during droughts. These distress sales diminish bargaining/pricing power.

There is considerable differentiation, but herd sizes are commonly small: some research suggests an average of 19.[32] Sales are therefore infrequent and generate small incomes. 'Emerging' farmers are a comparatively few wealthier individuals building larger herds and pursuing commercialisation.

[32] OABS Development (2018: 19)

3.2 Production

Production techniques are generally very different for smallholder farmers as compared to commercial farmers, as summarised in the table below:

Table 1: Key differences between commercial and smallholder farmers

	Commercial-industrial	Smallholder-informal
Land	Freehold private land tenure; fenced land with use of grazing camps.	Predominantly on 'communal' land governed by traditional authorities, or commonage adjacent to towns. Many are Land Reform on land governed by Communal Property Associations; land is often un-fenced so animals can roam freely
Genetics	Improved breeds developed for rapid growth in feedlot conditions, such as Bonsmara and Beefmaster; sourcing genetics from specialist stud farms or semen for artificial insemination.	Stronger reliance on indigenous Nguni cattle and crossbreeds, which are hardy but less commercially valuable because they are less efficient feed-converters in feedlots.
Calving	Highly controlled breeding to ensure short calving intervals, and synchronised calving at optimum time; calving rates of ~90%.	Often uncontrolled / un-synchronised breeding; calving rates <50%.
Feeding	Combined use of grazing, feeds, and nutritional supplements; many farmers grow their own maize for feed.	Heavy reliance on pasture, given difficulties affording feed costs. Pasture is often limited and shared with other farmers.
Medical and biosecurity	Extensive use of private veterinary services and animal medicine, including vaccinations, deworming and dipping; traceability mechanisms and movement control for biosecurity.	Limited access to medicines and vaccinations due to expense; reliance on over-stretched state veterinary services. Limited biosecurity given communal land / commonage and lack of fencing.

These factors combined mean smallholders typically have low commercial productivity and struggle to enter the main commercial value chain.

3.3 Marketing

Smallholder marketing arrangements are complex, with multiple routes to market depending on circumstances, offering different advantages/disadvantages:[33]

Auctions: auctioneers source cattle for sales to a wide range of buyers, including feedlots and abattoirs. Auctions have the advantage of transparent pricing which, given sufficient buyers, will approximate fair market rates. Some interviewees highlighted this as advantageous compared to the opportunism of informal buyers and speculators (below). A key disadvantage is unpredictability, particularly given few buyers. Many smallholders struggle to access auctions due to distance and transport infrastructure/costs.

[33] Ndoro et al. (2015)

Local informal markets: including sales to informal butcheries/abattoirs and community members, commonly for ceremonies/rituals. Attributes like colour and horns not valued in commercial markets can be highly valued for the latter. Prices realised depend on direct bargaining, and may therefore be lower or higher than market rates depending on circumstances, though the former is commonly assumed. Nonetheless, some interviewees suggested they preferred the greater agency compared to being price-takers at auctions.

Speculators: traders scour rural areas for cattle to purchase cheaply and sell at a profit. They offer immediate cash-in-hand at the farm gate, but information asymmetries and unequal bargaining power in the event of distress sales means widespread exploitation.

3.4 Obstacles to commercialisation

Profitable commercial growth means sales of weaners to feedlots, which generate the highest price per-kg because of their capacity for rapid muscle growth. Feedlots require high-capacity utilisation for profitability and seek new suppliers. However, large increase in smallholder weaner supply means overcoming multiple challenges, including:

Animal genetics: feedlots seek breeds with optimum feed-conversion efficiency to minimise feed expenditure (the key operating cost). Corresponding, smallholder herds require far-reaching genetic improvement for feedlots. **However, this is costly and requires ongoing control of breeding.**

Input costs: productivity, animal health, and feedlot quality requirements means significant expenditure on feeds, supplements, veterinary medicines, equipment etc.

Low sales volumes: smaller herds **generate insufficient income to meet input cost expenses and enable reinvestment.** Offtake rates (the number of animals marketed as a percentage of total animals kept) are also typically lower: 5% commonly, compared to 25% in commercial herds.[35] Calving rates (% cows producing fully-grown calves) are commonly <50% as compared to ~90% with commercial farms, due to animal husbandry challenges.[36]

Land: aspirant commercial farmers on communal land or commonage face major challenges with uncontrolled intermingling of their herds with other animals, creating biosecurity risks from the perspective of the feedlot system, uncontrolled breeding, and excess movement. As discussed below, much communal rangeland is overgrazed.

Animal health and biosecurity: feedlots have increasingly strict requirements given the major risks around disease outbreaks. Challenges affording veterinary medicine and preventing uncontrolled mingling of animals makes procurement from smallholder risky for feedlots.

Finance: lack of private land tenure makes accessing bank loans for investment challenging.

Timing of sales: smallholders commonly sell older animals and keep younger ones to build the herd. Because calving is not as controlled and sales made according to the need, sales may be made at inopportune moments when prices are lower.

There are a range of initiatives seeking to address these challenges and assist emerging farmers, including from state/provincial agriculture department, state veterinary services, NGOs, and increasingly from major feedlots.

