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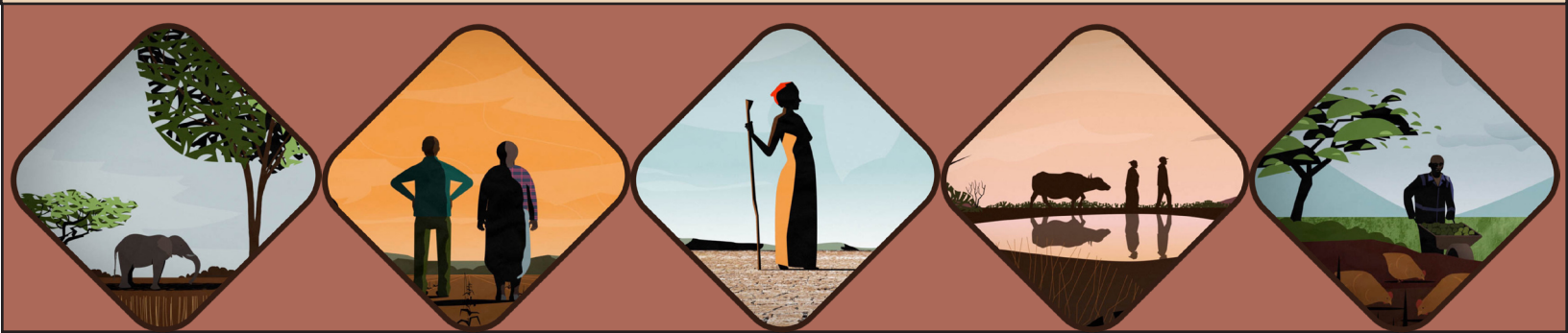
LOCALISED ROADMAP: KENYA

The Just Transition from Industrial Livestock Production to Equitable, Humane and Sustainable Food Systems in Kenya



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Executive Summary

Urgent action for a just transition from industrial animal production to equitable, humane and sustainable food systems

Kenya stands at a pivotal moment in its pursuit of sustainable development, as the country confronts climate change, environmental degradation, and growing socioeconomic inequalities. While livestock farming is integral to Kenya's economy and culture, the industrial animal production sector has emerged as both a significant contributor to these challenges and a lever for transformative change. Livestock farming is a critical sector providing food, livelihoods, and export earnings—yet its intensification has introduced a host of challenges. The industrialization of this sector has led to significant issues such as increased greenhouse gas emissions, deforestation, water pollution, and poor animal welfare standards. Notably, the livestock sub-sector contributes over 90% of agricultural greenhouse gas emissions and about 20% of Kenya's total emission (Grossi et al., 2019), primarily through enteric fermentation and manure management practices. Furthermore, industrial livestock systems have been linked to public health risks, including the emergence of antimicrobial resistance due to the misuse of antibiotics in animal farming (Ghimpeteanu Oana Mărgărita et al., 2022; Hosain et al., 2021).

Industrial-scale animal farming in Kenya has undermined traditional livelihoods and marginalized smallholder farmers and pastoralists. As grazing lands shrink and disputes over resources grow, many communities are switching to crop cultivation and agroforestry for more reliable incomes. Meanwhile, large agribusinesses displace small producers, degrade soil and water through monocultures and waste runoff, and weaken local food systems by prioritizing export-oriented animal products. Workers in factories and feedlots face dangerous conditions—chemical exposures, repetitive injuries, low pay, and mental stress—with women and migrant laborers disproportionately affected.

These intensive operations also drive climate change, biodiversity loss, and public health risks. Livestock emissions of methane and nitrous oxide add to Kenya's greenhouse gases, while deforestation for feed crops and overgrazing strip fertile soils and destroy wildlife habitats. Polluted waterways spread antibiotic resistance and harm fisheries, and crowded confinement system inflict suffering on animals. Transitioning to agroecological practices—fair land access, strong labor protections, habitat restoration, reduced chemical use, and higher animal welfare—can rebuild resilient livelihoods, secure local food supplies, and promote healthier communities.

A just transition in Kenya's food system is essential for achieving long-term sustainability and equity. By supporting smallholder producers implementing robust policies, and fostering climate resilience, Kenya can build a food system that balances economic, environmental, and ethical priorities food security and sovereignty needs. This transition will not only secure the livelihoods of millions of Kenyans but also position the country as a leader in equitable, humane and sustainable agricultural practices in Africa.

We must act now to shift towards equitable, humane and sustainable food systems. This involves putting small food producers at the centre and adopting agroecological practices that actively promote human rights, particularly the rights of traditionally marginalized populations including women and girls, Indigenous populations, and people with disabilities. It also means protecting the environment and animal welfare, while ensuring food sovereignty meets food security needs and guaranteeing that people working across the food system live in dignity and receive a liveable income.

A just transition can only be achieved with the active involvement of women, youth, smallholder farmers, peasants, pastoralists, small-scale fishers, food workers, and local communities. It must address inequality and achieve food sovereignty while tackling the climate drivers that create injustice. It must center social and gender equity and take an approach that addresses multiple intersecting forms of discrimination, such as sexism and ableism. Gender-based solutions that acknowledge the specific impacts experienced by women and their crucial role in and knowledge of agriculture are critical.

Promoting climate-responsive strategies in animal production are designed to mitigate and adapt to the effects of climate change, enhance food security, and promote sustainability and social justice. These strategies address issues such as extreme weather, changes in feed availability, and shifts in disease patterns.

Safeguarding workers' rights in the animal production sector is vital for ethical practices, sustainability, and long-term success. Ensuring fair treatment and safe working conditions not only enhances productivity but also reinforces a project's commitment to social responsibility, adhering to national and local labor laws, including minimum wage, working hours, and occupational safety and following the international standards like those set by the International Labour Organization (ILO) for fair treatment of workers. This demands a dedicated effort and an inclusive approach from governments, ensuring a human rights-based framework rooted in multilateralism. It should clearly define roles and responsibilities while actively involving affected groups at all levels. Climate justice and the principle of common but differentiated responsibilities under the United Nations Framework Convention on Climate Change must guide this process, accounting for regional and cultural variations and sensitivities towards food.

In Kenya animal-based foods is part of an equitable, humane and sustainable food system if combined with indigenous and traditional practices, knowledge and consumption patterns. It recognizes the role of culturally-appropriate meat consumption and the economic, social, nutritional, and cultural significance of traditional livestock and pastoralist systems. It also recognizes the essential role of smallholder farmers, pastoralists, small-scale fishers, women, indigenous peoples and peasants in providing healthy and nutritious food for all. The transition is an opportunity to address and advance the conditions and livelihoods of these groups by improving the current system through the adoption of agroecology and high welfare standards. Ultimately, agroecology contributes to sustainable animal production systems by integrating ecological principles into farming practices, enhancing sustainability, resilience, and productivity.

This paper outlines a roadmap to accelerate the just transition to a climate-resilient food system in Kenya that is locally and democratically governed, mitigates greenhouse gas emissions, promotes biodiversity, protects animal welfare, empowers workers, and advances food sovereignty that fulfils food security.

To achieve the transition, the paper provides policy recommendations under three key levers of change:

- Strengthen food system governance: We need to challenge the dominance of the food system by multinational corporations and put policies in place to foster transparency and hold them accountable for their social and environmental impacts. At the same time, we should support environmentally and socially responsible companies and protect and elevate traditional and local food systems.

- Promote agroecological practices: A just transition necessitates the embracing of agroecology to promote human rights, environmental protection and animal welfare, and to ensure food sovereignty meets food security needs while providing dignified and sustainable livelihoods.

- Shift towards diets within planetary and social boundaries: Countries with high per capita consumption of animal-based products must transition to plant-rich diets with reduced meat and dairy to stay within planetary and social boundaries. This shift will benefit public health and free up land and resources to support diversified agroecological production systems.

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Glossary

Agroecology: (La Via Campesina Definition): refers to a way of life that supports life-enriching systems and opposes life-alienating systems. It works together with nature and not against it, cherishing synergies between living beings and prioritising traditional farmer knowledge and participatory, transgenerational, and experiential learning processes. Agroecological principles are based on solidarity, circular, and regional economies within ecological boundaries that are truly beneficial for communities. It prioritises the rights of small-scale food producers and forms a movement towards equality and social justice for all people worldwide.

Alternative proteins: refers to engineered proteins that are plant-based, cultivated or fermentation-derived. These products are intended to taste the same as, or better than, conventional animal products and to provide similar nutritional value while costing the same or less. This term covers a wide variety of emerging products, some of which use novel technologies that are not yet regulated. Many currently rely primarily on monoculture crops.

Alternative proteins raise numerous concerns about the social and public health dimensions of a just transition since the sector is firmly entrenched in the industrial agriculture system. With the sector continuing to grow, alternative proteins are addressed in this document as a potential tool in the short-term to help reduce consumption of animal-based products in high-consuming countries only if certain conditions are met to ensure equity and justice. They are not considered the end goal of the transition.

Artisan fishers: (or artisanal fishers) are small-scale fishers who use traditional, low-tech, or manual fishing methods, often for subsistence or local trade. They typically operate in coastal or freshwater areas using simple gear like nets, lines, traps, or small boats. Their fishing practices are usually sustainable and culturally significant to local communities.

Diets within planetary and social boundaries: refers to balanced diets with low environmental impacts that contribute to food and nutrition security and to the health of present and future generations. Diets within planetary and social boundaries are protective and respectful of animal welfare, biodiversity and ecosystems. They are culturally acceptable, accessible, economically fair and affordable, nutritionally adequate, safe and healthy, and optimise natural and human resources. Diets within planetary and social boundaries prioritise plant-based foods such as whole grains, fruits, vegetables, nuts, and legumes. Meat and dairy are still included, but make up a smaller portion of the overall diet compared to plant-based foods. The recommended intake by EAT Lancet Commission (Breisinger et al., 2022) to be in line with the planetary health diet. Consumption per capita should be no more than 98 grams of red meat (pork, beef or lamb), 203 grams of poultry and 196 grams of fish per week, or 5,1 kg, 10,5 kg and 10,2 kg a year respectively.

Diversified protein system and protein diversification: refers to moving away from over-reliance on animal protein from industrial systems to the production and consumption plant-based proteins, particularly beans, lentils, nuts, seeds and minimally processed plant-based food and small amounts of food of animal origin (dairy, eggs, meat and fish) from equitable, humane and sustainable systems.

Equitable, humane and sustainable protein: refers to alternative and animal proteins produced in ways that protect human rights, the environment and animals, while ensuring food sovereignty fulfils food security and guaranteeing that food workers, smallholder farmers and small-scale fishers live in dignity and receive a sustainable livelihood. Animal proteins are from high -welfare systems where farm animals' physical, environmental and behavioural needs are met, where resource use is sustainable and where benefits flow across the value chain and to local communities.

Food system: It encompasses the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded.

Food system transformation: Food system transformation refers to the comprehensive reorganization of food production, distribution, and consumption to ensure food and nutrition security and environmental sustainability through agroecological approaches.

Industrial animal production: Is the intensive, large-scale system of raising livestock—often in confined spaces using specialized feeds, technology, and management practices—to maximize productivity and efficiency for food production.

Industrial fisheries are large-scale, highly mechanized commercial fishing operations that use significant capital investment and advanced technology to harvest fish for both human consumption and industrial products like fishmeal and fish oil.

Just transition: The principle of just transition is that a healthy economy and a clean environment can and should co-exist. The process for achieving this vision should be a fair one that should not cost workers or community residents their health, environment, jobs, or economic assets. Any losses should be fairly compensated. And the practice of just transition means that the people who are most affected by pollution.

Just transition of the animal production system: refers to shifting the global system of protein production from industrial animal production (which favours high - quantity, low-quality meat and seafood and maximizing corporate profits at the expense of workers, animals, public health and the environment) to one that is based on agroecological and high welfare practices that produce equitable, humane and sustainable proteins, in order to alleviate animal, human and environmental suffering on a global scale. The just protein transition applies throughout the supply chain from farm to fork and protects and empowers smallholders by adhering to agroecological principles.

Marginalized population: refers to groups and communities who experience discrimination and exclusion due to unequal power relationships across economic, political, social and cultural dimensions. Marginalized populations include but are not limited to women, people of colour, and Indigenous populations.

Mariculture: A branch of aquaculture that involves the cultivation of marine organisms—such as fish, shellfish, crustaceans, and seaweeds—in saltwater environments. This can occur in the open ocean, coastal areas, or land-based systems using seawater.

Plant-based protein: refers to protein derived from plants. Plant-based proteins include protein-rich whole plant foods such as pulses, nuts and seeds, and minimally processed plant-based foods such as tofu, tempeh and seitan.

Private investment: refers to money invested by private actors, such as transnational corporations, investment banks, private equity firms, and other profit- driven entities, rather than by democratically-governed public institutions, local cooperatives, tribal collectives, or other community-centred initiatives.

Sustainable consumption: In the context of food systems, this refers to practices in food consumption that conserve natural resources, enhance environmental quality and promote social equity.

Unsustainable livestock production: refers to any method of animal agriculture that causes ongoing or escalating harm to the environment at any stage of production — both at the farm level and at scale, including but not limited to habitat destruction, desertification, eutrophication, water scarcity, biodiversity loss and excessive GHGs. These forms of damage typically have long-term effects on both ecosystems and agricultural production. Exploitation and other harm to animals, workers, women and communities also defines unsustainable production, because sustainability can only be achieved through practices that protect animals, people and the planet.

These are food system actors involved in producing, processing, distributing, marketing, retailing, and consuming food. They include input suppliers, producers, processors, distributors/ wholesalers, retailers and consumers.

Vulnerable groups: Vulnerable groups in society are those segments of the population that are more likely to suffer from disadvantages, marginalization, or discrimination due to various socioeconomic, physical, or psychological factors. Vulnerable groups within society, including women, older members of society, persons with disabilities, children, youth, members of minority or marginalized communities, and members of particular

Introduction

ethnic, religious or cultural communities.

