Policy Prioritisation through Value Chain Analysis (PPVC)
Deep Dive Analysis on the Beef Value Chain in Kenya

Executive Summary
August 2021

BACKGROUND ON PPVC METHODOLOGY

The PPVC is a market-led approach that aims to:

- Assist governments with evidence-based analysis to adequately prioritise their policies and investments (e.g. the Agriculture Sector Transformation and Growth Strategy (ASTGS)[1] and the accompanying National Agricultural Investment Plan (NAIP) for Kenya, Kenya Vision 2030[2], and the Big Four Presidential Agenda[3])
- Determine which policies and public investments are most (cost) effective at driving market-led inclusive agricultural transformation, and
- Involve public- and private sector stakeholders right from the start.

First, the current state or "as-is" baseline is established. For the beef value chain, this provides the current state and historical trends of beef supply and demand, identifying critical stakeholders throughout the value chain, with associated market shares, operational costs, capacity and constraints, and then summarising challenges faced by the various value chain actors. Secondly, "ideal state" of the value chain is defined, in which key bottlenecks and constraints are addressed using specific levers of change (e.g. value chain investments and policy levers). In order to reach the ideal state, a combination of investments and policies are formulated at specific nodes of the value chain aimed at unlocking more value out of the market system. Furthermore, these changes are translated to gross margin impacts at the various nodes of the value chain. The impactof interventions on the beef sector is modelled over a medium-term horizon (10 years, using BFAP'spartial equilibrium model) and the resulting impact on agri-food system GDP, poverty reduction and off- farm agri-food system jobs is modelled using the IFPRI RIAPA CGE modelling system.

INTRODUCTION

Kenya's policy landscape is largely shaped by the Kenya Vision 2030, Agricultural Sector Transformation and Growth Strategy (ASTGS), National Agriculture Investment Plan (NAIP) and the Big Four Presidential Agenda. These policies establish the framework and enabling environment requirements for growth and inclusive agricultural transformation. However, appropriate and effective public investments require that these policies be translated into more concise and targeted strategies that take the budgetary constraints facing policymakers into consideration. In this regard, the Ministry sought support from the Alliance for a Green Revolution for Africa (AGRA) in analysing and identifying policy levers using market-based approaches and modelling techniques that could provide insight into how to achieve set targets for implementation of the ASTGS and the Big Four Initiatives.

In response to this request, AGRA partnered with the Bureau for Food and Agricultural Policy (BFAP), Tegemeo Institute of Agricultural Policy and Development, Egerton University and the International Food Policy Research Institute (IFPRI) on a project called Policy Prioritisation

through Value Chain Analysis (PPVC). The scope covered 12 commodity value chains that are common in both the ASTGS and the Big Four Initiatives. During the first phase of the project, the 12 value chains were ranked based on a list of indicators measuring each value chain's contribution to market-led, inclusive agricultural transformation. At a meeting held on 25th Nov 2019, the ranking results were presented to the Principal Secretary of the Ministry of Agriculture, Livestock & Fisheries, Prof Hamadi Boga. From the 12 value chains, Prof Boga selected three value chains for a deep-dive analysis, namely coffee, beef and fish. This policy brief presents an overview of the beef deep-dive value chain analysis.

BACKGROUND

Several estimates exist regarding the contribution of Kenya's livestock sector to the economy, but revised estimates of livestock population from the 2009 census used by Behnke and Muthami (2011) suggest that livestock contributes 13% of the national GDP and 43% of the agricultural GDP. More recent estimates contained in the Africa Sustainable Livestock 2050 (ASL2050) program, based on 2017 data from KNBS, place livestock's contribution at USD 3.1 billion. Cattle contribute close to three-quarters of red meat consumed in Kenya, making beef the most important source of red meat protein in the country (Farmer and Mbwika, 2012) and thus an important value chain in the livestock sector.