3.5 Criticisms of smallholder commercialisation

There is significant scepticism about whether such programmes can result in widespread benefits to ordinary Black smallholders. Some researchers question the appropriateness of smallholder commercialisation as a means to address rural poverty or highlight how it may generate new problems or unintended consequences.[37]

[35] Gwiriri et al (2019)

[36] Scholtz et al. (2023); interview, IB1 (2022)

[37] Chaminuka et al., 2014; Cousins, 1996; Dovie et al., 2006; Gwiriri et al., 2019; Hall & Cousins, 2013; Hornby & Cousins, 2019; Mapiye et al., 2020; Shackleton et al., 2005; Vetter, 2013

These include:

- Because commercialisation initiatives typically target/benefit a small elite of the best-resourced farmers, **they may heighten localised rural inequalities.**
- **Increased pressure on pasture, which is often already limited and consequently overgrazed/degraded.** More commercially successful farmers may seek to restrict land access to other, typically poorer, community members, for example with fencing to stop animal mingling.
- **Disruption to existing cattle-based mixed livelihoods and farming systems,** where cattle serve multiple functions beyond beef production – functions/benefits that are too often overlooked or undervalued, and which some authors argue may create higher values per-hectare than commercial beef production.
- A distraction/diversion from **alternative development strategies that may bring greater benefits for poverty reduction, including approaches to mixed cattle farming systems where cattle provide multiple functions beyond beef production.**
- **Increased exposure to risk and shocks,** as farmers face significant new costs and may take on debt.
- Improved cattle breeds better-suited to feedlots are generally viewed as less hardy than indigenous ones, meaning potential threats to ecological resilience and an undermining of genetic diversity.
- Smallholders may face forms of discrimination or be subject to large bargaining power disparities, exposing them to exploitation.

In addition to continued secondary and segmented farm labour markets for workers, it is therefore doubtful that commercialisation strategies in their existing form can result in broad inclusion and development for a just transition. Coupled with climate change issues, agrarian inequalities may even be deepened.

CLIMATE AND ECOLOGICAL DIMENSIONS OF BEEF PRODUCTION IN SOUTH AFRICA

04

4. Climate and ecological dimensions of beef production in South Africa

Key Takeaways:

i

The bulk of GHG emissions from South African beef cattle are from enteric fermentation and manure management.

ii

Emissions intensity of beef cattle depend on their breed and production system.

iii

Despite significant effort and investment in emissions efficiency in the industrial system, it is not clear that the projected growth can be achieved without increased emissions.

iV

Emissions should therefore remain on the agenda linked to sustainable levels of output and more equity in the distribution of production, consumption, and emissions.

V

Without an equity lens and interventions around emissions and adaptation, agrarian inequality could deepen under climate change and existing interventions, and even harm ordinary smallholder cattle farmers.

The main direct source of South African cattle's GHG are enteric fermentation and manure management. This is because much of South Africa is arid or grassland, about 70% of agricultural land is suitable for raising livestock, and so deforestation emissions are insignificant.

Manure management – Livestock's manure releases methane (CH_4) and nitrous oxide (NO_2) into the atmosphere.[38] Manure that decomposes aerobically[39] on open grassland releases more CO_2 and very little methane, whereas manure from intensive systems that is stockpiled and decomposes anaerobically produces less CO_2 and much higher levels of methane.[40]

Enteric Fermentation – By far the largest source of GHGs from cattle is enteric fermentation, the main product of which is methane. Enteric fermentation is a digestive process that takes place in ruminant animals like cattle (as well as sheep and many wild herbivores like antelope), whereby plant material is broken down in the gut by bacteria under anaerobic[41] conditions. Livestock contribute about 40% of the world's methane emissions.[42]

[38] DFFE (2023)
[39] In the presence of oxygen.
[40] Scholtz et al. (2013).
[41] In the absence of oxygen.
[42] Thomas (2023)

Methane's contribution to global warming in the shorter term is intense: it is 86 times more potent than carbon dioxide over a twenty-year timespan. However, it is shorter lived than carbon dioxide – its potency reduces to about 28 times more than carbon dioxide over 100 years.[43]

Given methane's short-term impact, lowering its emission has become a prominent focus globally in limiting global warming to 1.5°C above pre-industrial levels, which requires reducing overall emissions by 45% from 2010 levels by 2030.[44] Prominent proposals to do this rest on lowering consumption and production of meat and shifting to more sustainable diets.

Given that cattle are the largest livestock contributor to emissions worldwide, reducing methane emissions from cattle can therefore make a global contribution to keeping global warming within 'safe' levels. But what are the technical, economic, and environmental dimensions to beef cattle's methane emissions in South Africa?

4.1. Beef production and emissions in South Africa

Beef cattle are by far the largest source of livestock and agricultural GHG emissions in South Africa. Agriculture is the source of about 11% of South Africa's emissions, and livestock are responsible for 70% of agricultural emissions. Beef cattle were responsible for about 64.5% of direct livestock emissions in 2020, which amounted to about 6.7% of South Africa's total emissions.[46]

Cattle emit differing amounts of methane per animal depending on a number of factors, including breed type, feed sources, and production system. The sources of beef cattle emissions are as follows:

50%
from commercial beef herds;

36%
from cattle on communal land and land reform farms; and

2.5%
from cattle in feedlots.[47]

Extensively grazed cattle have higher direct emissions intensity than those raised in intensive (feedlot) systems, because of 'production efficiencies' in the latter.[48] The low percentage of emissions is also explained by the fact that at any one time most cattle are extensively grazing on pasture and so a small proportion are in feedlots.

Although 75% of beef consumed in South Africa has come from a feedlot, most of such animals are first extensively raised on pasture for 6-9 months before being 'finished' for 110-120 days in a feedlot.