Kenya stands at a pivotal moment in its pursuit of sustainable development. As the country confronts climate change, environmental degradation, and growing socioeconomic inequalities, the industrial animal production sector has emerged as both a significant contributor to these challenges and a potential lever for transformative change. Livestock farming remains central to Kenya's economy—providing food, livelihoods, and export earnings—yet its intensification has introduced a host of environmental, ethical, and public health concerns. Notably, the livestock sector is one of the leading sources of greenhouse gas (GHG) emissions in Kenya's agricultural landscape. Methane and nitrous oxide, primarily released through enteric fermentation, manure management, and land-use change, significantly impact the country's emissions profile. Beyond its climate footprint, industrial animal agriculture has wide-ranging effects on animal welfare, public health, worker safety, and rural livelihoods.

At the systemic level, Kenya's food system governance struggles with inequities in land and resource access, underfunding of agroecology, and exclusion of smallholder voices from decision-making processes. These governance gaps hinder innovation and the scaling of agroecology and inclusive food production systems. To address these interlinked challenges, a just transition from industrialized animal agriculture toward more equitable, humane and sustainable food systems is urgently needed. This concept emphasizes environmental integrity, social justice, and economic resilience—ensuring that no community is left behind as the sector evolves. This white paper outlines the key environmental, social, and governance issues associated with Kenya's current livestock production systems. It explores viable alternatives such as diets within planetary and social boundaries, agroecology, and inclusive policy frameworks, culminating in a roadmap for a just transition towards equitable, humane and sustainable food system. By adopting a rights-based and systems-oriented approach, Kenya can redefine its food system to better serve its people, protect its ecosystems and animals, and contribute to global sustainability goals.

This report explores the opportunities, challenges, and strategies for advancing a just transition in Kenya's food system, outlining the critical legislative steps needed to create a more equitable, humane, and sustainable future for all.

Part I: Background and Context Analysis

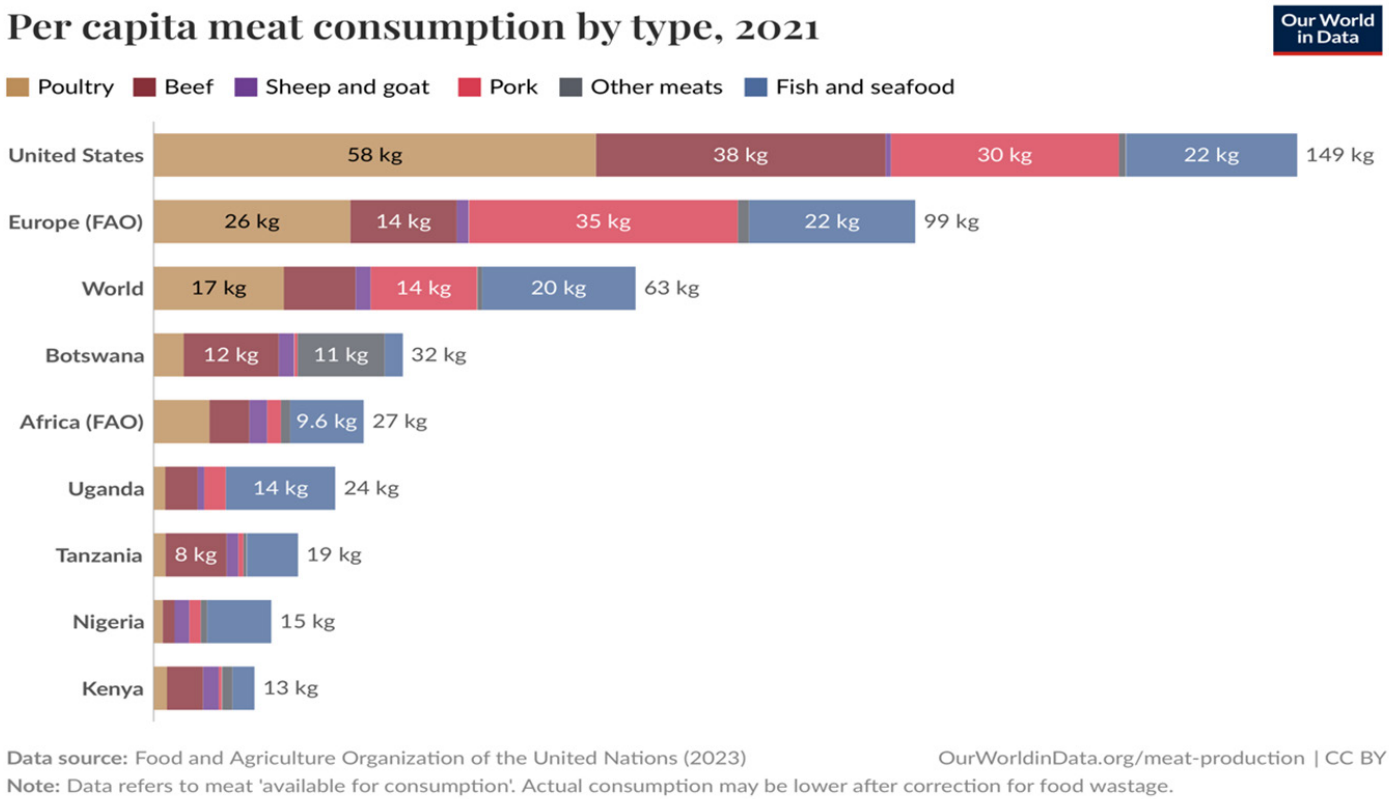
Kenya's food system is undergoing a significant transformation, driven by urbanization, economic growth, and evolving consumer preferences(Breisinger et al., 2022). As demand for livestock-derived products continues to rise and the impact of climate change becomes more prevalent, production systems need to adapt to meet these challenges. The following section provides a detailed analysis of the current trends in meat, dairy, and fish consumption, examining the key factors influencing dietary patterns, production methods, and regulatory frameworks. Additionally, the study highlights the challenges and opportunities within the sector, offering insights into how Kenya can enhance food security and economic growth by shifting to equitable, humane and sustainable food systems.

Meat and Fish Consumption and Production Trends

The demand, production, and consumption of livestock-derived products have experienced a notable increase and are projected to persist in the foreseeable future (Steinfeld, H. 2006). Kenya's food system is undergoing a fast transformation driven by urbanization, evolving consumer preferences, and changes in production practices. Protein sources such as meat, dairy and fish are central to both dietary patterns and economic activities in the country.

Meat consumption per capita in Kenya

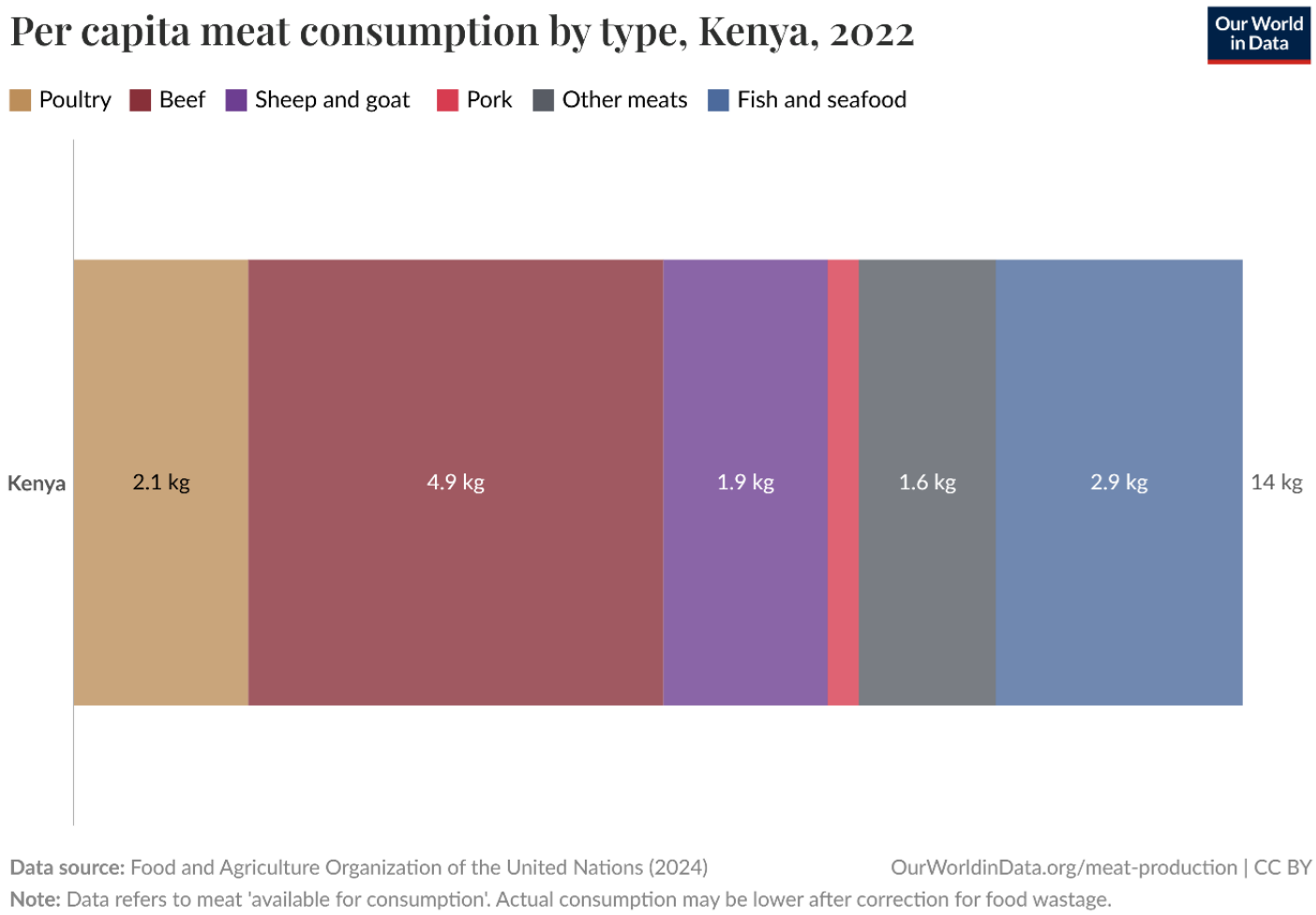
Kenya's per capita meat consumption is notably low both in a global and African context. In 2021, Kenyans consumed an average of just 13 kg of meat per person per year, which is five times lower than the global average of 63 kg. Even compared to the African average of 27 kg, Kenya's consumption is less than half. Within the region, countries like Botswana (32 kg), Uganda (24 kg), Nigeria (15 kg), and Tanzania (19 kg) all record higher per capita meat consumption than Kenya. This reflects a relatively modest demand for meat in Kenya, which may be influenced by economic, cultural, or environmental factors.



Meat consumption

Kenyan total meat consumption, which includes red meat, fish and poultry, is around 14 kg per person per year. This is roughly in line with the EAT-Lancet guidelines, which recommend a combined maximum of 15.7 kg per year for red meat and poultry. However, the guidelines emphasize reducing red meat (about 5.1 kg/year) in favor of white meat (about 10.6 kg/year) for sustainability.

Kenya's red meat consumption patterns (Beef, pork and goat/mutton) are shifting in response to rapid urbanization, rising incomes, and evolving dietary preferences. Based on the most recent data from Food and Agriculture Organization of the United Nations (2024).



While Kenya's per capita meat consumption remains relatively low—at 14 kg per person in 2022, significantly below the global average of 63 kg and even lower than the African average of 27 kg—it nonetheless reflects a steady increase in demand, particularly in urban areas. Projections from Statista (https://www.statista.com/study/48827/meat-market-data-and-analysis) indicate that total meat consumption in Kenya is expected to continue rising in the coming years. This growing demand for animal-sourced protein, though starting from a low base, is already having significant environmental impacts. The expansion of feed crop cultivation and pasture to meet livestock needs has driven the conversion of biodiverse ecosystems into uniform agricultural landscapes. In Kenya's arid and semi-arid regions, where ecosystems are already ecologically fragile, overgrazing by large herds of cattle and goats has contributed to soil erosion, vegetation loss, and declining biodiversity. These changes not only threaten environmental sustainability but also undermine the resilience and livelihoods of pastoralist communities (Lind et al., 2020).

When compared to the EAT-Lancet Commission's planetary health diet guidelines—which recommend

no more than 5.1 kg of red meat per person annually(Breisinger et al., 2023)—Kenya's average red meat consumption slightly exceeds the sustainable threshold. While this overconsumption is not extreme, it is notable given the country's projected population growth (https://worldpopulationreview.com/countries/kenya) and rising demand for animal products.

Fish Consumption

Kenya's per capita fish consumption stands at approximately 3 kgs per year (2023) https://www.helgilibrary.com/indicators/fish-consumption-per-capita/kenya), which is significantly below the EAT-Lancet Commission's recommended intake of 10.2 kilograms annually. This substantial gap highlights the protein gap in Kenyan diets that will be further increased as the population increases. There is an opportunity to support small scale fisher to improve production practices along with fish post-harvest management and reduce losses and wastes along the value chains. However, achieving this shift requires overcoming challenges related to availability, affordability, and cultural preferences.

Although red meat—particularly beef, goat, and mutton—continues to hold strong cultural significance in Kenya, poultry and fish are increasingly viewed as attractive alternatives. Interestingly, fish consumption has demonstrated a paradoxical trend: despite an increase in national fish production, per capita intake has declined in some regions. This is largely attributed to factors such as rising prices, limited distribution networks, and evolving consumer preferences (Kenya Markets Trust, 2019; Omukoto et al., 2024).

Meat Industry Analysis

Meat demand in Kenya continues to grow, driven by a population of around 44.6 million, many of whom have deep-rooted cultural ties to meat consumption (Kenya Market Trust, 2014). However, meaningful transformation in the food system has been limited. Key actors along the value chain often lack the support, resources, or motivation to respond to changing needs. At the same time, consumer preferences are evolving—there is increasing awareness and concern about meat quality, hygiene, and safety, with a shift in preference toward chilled over freshly slaughtered meat (KMT Livestock Deep Dive Report, 2016).

If current consumption trends and production practices continue unchecked, Kenya risks breaching ecological limits, with serious implications for both people and the planet. A just and sustainable food future calls for a shift that balances nutrition, livelihoods, and environmental stewardship. This means ensuring access to diverse and affordable sources of protein, particularly for communities historically underserved or excluded, while reducing overreliance on red meat where it is environmentally or health-wise unsustainable.