Beef cattle production systems in Kenya can be classified into extensive grazing systems (which includes pastoralism and ranching), semi-intensive grazing systems (which includes agro-pastoralism) and intensive systems, such as feedlots (FAO 2019).[1] Pastoralism is characterised by communal sharing of grazing areas and water resources. Livestock keeping in the system is uncommercialized with cattle breeds mostly indigenous. Ranches consist of large tracts of grazing land with most ranches also having disease control, feeding and water management infrastructure. They are commercially oriented and keep both indigenous and improved livestock breeds, with focus on premium beef markets. Pastoralism and ranching are practiced in arid and semi-arid areas. Agro-pastoralism is practiced in areas that also support rain-fed agriculture. The system integrates livestock and crop production in a symbiotic relationship, where livestock are fed on crops residues, animal manure is applied to crops and animals are used for ploughing fields. The system is mainly subsistence and the number of animals kept per holding is much smaller. Feedlots are commercial systems, where livestock are kept under an intensive feeding regime for weight gain in a short period of time (about 100 days) before sale. The system is capital

---

[1] Alternative classification of Kenya's beef value chain is provided by Carabine et al. (2018): a more formal chain consisting of private ranches raising cattle and the other of informal pastoralists raising cattle in extensive production systems. This classification views the formal system as involving private ranching that incorporates a fattening component before the cattle is sold into the market, and the informal system as involving pastoralism with cattle being raised through extensive grazing and sold directly into the market.

intensive, high-input and high-output and targets premium beef markets, with a high quality product.

The FAO (2019) estimates that extensive pastoralism accounts for 34% of farms while extensive ranching accounts for 11% of the farms. Semi-intensive systems (agro-pastoralism) is the largest group and accounts for 54% of farms while the least is intensive systems (feedlots), which account for 1% of farms. In terms of livestock numbers, it is estimated that pastoralists in arid and semi-arid lands (ASAL) keep 60--80% of the national livestock herd (Carabine & Simonet, 2018; FAO, 2019; KMT, 2019). Farmer and Mbwika (2012) estimated Kenya's livestock production in the ASAL to be worth US.$ 800 million in real terms (2005 base year of US$) while internal trade in pastoral areas averaged about US.$90 million per annum.

Formally recorded beef production in Kenya has increased sharply in recent years and is mainly oriented towards the domestic market. Over the past five-year period, from 2014 to 2019, beef production increased from 263,000 to 465,000 tons - a 77% increase (Figure 1). With the country's human population increasing from 46.7 million to 47.5 million over the same period, beef consumption has also been on the rise, remaining marginally higher than local production and resulting in limited net exports. Besides population growth, the increase in consumption of beef in Kenya is also driven by income growth and increased urbanization. Per capita beef consumption has grown to almost 9kg per year, which is quite strong compared to other countries with similar income levels (Figure 2). Consumption levels are highest in the major cities, with Nairobi and Mombasa reflecting the highest annual meat consumption per capita at 25.8kg and 21.2 kg, respectively (Farmer and Mbwika, 2012).
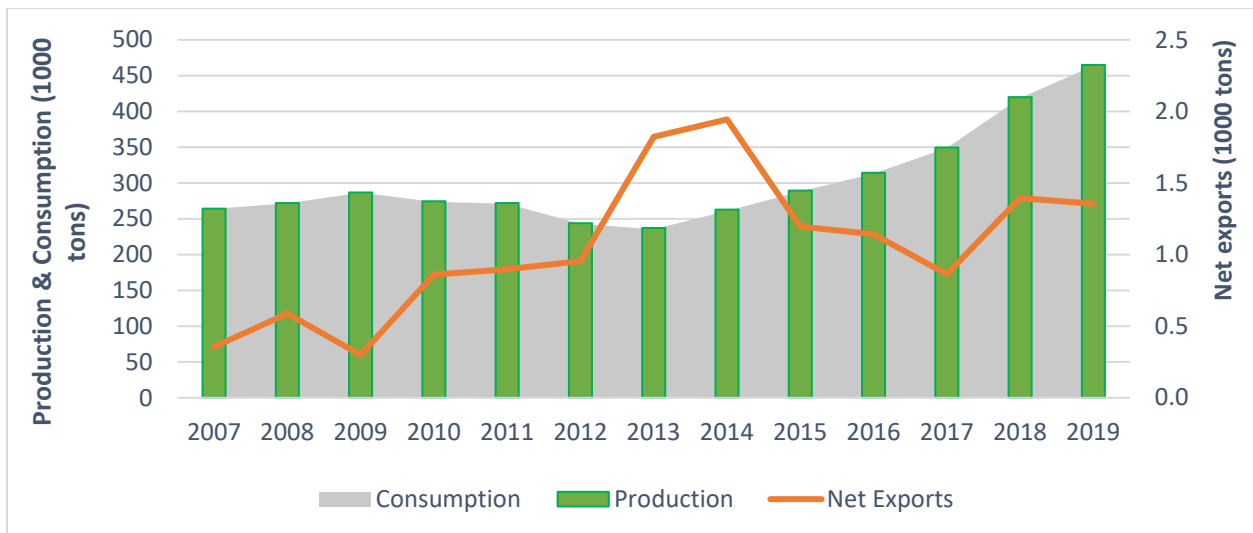