Amongst extensively-grazed cattle, those on commercial farms have a lower emissions intensity than those in communal systems, because of production efficiencies like higher calving rates and breed selection.[49] As such, the highest emissions-intensity cattle in South Africa are predominantly in the hands of low-income households, pointing to an equity dimension in considering emissions.

4.1.1. What to do about emissions, and other environmental problems?

In terms of climate change, what would an acceptable 'target' for emissions from beef cattle in South Africa be?

Emissions from beef cattle have remained relatively level since 2000,[50] but current herd expansion[51] and the growth strategy implies they could rise, without mitigation measures. However, policy currently does not provide a target for emissions reductions in agriculture, with the draft sectoral emissions targets (SETs) published in April 2024 planning for most emissions reductions to come from energy and industry.[52]

[43] Elgin (2021)
[44] IPCC (2018)
[45] DFFE (2023)
[46] Percentages in this sentence were arrived at through author calculation using DFFE (2023) quantities. Breaking down the direct emissions figure, beef cattle were responsible for 68% of enteric fermentation emissions and 39.7% of manure management emissions in 2020.
[47] Tongwane and Moeletsi (2020)
[48] Scholtz et al. (2013)
[49] Tongwane and Moeletsi (2020)
[50] Apart from a reduction between 2014-2020 as a result of population decline because of the 2015-16 drought (Godfray et al., 2018).
[51] BFAP (2023)
[52] The SETs set the sectoral targets and interventions for South Africa's nationally determined contribution (NDC) to global emissions reduction under the 2015 Paris agreement to be achieved.

The SET document acknowledges that enteric fermentation from livestock is the largest source of emissions in agriculture and indicates that existing government policies and measures are projected to lower the sector's emissions by 3.37Mt between 2025-2030.[53] This implies that with a small decrease in emissions from livestock overall, South Africa can meet its NDC under the Paris Agreement.

The logic of the SETs, the red meat industry, and researchers supportive of the industry, is that emissions will be contained, despite output growth, through continuous enhancement of technical efficiencies (a 'sustainable intensification' approach) – producing more meat per animal, and applying technologies aimed at lowering methane emissions, so lowering the emissions intensity per kilogram of meat. This logic of improved production efficiency is also applied to development in the smallholder sector on the grounds that subsistence cattle have higher emissions intensities than commercial and feedlot cattle, and that their grazing practices contribute to land degradation.[55]

These measures do not address the specificity of lowering methane emissions to meet the Paris Agreement targets in the required timeframes. However, even if we accept that emissions levels alone are not currently a problem from beef cattle in South Africa, **there are three reasons why focusing only on point-source emissions is insufficient to thinking about and addressing environmental sustainability and social justice in the sector.**

The first relates to the ability to contain emissions despite output growth. There appears to be little by way of science or calculations that show that the proposed technology interventions to reduce emissions intensity of beef production will not (at least) be offset by the overall growth of beef production that is being aimed for in the industry's growth strategy.[56]

While direct emissions from cattle in intensive systems may be lower than those in extensive ones, the full indirect emissions associated with a unit of beef from a food systems perspective (that is, across the length of the value chain) need to be considered. For example, important indirect emissions are from feed production, which produces further GHG emissions.[57]

Furthermore, if poverty and inequality were to be comprehensively addressed through a just transition, rising incomes could lead to increased beef consumption and production, and therefore rising emissions. A future-oriented perspective therefore indicates the need to set an emissions limit (and therefore production and consumption limit) for the beef cattle sector, a point we will return to.

Second, there are unanswered questions in the South African context about the broader environmental, health, and animal welfare impacts of intensive-production systems like feedlots. This includes issues like water and air pollution, high amounts of water requirements in the context of increasing drought in an arid country, zoonotic disease risk arising from genetic and production homogenisation, reduced biodiversity and so lower food system resilience, and human health concerns related to anti-biotic resistance.[58]

However, while the knowledge base on these aspects exists at the international level, **there is a major gap in research, knowledge, and data on them specific to South African beef production systems,** which hampers both a clearer understanding and suitable policy formulation.[59]

4.1.2. Emissions and equity

Thirdly, even if current emissions in the sector did not require significant reductions for South Africa to meet its commitments to addressing climate change, and they were contained through technical efficiencies, **from a just transition perspective this leaves inequalities linked to emissions intact.**

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[53] DFFE (2024: 31

[54] Scholtz et al. (2013); Scholtz et al. (2023); Tongwane and Moeletsi (2021). Interventions including selective breeding,, improved concentrated feeds to maintain high growth rates, nutritional manipulation to reduce CH_4 emissions, and biogas digestors to capture emissions from stored manure.

[55] Tongwane and Moeletsi (2020)

[56] Garnett et al. (2017)

[57] Tongwane et al. (2016)

[58] Hayek and Miller (2021); UNEP and ILRI (2020)

[59] While we found a number of research sources on these dimensions in the South African context, all of them draw on international data and experiences to make their critique of intensive animal production in South Africa, with no data specifically from South African operations. Furthermore, we tried to access relevant data through the FAO's GLEAM database but could not do so. When we inquired about data access via email, we were informed that 'national and sub-national data from the model are not publically (sic) available in its current version.'