Rather than scaling up industrial models, the focus should be on strengthening smallholder and pastoralist food systems, supporting agroecological practices, and promoting plant-rich diets rooted in local cultures and traditions. Expanding access to low-impact, equitable, humane and sustainable animal products and climate-resilient plant proteins can help close the protein gap in ways that are equitable, culturally respectful, and ecologically sound.

Cultural Sensitivities and Dietary Preferences

Consumption patterns are deeply influenced by Kenya's diverse cultural landscape. In regions such as the Rift Valley and Central Kenya, communities historically rely on cattle and goat products, with dishes like nyama choma (grilled meat) symbolizing social celebration. Among the Maasai, for instance, raw or lightly fermented milk is integral to their diet, while pastoral communities may also consume blood and raw meat in traditional settings (Kenya Markets Trust, 2019). Coastal communities, meanwhile, incorporate a higher share of fish and seafood into their diets, reflecting both geographical availability and longstanding cultural practices. Yet, changing consumer perceptions—driven by concerns over food safety, health implications, and environmental sustainability—are encouraging shifts toward leaner meats and alternative protein sources (Bukachi et al., 2022).

Health and Nutritional Considerations

Analysis of Meat and Fish Consumption in Kenya Compared to Dietary Guidelines

This analysis explores how current patterns of meat and fish consumption in Kenya compare with recommendations from the EAT-Lancet Commission and Kenya's national dietary guidelines. It aims to highlight nutritional gaps and their implications for both health and environmental sustainability.

The **EAT-Lancet Commission** (2019) promotes a global reference diet intended to support human health and stay within planetary boundaries. In contrast, **Kenya's national dietary guidelines** (2017) provide frequency-based recommendations tailored to local dietary practices and resources.

EAT-Lancet Commission Recommendations

The EAT-Lancet's planetary health diet sets the following weekly intake targets:

Food Type	Recommended Intake (g/week)
Red meat (Beef, pork, goat/mutton)	98
Poultry	203
Fish	196
Total	**497**

Current Kenyan Diets: Meat and Fish Consumption

According to recent data (FAO, Visual Capitalist), per capita consumption in Kenya, converted to weekly values, is as follows:

Food Type	Annual Intake (kg)	Weekly In take
Beef (Bovine)	4.5	~86.5
Mutton/goat	4.5	~86.5
Pork	0.4	~7.7
Total Red Meat	**9.4**	**~180.8**
Poultry	1.3	~25
Fish	2.9	~55.8
Total Meat and Fish	**13.6**	**~261.5**

Kenyan National Dietary Guidelines

Kenya's 2017 guidelines recommend:
"Eat lean meat, fish, seafood, poultry, insects, or eggs at least twice a week."

This recommendation (Ministry of Health, 2017) focuses on frequency rather than quantity and includes a wide range of protein sources, acknowledging the cultural and ecological importance of diverse foods such as insects. Assuming a standard portion size of 100–150 grams, this equates to an estimated 200–300 grams per week.

Kenya's red meat-heavy diet may increase the risk of non-communicable diseases and contributes to environmental degradation. Shifting toward higher poultry and fish coupled with local plant-based protein

intake, as advised by EAT-Lancet, could reduce ecological impact and improve dietary diversity.

Cultural and Economic Considerations

Low poultry and fish intake may be influenced by:

- Higher prices and limited distribution networks
- Strong cultural preferences for red meat
- Inadequate aquaculture and poultry production infrastructure, including improving fish post-harvest management and reduce losses and wastes along the value chains

The inclusion of insects in national guidelines reflects a progressive stance on sustainable protein, but this raises concern about animal welfare as well in terms of broader acceptance which will require public education and gradual cultural adaptation.

Production Trends of Animal-Sourced Foods

Dual Production Systems: Traditional Versus Industrial

Kenya's animal-sourced food production is characterized by a dual system. Traditional smallholder and pastoral systems remain predominant in rural and arid regions, where livestock serve both as a livelihood and a cultural cornerstone. In contrast, industrialized production—driven by intensive farming practices that prioritizes profit over people's health, the environment and animals, is expanding in urban and peri-urban areas to meet growing consumer demand (Kenya Markets Trust, 2019). However, while dairy production has seen significant technological advancements, it still fails to meet domestic demand fully, compelling reliance on both local production and imports. (Meat - Kenya | Statista Market Forecast). To address this gap, it is essential to prioritise support for pastoralists and small producers, helping them build skills and scale up humane, agroecological production methods as alternatives to industrialised dairy production.

Traditional Livestock Sector

Sector Size and Production Trends

Traditional livestock systems, largely managed by pastoralist and Agro-pastoral communities, underpin rural livelihoods through extensive grazing practices and low-input management that utilize indigenous cattle breeds, such as the resilient Zebu, ideally suited for arid and semi-arid conditions. Despite producing lower per-animal yields compared to industrial operations, these traditional systems remain the principal source of beef and dairy for local consumption, even as production fluctuates with seasonal rainfall, drought, and variations in pasture availability (https://www.ilri.org/news/kenya-livestock-master-plan-process-initiated-enhance-sustainable-development-and-investment)

However, the rapid expansion of the industrial livestock sector poses a significant risk of marginalizing these time-honoured practices. To prevent the erosion of traditional systems, it is imperative that policy frameworks integrate safeguards. Such measures should include financial incentives and technical support for traditional farmers, rigorous environmental impact assessments to mitigate resource degradation, and stringent animal welfare standards across all production models. Moreover, active community involvement in decision-making is essential to preserve indigenous knowledge and cultural practices, while targeted research and development initiatives can help merge modern innovations with traditional methods.

Investment and Local Solutions

Investments in the traditional livestock sector are often low, typically involving smallholder capital, microfinance schemes, and government- or NGO-supported rural development projects. Rather than pursuing large-scale

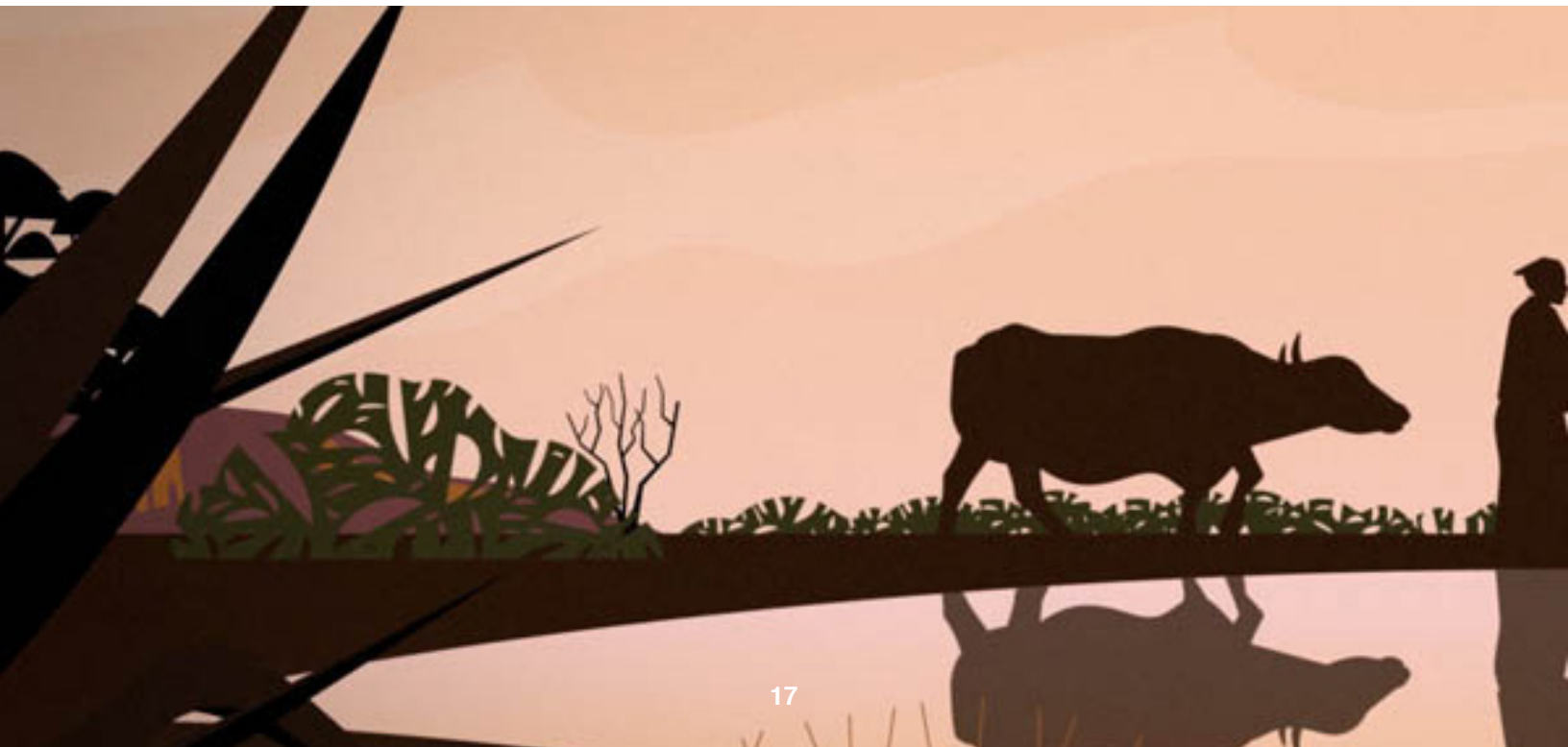
mechanization, investment should concentrate on community-led initiatives focusing on strengthening animal-health services and welfare, improving fodder production systems, and expanding local veterinary outreach. Moreover, the Kenya Livestock Master Plan has begun integrating traditional knowledge with modern practices—through participatory breed improvement, disease-surveillance networks, and targeted capacity-building—to boost productivity sustainably, enhance resilience to climate variability, and open more reliable market opportunities for smallholder producers.

Community cooperatives and farmer groups are increasingly pooling resources for bulk purchase of inputs, sharing improved breeds, and collectively managing grazing lands to counteract the challenges of overgrazing and climate variability.

The government, in collaboration with county administrations and development partners, should prioritize investment in community-led livestock development programs that integrate traditional knowledge with modern practices. Specifically, policies should support the strengthening of local animal health systems, fodder production, and veterinary outreach through targeted funding, technical training, and infrastructure development. Additionally, policy frameworks should promote and formalize community cooperatives and farmer groups as key vehicles for collective resource management, breed improvement, and market access, ensuring that smallholder and pastoralist producers benefit equitably from national livestock investments and climate resilience initiatives.

Opportunities, Challenges, and Impacts

Opportunities in the traditional livestock sector include leveraging indigenous knowledge to improve feed production, disease control, and breeding practices that are resilient to drought. Improving animal welfare practices in the traditional livestock sector can also improve livelihoods through enhanced long-term productivity. Culturally embedded practices—such as communal grazing and rotational land use—offer models for sustainable resource management. However, challenges remain: limited access to credit, vulnerability to climate extremes, competition for dwindling grazing land, and low market integration often reduce profitability. Environmental impacts such as overgrazing and land degradation are prevalent, yet locally driven initiatives (e.g., community pasture management schemes) are emerging as critical mitigation measures. The Kenya Livestock Master Plan process initiated to enhance sustainable development and investment in the sector by supporting locally grounded approaches that strengthen livelihoods, promote climate resilience, and build on indigenous knowledge to guide a fair and inclusive transition toward more sustainable and agroecological livestock systems.



Artisanal Fishing Sector and Local Community led Solutions

Sector Size and Production Trends

Artisanal fisheries in Kenya—dominated by small-scale fishers using traditional gears and vessels—are central to coastal and inland water communities' livelihoods. Artisanal fishing accounts for the majority of marine fish landings in regions such as Lake Victoria, the Kenyan coast, and inland water bodies. Production levels are generally modest compared with industrial fisheries but remain crucial for local protein supply and income generation. Historical data suggest that artisanal landings have fluctuated due to environmental factors, overfishing, and resource management challenges. Recent assessments indicate that catches from artisanal fisheries, although stable overall, often comprise a high proportion of juvenile fish, signalling overexploitation concerns (Maritime Centre, 2023; Tuda & Wolff, 2015).

Responsibility for this overexploitation is shared. On one hand, many artisanal fishers (who contribute over 80% of coastal landings and are driven by poverty, limited alternative livelihoods, and high market demand) employ undersized meshes and destructive methods such as beach seines and monofilament nets, inadvertently capturing juveniles and depleting stocks of demersal reef fish, Nile perch, tilapia, and other key species. On the other hand, local and foreign industrial fleets, including distant water fishing nations (DWFNs) operating under lax enforcement of seasonal closures and gear restrictions in Kenya's Exclusive Economic Zone (EEZ), harvest large volumes of both adult and sub-adult fish & often under-reporting tuna and pelagic catches. Weak enforcement and widespread illegal, unreported, and unregulated (IUU) fishing further increase pressure on already strained aquatic ecosystems.

Investment and Community-Led Initiatives

Artisanal fishing receives minimal direct investment from large-scale commercial or government programs. Instead, local communities and non-governmental organizations spearhead innovative, community-led solutions. Examples include co-operatives that pool resources for better gear, local microcredit schemes to replace or upgrade fishing vessels, and training in sustainable fishing practices(Tuda & Wolff, 2015).
In coastal areas, partnerships between artisanal fishers and community-based organizations have led to the establishment of landing sites with improved cold storage and processing facilities, enhancing both fish quality and market access. Initiatives such as the HyaPak project—although primarily targeting aquaculture feed—demonstrate how community innovation can address both environmental challenges (e.g., water hyacinth proliferation) and supply chain inefficiencies(Tuda & Wolff, 2015).

Opportunities, Challenges, and Impacts

Opportunities for artisanal fisheries include improved resource management through participatory governance, diversification of fish products (e.g., value addition and local processing), and enhanced market linkages via digital platforms and cooperative networks. However, challenges persist: inadequate infrastructure (e.g., poor road networks and lack of cold storage), overfishing due to limited regulatory enforcement, environmental degradation, and low bargaining power in market negotiations. The impacts on local communities are profound; while artisanal fisheries support food security and generate employment for thousands of coastal households, they are also highly vulnerable to external shocks such as invasive species (e.g., water hyacinth), pollution, and climate variability. Recent reports document drastic declines in catch per unit effort, affecting incomes and local food systems (The invasive water hyacinth is threatening fishermen's livelihoods on a popular Kenyan lake | AP News).