Figure 1: Kenya's beef production, consumption and net exports over time
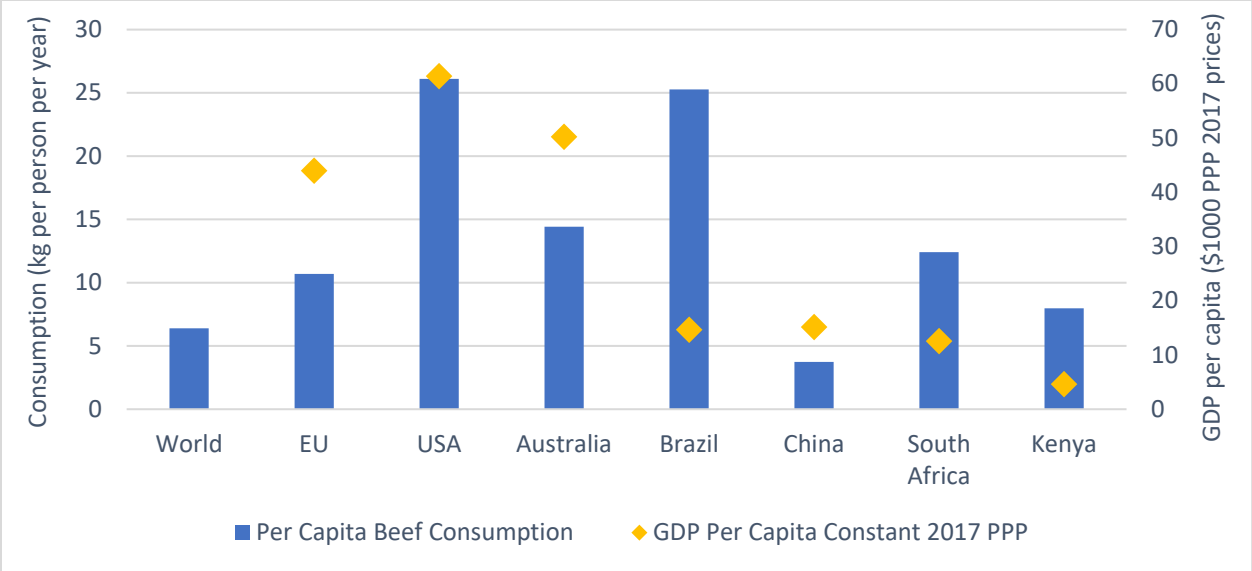Source: KNBS & ITC Trademap, 2020

Figure 2: Per capita consumption of beef in Kenya and other countries
Source: OECD-FAO, 2020 & PPVC Deep Dive Analysis

A key caveat which underlies the beef production and consumption numbers is that considerable informal trade in live animals that takes place between Kenya and its neighbouring countries. Farmer and Mbwika (2012) have reported that 20 -25% of red meat consumed is from animals imported from Ethiopia, Somalia, Tanzania, and Uganda. These animals are slaughtered in Kenya and therefore recorded as production, but are not raised in the country. With beef cattle accounting for 77% of red meat off-take in Kenya (Behnke & Muthami, 2011), the above reported percentages of live animal imports from neighbouring countries imply that 15-19% (or an average of 17%) of the beef cattle slaughtered in the country are from imports. Therefore, Kenya is generally regarded as a net importer of cattle and does not produce enough to cover its domestic beef consumption needs.

The combination of rising beef consumption in Kenya, limited exports and a substantial share of live cattle imports from neighbouring countries suggests that there is ample opportunity to expand domestic production. Exploiting that opportunity would require not only rising volumes, but also improvements to the quality of animals presented for slaughter, thereby enabling not only the replacement of currently imported cattle with domestic production, but also unlocking additional export opportunities.

