



**Constraints and Opportunities in Livestock Service Delivery in Northern
Kenya Rangelands
An Initial Scoping Study**





This publication was produced under the Nawiri project supported by the United States Agency for International Development (USAID) Bureau for Humanitarian Assistance (BHA). The project's goal is to sustainably reduce levels of acute malnutrition among vulnerable populations in Kenya's arid and semi-arid lands (ASALs). The project is being implemented in Isiolo and Marsabit Counties by a consortium led by Catholic Relief Services, and in Samburu and Turkana Counties by a consortium led by Mercy Corps.

Suggested citation:

Irungu, P. (2021). Constraints and Opportunities in Livestock Service Delivery in Northern Kenya Rangelands. Feinstein International Center at Tufts University, USAID Nawiri project.

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Acknowledgements

USAID Nawiri would like to acknowledge the efforts of Dr. Patrick Irungu of the Feinstein International Center at Tufts University for his invaluable role in this report.

Special appreciation goes to key informants who contributed to the report, as well as Gabriel Mbokothe, Nawiri Livelihoods Lead, John Burns, Nawiri Research Lead (Tufts University), and Andy Catley of Tufts University for providing strategic leadership and oversight.

Our sincere thanks to all those who gave their time and insights to contribute to the report. This includes Nawiri Consortium staff, representatives from both Marsabit and Isiolo Counties, and other local experts for their immense support and contribution to the report.

Acronyms

ASAL	Arid and semi-arid lands
CBAHW	Community-based animal health worker
CBPP	Contagious bovine pleuropneumonia
CIDP	County Integrated Development Plan
KALRO	Kenya Agricultural & Livestock Research Organisation
KDHS	Kenya Demographic and Health Survey
NGO	Non-governmental organization
SAP	Structural adjustment program
USAID	United States Agency for International Development

Executive Summary

This scoping study examines the constraints to and opportunities for improved veterinary, fodder, and extension services in Northern Kenya counties. The study was conducted as preparation for a more detailed field assessment of livestock services focusing on Marsabit and Isiolo Counties, covered by the Nawiri Program. Information was gathered from key informants and a substantial body of existing literature on livestock services in Kenya's arid and semi-arid lands (ASALs). This report presents the views of selected experts on livestock services in the ASALs and some brief references to the literature; it aims to be descriptive rather than analytical.

The scoping study documents a myriad of constraints limiting the delivery of livestock services in Northern Kenya and ASALs in general. Nevertheless, no new or "out of this world"-type constraints were identified. In the domain of animal health service delivery, the following constraints were identified: (i) pastoralist mobility, which, coupled with remoteness, sparse population, and vast area, makes it expensive to deliver animal health services due to high transaction costs; (ii) limited number of trained animal health providers (veterinarians and livestock health assistants) and extension officers, especially at the grassroots level; (iii) inappropriate and somewhat discriminative government policy that (a) prioritizes crop agriculture over livestock production, (b) underinvests in the livestock sector, and (c) criminalizes community animal health workers (CBAHWs) who have been shown to offer vital and affordable animal health services in ASALs, which are characterized by low professional veterinary service investment; (iv) uncoordinated/scattered efforts by various organizations, which wastes resources due to duplication and lack of prioritization; and (v) unregulated cross-border herd movements that make it difficult to mount effective disease control initiatives.

With regard to extension services, the following constraints were identified: (i) mobility that makes it difficult and too expensive to offer extension services; (ii) inadequate staffing and lack of mobility of extension services due to inadequate facilitation by county governments; (iii) lack of prioritization of extension services by county governments as they are not "politically visible;" (iv) lack of a favorable extension strategy that takes into consideration pastoral production issues; and (v) insecurity, remoteness, and the vastness of these areas, all of which make it both risky and expensive to offer extension services.

The main constraints hindering effective fodder production in Northern Kenya are: (i) a harsh biophysical environment that does not allow robust fodder production in ASALs; (ii) lack of certified indigenous grass seeds that are well adapted to the ASAL environment; (iii) unclear property right regimes; (iv) limited knowledge of pastoralists on both rainfed and irrigated fodder and pasture production techniques; and (v) invasion of grazing areas by invasive *Prosopis juliflora*, which reduces the area suitable for fodder production.