Industrial Animal Agriculture Sector

Sector Size and Investment

Kenya's industrial livestock sector experienced marked expansion in 2023, producing 556,653 metric tonnes of meat—a 19.8 percent increase over 2022—at an estimated value of Kes 304.6 billion (KNBS National Agriculture Production Report, 2024). Despite this growth, only about 65 percent of the meat produced is consumed locally (roughly 362,800 metric tonnes), while the remaining 35 percent (193,800 metric tonnes) is largely exported to international markets in the Gulf States, including the UAE, Saudi Arabia, and Oman, as well as to regional destinations such as South Sudan and the Democratic Republic of Congo (KNBS, 2024; Ministry of Agriculture, 2024).

Likewise, although dairy has benefited from technological advances, it still fails to meet national requirements, necessitating a mix of local output and imports to satisfy consumer needs (Meat – Kenya | Statista Market Forecast).

Thus, while industrial growth contributes to overall supply, it does not by itself secure Kenya's food needs. A truly resilient and equitable livestock sector will depend on diversifying production models, strengthening small scale and pastoralist systems, and integrating sustainable practices across the value chain—rather than promoting industrial expansion.

In parallel with the overall growth in meat production, specific initiatives aimed at increasing the production of beef have emerged to address the domestic demand which exceed current production by about 40,000 tonnes, with current production at around 260,000 tonnes (KNBS National Agriculture Production Report, 2024). To bridge this gap, the Kenya Agricultural and Livestock Research Organization (KALRO) has implemented a cross-breeding program targeting smallholder farmers in arid and semi-arid regions. However, while such efforts seek to enhance production, it is important to critically evaluate whether scaling up beef production aligns with long-term health and sustainability goals.

Beef is the most resource-intensive animal-sourced food, requiring significant water, land, and feed inputs, and contributing substantially to greenhouse gas emissions. When viewed through the lens of the EAT-Lancet dietary guidelines—which recommend reduced red meat consumption for planetary and human health—the push to increase beef output raises concerns. Given that beef already contributes approximately 36% to agricultural GDP and is preferred by nearly 80% of Kenyans, the challenge lies in balancing cultural preferences and economic benefits with the need to transition toward more sustainable and health-conscious food systems.

Industry Players and Production Trends

In Kenya's evolving livestock sector, several large-scale processors and agribusiness conglomerates have emerged, reflecting a blend of local enterprise and foreign investment. In the meat processing arena, the Kenya Meat Commission (KMC) plays a dominant role. As a state-owned enterprise established to serve national food security objectives, KMC is entirely a local institution. In addition, private companies such as Quality Meat Packers and Neema Livestock Slaughtering & Investment Ltd have positioned themselves as

modern meat processors. Both of these firms are local enterprises. Although integrated poultry operations are also part of the industrial transformation, these are largely dominated by local companies.

Opportunities, Challenges, and Impacts

Opportunities in industrial animal agriculture include the potential for improved food safety, enhanced export potential, and increased value addition through processing and branding. Investments in modern technology and infrastructure have created prospects for more efficient supply chains and higher production yields (The Government of Kenya, 2020).

Indeed, Environmental impacts—such as waste management, greenhouse gas emissions, and water resource depletion — remain significant concerns. Socially, industrial production has raised questions about labour conditions and the sustainability of smallholder livelihoods in the wake of rapid mechanization and consolidation of the value chain(Emam et al., 2024).

To transition toward a more equitable, humane and sustainable food system, it is imperative to re-examine and reform these production models by embracing agroecological practices, and promoting diversified, small-scale farming that can help alleviate land competition, enhance local economies, and fortify food security.

Policy and Market Drivers: Balancing Safety, Sustainability, and Cultural Preferences

Regulatory Environment and Food Safety

Government policies in Kenya strive to modernize the food system through regulatory measures aimed at improving food safety and quality. However, these initiatives often marginalize the informal markets that form the backbone of local agroecological practices. By pushing to phase out these traditional channels, policymakers risk alienating low-income consumers who depend on affordable, culturally relevant foods, and simultaneously eroding the community-based networks essential for agroecology. As (Bukachi et al., 2022) highlighted, this disconnect between regulatory ambitions and local realities calls for a more refined approach—one that critically assesses whether modern standards genuinely serve the public interest or inadvertently undermine the nutritional security and sustainability that local, agroecological systems provide.

Market Interventions and Consumer Education

Innovative market interventions are vital for boosting production efficiency and enhancing consumer health. Targeted measures---such as subsidies for small holder producers, strategic investments in cold chain infrastructure, and comprehensive public education campaigns-- can transform the food system while safeguarding traditional dietary practices. By correcting common misconceptions about processed versus fresh meat, these initiatives promote sustainable practices and underscore the cultural significance of animal-sourced foods. Crucially, involving local producers in these efforts ensures that modernization aligns with community values, ultimately fostering both public health and environmental sustainability(Bukachi et al., 2022).

The Role of Alternative Proteins

Given the environmental and health concerns associated with intensive animal agriculture, alternative proteins—such as plant-based meat substitutes and lab-grown meat—are receiving increasing global attention. However, in Kenya, where per capita meat consumption remains relatively low and traditional animal-sourced foods like nyama choma are deeply embedded in cultural and social practices, the relevance of highly processed meat analogues is limited. These products may hold some appeal for urban dwellers who are increasingly consuming fast food, where plant-based versions of familiar items such as burgers could provide a healthier and more sustainable option.

Nonetheless, for the wider population, there is a stronger case for prioritizing traditional, locally available plant-based proteins over processed alternatives. Kenyan diets already exhibit characteristics that align with planetary health principles, particularly through the consumption of indigenous crops such as millet, sorghum,

legumes, and leafy greens. Supporting the uptake and diversification of these traditional foods offers a culturally appropriate and nutritionally sound pathway to reduce dependence on intensive animal-sourced proteins.

This approach not only preserves cultural heritage but also opens up opportunities for investment in agroecology, improved nutrition, and rural livelihoods. The "My Food is African" campaign, launched by the Alliance for Food Sovereignty in Africa (AFSA), exemplifies such a balanced strategy by advocating for the revitalization of indigenous food systems and agroecological practices, rather than an exclusive focus on ultra-processed protein substitutes (AFSA, 2022).

To ensure a sustainable and inclusive dietary transition, policymakers and industry stakeholders are encouraged to support a dual approach—promoting traditional plant-based proteins alongside selective development of alternative protein options where relevant. Such a strategy ensures that Kenya remains within both planetary and social boundaries while respecting food cultures and empowering local economies (Bukachi et al., 2022).

Industrial Aquaculture Sector

Sector Size and Investment

Kenya's aquaculture industry is primarily divided into freshwater aquaculture and mariculture. Although freshwater aquaculture has experienced significant advancements over the past decade, mariculture remains largely underdeveloped. The industrial sector has recently benefited from the government-funded Economic Stimulus Program, which has significantly expanded industrial fish farming nationwide.

While government-led initiatives such as the Economic Stimulus Program and the Fish Farming Enterprise Productivity Program (FFEPP) have driven rapid increases in pond infrastructure, hatchery development and processing capacity, it is critical that this growth follows a model of equitable, community-centred development rather than simply scaling up commercial operations. Without intentional safeguards, small-scale fisherfolk risk being marginalized—confined to low-margin contract schemes or pushed out of productive waters. A just transition in Kenyan aquaculture must therefore be set in agroecology principles, promoting high welfare and environmental standards and rest on co-management arrangements that guarantee local fishers a seat at decision-making tables, transparent benefit-sharing mechanisms, and access to affordable inputs and technical support. Strengthening cooperatives and community-based enterprises, rather than promoting vertically integrated corporate farms alone, can help maintain livelihoods, preserve traditional fishing knowledge, and build resilience against market shocks.

Complementary environmental safeguards—zoning to protect wetlands and spawning grounds, rigorous impact assessments, on-farm effluent treatment and robust high welfare standards and biosecurity protocols—should be coupled with social-safeguard measures such as free, participatory training programs and access to microfinance. Only through this integrated approach—one that balances ecological health with social justice—can Kenya's aquaculture expansion fulfil its promise of sustainable development and poverty alleviation.

Industrial and Production Trends

Kenya boasts extensive inland water resources, including major lakes—Victoria, Turkana, Baringo, Naivasha, Chala, Kanyaboli, and Jipe—as well as significant rivers such as the Tana, Athi, Nyando, Nzoia, Gucha, Migori, Yala, and Mara. The nation's water assets are further enhanced by a network of dam-created reservoirs, approximately 600 kilometres of coastal shoreline, and an Exclusive Economic Zone extending 200 nautical miles, all of which present substantial opportunities for aquaculture development. These diverse habitats support the deployment of larger vessels and gear (e.g., trawl nets, longlines and purse seines), the development of onshore processing and cold chain infrastructure, and expansion into export markets.

Aquaculture activities are primarily concentrated in the central, Nyanza, and western regions, with additional operations in parts of the Rift Valley and coastal provinces (Nyonje et al., 2011). Historically, fish farming in Kenya has been predominantly extensive rather than intensive (Maritime Centre, 2023), largely due to the prohibitive costs of upgrading infrastructure and the requisite specialized knowledge for intensive systems.

This industrial fish trade depends on large-scale feed mills that contribute to the depletion of local fish stocks and increase dependency on imports (Emam et al., 2024).

In light of these dynamics, it is important to integrate robust environmental, social, and welfare safeguards into the expansion of aquaculture. The intensification of aquaculture practices can potentially lead to issues such as water quality degradation from nutrient runoff, habitat disruption from infrastructural development, and an increased risk of disease outbreaks due to higher stocking densities. To mitigate these risks, comprehensive environmental impact assessments, stringent zoning regulations, and effective waste management protocols are essential. Equally, ensuring optimal welfare for cultured species is paramount; this can be achieved through the adoption of enhanced management practices, rigorous biosecurity measures, and strict adherence to welfare standards. Additionally, social safeguards must be implemented to protect the livelihoods of artisanal fishers and livestock keepers, and to ensure that traditional knowledge systems are not marginalized in the process. Inclusive governance mechanisms and participatory planning can help balance the growth of aquaculture with the rights and roles of these communities.

Animal Feed Production in Kenya

Animal feed production in Kenya is a critical component of the country's agricultural value chain, underpinning the productivity of the livestock and aquaculture sectors while directly influencing food security and rural livelihoods. The sector is characterized by two primary systems: forage-based feeding and manufactured feeds (Njagi, 2022). In extensive livestock systems, animals rely on natural pastures and fodder crops such as lucerne, kale, cabbage, and sweet potato. However, seasonal variations—marked by high nutritional quality during the rainy season and subsequent deterioration during the dry season—often necessitate the preservation of silage to maintain feed quality. In contrast, intensive production systems utilize manufactured feeds that combine locally available energy sources, such as maize bran, wheat pollard, and rice bran, with protein inputs like soybean cake, sunflower cake, and imported fishmeal, supplemented by premixed vitamins and minerals.

Despite a substantial installed capacity of over one million tonnes per year, actual production hovers around 800,000 tonnes. This discrepancy is largely attributed to supply constraints in raw materials and a shortage of skilled human resources in quality control and feed formulation. Raw materials account for over 80% of the cost of producing a standard feed bag, elevating production costs and reducing the competitiveness of locally manufactured feeds compared to imports from neighbouring countries such as Tanzania and Zambia.

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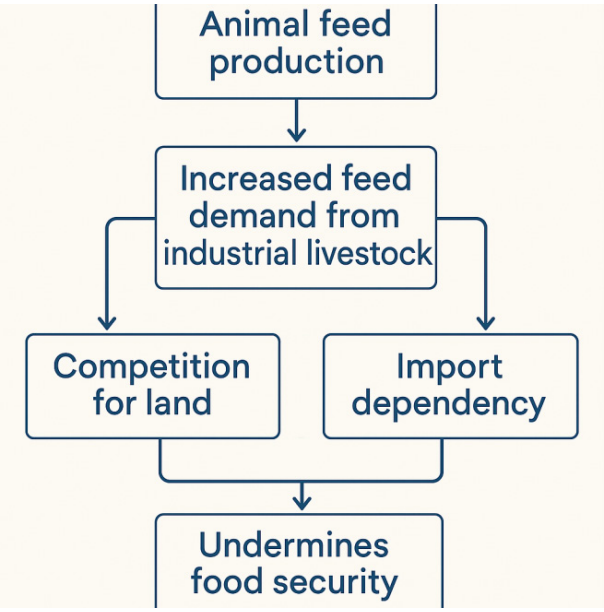
However, the current trajectory toward industrialization in the feed sector warrants critical examination. Expanding industrial livestock production would intensify demand for manufactured feeds, which in turn could exacerbate competition for land—diverting fertile land from food crop cultivation to grow feed crops. This is especially concerning in a context where pastoralist communities are already being pressured to reduce their herd sizes due to diminishing grazing lands, as noted earlier. Moreover, the feed sector's heavy reliance on imported protein sources, such as fishmeal and soy, exposes Kenya to volatile global markets and increases dependency on external supply chains, hindering food security and sovereignty.



Seasonal production shocks in key feed crops, coupled with climate variability, further strain the resilience of domestic feed systems. The fragmentation of the sector—characterized by small-scale manufacturers operating below capacity—limits economies of scale and innovation. Taken together, these dynamics highlight that further industrialization of animal feed production, rather than enhancing food security, may undermine it by increasing import dependency and diverting essential resources away from food production. This trajectory risks weakening national food sovereignty and deepening structural vulnerabilities within Kenya's agri-food system highlighting further the urgency to transition and support equitable, humane

Part II: Case for Just Transition

While the risks of industrial animal production and the benefits of a just transition in Kenya have broad socioeconomic, environmental, health and equity implications, this paper focuses on seven key areas: livelihoods, human and labour rights, food sovereignty and food security, climate, biodiversity, public health, and animal welfare.