VALUE CHAIN STRUCTURE AND PRODUCT FLOW

Kenya's beef value chain is long and fairly complex, involving various segments that handle live animals and beef. From the product flow presented in Figure 3, three important observations can be deducted:

- Kenya's beef market relies on a substantial number of cattle imports, to the tune of 17% of the total marketed cattle.
- The share of feedlots is currently low, and they supply mainly markets that demand products of higher quality, such as high-class butcheries, the hospitality industry and export markets. It is important to note that promotion of feedlots is in the government's policy and investment agenda for the livestock sector. If the plan is implemented, it has the potential of increasing the supply of beef to the high-end markets, including export markets.
- Pastoralism & agro-pastoralism are important sources of animals for feedlots. This implies a need for improving the quality of animals in the pastoralists' & agro-pastoralists' herd to supply quality animals to feedlots for efficiency in the system.
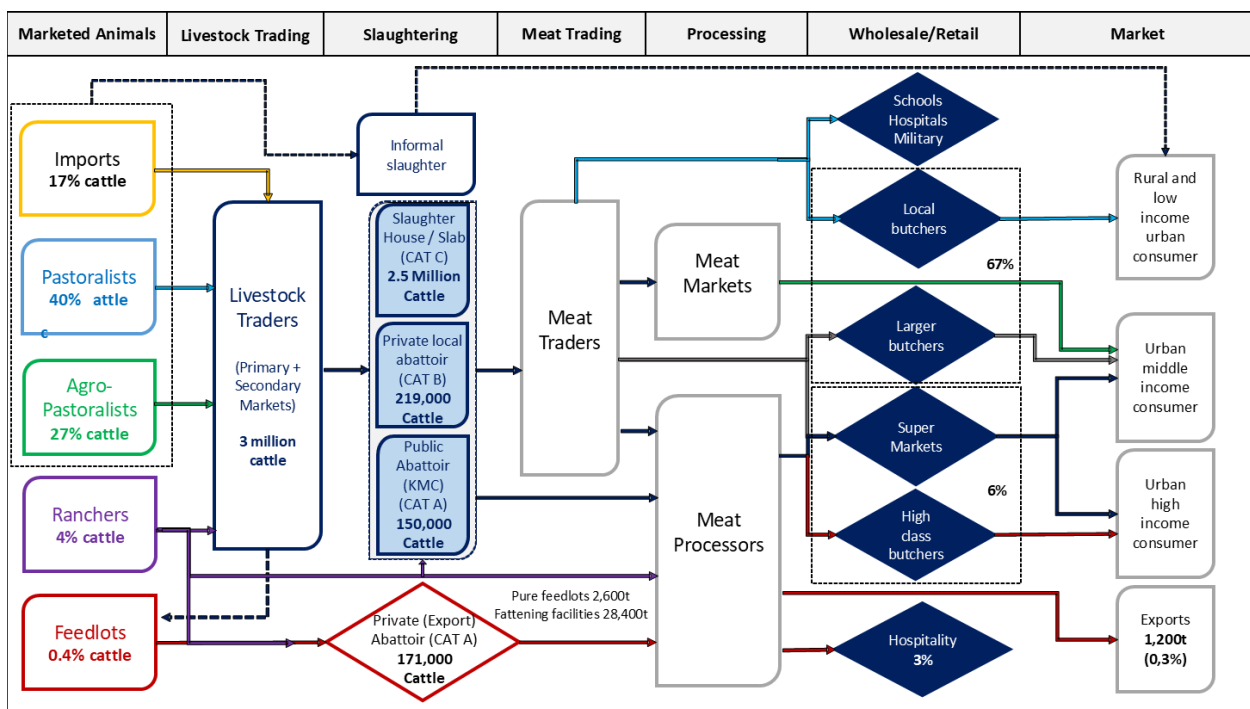

Figure 3: Kenya's beef value chain map

Source: PPVC Deep Dive Analysis

KEY CONSTRAINTS

Some of the most important **constraints** in the beef value chain relate to the level of productivity and carcass quality. In terms of productivity, a major limitation is **poor genetics** of animals,

especially in the pastoralists and agro-pastoralists' herds. Over the years, beef cattle producers have been practising negative selection, eliminating the best breed through slaughter, due to market demand and higher prices achieved for better quality animals. The practice is one of the leading contributors to poor breeding stock in the pastoralists and agro-pastoralists' herds. Studies (e.g., Mwangi et al., 2020) have found that over 70% of breeds in the pastoralists and agro-pastoralists' herds are East African zebu. These breeds take at least five years to reach slaughter weight and produce **lower carcass weights** ranging between 135 – 180kg. Beef from such carcass is generally of **lower quality** and struggle to enter export and domestic premium markets. There is also a **lack of a structured grading** or classification system in a large part of the Kenyan cattle market, and so the market is not segmented or stratified for quality and consistency. Only a few buyers (e.g. Farmer's Choice) are purchasing cattle based on a first order grading methodology. This lack of a grading system is a disincentive to production of high-quality cattle, which is also one of the reasons why beef exports remain limited.