Several opportunities were identified in each of the three domains. For animal health services, the main opportunities were: (i) existence of community disease reporters (formerly CBAHWs) who complement disease surveillance and control efforts of veterinarians; (ii) availability of mobile platforms such as epi-collect that enhance animal health and disease data collection and reporting; (iii) bilateral and multilateral cross-border livestock movement agreements; and (iv) existence of One Health program supported by United States Agency for International Development (USAID). Opportunities for extension services were: (i) existence of departments of livestock in all counties in the regions, which, although understaffed, have well-trained extension service

officers; (ii) possibility of linking livestock health assistants, livestock production assistants, and other cadres of animal health workers to work as a team of extension service providers in remote areas; and (iii) availability of mobile platforms for livestock extension. Fodder production could benefit from: (i) ongoing and past successful fodder production projects, which could be used for peer-to-peer learning/demonstrations, and as a source of grass seed; (ii) existing fodder producer groups, which provide entry points for collective action; (iii) major rivers in many arid counties, which could be used for irrigated fodder production; (iv) existence of certified local pasture seed and other exotic species suitable for ASALs; and (v) political goodwill of county governments in support of fodder production and community facilitation.

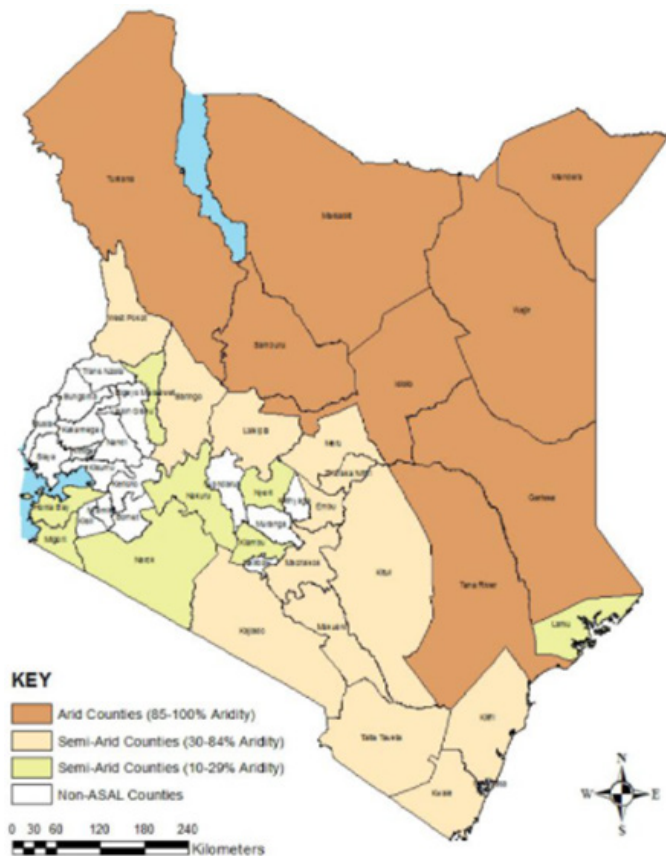
Addressing these constraints while scaling up the identified opportunities could increase livestock service delivery in Northern Kenya. This could redress the socio-political and developmental neglect that this region has endured for many years since pre-colonial times.

1. Introduction

1.1 Background

Kenya's arid and semi-arid lands (ASALs) are characteristically defined as areas that receive low and erratic rainfall (≤ 650 mm), have generally hot and dry weather, and have soils of low and variable fertility that are too poor for meaningful arable crop production. These lands occupy approximately 89% of Kenya's landmass, host about 38% of the population, and contribute about 12% to the gross domestic product (GDP).¹ They also harbor over 90% of wildlife and 70% of the national large livestock herd.² Administratively, the ASALs are spread across 29 of the country's 47 counties, with the most arid counties being exclusively confined to Northern Kenya (Figure 1).