1.1 Livelihoods

In many parts of Kenya, the fragmentation of land—driven by factors like population growth, inheritance practices, and land-use changes—has shrunk available grazing areas, intensified competition for water, and triggered boundary disputes, all of which undermine sustainable animal production. For example, in semi-arid regions such as Turkana and northern Kenya, the reduction in contiguous grazing land and increased resource competition have forced pastoral communities to reduce herd sizes. In response, many of these communities have begun shifting to crop-based systems, cultivating drought-resistant crops like sorghum and millet. This transition not only relieves the pressure on overgrazed and degraded lands but also provides a more stable income source during environmental stress. Similarly, in areas where communal grazing has broken down due to fragmented land parcels and disputes over water points, farmers are reallocating parts of their land to crop farming and agroforestry. Such a shift helps mitigate desertification and improves soil fertility while diversifying livelihoods away from the declining returns of livestock production.

Industrial animal production has significant negative impacts on livelihoods in Kenya, affecting various sectors of society, including small-scale farmers, communities, and the environment.

- **Displacement of Small-Scale Farmers:** Industrial animal production favors large-scale operators, sidelining smallholder farmers who lack the resources to compete. Expansion of industrial farms often leads to the acquisition of large tracts of land, displacing small-scale farmers and pastoralists from their traditional grazing areas(Lind et al., 2020). The dominance of large agribusinesses in supply chains makes it challenging for local farmers to sell their livestock or animal products at competitive prices.

- **Environmental Degradation:** Clearing land for industrial animal farming or feed crop production leads to the destruction of forests and biodiversity, reducing the availability of resources for rural communities(Grossi et al., 2019). Overgrazing, monoculture feed crop farming, and improper waste management contribute to soil erosion and reduced soil fertility, affecting neighbouring agricultural lands. Lastly, animal waste and chemical runoff from feedlots pollute rivers and water bodies, reducing access to clean water for rural households.

- **Health Risks to communities:** Close confinement of animals in industrial setups increases the risk of disease outbreaks that can spread to humans, threatening the health of local populations(Liverani et al., 2013). The overuse of antibiotics in industrial farming contributes to the development of drug-resistant bacteria, which can infect people and animals. Emissions of ammonia and methane from factory farms can harm respiratory health and reduce the quality of life for nearby residents.

- **Economic Inequality:** Industrial animal farming disrupts traditional practices such as nomadic pastoralism, which is central to the livelihoods of many Kenyan communities(Scoones, 2021). Jobs created in industrial farms often offer low wages and poor working conditions, perpetuating poverty among workers. Smallholder farmers who switch to contract farming with large corporations often face exploitative terms, limiting their financial independence. Contract farming is widely practiced in agricultural value chains in Kenya e.g. horticulture (fruits, vegetables, and flowers), dairy, and poultry(Breisinger et al., 2023). It involves agreements between farmers and agribusinesses or cooperatives, where the buyer commits to purchasing a specified quantity and quality of produce at an agreed price.

- **Food Security Challenges:** Industrial farming focuses on producing specific types of animal products (e.g., chicken, pigs, beef) for export or urban markets, reducing the availability of diverse, locally appropriate foods Increased reliance on industrial systems creates susceptibility to market price fluctuations(Lam et al., 2019).

- **Social and Cultural Disruptions:** Industrial animal farming marginalizes traditional livestock-keeping practices, eroding cultural heritage tied to pastoralism and small-scale animal husbandry. Expansion of industrial farms can lead to conflicts over water, grazing land, and other resources between local communities and large agribusinesses.

- **Impact on Local Ecosystems:** Industrial farms consume vast amounts of water, feed, and energy, depleting resources that local communities depend on. Monoculture feed crops and large-scale farming disrupt local ecosystems, reducing the diversity of plant and animal life that supports rural livelihoods.

1.2 Human and Labour Rights

The welfare of workers in Kenya's industrial animal agriculture sector is a critical, yet often overlooked, dimension of sustainable and ethical food systems. Physical, psychological, and social aspects of workers' well-being are significantly impacted by the demanding and often hazardous conditions present in large-scale farming operations, including factory farms, intensive livestock units, and meat processing facilities.

Workers in this sector frequently face physical risks such as exposure to harmful chemicals—including disinfectants, pesticides, antibiotics, and other substances—that can lead to long-term respiratory problems, skin irritations, and other chronic health conditions (The Occupational Safety and Health Act, 2007, 2010). Tasks involving repetitive motions, heavy lifting, awkward postures, and prolonged standing contribute to a high incidence of musculoskeletal disorders, including back pain and joint injuries (Riechi Mogute, 2021). While legal frameworks mandate the provision of personal protective equipment (PPE) such as gloves, helmets, and safety boots, many workers report receiving inadequate gear and insufficient training on occupational safety protocols.

Beyond physical hazards, the psychological toll of working in industrial animal production is profound. Slaughterhouse and meat processing workers, in particular, experience elevated rates of mental health issues, including depression, anxiety, and post-traumatic stress disorder. These challenges are exacerbated by exploitative labor conditions such as overcrowded living quarters, long working hours, low wages, unauthorized wage deductions, and lack of job security—conditions that disproportionately affect vulnerable populations, including migrant and cross-border labourers (Riechi Mogute, 2021).

The sector also reflects persistent gender disparities. Women working in industrial animal farming may face specific health risks, including greater exposure to zoonotic diseases, repetitive strain injuries, and chemicals such as hormones and antibiotics, which may pose threats to reproductive health(Bukachi et al., 2022). Despite playing key roles in agricultural value chains, women are often excluded from decision-making, face wage gaps, and have limited access to protective resources and information.

Addressing worker welfare in industrial animal agriculture is essential for building a just and resilient food system. A rights-based approach must prioritize safe working conditions, fair labor practices, access to healthcare, mental health support, gender equity, and full enforcement of labor protections as outlined in Kenya's Occupational Safety and Health Act. As the country considers a transition toward more sustainable and humane food systems, centering the well-being of workers is both a moral and practical imperative.

In the traditional livestock systems, smallholder farmers and labourers—often operating in informal settings—face routine exposure to hazardous agrochemicals, inadequate access to healthcare, and lack of social protection. Child labor remains prevalent in rural areas, and women frequently encounter systemic discrimination in land ownership, access to resources, and decision-making. Additionally, exploitative contract farming arrangements and restrictive seed policies undermine the autonomy and livelihoods of small producers. As Kenya considers a transition toward more sustainable, humane and equitable food systems, this moment presents a critical opportunity to not only address the harms of industrial systems but also to rectify long-standing labor and human rights violations within traditional agricultural structures. Ensuring a just transition requires transformative reforms that center the rights, agency, and well-being of all food system workers—across both industrial and smallholder contexts.

1.3 Climate

The livestock sector is one of the largest contributors to greenhouse gas (GHG) emissions in Kenya's agricultural landscape (Grossi et al., 2019). Livestock farming, especially cattle, is responsible for significant emissions, with methane (CH_4) and nitrous oxide (N_2O) being the primary gases released into the atmosphere (Grasty & FAO, 1999; Grossi et al., 2019). The emissions are a result of several processes within livestock systems, including enteric fermentation, manure management, and land-use changes related to grazing and feed production. In addition to methane, the industrial animal agriculture sector is also a significant source of nitrous oxide emissions through both the production of animal feed and the management of manure (Nin-Pratt, 2022).

The production of animal feed necessitates extensive use of nitrogen-based fertilizers, while nitrous oxide emissions result from the volatilization and dispersion of nitrogen from manure. Additionally, nitrous oxide contributes to water pollution when nitrogen from manure runoff enters aquatic ecosystems or percolates into groundwater through the soil.

1.4 Biodiversity

In Kenya, the expansion of large-scale agriculture to support industrial animal farming has triggered significant environmental changes (Scoones, 2021).The clearing of land for monoculture feed crops—such as maize and sugarcane—has often occurred at the expense of critical ecosystems. Notably, areas near the Mau Forest Complex and the Aberdare Range have experienced widespread deforestation and land conversion, disrupting habitats vital to wildlife, including elephants, leopards, and endemic bird species.

This intensification is particularly evident in regions like Central Kenya and the Rift Valley, where dairy and poultry farming dominate. Here, industrial livestock operations generate considerable amounts of waste. When manure and other by-products are poorly managed, they contribute to runoff that pollutes water bodies such as the Tana River and tributaries feeding into Lake Victoria. This nutrient-rich runoff promotes harmful algal blooms, which deplete oxygen levels, suffocate aquatic life, and severely degrade water quality.

Simultaneously, the rising demand for feed crops and pasture has driven the transformation of biodiverse landscapes into uniform agricultural zones. In Kenya's arid and semi-arid regions—already ecologically fragile—overgrazing by large herds of cattle and goats has led to significant soil erosion and loss of vegetation cover. This not only threatens biodiversity but also undermines the resilience and livelihoods of pastoralist communities(Lind et al., 2020)

Pollution from agriculture and livestock production has also had a profound impact on Kenya's fisheries. In Lake Victoria, fish populations are declining due to a combination of untreated industrial waste, agricultural runoff, and the improper disposal of fishing-related debris. These factors collectively diminish fish stocks, undermining the livelihoods of fishing communities and increasing the risk of food insecurity. Along Kenya's coastline, similar challenges persist. Pollution and unsustainable fishing methods have depleted marine resources, forcing local fishermen to rely on rudimentary practices to sustain their catch (J. M. Munguti et al., 2014). Illegal fishing further accelerates stock depletion, compounding environmental and economic pressures.

Additionally, livestock farming is a significant source of methane emissions in Kenya, contributing to the broader challenge of climate change. As temperatures rise and weather patterns shift, native species may struggle to adapt, leading to declines in biodiversity. Compounding this issue, industrial agricultural practices have in some cases facilitated the spread of invasive species, which compete with and displace indigenous flora and fauna, further threatening Kenya's unique ecological heritage.

1.5 Public Health

In Kenya, the rapid growth of industrial animal farming—especially in the poultry and pig sectors—has led to increasing reliance on antibiotics. Much like the global trend where industrial animal agriculture accounts for 73% of antibiotic use, many Kenyan farms use antibiotics as growth promoters and to prevent diseases caused by overcrowding and poor sanitary conditions. Studies in regions such as Kiambu and Nakuru counties have

begun to show worrying signs of antimicrobial resistance (AMR), with drug-resistant bacteria being detected in both livestock and local human communities.

The challenge is compounded by the fact that only a fraction of these antibiotics is absorbed by the animals. The rest is excreted and can contaminate local water sources, including rivers and groundwater used by communities in and around major urban centers like Nairobi and Kisumu. In coastal areas near Mombasa, improper waste management has similarly raised concerns about antibiotic residues in marine ecosystems (https://www.ilri.org/research/projects/zoonoses-livestock-kenya).

Kenyan agriculture also heavily relies on pesticides to protect both crops and feedstock for animal production. In counties like Makueni and Kisii, the widespread use of insecticides and herbicides has led to residues being found on produce and in the water supply. These chemicals not only threaten food safety but also harm beneficial insect populations, including essential pollinators like bees, which are critical for maintaining local biodiversity and supporting agricultural productivity.

Farm workers and nearby residents in agricultural hubs have reported acute health issues—headaches, dizziness, nausea, and respiratory problems—associated with pesticide exposure. Over time, chronic exposure has raised concerns about more severe health outcomes, including cancers (such as leukaemia and lymphoma), neurological diseases like Parkinson's, and developmental issues in children (charles muiruri, 2019).

The misuse of antibiotics in livestock production in Kenya has become a growing crisis, posing serious threats to public health, food safety, and farmer livelihoods. Many farmers routinely administer antibiotics to animals, not just to treat infections but also to promote growth and prevent disease, often without veterinary guidance. This overuse accelerates antimicrobial resistance (AMR), where bacteria evolve to withstand these drugs, rendering common antibiotics ineffective in both animals and humans. As resistant bacteria spread through meat, milk, and the environment, consumers face increased risks of untreatable infections, leading to longer hospital stays, higher medical costs, and increased mortality rates. For farmers, the crisis threatens exports and market access, as international regulations tighten on antibiotic use in food production. Without urgent intervention—through stricter regulations, farmer education, and alternative disease prevention methods—the unchecked use of antibiotics in Kenya's livestock sector could escalate into a severe public health and economic disaster.

Kenyan health and environmental agencies are enforcing stricter regulations on antibiotics and pesticides, enhancing waste management, and advancing sustainable farming practices to mitigate associated risks. These initiatives are essential for safeguarding public health and preserving biodiversity. Additionally, a

transition toward an equitable, humane, and agroecological food system—characterized by reduced chemical inputs and improved smallholder livelihoods—will further support the conservation of Kenya's natural ecosystems.