Interventions aimed at enabling export led growth in the Kenyan livestock sector would have to be accompanied by the appropriate **animal health & meat safety standards** as prescribed either bilaterally by the trading partner, or by the World Organization for Animal Health (OIE). In most instances, the ability to trade is dependent on compliance with protocols specified by the importing country, as well as the animal health status of the exporting country, as issued by the OIE. The PVS Gap Analysis report for Kenya (OIE, 2011 and 2018) identified a number of gaps relating to the overall animal health status, and also provided clear guidelines, interventions and funding requirements to address them. Presently, some in-country strategies of intermediate compliance help to mitigate the effect of such gaps. An example is the procurement procedure implemented by the KMC relating to animal health, as well as their quality assurance protocol which is HACCP (Hazard Analysis and Critical Control Points) compliant and meets the requirements of the ISO22000:2005 standards. To date, this has been sufficient to enable trade to the Middle East and some parts of Asia, but for risk mitigation and the longer term sustainability in the Kenyan livestock sector, it is important that the recommendations contained in the PVS report be implemented.

An important constraint mentioned in the PVS report was the lack of a **national livestock identification and traceability system**. Such a traceability system should provide for the identification of animals at birth. At this stage however, identification with earmarks and branding is still rudimentary. Identification and traceability can be facilitated by the Agriculture, Livestock and Fisheries Sector Board within KEPSA. Similarly, the Kenya Bureau of Standards (KNBS) could, within its mandate, facilitate the adoption of standards based on specific market requirements, but industry stakeholders and government would still need to develop these standards and protocols.

The market led interventions prioritized in this report are aimed at unlocking premium markets for high quality products and would therefore require animal & public health, as well as identification and traceability to be prioritization in the next decade.

Unlocking market access and quality premiums will enhance growth opportunities, but the ability to supply competitively remains critical to unlocking the benefits from such opportunities. Presently, production is dominated by extensive systems, but further expansion, both in terms of beef herds, grazing and feed grain production is limited by land constraints in Kenya. Intensive systems currently provide a very small share of production and there is scope to grow such systems, however competitiveness within these systems is inhibited by high feed costs in Kenya.

Kenya's challenge of high feed costs affects all intensive livestock sectors and emanates from its deficit in raw material production. Kenya is a net importer of important raw materials used in the manufacture of animal feed, including maize, as primary energy source and soybean meal, the major source of protein in rations. This results in increased prices. While the raw maize and soybean meal can be procured at significantly lower cost elsewhere, factors such as transport costs (both sea freight and inland), port and handling costs and tariffs all add to the import parity levels (Figure 4). Both soybean meal and maize

Figure 4: Comparison of raw material costs sourced at different destinations

sourced from outside of the East African Community carry significant tariffs of 10% and 50% respectively. In the case of maize, this is further exacerbated by the premium payable for non-GM maize.
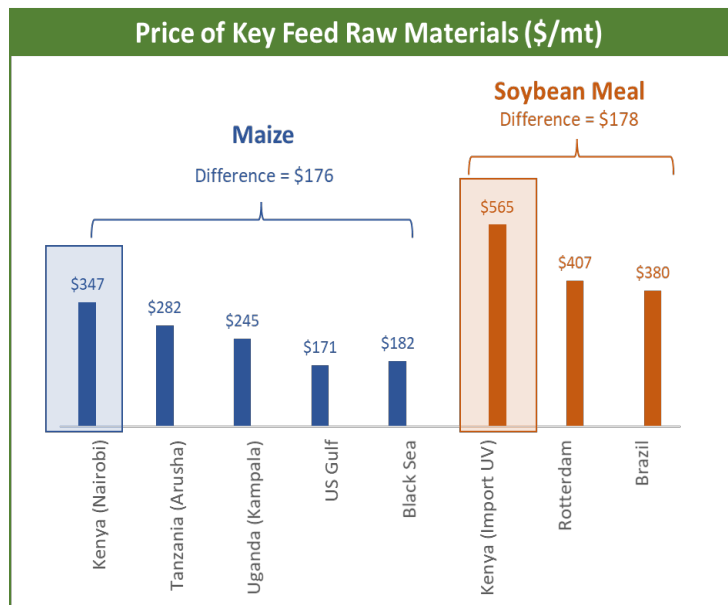
PRIORITISED AREAS FOR INTERVENTION