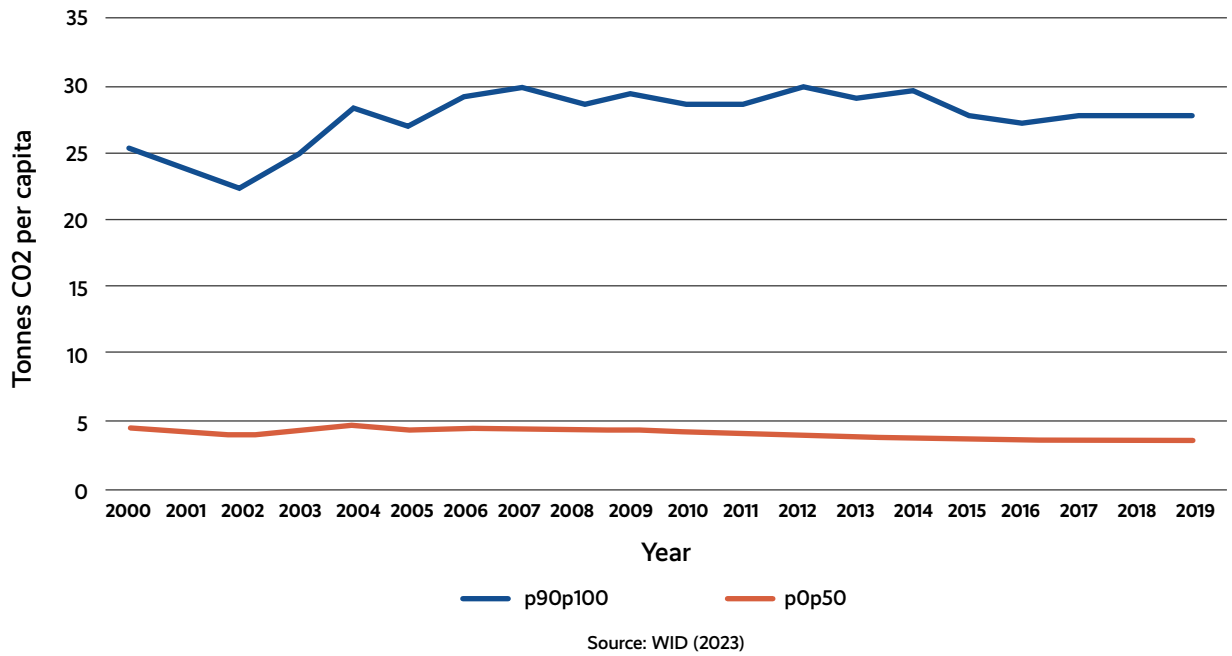
This is evident in the case of consumption inequalities. The Intergovernmental Panel on Climate Change (IPCC) and the Lancet-EAT Commission have argued for sustainable diets with limited amounts of animal product consumption in order to reduce food system emissions. But deep inequalities in diets in South Africa and the ability to afford such a recommended diet would need to be addressed. On average, South Africans consume 50% less than the global average consumption of fruits, vegetables, legumes, and nuts, 44.2% of households in South Africa are food insecure,[60] and about 60% of them cannot afford a healthy diet.[61]

In this context of inequality, there is therefore vast underconsumption of most food types by many. This inequality is reflected in beef production and its associated emissions: the poorest household consumption decile spends around 14 times less on beef than the richest, and the poorest 50% of the population account for only about 23% of beef purchase value.

The existing growth strategy through exports, as well as technical proposals to lower emissions per unit of beef produced, leaves these inequalities in diets, food insecurity patterns, and emissions from beef consumption intact.

A further dimension of inequality that a focus only on managing point-source emissions leaves intact is the socio-economic distribution of emissions, or **carbon inequality.** In South Africa's unequal agrarian structure, most cattle owning households are poor and therefore in the bottom 50% of income earners in South Africa, who only emit on average 3.5 tonnes of CO_2e, compared to 27.8 tonnes of CO_2e of the top 10% of income earners (see Figure 2).[62]

Figure 3: Carbon inequality in South Africa, 2000-2019



Source: WID (2023)

Thus although their cattle have the highest emissions intensity, they are crucial to these households' livelihoods, and such households are still only responsible for a marginal amount of South Africa's emissions.

In light of concentration in commercial production, and high beef consumption by higher income groups, the emissions associated with both are highly concentrated. The question of economic inequality and inclusion of smallholders discussed in Section 3, is therefore also linked to **inequality in the distribution of emissions, and so a climate justice question.**

As discussed in Section 3, it is mostly better-off cattle farmers who have the ability to take advantage of efforts to include Black farmers in commercial beef value chains. There are therefore major questions about the ability of existing strategies for market inclusion to result in broadscale, equitable inclusion.

[60] Simelane et al. (2023)
[61] FAO et al. (2022)
[62] World Inequality Database (2023)

In this context, **the red meat industry's growth strategy potentially assigns greater emitting power in production to a few Black farmers able to benefit from commercialisation.** The problem of wider carbon inequality and climate justice remains intact.

This equity problem of the ecological dimensions to market inclusion and expansion extends to climate impacts on the beef cattle sector. These could reproduce or intensify inequality, so undermining a just transition objective of equitable livelihoods and decent work.

4.2. Climate change impacts on beef cattle – adaptation and a just transition

Southern Africa, where South Africa is situated, is a climate change hotspot,[63] and natural and human systems (such as agriculture) currently have low ability to cope with climate change impacts.[64] But, as will be discussed in this section, there is also significant inequality in coping ability between various categories of farmers, which could beget further inequality.