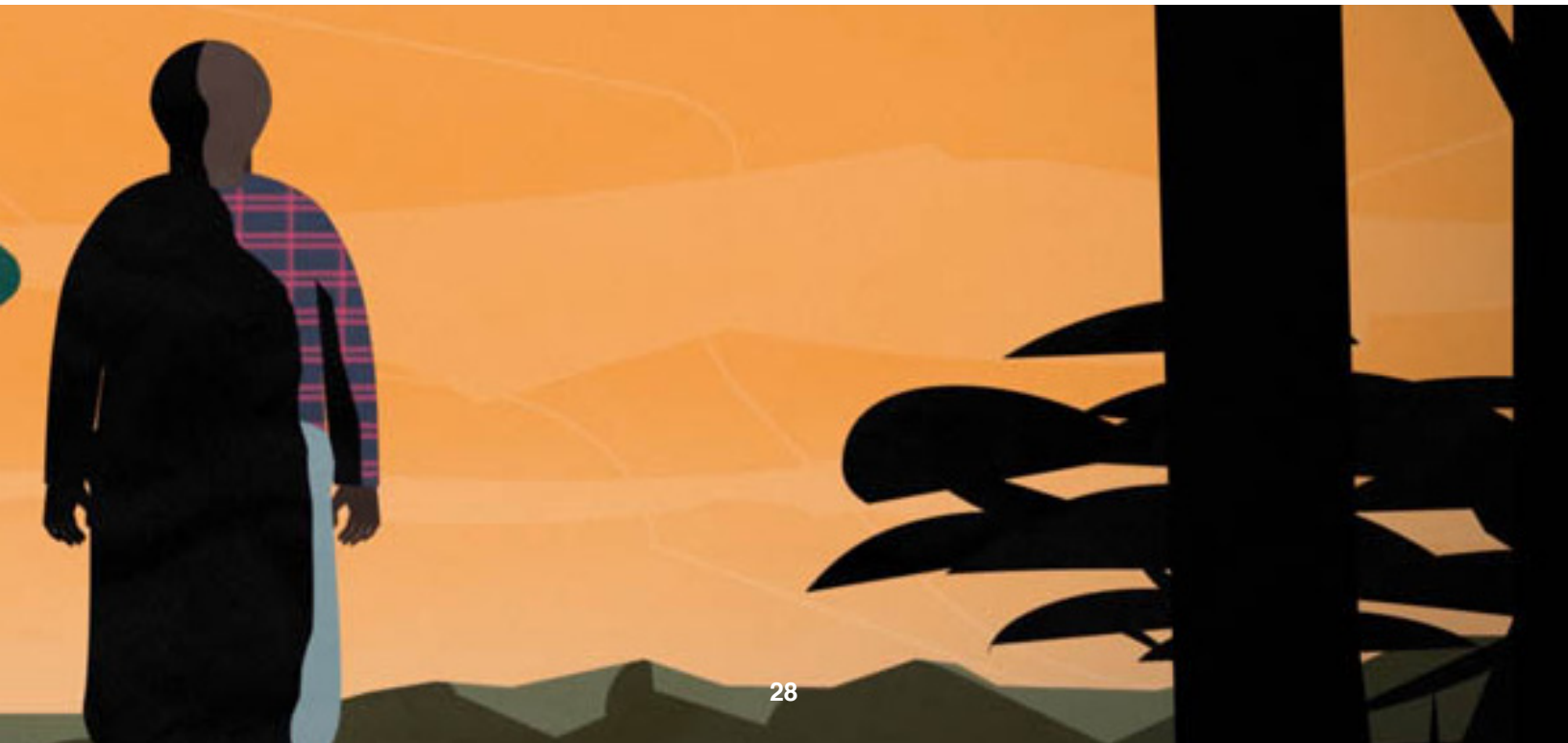
1.6 Animal Welfare

In Kenya, the concept of animal welfare—acknowledging that animals can experience both pleasure and pain—is increasingly recognized through scientific research and advocacy. This movement has global roots, dating back to 1822 when British MP Richard Martin proposed a bill to protect animals from cruelty. Locally, Kenya's commitment to animal welfare is evidenced by the establishment of the Kenya Society for the Protection and Care of Animals (KSPCA) in 1925.

The industrial production of animals in Kenya raises serious and widespread animal welfare concerns, with many standard practices causing significant physical and psychological distress. Animals in intensive systems are often kept in overcrowded and barren environments that restrict natural behaviors, expose them to chronic stress, and compromise their overall health. Practices like the early separation of mothers from their young further exacerbate stress and can have long-term negative impacts on animal development and behavior.

Despite growing public awareness and ongoing advocacy for better welfare standards, the prioritization of efficiency and profit in industrial animal production often takes precedence over the well-being of animals(Bell et al., 2011). These ethical concerns have contributed to increasing interest in alternative food system models, including plant-based diets and regenerative farming practices that emphasize compassion, sustainability, and ecological balance(Beach et al., 2008). Addressing animal welfare is thus not only a moral imperative but also an essential component of building equitable and humane food systems in Kenya.

Fish in aquaculture operations are maintained under suboptimal conditions, and industrial fishing employs destructive and inhumane methods. High stocking densities in aquaculture lead to overcrowding, thereby limiting space, inducing stress, reducing mobility, and compromising health. Overcrowded conditions often result in aggression, injuries, and disease outbreaks among the fish. In many facilities, inadequate water quality management produces elevated levels of waste products, ammonia, and other toxins, contributing to respiratory distress and infections. The lack of proper filtration or water circulation, particularly in intensive systems, exacerbates these issues. Furthermore, additional stressors such as noise, rapid water flow, and the inability to engage in natural behaviors compromise immune responses, while the absence of environmental enrichment deprives fish of essential mental stimulation. A just transition to agroecology and high-welfare practices is imperative, as it would reduce reliance on antibiotics, enhance the lifespan and yield of the animals, and ultimately improve the livelihoods of smallholders and fisherfolks.



Part III: Roadmap to an Equitable, Humane and Sustainable Food System

2.1 Our Vision for an Equitable, Humane, and Sustainable Food System in Kenya

An equitable, humane, and sustainable food system in Kenya envisions a transformation where food production not only meets the nutritional needs of the population but also upholds human rights, promotes environmental stewardship, and ensures inclusivity for marginalized groups. This approach aligns with Kenya's national development frameworks, notably the Big Four Agenda and Vision 2030.

Kenya's Vision 2030 aspires to transform the nation into a newly industrializing, middle-income country providing a high quality of life to all its citizens in a clean and secure environment. Within this framework, food security is a pivotal component, aiming to ensure that all individuals have access to sufficient, safe, and nutritious food at all times. The Big Four Agenda, complementing Vision 2030, emphasizes enhancing food and nutrition security through increased agricultural productivity, value addition, and sustainable practices.

Key Components of an Equitable, Humane, and Sustainable Food System:

Agroecological Practices: refers to a way of life that supports life-enriching systems and opposes life-alienating systems. It works together with nature and not against it, cherishing synergies between living beings and prioritising traditional farmer knowledge and participatory, transgenerational, and experiential learning processes. Agroecological principles are based on solidarity, circular, and regional economies within ecological boundaries that are truly beneficial for communities. It prioritises the rights of small-scale food producers and forms a movement towards equality and social justice for all people worldwide. is a way of life and farming that works in harmony with nature by valuing traditional knowledge, promoting crop diversification, organic fertilization, high welfare standards, and conservation practices. It enhances soil health, biodiversity, and climate resilience while fostering solidarity-based local economies, protecting small-scale producers' rights, and advancing equality and social justice worldwide.

1. **Inclusivity and Equity:** Empowering women, youth, indigenous communities, and pastoralists by ensuring equitable access to resources, decision-making processes, and benefits derived from agricultural activities

2. **Animal Welfare:** Adopting high welfare and humane livestock rearing practices that ensure the well-being of animals, which in turn contributes to improved livelihoods, food safety and quality.

3. **Environmental Conservation:** Protecting natural resources by promoting sustainable land use, water conservation, and reforestation efforts to mitigate environmental degradation.

4. **Economic Viability:** Supporting smallholder farmers and local enterprises through access to markets, credit facilities, and capacity-building programs to enhance livelihoods and reduce poverty.

5. **Policy and Institutional Support:** Developing and enforcing policies that promote sustainable agriculture, protect the rights of all stakeholders, and facilitate coordination among various sectors involved in the food system.Promote agroecological practices: A just transition necessitates the embracing of agroecology to promote human rights, protect the environment and animal welfare, ensuring food sovereignty meets food security needs, and providing dignified and sustainable livelihoods for people working across the food system, while ensuring that food security attempts are aligned with the climate mitigation and biodiversity conservation agendas.

6. **Maintain diets within planetary and social boundaries:** The consumption of animal products must be

complemented and supplemented with plant-rich diets to stay within planetary and social boundaries.

Countries with high consumption of animal products are advised to adopt plant-rich diets to free up some land currently dedicated to the production of animal feed to scale up agroecology, whilst developing country should maintain local diets within planetary and social boundaries. Animal-sourced foods should be derived from equitable, humane and sustainable systems that honour traditional practices, especially among pastoralists and smallholders, while implementing high-welfare and agroecological standards. The food system's power should shift from large-scale industrial agribusinesses to local communities, cooperatives, and small-scale enterprises, promoting inclusive economies. Policies and subsidies should support agroecological practices, ensuring sustainable livelihoods and addressing climate change and food insecurity.

Our vision emphasizes food sovereignty, where Kenyans decide what food to produce and how to produce it. Farmers, pastoralists, and fishers earn dignified livelihoods and benefit from fair market conditions. The system ensures reduced reliance on industrialized animal agriculture while promoting diversified, plant-based diets and traditional livestock systems rooted in Kenyan cultural practices (Kenya Climate Smart Agriculture Strategy 2017-2026).

The following roadmap outlines pathways to transition to a climate-resilient food system that is equitable, humane, sustainable, and locally and democratically governed. It aims to mitigate greenhouse gas emissions, biodiversity loss, and food insecurity, and identifies three key levers of change to transform our food system.

Strengthen Food System Governance

Effective governance is essential to transforming Kenya's food system into one that is equitable, sustainable, and locally governed. This transformation requires several key actions. First, it involves empowering local communities, particularly those in arid and semi-arid lands (ASALs) and urban informal settlements, to control food production systems. This can be achieved by elevating traditional and local food systems and enhancing local decision-making through existing structures like county agricultural committees. Secondly, it necessitates challenging the dominance of multinational corporations by fostering transparency, holding them accountable for their environmental and social impacts, and actively supporting environmentally and socially responsible companies. Finally, prioritizing policies that address the unique challenges faced by women farmers, who constitute 70% of Kenya's agricultural workforce, is crucial to ensuring their equitable participation in and benefits from the transformed food system.

Promote Agroecological Practices

Agroecology is central to achieving an equitable and just transition in Kenya. This transition depends on a number of interconnected actions. Supporting smallholders and pastoralists through the promotion of agroecological and high animal welfare practices, including agroforestry, conservation agriculture, rotational grazing, and organic farming, is crucial, aligning with Kenya's commitment to sustainable land management and climate resilience. Respecting indigenous knowledge and biodiversity is also essential, strengthening both food sovereignty and security while building climate resilience in vulnerable regions. Moreover, ensuring food sovereignty and security means meeting local food needs and providing dignified livelihoods for farmers, pastoralists, and fishers through access to affordable credit, targeted subsidies, and comprehensive training programs. Finally, scaling up agroforestry and organic farming will require fostering effective public-private partnerships.

Shift Towards Diets Within Planetary and Social Boundaries

A transition to more sustainable diets is essential for addressing intertwined environmental, public health, and food security challenges. This shift involves several interconnected components. One key aspect is reducing Kenya's reliance on industrial animal agriculture by implementing sustainable and high welfare livestock practices. These practices must carefully balance the cultural and economic significance of livestock with the urgent need to mitigate environmental impacts. Simultaneously, promoting plant-rich diets with reduced meat and dairy consumption is crucial for aligning with planetary boundaries, which in turn frees up resources for diversified agroecological production systems. Furthermore, addressing public health issues such as antimicrobial resistance (AMR) and zoonotic diseases requires stricter regulations and enhanced animal welfare practices and

veterinary services. Complementing these efforts, raising public awareness about healthy diets can contribute to combating non-communicable diseases while simultaneously supporting agroecological practices that lower greenhouse gas emissions and enhance soil carbon sequestration.

Mechanisms for Implementation

Effective implementation of an equitable and just food system transformation requires robust mechanisms that ensure broad participation, build capacity, and track progress. Central to this is meaningful stakeholder engagement, which necessitates actively involving diverse groups such as smallholders, pastoralists, Indigenous communities, women, and youth in both policy formulation and implementation processes. Leveraging existing platforms like the Agricultural Sector Development Support Programme (ASDSP) is crucial for ensuring inclusivity and maximizing existing infrastructure. Complementing this inclusive approach is the need for comprehensive capacity building. This involves training extension officers and farmers in agroecology and high welfare practices, equipping them with the knowledge and skills necessary for successful implementation.

Furthermore, enhancing agricultural education programs by integrating agroecological principles will ensure that future generations of agricultural professionals are well-versed in these critical approaches. Finally, robust monitoring and evaluation are essential for tracking progress and ensuring accountability. Establishing a national food systems observatory will provide a crucial mechanism for gathering data, analyzing trends, and providing evidence-based recommendations to guide ongoing efforts and adapt strategies as needed. This observatory will serve as a central hub for information and analysis, ensuring that the transition to an equitable, humane and sustainable food system is grounded in solid evidence and adaptable to evolving circumstances.

2.2 Principles of a Just Transition in Food and Agriculture in Kenya

In Kenya, agriculture contributes significantly to the economy and livelihoods of millions, with livestock production being a key subsector. However, in the face of climate change and environmental degradation, there is a pressing need to transition towards sustainable agricultural practices that align with Kenya's commitments under the Paris Agreement and the Climate Change Act, 2016 (The Paris Agreement | UNFCCC).

A just transition from industrial agriculture in Kenya must centre on industrial workers, smallholder farmers, pastoralists, small-scale fishers, and food workers. These groups form the backbone of the agricultural sector and must be actively involved in ensuring the transition addresses inequality, ends exploitation, and promotes food sovereignty. The process must consider social, gender, and racial equity while addressing systemic discrimination, including sexism, tribalism, and ableism. Gender-sensitive solutions that recognise the pivotal role of women, who make up the majority of agricultural labour, are essential.

The transition must respect regional and cultural diversity, with government leadership at all levels ensuring inclusivity and accountability. A human-rights-based approach, rooted in the principles of climate justice and equity, is critical. This approach must acknowledge the differentiated responsibilities between countries and communities, while empowering smallholders, pastoralists, Indigenous communities, women, and young people to lead in achieving humane and sustainable food systems.

Kenyan policymakers must promote coherence across food, agriculture, health, environmental, climate and labour policies. This requires breaking up market concentration, holding corporations accountable, and supporting agroecological and high welfare practices that prioritise food sovereignty and sustainability. While Kenya has unique dynamics due to its diverse landscapes and farming practices, the following principles can guide a just transition:

Protect Livelihoods and Dignity of Farmers

Smallholders, pastoralists, small-scale fishers, and Indigenous communities must have their livelihoods safeguarded through policies that provide economic and technical support, access to healthcare, and mental health services. Investments in job training and financial aid must address cultural sensitivities and the specific needs of marginalised groups affected by changes in agricultural systems and diets.

Advance Human Rights and Gender Equity

Every Kenyan has the right to fair wages, safe working conditions, and access to healthcare. Agricultural policies must align with trade policies to prevent human rights violations caused by exploitation or land-grabbing, especially in marginalised regions. The Free, Prior, and Informed Consent principle should be upheld to protect communities from external exploitation.

Ensure Food Sovereignty and Food Security

Agricultural policies should empower smallholders to decide what and how to produce, ensuring the right to food as a basic human right rather than a commodity. Strengthening local food systems, applying Indigenous knowledge, and supporting community-led decision-making are crucial for achieving food sovereignty.

Prioritise Agroecology and Diets Within Planetary Social Boundaries

Kenya's food systems must be aligned with the country's environmental and social goals. Agroecological practices can enhance soil health, conserve water resources, and mitigate climate change. Policies should promote diets within planetary boundaries addressing pollution, land degradation, and equitable access to resources like land and water.