Introduction of a **grading and classification system** will incentivize production of higher quality animals, because cattle producers will be able to receive premium prices for quality products. High quality animals will enable processing and exports of premium products, which will in turn enable optimization of carcass value. **Expansion of feedlots**, which currently accounts for a small share of the beef produced in Kenya, has the potential of increasing and improving the **consistency of supply** of top-quality products for the domestic premium market, as well as the

largely unexploited export market. But expansion of feedlots will require a competitive feed sector, because feeds are a critical cost component in the operation of feedlots. Furthermore, expansion of feedlots will require sufficient supply of improved breed of cattle into the system. This implies a need to **improve genetics** in the pastoral production system, which is a major supplier of cattle for feedlots. Improved genetics will **increase productivity** through increasing calving rate, shorten the growth cycle for animals, increase average carcass weight and quality, in turn raising slaughter outputs. These interventions have the potential to raise beef production volumes substantially, as indicated in Figure 5, which compares production volumes in 2030 attained from incremental introduction of the stated interventions to 2019 volumes, as well as the baseline projection for 2030.) Figure 6 Presents a similar comparison in gross production value terms, thus accounting not only for the increase in production volume, but also the concomitant changes in average market prices as a result of the interventions. It should be noted that, while productivity gains have the largest effect on production volume, the importance of introducing the grading system and expanding feedlot production is important with respect to price impact. If additional volumes are enabled through productivity gains without enabling premium markets and value addition through the introduction of the grading system, average market prices would decline by almost 5% relative to the baseline. However, when the premium market is enabled, average prices remain largely unchanged, due to the greater share of premium products being traded in the market.
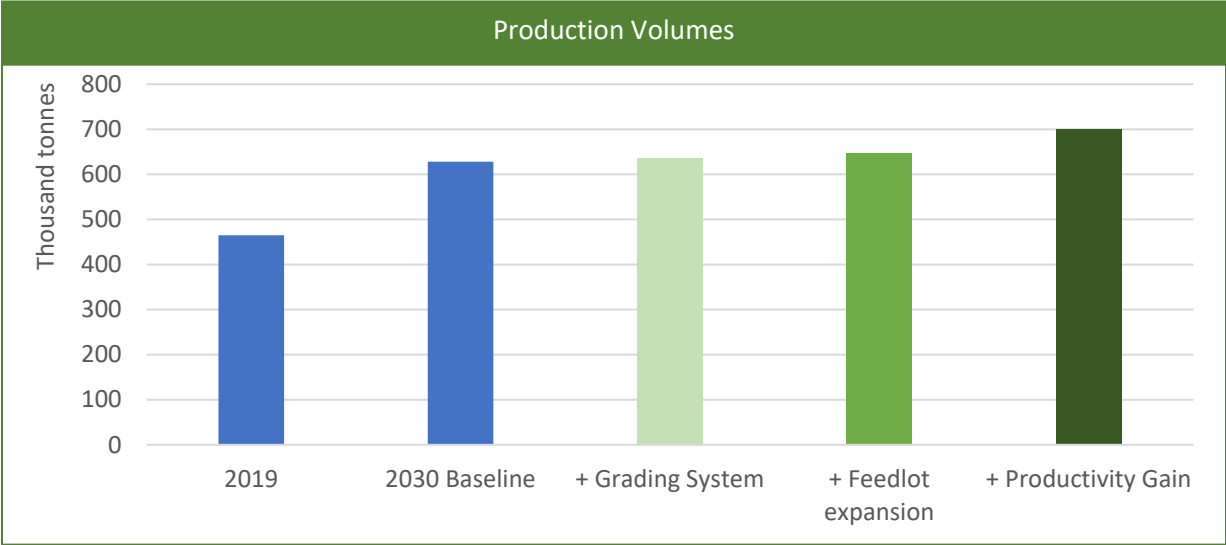