Key variables relevant to cattle in South Africa are temperature and precipitation.

Increased temperatures: The country as a whole will experience higher average temperatures. It is predicted that much of the interior of the country, where 60% of cattle slaughtered are raised,[65] will become hotter and drier, with the sharpest impacts taking place in the central and western interior of the country.

Precipitation: Rain will fall within shorter periods of time, leaving longer periods without rain. The eastern coastline and inland areas are likely to experience greater precipitation, but this is expected to decrease as well after around 2040.[66]

4.2.1. Impacts on beef cattle

Although the exact nature of impact of these weather patterns on cattle are shaped by factors like breed and management system, there are three important overall factors through which beef production is affected:

01 **Heat stress:** Most cattle start experiencing heat stress from temperatures above 30°C (dependent also on humidity levels). They then reduce their feed intake, which affects growth and reproductive performance, reduces meat yield and quality, and can lead to increased deaths and illnesses.[67] This has associated economic implications.

02 **Rangelands and forage:** Less rain and high temperatures lowers carrying capacity of rangelands by providing less forage.[68] Some of South Africa's best grassland in the warm temperate region along the eastern escarpment will be almost entirely replaced by hot temperatures and hot arid regions by 2050.[69]

03 **Disease:** Climate change affects the health of cattle through introducing new diseases or increasing the incidence of existing ones, through various mechanisms.[70]

How exactly these factors translate into economic and livelihood implications are shaped by prevailing socio-economic conditions.

[63] Hoegh-Guldberg et al. (2018)
[64] Scholes et al. (2020)
[65] DALRRD (2021)
[66] GCI (2020); NBI (2021).
[67] CSIR (2019)
[68] Archer van Garderen et al. (2015)
[69] NBI (2021)
[70] Rust & Rust (2013)

4.2.2. Economic and livelihood impacts

Climate change is a 'stress multiplier' that intensifies existing social and environmental problems, including inequality.[71] This threat appears evident in the beef sector: between smallholder farmers, and between smallholder and larger-scale commercial farmers.

Impacts on Smallholder Farmers

Based on previous weather events linked to climate change like drought, key factors affecting smallholder cattle farming households include:

Loss of livestock: Due to less financial ability to purchase supplementary feed and medication, smallholder farmers experienced significant livestock loss.[72] In light of the multiple uses and values of livestock products, the loss of milk, meat, and savings in monetary terms can translate into a significant financial hit on smallholder households.[73]

Low prices: Some households may sell livestock during drought to convert them into cash, but due to their livelihood role they can be resistant to selling. When they are forced to finally do so, they may receive very low prices due to poor condition and gluts in the market.

Agrarian differentiation: It has been found that during drought and high temperatures, smaller herd sizes, which generally belong to poor households, experienced higher mortality rates than larger herds, which usually belong to wealthier households.[74] After drought, herds of wealthier households recover quicker due to ability to purchase supplementary feed and vaccines.

The herds of poorer households can, in contrast, take a number of years to recover, representing a sustained reduction over time in the size of their economic asset base. These patterns are also gendered: women-headed households tend to have smaller herds, and the wealthier herd owners are mostly men.[75]

Impacts on the commercial beef industry

The sense from the industry is that it is well prepared for climate change impacts, with much research and resources devoted to bolstering the resilience of commercial beef production.

Commercial farmers benefit from access to breeds that have historically been bred to suit the hotter and drier conditions of South Africa, such as Bonsmara (80% of the commercial beef herd is reportedly of adapted breeds). Bonsmara breeders are also investing in breeding 'efficiencies' to further bolster resilience to climate change impacts.[76]

The parastatal Agricultural Research Council has also undertaken significant amounts of research on adaptation interventions, much of it funded by the industry's Red Meat Research and Development Trust (RMRD).[77] It guides the industry to adopt breeds genetically improved for climate change conditions, enhance fodder production, adopt early warning systems, disease control, and take measures in water, soil, and rangeland management.[78]

Commercial beef and livestock farming have nonetheless been, and will be, impacted by climate change impacts like drought, in some of the following ways:

Loss of income: Drought can lead to loss of income due to a number of factors, including the need to purchase feed, destocking, and poor commodity prices due to gluts during drought.[79]

Profitability: With tight margins due to cost and price pressures, lower calving rates due to high temperatures hit commercial farmers' profitability.[80]

[71] Scholes et al., 2023
[72] Vetter et al., 2020
[73] Shackleton et al., 2005
[74] Vetter et al., 2020
[75] Ibid
[76] IB5, interview, 2023
[77] See https://meatindustrytrust.co.za/research/.
[78] Grobler et al., 2021; Motshabi & Wepener, n.d.; Pyoos et al., n.d.
[79] Archer et al. (2021)
[80] BFAP (2023); Grobler et al. (2021)

Further consolidation and inequality: As mentioned in Section 2, the industry has already seen declining numbers of cattle farmers and increasing scale. The drought of 2015-16 saw increasing commercial farming debt and some cattle farmers were pushed out of the industry. Larger and more profitable producers, and those with diversified income streams, are potentially better able to absorb such implications.[81] There is thus also potential for increased concentration and inequality in the commercial beef sector as a result of climate change.

Conditions of farm workers: work is likely to become more strenuous under conditions like increased heat, and the capacity of workers' households to be resilient to climate change is profoundly undermined by their position in low-waged, secondary, and segmented labour markets.[82]

Deepened agrarian inequality between commercial beef farmers and smallholders?

