



Cushioning pastoralist against the effects of drought: The case of beef feedlotting and rangeland restoration

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Abstract

The beef industry in Kenya is the largest contributor to livestock value added products as well as a major contributor to income and employment. Its contribution to societal welfare is particularly relevant in the rangelands, where beef production is the main economic activity. The four major beef production systems in Kenya are pastoralism, ranching, agro-pastoralism systems, and feedlots (FAO, 2017). Feedlotting is one of the initiatives, being promoted through the Bottom-Up Economic Transformation Agenda (BETA) to cushion the pastoralists from perennial livestock losses, avail sufficient feeds and water, and access high-end and export markets for both live animals and meat. Currently the feedlot system is under-developed and faces challenges that affect returns; lack of stratification of production, high capital investment and low technical skills in feedlot management, limited availability of suitable feed due to competition for grains and long finishing times of up to 12 months in feedlots with poor productivity. The success of the BETA agenda will contribute to increased productivity, reduced livestock losses, increased incomes, and restored rangelands. At least 450 feedlots are to be established, one in each identified ward, to support at least 10 cooperatives, create employment for livestock extensionists/advisors/service providers and entrepreneurs in the value chain using the best technologies and innovations. Pastoralists will have guaranteed market for their livestock and the reduced stocking pressure will facilitate recovery of rangelands.

Introduction

Globally, rangelands are considered to be the world's largest ecosystem biome with high biodiversity and socio-economic and cultural value (Bengtsson et al. 2019). Rangelands cover over 54% of the world's terrestrial surface (Rangelands Atlas 2024) and support over 30% of world's human population (Sala et al. 2017). Locally, the Arid and Semi-Arid Lands (ASALs) cover 80%–89% of Kenya's landmass (Birch 2018), accounting for 30-out of a total of 47 counties, with these areas mainly defined by their levels of aridity, consistently high ambient temperatures, and low rainfall that has high spatial and temporal variation of 200 to 750 mm annually (Pratt and Gwynne 1977; Heady 2019). Vegetation of the ASAL areas is made up grasslands, wooded grasslands and shrub/woodlands (Nyongesa et al 2023).

Estimates show that the ASAL areas hold approximately 16 million people, which is about 30% of national population (Njoka et al 2016). The climate and vegetation type has for centuries supported pastoralism as the main livelihood (Nyariki and Amwata 2019). While traditionally pastoralism was classified as a livelihood type where majority of the people derive more than 50% of the livelihoods from livestock (Dong 2016), we adopt a much broader definition that embraces a landscape and systems approach (Plieninger et al 2023). This is because of the many goods and services that are provided by pastoralism and its landscape that have often been overlooked, namely fish, tourism, inputs in agriculture, recreation, environmental, support and regulatory services.

Recent estimates quantified the value of the pastoral sector to have an economic worth of US\$1.13 billion (Nyariki & Amwata 2019) with the livestock sector and non-livestock sector accounting for 92% (US\$1.04 billion) and 8% (US\$0.0903 billion) respectively. The livestock sub-sector, which is the mainstay of the ASALs contributes 10% of the GDP (KNBS 2023), and employs more than 50% of the ASAL based workforce (AECF 2020).

Despite their demonstrated and strategic importance to Kenya's economy and overall development, the ASALs face several challenges limiting their potential and contribution to national development. The ASAL areas are prone to droughts, which have become more frequent and intense in the last 15 years (Haile 2019). They are also very susceptible to the vagaries of climate change (SEI 2023); aside from droughts and low rainfall, these include floods, livestock disease outbreaks, attacks by invasive species, and even locusts.

Before the advent of the devolved government (Odhiambo 2013) ASAL areas received minimal national development investments. The ASALs have also attracted increasing human population given their vast spatial coverage on the one hand and increasing population pressure in the more mesic parts of the country. The majority of these people (One future trust 2024 settle down to practice crop production in these marginal lands but often with inappropriate technologies and mindset of the higher potential areas. Vast areas of the ASALs are also degraded (Wavinya 2023) with patches of bare soils, gulleys, hard pans and species (NRT 2023), rendering pasture production and access by livestock impossible. These challenges have negatively impacted the environment and livelihoods in these areas, including massive loss of livestock during droughts (NDMA 2023), floods and disease outbreaks (SEI 2023) e.g. Peste des Petits Ruminants (PPR), East Coast Fever (ECF), Foot and Mouth Disease (FMD), Rift Valley Fever (RVF); degradation of the range and environment, and visible low Human Development Index (HDI). Consequently, literacy levels, sanitation, social amenities are low, while poverty and malnutrition are very high (GoK 2016).