Figure 5: Future scenarios of beef production volume with interventions

Source: BFAP Multi-Market Partial Equilibrium Model
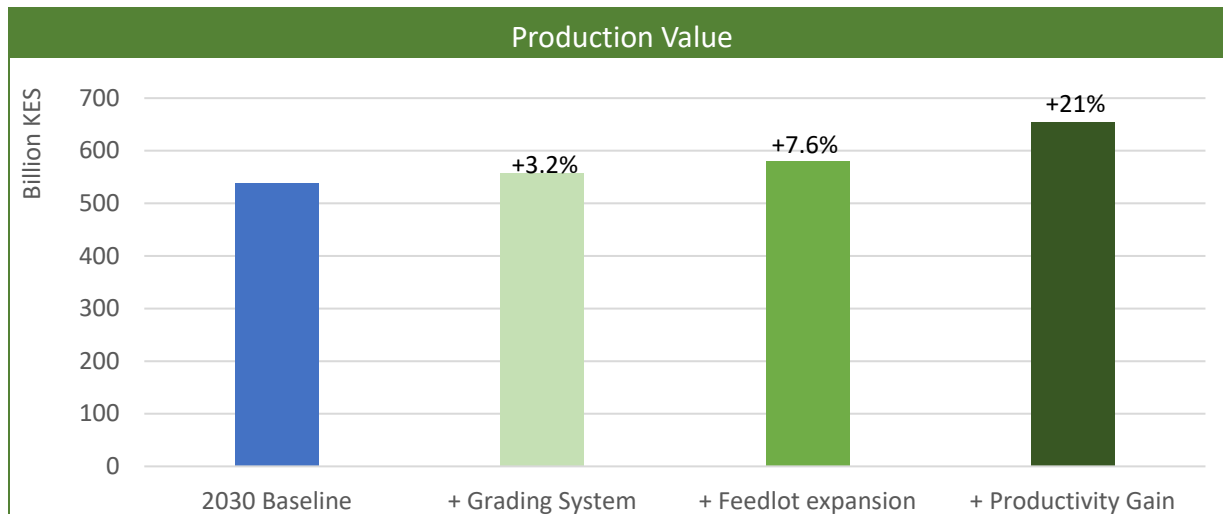
Figure 6: Future scenarios of beef production value with interventions

Source: BFAP Multi-Market Partial Equilibrium Model

In terms of contribution to the economy, the proposed interventions are estimated to contribute **KES 18.4 billion additional value added (GDP)** in livestock farming over and above the business-as-usual baseline (Figure 7). This is derived from increased producer margins as they adopt improved breeds and move an increasing share of animals through feedlot and ranching systems to yield higher quality products. Considered within the broader agri-food system, which includes additional value addition and associated impacts on other related sectors, the interventions together are estimated to lead to an agri-food system GDP gain of KES 30.8 billion or US$285 million. Furthermore, it has the potential to create 42 000 jobs and reduce the number of poor people in Kenya by 121 000 (Figure 8).
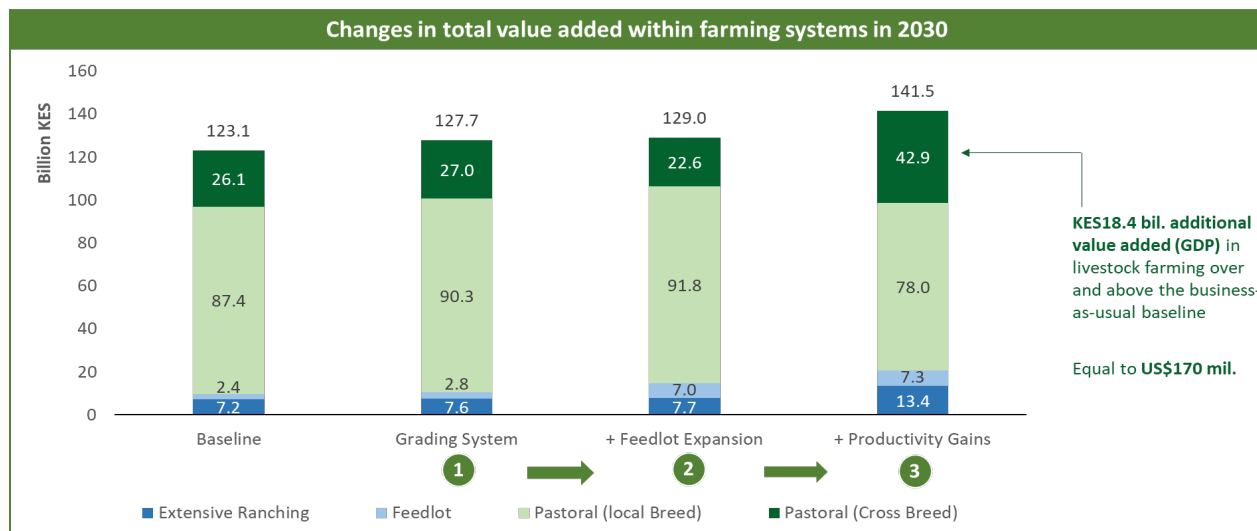