The impacts on commercial farmers outlined above are similar to those on smallholder farmers. But there is a big difference in their economic positions and therefore abilities to cope.

Smallholder cattle farmers make decisions and undertake actions (such as breed selection) aimed at resilience in the context of multiple livelihood strategies.[83] But they also do so within significant resource and capability constraints.[84] Additionally, smallholder farmers in communal areas are also less able to shift herds onto new rangelands with better carrying capacity when existing rangelands are depleted.[85]

Despite inequalities between commercial beef farmers, the average commercial farmer is still in a better position to respond to climate impacts than the average smallholder. They generally have better access to finance and insurance to replenish herds after losses due to drought, for example, and access to greater levels of technical support through service providers and industry bodies. Those holding loans from commercial banks also benefit from the latter's input and guidance, which the banks undertake to manage their risk.[86] They are also in a better position to diversify activities in response to climate (and economic) pressures.[87]

Together with the potential mechanisms of inequality discussed in Section 3, **climate change mitigation and impacts therefore have the potential to intensify agrarian inequalities that already exist between smallholder cattle farmers, and between the commercial beef sector and smallholders.** This could further undermine stated objectives of broad-based economic inclusion and climate resilience.

[81] KI1, interview, 2023; Vetter et al. (2020)
[82] Bennie et al. (2024)
[83] SO1, interview (2023)
[84] NBI, (2021)
[85] KI1, interview (2023)
[86] SAFA (2022)
[87] Archer van Garderen et al. (2015). For example, Tibesigwa et al. (2017) find that commercial mixed farms (livestock and crop farming) in South Africa are the most resilient to climate change impacts compared to other types (such as livestock only, crops only, or horticulture only).

ALTERNATIVES FOR BEEF AND CATTLE IN SOUTH AFRICA?

05

5. Alternatives for beef and cattle in South Africa?

Key Takeaways:

i

The market-centred approach to the beef sector is dominant, but has important limitations.

ii

Greening production and agroecological approaches hold important lessons for a sustainable and just beef sector, but are marginal in policy and practice.

iii

Regenerative approaches are not a silver bullet solution to emissions questions in the system.

iv

A more holistic approach that centres redistribution, re-balancing, and livelihoods likely embodies a more equitable approach to the sector.

The analysis presented so far points to questions about whether the existing direction and growth of the industry is sufficient to achieving a just transition: holistic ecological sustainability, equitable livelihoods and decent work on a broad scale, and contribute to the right to food through sustainable and healthy diets. Given the apparent limitations to this, this section considers and provides an initial assessment of proposed solutions around livestock, sustainability, and social justice.

5.1. Proposed solutions

Broadly speaking, the beef industry, and industry-aligned actors, acknowledge the importance of environmental sustainability in beef production. However, the conception of the problem and solutions are not uniform but reflect varying actors, interests, perspectives, and power relations.

Here we will briefly explain three approaches that are evident in the South African context, and briefly assess them in relation to climate change and South African imperatives.

5.1.1. Market-centred

The first approach can be described as market-centred, in that it seeks to ensure the continued growth of the beef sector in the name of the economy, jobs, and nutrition, and to **'manage the damage' through intensification technologies and market efficiencies.**[88] This reflects the dominant approach in South Africa, as in the tagline 'Competitiveness through Sustainability'.[89]

There are a number of potential limits to this approach:

- It risks productive efficiencies stimulating higher demand and production, so still growing the overall environmental footprint of the beef industry[90] – the 'Jevon's Paradox'.

[88] Ibid
[89] SAFA (2022)
[90] Garnett et al. (2017)

- Technical interventions do not address prevailing power and economic relations that maintain inequality and exclusion.
- While this frames a developmental approach to smallholder farmers, Section 3 shows that there are barriers to broad-scale inclusion of smallholder farmers through this approach, which point to deeper ecological, economic, and social questions.

5.1.2. Greening production

The greening production approach promotes the role of beef production in terms of its ability to lower emissions and achieve healthy and productive grasslands, primarily through what is variously called regenerative, adaptative, or holistic grazing (we will here use the three terms interchangeably).[91]

Regenerative farming broadly refers to farming techniques that improve and regenerate landscapes and ecological processes such as water and nutrient cycles, and aim to draw down carbon.[92] It does this through high-intensity grazing of designated areas within particular time-frames.[93] Such approaches are taking hold in the commercial agriculture and beef sector in South Africa. Interviewed commercial farmers reported improved forage production, increased pasture carrying capacity, and therefore improved productivity and economic performance.[94]

However, the approach on its own does not necessarily address wider social and economic transformations needed for justice and equity. For example, **it leaves intact existing labour relations and the secondary and segmented nature of labour markets in livestock farming, which undermine quality and climate resilience of farm worker livelihoods.**[95]

We will return to examining the viability of sequestration through this approach to address the emissions problem in Section 5.2.

5.1.3. Agroecological

A third position centres **the importance of cattle in many poor people's livelihoods, and their agroecological role in recycling nutrients and re-fertilising soils.**[96] It centres justice and the livelihood needs of the marginalised, and advances appropriate policy measures that integrate equitable livelihoods with healthy ecosystems and landscapes.