Enhance Public Health

Kenya must address public health threats linked to industrial animal agriculture, such as antimicrobial resistance (AMR), zoonotic diseases, and environmental pollution. Shifting to agroecology will improve health outcomes by focusing on community well-being and corporate accountability.

Improve Animal Welfare Standards

For pastoralists and livestock-dependent communities, agroecology practices must include high animal welfare standards consistent with Kenya's Animal Welfare bill.
These standards should enhance environmental sustainability while respecting the cultural importance of livestock to livelihoods.

Kenya's Animal Welfare and Protection Bill 2019 set out a clear legal framework that agroecological systems in pastoral and livestock-dependent communities must respect and integrate. Under Section 12(1), any custodian "must treat the animal with 'respect and dignity,' provide adequate basic needs (e.g. sufficient food, water, space), not subject the animal to 'fear, pain, stress or any form of suffering,' provide an appropriate environment to the animal, taking into consideration species specific behaviours, maintain care during transport, be accountable for anything done to or by the animal and provide veterinary care" (Act, 2020).

In practical terms, pastoralists embracing agroecology can operationalize these standards by adopting rotational grazing schemes that prevent overstocking, maintain pasture health and ensure animals have continuous access to forage and water; by constructing simple, weather proof shade shelters or kraals that meet space and comfort requirements; by employing low stress handling practices (such as quiet herding pathways and shaded loading ramps) to reduce fear and injury; and by planning transport routes and durations to minimise distress.

Engaging Stakeholders

A just transition in Kenya requires an inclusive approach that involves farm workers, smallholders, pastoralists, fisherfolk, women, Indigenous communities, youth, and other marginalised groups. The government must establish mechanisms to ensure meaningful participation in policy formulation and implementation. Corporations must not dominate discussions, ensuring community voices are central to decision-making.

Mechanisms for a Just Transition in Kenya

- **Engage stakeholders early:** Conduct consultations farm workers, smallholders, pastoralists, women, and other affected groups before implementing new policies.

- **Strengthen local mechanisms:** Work with local organisations, cooperatives, and Indigenous groups to enhance participation and transparency.
- **Develop region-specific strategies:** Tailor resources and policies to suit Kenya's diverse agroecological zones, ensuring inclusivity.
- **Set clear priorities with stakeholders:** Collaboratively establish goals for transitioning to agroecology.
- **Monitor and evaluate progress:** Use participatory approaches to assess the impact of new policies and adapt where necessary.

Who Does the Just Transition Impact?	Key Stakeholders
Smallholder Producers and their Support Systems	• **Smallholder farmers:** Crop growers, small-scale aquaculture farmers, veganic farmers, organic livestock farmers, subsistence farmers, and silvopastoralists/agroforestry practitioners. • **Support organisations:** Farmer cooperatives, agricultural extension services, local advisory services, and NGOs that represent small-scale farmers. • **Women's organisations:** Local women farmer associations and community-based organisations promoting rural women's empowerment in agriculture.
Industrial Producers and Related Industries	• **Corporations:** Multinational and local companies involved in providing market and raw materials for the industries. • **Industry associations:** Groups like the Kenya Meat Commission, Cereal Millers Association, and other commodity trade organisations.
Workers Throughout the Supply Chain	• **Farmworkers:** Including permanent and seasonal labourer, who often form a significant part of the workforce in smallholder and industrial farms. • **Fishing communities:** Workers in industrial fleets, artisanal fishing, and aquaculture. • **Unions and advocacy groups:** Organisations representing workers' rights.
Communities Affected by Agricultural Production	• **Rural communities:** Those dependent on agriculture for livelihoods, including pastoralists, small-scale fishers, and Indigenous groups like the Ogiek and Maasai. • **Frontline communities:** Those disproportionately impacted by environmental degradation and land use changes.

Who Does the Just Transition Impact?	Key Stakeholders
Innovators	• **Startups and tech innovators:** Companies exploring alternative proteins, sustainable food systems, and agroecological practices. • **Kenya Agricultural and Livestock Research Organization (KALRO):** Developing locally relevant technologies and innovations in agroecology and sustainable food systems.
Researchers and Advocates	• **Research institutions:** Universities and think tanks such as the University of Nairobi, JKUAT, Egerton University, etc and the International Livestock Research Institute (ILRI). • **Advocacy groups:** Organisations promoting sustainable agriculture and food sovereignty.
Regulators	• **Government bodies:** Ministry of Agriculture and Livestock Development, National Environment Management Authority (NEMA), and Kenya Bureau of Standards (KEBS), Kenya Veterinary Board, and KEPHIS. • **International agencies:** FAO, UNEP (headquartered in Nairobi), and regional bodies like the African Union's Comprehensive Africa Agriculture Development Programme (CAADP), Organic certification bodies.
Investors and Funders	• **Development agencies:** Kenya-based offices of international agencies (e.g., USAID, World Bank, African Development Bank). • **Private investors:** Agribusiness financiers, microfinance institutions, and impact investors focused on sustainable agriculture. • **Financial institutions:** Saccos, banks, and cooperatives.
Consumers	• **Urban populations:** Particularly low-income groups and informal settlement residents with limited access to affordable, nutritious food. • **Rising middle class:** Consumers whose meat consumption is increasing alongside income growth. • **Retailers and food service providers:** Supermarkets, informal markets, and local food vendors catering to diverse dietary needs. • **Exporters**
Animals	• **Farmed animals:** Livestock integral to smallholder and pastoralist livelihoods, including cattle, goats, and chickens. • **Wildlife:** Animals impacted by agricultural expansion, such as elephants and antelopes in areas like the Maasai Mara and Tsavo. • **Aquatic life:** Fish and crustaceans in Kenya's inland waters (e.g., Lake Victoria) and coastal ecosystems.

2.3 Policies to Strengthen Just Transition in Food and Agriculture

Lever 1: Policies to Strengthen Food System Governance.

Financial Justice

To achieve financial justice within Kenya's food system governance, the government must implement fair and robust tax policies to ensure that multinational agribusinesses contribute equitably to national revenue. Strengthening tax compliance and holding corporations accountable for environmental and social damages is essential. Enhancing the capacity of the Kenya Revenue Authority will be key to enforcing these policies effectively. Additionally, agricultural subsidies should be reallocated from large-scale industrial farming to smallholder farmers and agroecology. This shift, as outlined in Kenya's **National Agroecology Strategy (2024–2033),** will promote agroecology and strengthen food sovereignty.

Investment regulations must also be revised to prevent multilateral development banks from funding the expansion of industrial livestock operations that harm the environment. Instead, financial resources should be directed toward agroecological and high welfare practices aligned with Kenya's sustainable development goals. Ineffective solutions, such as biodigesters and carbon offset schemes, should be defunded in favor of strategies that genuinely address Kenya's ecological and social needs.

Public development banks operating in Kenya should align their investments with global agreements such as the Paris Agreement and the Sustainable Development Goals (SDGs) to promote sustainable agricultural practices. To regulate private investments in the food system, the government should establish a national task force to prevent exploitative practices, including industrial animal agriculture and fishing, and ensure investments benefit local communities and ecosystems. Strengthening trade and investment agreements is also crucial for supporting Kenya's food sovereignty. These agreements should protect local farmers and fishers from unfair competition and require that imports meet Kenya's environmental and health standards. Furthermore, sufficient resources must be allocated to agencies responsible for enforcing environmental and labor laws in the agricultural and fishing sector. Strengthening these agencies will enable them to carry out their mandates effectively, ensuring compliance with regulations that protect workers, communities, animals and ecosystems. By implementing these policy measures, Kenya can create an equitable, humane and sustainable food system that is resilient and prioritizes the well-being of people, the animals and the environment.

Accountability and Governance

Strengthening accountability and governance in Kenya's food systems requires the enforcement of social environmental and animal welfare regulations tailored to Kenya's context, particularly for industrial animal and fishing production. Regular inspections and penalties for non-compliance must be prioritized. Comprehensive corporate accountability frameworks should be adopted to ensure transparency, incorporating mandatory disclosures and a "do no harm" principle.

Expanding labor laws to guarantee basic human rights, healthcare, and collective bargaining for agricultural workers is equally critical. Formalizing employment terms and banning exploitative practices can further protect workers' welfare. Companies seeking government contracts and incentives must meet stringent worker protection, environmental and animal welfare standards, promoting responsible business practices.
Kenya should ratify and integrate international treaties on business and human rights into national legislation, holding corporations accountable for their actions. To safeguard public interest, conflict-of-interest policies must be implemented, preventing the "revolving door" between government agencies and industry lobby groups. Antitrust regulations should be enforced to prevent monopolistic practices, fostering a fair and competitive market environment.

Emerging sectors like alternative proteins require the development of regulatory frameworks to ensure they are safe, sustainable, and economically beneficial.
Public health reporting should also be enhanced, particularly for zoonotic diseases and greenhouse gas emissions linked to industrial animal production, contributing to better monitoring and public health outcomes. Establishing national and regional policy advisory councils comprising diverse stakeholders will ensure that

food system policies are inclusive and effective.

Trade

Trade policies in Kenya should prioritize domestic agricultural production to support local farmers and reduce dependency on imports, aligning with the country's food security and economic development goals. These policies must also ensure coherence with global agreements, to promote sustainable development. Mechanisms to hold stakeholders accountable in trade agreements must be strengthened, ensuring adherence to agreed-upon standards. Trade restrictions should be applied to agricultural products linked to deforestation, safeguarding Kenya's forests and biodiversity. Furthermore, trade standards should reflect Kenya's specific health and sustainability goals, ensuring that imported products meet national criteria.
Kenya should reject carbon and biodiversity offset schemes that fail to deliver real environmental benefits, focusing instead on direct actions to reduce emissions and protect ecosystems. Strict policies must be implemented to address human rights abuses in food supply chains, ensuring ethical production practices. The principle of Free Prior and Informed Consent (FPIC) must be upheld when multinational corporations engage with local communities, respecting indigenous rights and land tenure.
To protect small-scale farmers, fishers, and pastoralists from the adverse effects of cheap imports, measures must be put in place to safeguard their livelihoods and preserve traditional practices. Tools such as mirror analysis can improve transparency and accountability in food and agriculture trade flows, ensuring that trade benefits all stakeholders equitably.

Promote Inclusive and Sustainable Market Interventions in the Livestock Sector

To modernize Kenya's food system while preserving cultural traditions and improving public health, the government should implement targeted market interventions. These include subsidies for smallholder livestock producers, strategic investment in cold chain and storage infrastructure, and nationwide public education campaigns to address misconceptions about fresh and processed meat. Engaging local producers in the design and implementation of these initiatives will ensure that modernization efforts are culturally appropriate, enhance production efficiency, and promote sustainable consumption patterns aligned with both health and environmental goals.

Livestock and pastoralism Sector

Livestock production and pastoralism are central to the social, economic, and environmental life of Kenya's Rift Valley and northern counties. In these arid and semi-arid areas, seasonal livestock movements are vital for food security, livelihoods, and cultural identity for millions of people. However, since 2020, the expansion of industrial animal production, enclosure of communal rangelands and recurrent climate shocks have led to land fragmentation, restricted pastoral movements, and weakened traditional systems that manage access to pasture and water.

Kenya's legal and policy framework contains instruments relevant to a just transition. The Community Land Act (2016) provides mechanisms for recognising and registering community land and customary tenure, enabling protection of grazing commons and seasonal corridors; yet implementation remains uneven, and county-level land use decisions frequently permit conversions that undermine pastoral mobility (Republic of Kenya, 2016). The National Livestock Policy (Sessional Paper No. 3 of 2020) and the National Adaptation Plan (NAP 2015–2030) identify rangeland management, breed conservation and drought preparedness as priorities, offering entry points to mainstream pastoral needs into climate finance and county implementation. To be effective, these frameworks require translation into devolved investments—community-managed water infrastructure, strategic forage reserves and mobile veterinary/extension services tailored to mobile production systems (Republic of Kenya, 2020; Republic of Kenya, 2015).

Technical interventions that respect mobility and customary governance can increase resilience and reduce emissions intensity. Participatory rangeland management, adaptive and rotational grazing, community fodder banks and conservation of drought-resilient indigenous breeds (for example, Boran and East African zebu types) have shown benefits for forage productivity, animal health and soil carbon when co-designed with pastoral communities (Thornton et al., 2025). Integrating such approaches into county climate actions and national NDC investment plans will channel adaptation and low-regret mitigation finance to high-need arid and

semi-arid lands (ASAL) areas.

Justice-centred governance is essential. Procedural justice requires meaningful representation of pastoralists—particularly women and youth—in county policy fora, land adjudication and climate planning. Distributive justice demands that financial instruments (index-based insurance, concessional credit, targeted grants) and market development initiatives be designed to reach mobile and small-scale producers rather than favouring industrial consolidation. Recognition justice requires that customary institutions and indigenous knowledge be respected in conservation, restoration and payment-for-ecosystem-services schemes (Thornton et al., 2025).

Market and finance mechanisms must be adapted to pastoral realities. This includes mobile-friendly market platforms that enhance price transparency and livestock trade; livestock value-chain cooperatives that strengthen collective marketing and bargaining power; drought-response financing linked to early-warning systems; and blended finance instruments that de-risk the adoption of appropriate productivity-enhancing inputs. These inputs refer not to synthetic fertilizers or genetically modified feeds, but to locally adapted, low-input innovations consistent with agroecological principles such as improved indigenous breeds, drought-tolerant fodder and pasture seeds, community-led veterinary and extension services, rotational grazing systems, fodder tree integration, and water harvesting or storage technologies. All interventions must be accompanied by robust safeguards to prevent land dispossession, ensure community consent, and reinforce customary governance of rangelands. International guidance on pastoralism and biodiversity supports models where pastoral custodianship and conservation objectives are mutually reinforcing (Secretariat of the Convention on Biological Diversity, 2013).

Local Food Systems

Strengthening local food systems requires engaging a broad range of stakeholders, including farmers, fisherfolks, consumers, marginalised groups and civil society, in the development of policies that protect and promote food sovereignty. Inclusive stakeholder engagement will ensure that food system policies are both effective and reflective of the diverse needs of Kenyan communities.