Figure 7: Changes in total value added within farming systems in 2030

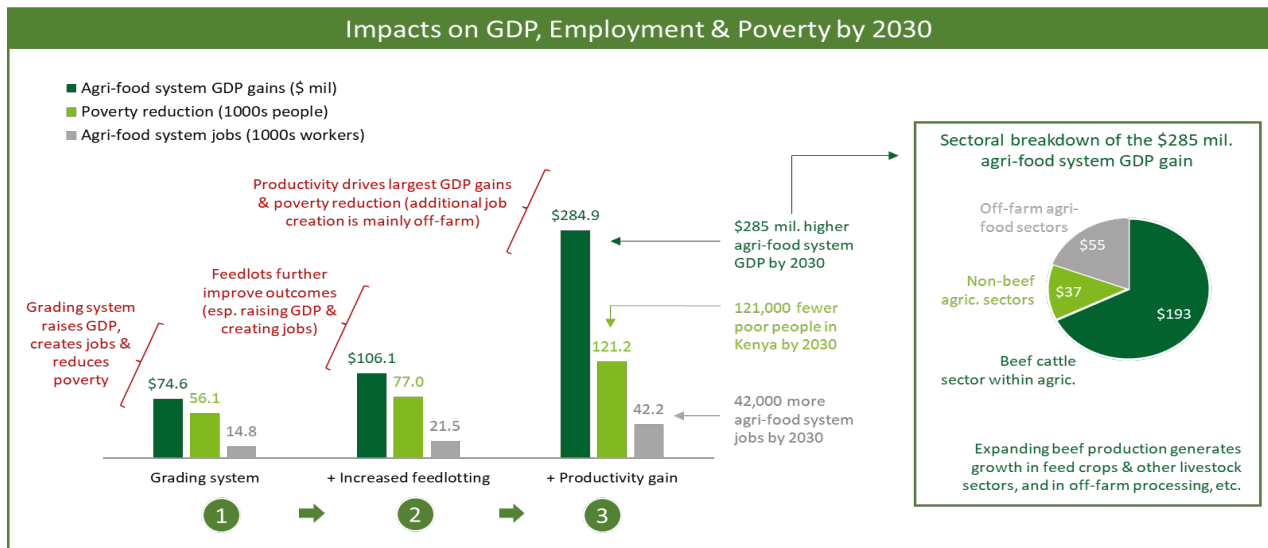Source: PPVC Gross Margin analysis

Figure 8: Impacts on agri-food system GDP, Employment & Poverty by 2030

Source: IFPRI RIAPA Kenya Economy wide Model

REFERENCES

Behnke, R. and Muthami, D. (2011). *The contribution of livestock to the Kenyan economy.* IGAD LPI Working Paper 03-11. Addis Ababa, Ethiopia: IGAD Livestock Policy Initiative.

Carabine, E., & Simonet, C. (2018). Value chain analysis for resilience in drylands (VC-ARID): identification of adaptation options in key sectors. *Value chain analysis for resilience in drylands (VC-ARID): identification of adaptation options in key sectors.*

FAO (2017). *ASL2050 Livestock production systems spotlight: Kenya. Cattle and poultry sectors*. African Sustainable Livestock 2050. FAO, Nairobi, Kenya.

FAO. 2019. *The future of livestock in Kenya. Opportunities and challenges in the face of uncertainty.* Rome. 56 pp. Licence: CC BY-NC-SA 3.0 IGO