The estimated livestock population of Kenya's ASALs is 16 million beef cattle, 33 million goats, 22 million sheep and 4.4 million camels. With respect to production of beef, Kenya currently produces 244,217 MT as at 2022 (Statista 2024; NIPFN.KNBS 2024) annually, a huge drop from about 589,000 MT in 2017 (Statista 2024). Consumption is estimated at 553,200 MT (FAO 2016; Kenya Market Trust 2020, PETs- BETA 2023) with per capita consumption estimated at 16 kg (Kenya Market Trust 2019). Kenya has an estimated beef production deficit of some 308,983 MT (Kenya Market Trust 2019), a gap that needs to be closed. Currently, the gap is filled informally by livestock from neighbouring Tanzania, Uganda, Ethiopia and Somalia (ibid).

It is against this background that the government through its Bottom-up Economic Transformation Agenda (BETA) developed a Pastoralist feedlot system program to address the challenges.

Methods

Based on the above, we propose a food systems approach that targets the traditional livelihoods of the pastoralists as possible and pragmatic options that can address the challenges in the long run. The proposal is anchored on establishment of pastoralist feedlot systems integrated with measures of improvement in the primary resource base – rangelands, improvements of livestock production and provision of opportunities for diversifying sources of incomes.

The project will be implemented in 450 wards of 31 counties with Arid, Semi-Arid and marginal environments. Each feedlot will be made up of approximately 5,000 acres of land, a water reservoir (dam) of 750,000 to 800,000m³ capacity, water sources for the surrounding communities (e.g. boreholes).

One feedlot is expected to directly benefit ten villages around each feedlot, with an average of 25 households in a community for about 112,000 Households in total. It is expected that indirect beneficiaries from the program would be five times the number of beneficiaries per feedlot, giving an estimated 562,500 indirect Households as beneficiaries. This brings the total number of all beneficiaries to 674,500 Households that can be extrapolated to an average of 3 million persons. In addition to the direct beneficiaries, the program is projected to create at least 2,700 jobs directly in the feedlots, and a factor of at least 10 (27,000) jobs indirectly linked to the feedlots.

The feedlot systems program has been designed to open up opportunities for MSMEs and further jobs. The projected employment and business opportunities will also encourage children to go to school as the families will now settle and not move from place to place (nomadic lifestyle). The design is heavily reliant on the feedlots accessing livestock from the neighbouring pastoralist communities. The expectation is that each household will be able to sell at least two heads of cattle per month (24 annually) to the feedlot. The feedlots are expected to intensively fatten and finish the livestock with natural grass over a target three-month period (more realistically six months initially). The feedlots can sell finished livestock as live animals or slaughter and sell as carcasses. Whichever option, it is expected that the feedlot will share a portion of the profits as bonus payments to the supplier communities.

Secondly, the feedlot system will strive to enhance rangeland improvement outside the feedlots, directly targeting the neighbouring pastoralist grazing areas. This will be a collaboration with the local communities in a participatory manner in order to secure the targeted area for rehabilitation. For a start, the program will target about 20,000 acres of pastoral land through the in-situ soil and water conservation method, using the Vallerani system that has already been tried and tested. The Vallerani System (VS) is a mechanized system that combines traditional water harvesting techniques and the mechanization of micro-basins, for the restoration of large-scale degraded soils, which can be applied for reforestation, pasture improvement, crops, windbreaks, etc ([Vallerani System EN | Vallerani System](#)). Other rangeland rehabilitation techniques including bush clearing, scratching and in extreme cases, reseeding will be applied to enhance rangeland pasture and forage production and productivity.

To increase feedlot production and productivity, the program will target the improvement of pastoralists livestock genetics, through a participatory breeding program and a comprehensive livestock disease surveillance and management program. Because of the prevalent droughts where water and pasture become inadequate, each feedlot will have a portion of the land dedicated to pastoralist resilience. The feedlots will produce forages and sell these to the pastoralists during periods of scarcity. A key feature underpinning the program design is ensuring investments have quantifiable and positive returns on investments. It is proposed that the feedlots be run as a profitable venture, even while involving participation of the local communities. The program will provide options and guidance for effective management of the feedlots.

Results/Progress

Three Counties already have the feedlot infrastructure in place and are at different levels of implementation with more counties committing resources to fence off the initial 5,000 acres identified with the community. It is expected that once the first three take off the rest will be motivated to fast track their implementation

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