Lever 2: Policies to shift towards agroecological practices

Kenya's commitment to agroecology is exemplified by the establishment of the National Agroecology Strategy for Food System Transformation (2024–2033). This forward-looking strategy seeks to promote sustainable food systems, enhance food security, and support climate-resilient livelihoods. It outlines comprehensive measures across financial justice, governance, and producer support to facilitate the transition to agroecological practices.

Financial Justice

Securing land tenure for marginalized groups—including women, Indigenous peoples, ethnic minorities, and people of color—is a central tenet of the strategy. Recognizing and supporting land rights empowers these communities and enables them to adopt sustainable agricultural practices. Additionally, improving access to financial resources for smallholders, small-scale fishers, pastoralists, and rural women remains a priority. Innovative solutions such as mobile money platforms have already demonstrated their effectiveness in providing credit to underserved populations, including smallholder farmers in Kenya. Inclusive financial processes are essential to ensure that marginalized groups benefit equitably from financial assistance programs. Redirecting subsidies and other financial incentives towards producers transitioning to agroecological practices further aligns with the strategy's goals of fostering sustainable food systems. Enhanced access to farming insurance is another key measure, helping smallholder farmers mitigate financial risks associated with climate change. Companies like Pula, based in Nairobi, have been instrumental in offering such solutions.

To stabilize income for smallholder farmers and promote food security, the strategy advocates for the establishment of strategic grain reserves and other supply management programs. Incentives and technical

support for meat, dairy, and seafood producers to transition to plant-based production are also encouraged, reflecting a broader shift towards sustainable agricultural practices and dietary patterns.

Linking climate and development funding to the guiding principles of agroecology ensures that financial resources support resilient food systems. Investments in local infrastructure, tailored to community needs, further strengthen the capacity of rural areas to sustain agroecological practices. Financial support for rural entrepreneurs and small businesses fosters economic development while aiding agroecological transitions. Participatory budgeting and planning for food and agriculture programs are emphasized as essential tools for ensuring that financial resources are allocated according to the priorities of local communities. Funding is also directed towards restoring former agricultural land, which contributes to environmental sustainability and biodiversity conservation.

By investing in research and academic programs, the strategy institutionalizes agroecology in science and education, promoting knowledge dissemination and capacity building. Finally, the adoption of true cost accounting for food and agriculture reflects the environmental and social costs of production, incentivizing sustainable practices and fostering accountability.

Governance

Equitable governance is a cornerstone of the strategy, with a strong emphasis on recognizing and supporting land tenure for marginalized groups such as Indigenous peoples, women, and people of color. Secure land rights are seen as foundational to empowering these communities and ensuring their participation in sustainable agriculture.

Policy coherence across agencies and agreements is essential to align and reinforce food system policies effectively. Enforcing labor rights and ensuring living wages for agricultural workers further promotes social justice and supports sustainable practices. Strengthening animal welfare standards within agroecology assessment frameworks, such as the FAO's Tool for Agroecology Performance Evaluation (TAPE), ensures ethical treatment of animals in food systems.

To monitor environmental impacts and support biodiversity conservation, the strategy calls for the establishment of clear biodiversity metrics for food and agriculture policies. Additionally, reducing food loss and waste through initiatives that incorporate environmental metrics contributes to resource efficiency and sustainability.

The recognition of food as a human right is central to the strategy. Developing programs that reject the commodification of food ensures access to sufficient, nutritious food for all individuals.

Producer Support

Empowering producers lies at the heart of the strategy. Improving access to and control over land and resources for smallholders, peasants, and pastoralists—particularly women, Indigenous peoples, and other marginalized groups—is vital. The strategy prioritizes secure land rights and resource access as a means of fostering equity and sustainable agriculture.

To facilitate the transition to agroecology, the strategy includes expanded employment support, technical assistance, and funded training programs. These initiatives equip producers with the skills and knowledge required to adopt sustainable farming practices. Furthermore, improving access to healthcare services for agricultural workers enhances their well-being and strengthens rural communities.

Women-led participatory processes in food and agriculture spaces are encouraged to ensure that women's perspectives and needs are integrated into decision-making. Establishing preferential trading conditions for smallholders, small-scale fishers, and pastoralists enhances their economic viability and market access. Finally, increasing market support for food produced using agroecological methods provides economic incentives and fosters the widespread adoption of sustainable farming practices. By implementing these measures, Kenya is paving the way for a more inclusive, sustainable, and resilient food system.

Promote Sustainable Rangeland Management and Climate-Resilient Livelihoods for Pastoralists

To address land degradation and biodiversity loss in Kenya's arid and semi-arid regions, the government should implement policies that promote sustainable rangeland management while supporting smallholder and pastoralist communities. Key actions include incentivizing rotational grazing and community-led land use planning, investing in reforestation and soil restoration programs, and supporting the adoption of drought-resilient livestock breeds. Additionally, strengthening access to markets, veterinary services, and alternative income sources—such as agroecology and eco-tourism—can enhance resilience and reduce pressure on fragile ecosystems, ensuring both environmental sustainability and pastoralist livelihoods.

Strengthen and Scale Community-Based Livestock Cooperatives

To enhance resilience against overgrazing and climate variability, the government should support and scale up community cooperatives and farmer groups engaged in collective livestock management. This includes facilitating access to credit and inputs through bulk purchasing schemes, promoting the sharing of climate-resilient breeds, and supporting joint grazing land management plans. Additionally, providing technical assistance, extension services, and legal recognition for cooperatives can strengthen their capacity to sustainably manage resources, improve productivity, and build climate-adaptive livelihoods.

Lever 3: Policies enabling a shift towards diets within planetary and social boundaries

Transitioning Kenya toward sustainable and culturally appropriate diets within planetary and social boundaries necessitates a robust policy approach that integrates financial justice, governance, and updated national dietary guidelines.

A critical step involves reforming agricultural subsidies to shift from consumption-focused support to production-oriented incentives. This includes promoting the cultivation of legumes and other plant-based proteins, which not only diversifies farmers' income sources but also contributes to dietary diversity and environmental sustainability. By enhancing local manufacturing and making nutritious foods more affordable, such reforms can stimulate economic growth and improve public health outcomes.

Updating national dietary guidelines and procurement policies is equally essential. Emphasizing traditional, nutrient-rich foods like millet, sorghum, and indigenous legumes in these guidelines can reinforce healthy eating habits. Aligning public procurement, especially in institutions such as schools and hospitals, to source these foods supports local farmers and preserves cultural food practices.

Strengthening governance frameworks ensures that policies are inclusive and reflective of community needs. This involves securing land tenure for marginalized groups and integrating traditional knowledge into policy development. Encouraging agroecological practices, including integrated livestock systems, enhances biodiversity and resilience by combining traditional knowledge with modern science to improve soil health and sustainability.

Governance and accountability play a vital role in enabling this shift. Aligning trade policies with national food security and agriculture goals ensures sustainable agricultural practices and food system resilience. Integrating food and nutrition security into national development agendas ensures comprehensive policy coherence, while transitioning away from government-supported promotions of industrial animal proteins redirects focus towards sustainable and ethical food production. Tracking and reporting consumption-based emissions through comprehensive lifecycle analyses enable evidence-based policymaking to address environmental impacts.

Corporations must also be held accountable for overproduction and food waste through enforceable regulations that promote sustainable consumption and production. Additionally, marketing of meat and dairy products should be strictly regulated to ensure transparency, protect consumer health, and align consumption patterns with sustainability priorities. Advancing regulatory frameworks for alternative proteins fosters

accountability and innovation, ensuring consumer trust in these emerging sectors.

Dietary guidance and procurement policies must also be updated to reflect sustainability priorities. National dietary guidelines should promote healthy diets that are environmentally and socially responsible. Government procurement policies should prioritize culturally appropriate, regional, and seasonal foods while reducing food waste and supporting local food systems;

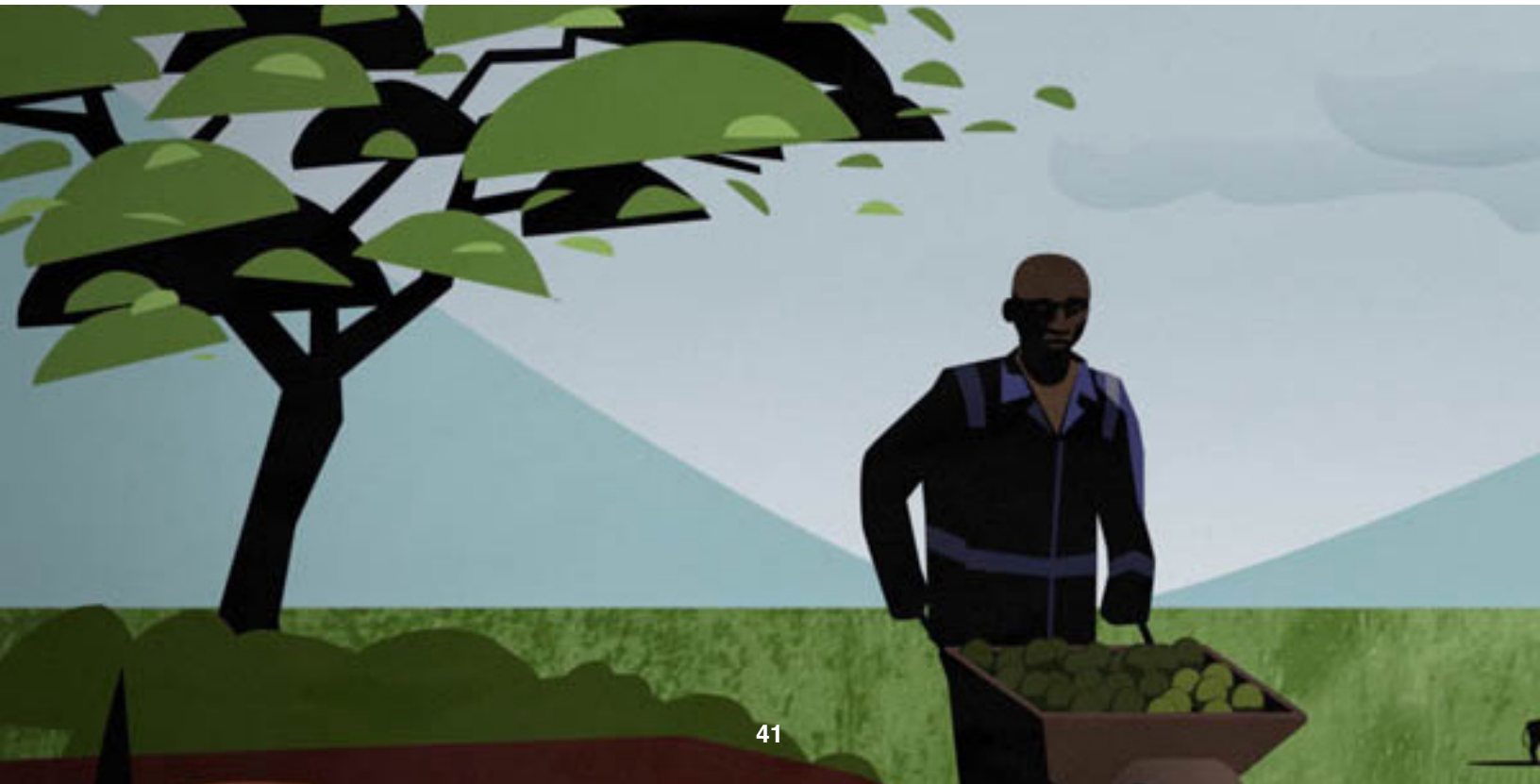
Support small-scale poultry producers and fishers to transition to agroecological, high-welfare systems by providing:

- Financial incentives & affordable credit (e.g. micro-grants or low-interest loans) to invest in improved housing, fencing, pond liners and feed storage.
- Hands-on training & upskilling in regenerative practices (rotational grazing, integrated pest management, water-wise aquaculture), animal health and humane handling;
- Extension services & peer-learning networks that link producers with agronomists, veterinarians and experienced “farmer-mentors”;
- Access to quality inputs (locally adapted feed, seed stock or fingerlings) through cooperative purchasing schemes;
- Basic infrastructure support—cold-chain facilities, community processing centres and solar-powered refrigeration—to reduce post-harvest losses and improve product safety;
- Market development & certification assistance (e.g., organic or fair-trade labelling) to help smallholders capture better prices and build consumer trust.

Set clearer quantitative targets in future guideline updates to align better with health and environmental objectives.

Support Local Producers to:

- Provide financial incentives (micro-grants, low-interest loans) and access to quality inputs (indigenous



seed, organic fertilizer) so smallholders can scale up food-grade production of traditional legumes, grains and oilseeds.

- Offer hands-on training in agroecological methods—intercropping, soil-building rotations, water-harvesting—and set up farmer-led demonstration plots to showcase best practices.

- Strengthen producer cooperatives and market linkages (e.g. aggregation hubs, local buyers' networks) to improve farmers' bargaining power, reduce post-harvest losses, and ensure reliable off-take of their harvests.

Promote Traditional Plant-Based Proteins and Context-Relevant Alternatives for a Sustainable Dietary Transition

To ensure a culturally appropriate and sustainable shift in protein consumption, Kenyan policymakers should prioritize investment in traditional plant-based proteins—such as legumes, millet, sorghum, and indigenous leafy greens—through support for agroecological farming, seed systems, and local value chains. Public nutrition campaigns and school feeding programs should highlight the health and cultural value of these foods. Simultaneously, selective support can be given to alternative proteins like plant-based fast food options in urban areas, where consumer interest is growing. This dual approach supports dietary diversity, respects food cultures, and promotes environmental sustainability while creating inclusive economic opportunities across rural and urban contexts.

Embed **nutrition education** in schools, health clinics and community centres, focusing on the benefits of traditional plant proteins (e.g., cowpeas, bambara groundnut, sorghum) and simple, culturally-rooted recipes

Increasing the availability of culturally appropriate, plant-centered meals in public and private institutions respects diversity, enhances dietary variety, and supports sustainable practices. Encouraging the consumption of locally produced foods grown using agroecological practices strengthens local economies and reduces carbon footprints. Governments should provide financial support and technical assistance to institutions transitioning toward plant-centred food services, facilitating the adoption of healthier and more sustainable meal options.

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