An example in South Africa is a programme developed by a few organisations in the Matatiele area of the Eastern Cape Province, including Environmental Rural Solutions (ERS) and Conservation South Africa, which gave rise to the Meat Naturally initiative. It seeks to integrate protection of a portion of the Umzimvubu River catchment, rangeland restoration, and improved livelihoods through better livestock health and market access.[97] The programme incorporates elements of greening production and agroecological approaches. However, it has to operate within prevailing limits of a lack of land reform, which for some farmers involved in the programme still limits the number, and therefore economic benefits, of cattle through the programme.

This points to the broader structural and distributive dimension in considering what a sustainable and just beef sector in South Africa could be. For now, we consider to what extent maintaining existing beef production through regenerative and rangeland restoration approaches addresses its environmental footprint and vulnerabilities in South Africa, and achieves equitable livelihoods and decent work.

5.2. Healthy grasslands - a carbon silver bullet?

The overarching logic of holistic grazing in relation to climate change and landscape health is surely something to aspire to in in terms of raising cattle in an ecologically sensitive manner. However, in their extensive distillation of peer-reviewed research on this topic of sequestration through grazing, Garnett *et al*.[98] point to several challenges with trying to use soil carbon sequestration for climate mitigation as a driving policy approach.

[91] Ibid
[92] Bless (2023)
[93] Garnett et al. (2017)
[94] CF1, interview, 2023; CF3, interview, 2023
[95] Bennie et al. (2024)
[96] Such as Scoones (2022).
[97] Matela & McLeod (n.d.); ERS1, interview, 2023.
[98] Garnett et al. (2017)

These include:

- There is still **scientific uncertainty globally about carbon sequestration capacity of soils,** with research findings tending to be patchy, contradictory, inconclusive, and locality-specific.[99]
- Sequestration capacity is shaped by a number of intersecting factors related to the biophysical context, and so **can be season-dependent, negligible, or season-reversable.**[100]
- **Accurate measures of soil carbon content and sequestration is also a complex (and expensive) task,** as levels are dependent on many different variables. One of these measuring is carbon sequestration through improved management in one location against the loss of carbon through land use change in another.
- When improved management increases forage production, it allows for more cattle to be kept per hectare of pasture, resulting in more overall methane emissions.[101] **Indeed, prominent peer reviewed studies show that while improved grazing practices will overall sequester carbon, the grazing sector would still be a net emitter.**[102]
- Even if existing levels of beef production could be sustained without feedlots through regenerative grazing,[103] and **it keeps emissions at existing levels, it leaves the concentration of emissions through agrarian and consumption inequality intact.**

This is not to suggest that such regenerative approaches to grassland health should not be pursued. Rather, the question is the range of objectives that need to be considered and balanced with each other, that may call into question open-ended growth of beef production while hoping regenerative approaches will contain emissions.

5.3.Merging environmental resilience and livelihoods

The positive impacts reported by commercial farmers and the Meat Naturally programme in terms of pasture health and economic improvements nonetheless highlight to what extent **good stewardship practices** (whatever label they may take) can link landscape rehabilitation to improving the livelihoods of working people like farm workers and smallholder farmers on a broader scale. We will briefly consider these in turn.

First, improved economic performance reported by commercial farmers practicing regenerative grazing raises the question of **whether it can contribute to an economic basis for transforming labour conditions on commercial livestock farms and achieve decent work** – whether 'environmental upgrading' can be paired with 'social upgrading'.[104] This depends, in large part, on the distribution of the benefits generated and the balance of power between actors, with no automatic reason to believe that these would necessarily be passed on to more marginalised groups, such as workers.

Second, increased forage production as a result of improved grazing **management can have important environmental, economic, and food security benefits, such as to households in former homelands and on land reform farms, especially under climate change.**[105] Environmental Rural Solutions and partners, for instance, have established institutional arrangements for collective land management to occur, a factor that is crucial for sustainable rangelands. The Meat Naturally experience therefore appears to show **the importance of individual and social commitment behind good grazing practices** (rather than just the technicalities of regenerative specifically).[106]

This suggests that while technical interventions are important, they need to be situated in a wider social and economic context, which points us to aspects of this context that potentially need to shift to enable a just transition.

[99] Conant et al. (2017); Garnett et al. (2017).
[100] See Garnett et al., 2017: 37-38; Conant et al. (2017).
[101] Henderson et al. (2015)
[102] Garnett et al., 2017
[103] As some advocates of regenerative grazing in South Africa argue (CF4, interview, 2023).
[104] Karatepe & Scherrer (2019)
[105] (Henderson et al., 2015)
[106] Promoted by Alan Savory and the Savory Institute.

5.4. Re-thinking beef production, ecology, and diets in South Africa?

There are evidence gaps on important environmental, economic, and equity dimensions of the beef sector in South Africa. But the information presented in this Guidance Memo points to the following elements that may help frame how to think about interventions for a holistic just transition in the beef sector that balances equity, economics, the right to food, redistribution, and broad inclusion:

- Set a clear and ambitious target for allowable emissions from beef and livestock.
- Then, develop and implement an equitable strategy that moves beyond simply growth, and contains different approaches (not just technical fixes) for how to achieve that limit and 'who gets to emit' within that.
- The broader environmental, human health, and animal health and welfare questions around intensive feedlot operations indicate that reducing GHG emissions cannot be dealt with in isolation, and rather requires more integrated and holistic approaches to sustainability transitions in agriculture and the food system.
- In balance with the above, pursue low emissions in the commercial sector, including through possible limits to growth of output, linked to shifting diets to a more equitable basis: less consumption by prosperous consumers and more by poorer, in line with dietary guidelines.
- Pursue policies more holistically suitable to benefitting smallholders, and ensure they receive a just share of allowable emissions from their cattle - a 'redistribution of emissions'. This must include redistribution of productive resources like land.
- Enact policies to reconfigure agrarian labour markets to improve wages, working conditions, labour relations, and workers' bargaining power.
- Shift the economics of the industry so that economic viability and equality can be achieved through environmentally sustainable and socially just levels of production, as per points above.

These are medium- to longer-term measures. Therefore, in the next section we make the immediate recommendations that could begin the process of dialogue and engagement to achieve further clarity and collaborative action on these issues.

RECOMMENDATIONS

06

Image credit: GALLO IMAGES | GETTY IMAGES

6. Recommendations

In this final section we make five recommendations that are intended to advance and inform action aimed at orienting the sector towards achieving equity, inclusion, sustainability, and resilience. They are also measures that civil society and labour can unite behind and collectively advocate for.

Recommendation 1: Commission a socio-ecological assessment of the sector

We recommend that an assessment study is commissioned that covers the full range of impacts and contributions of the beef sector in South Africa regarding environment and livelihoods, and labour.

This Guidance Memo illustrated a number of uncertainties and knowledge gaps regarding the ecological impacts of beef production systems in South Africa, in particular of feedlots. For example, while a large amount of information exists on the ecological impacts of feedlots at the global level, there is a dearth of such information specific to those in South Africa.

Understanding the exact levels and kinds of impacts is important for informing appropriate policy making. Such an assessment should include ecological impacts but also assess ecological solutions, the current state of work, wages, and livelihoods in the sector, and determine ecologically appropriate levels of production and consumption; and proposed solutions aligned with a just transition.

The Bureau for Agriculture and Food Policy (BFAP), which supports the industry through research and strategic guidance, has called for a baseline on emissions and absorption in the sector to be done, and metrics developed, to guide industry interventions.[107] First National Bank has also indicated that it commissioned the World Bank to conduct a study on the climate change impacts of the beef industry in South Africa.[108]

However, the process and the output for both have thus far not been publicly available. A transparent and participatory assessment is thus still necessary, in line with procedural justice. Its terms of reference should also be wider than only climate change impacts, as suggested above.

Recommendation 2: Commission a study on the economics of the beef sector

As we have shown in this Guidance Memo, the prevailing economics of the beef sector since liberalisation create pressures to scale, intensification, concentration, and the persistent need for growth in ways not directly linked to nutritional and ecological needs of the country. This means that to remain viable actors have to pursue continued growth outlets, rather than being able to align production with a set of ecological, equity, and economic parameters, while earning decent incomes and livelihoods.

[107] SAFA (2022)
[108] Ibid

As discussed in Section 3, it also poses barriers to broad-based inclusion of smallholder farmers. A study could therefore aim principally to assess the extent to which the economics of the sector can be shifted to ensure economic viability for actors and ensure broader inclusion, while operating within ecological limits (and indeed make ecological contributions). On the latter aspect, the criteria for ecological sustainability would emerge from the assessment under Recommendation 1.

This would help explain what an ecologically sustainable system would look like (such as what role for feedlots), and how to align this with decent livelihoods.

Recommendation 3: Support the growth of a wider knowledge base to inform the framing of problems and solutions in the sector

As shown in this Guidance Memo, the responses to problems in the sector predominantly rest on technical interventions and modifications, such as to the emissions of cattle. There is therefore a particular paradigm that informs research and the knowledge base. For example, much research in the sector is supported by the industry's Red Meat Research Trust, which shapes a particular kind of knowledge approach to problems associated with cattle and beef production. However, efforts to address the challenges of climate change, wider ecological problems, and poverty and inequality, would be enriched and strengthened by bringing in a wider set of paradigms, approaches, and solutions.

We therefore recommend steps to consider how to ensure greater financial and institutional support is directed towards supporting research that approaches issues in the sector from deeper and potentially more transformational assumptions, and that the knowledge generated through this research is actively brought to bear in shaping policy and practice.

Recommendation 4: Initiate a process of conversation and dialogue on a sustainable and equitable beef sector

The information resulting from Recommendations 1 and 2 can provide an important knowledge base for cross-sectoral and social partner conversation to collectively interrogate the drawbacks of the sector in terms of ecological sustainability and equity, and of the opportunities that addressing them can present for a just transition.

We therefore recommend that alongside and after these studies, discussions are had that are aimed at airing the views and needs of different sectors of farmers, relevant communities, civil society, labour, and industry, so that perspectives are shared across silos. This is not a silver bullet for change, potential antagonisms, and power inequalities, but it could contribute to the grounds for a broad inclusionary approach to a just transition.

Recommendation 5: Capacity building and organisation in civil society

We recommend horizontal capacity building work that can happen in civil society and labour. There is a broad civil society sector that works on sustainable agriculture and food systems, on the ground and in advocacy. But there is less active policy advocacy happening on livestock related to working people's livelihoods.

However, there are NGOs and associations that work in communities with livestock, and so there are opportunities for creating greater connections between grassroots work and policy change. This can build capacities on the relationships between cattle and beef, livelihoods, and ecology, and on practical interventions that provide tools to shift aspects of the sector necessary to a just transition, such as farm worker participation in developing buyer standards, as we learned from the East Cape Agricultural Research Project.

We suggest this process of relationship building, organisation, and capacity building is also necessary for civil society to collectively advocate for the recommendations we have made here.

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