Figure 1. Map of Kenya showing ASAL counties.



Source: <https://www.asals.go.ke>.

1 <https://www.asals.go.ke/>.

2 Ibid.

The ASALs are almost exclusively inhabited by pastoralist and agro-pastoralist communities who predominantly keep livestock herds with which they opportunistically harvest the highly variable, communally managed rangeland resources and convert them into useable animal proteins. Besides being a source of food and household nutrition, livestock is a form of currency to the pastoralist, a store of wealth on hoof, and an important form of social capital.

Although the ASALs are increasingly changing with emerging developments, both pastoralists and agro-pastoralists are poorly integrated into the formal monetary and political economy. For example, most of the livestock trade is conducted informally through barter, perhaps due to limited modern roads, banking, and infrastructure, coupled with high levels of illiteracy and insecurity. The 2013 constitutionally sanctioned devolution of Kenya's hitherto centralized governance structure is gradually taking root. In many ASAL counties, however, devolution has introduced competitive politics that are creating new ethnic dynamics and forms of marginalization.

Among the ASAL counties of Kenya, those in Northern Kenya are unique in that they account for about 53% of the country's landmass. Studies show that these counties have enormous economic potential in terms of livestock, flora and fauna, tourism, mineral resources, and unique cultures (e.g., see Irungu et al. 2019). However, despite the huge potential, Northern Kenya counties are the least developed in the country, in part due to the limits imposed by the harsh biophysical environment in terms of aridity, low and variable rainfall, and high livestock and human disease prevalence. For example, as shown in Table 1, the Northern Kenya counties score very low in all human development indicators (health, education, standard of living, and life expectancy).

Table 1. Level of agreement for monthly calendar indicators, North Horr (n = 13 groups)

County	Human Development Index ³	Position nationally out of 47 counties	County Development Index ⁴	Position nationally
Garissa	0.47	34	0.47	36
Isiolo	04.5	36	0.52	27
Marsabit	0.44	39	0.37	44
Samburu	04.3	42	0.38	43
Mandera	0.42	43	0.31	46
Wajir	0.42	44	0.33	45
Turkana	0.37	47	0.23	47
Nairobi	0.64	1	0.77	1
Kenya	0.52	-	0.52	-

Another contributor to the low development indices in Northern Kenya is the historical marginalization of the region. For example, during the colonial period, Northern Kenya was considered a “closed district”—courtesy of the colonial Outlying District Ordinance of 1902—ostensibly because of its inhabitation by “hostile tribes” (Braaksma 1994; Hassan 2008). The colonial policy therefore focused largely on maintaining security among the warring communities, and no deliberate efforts were made to invest in the region (Omiti and Irungu 2002). As a result, all movement into and out of Northern Kenya was prohibited, except with the express permission of the colonial administration (Castagno 1964). The colonial government “felt it necessary to protect the nomads from undesirable elements from the highlands and other places” (Castagno 1964, 171). The overall effect of the colonial policy was to limit the contact between inhabitants of northern and southern Kenya, a result that led Farson (1950) to remark bluntly that “there was one-half of Kenya

about which the other half knows nothing, and seems to care even less” (Castagno 1964, 173).

After independence, the new African government continued the colonial policy of exclusion of Northern Kenya, only maintaining security and making periodic interventions in the form of emergency food and/or medical aid whenever a severe drought or disease struck. The Shifta war of 1963–67 to suppress Somali secessionists put paid to the total neglect of the region. On the development front, the new government’s policy emphasized “trickle-down” economics, guided by the Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya. The policy document directed government investment to areas with high agricultural potential—as they were perceived to have a higher return on investment—but neglected marginal areas with the hope that the income obtained from the highlands would “trickle down” to low agricultural-potential ASALs through grants and

3 <https://data.humdata.org/dataset/dbd29b92-99aa-452b-bde1-704058328ae2/resource/b46703cc-196f-4e40-860f-e1dd1709d81c/download/kenya-human-development-index-hdi-per-county.xlsx> (accessed September 11, 2019).

4 <https://www.crakenya.org/wp-content/uploads/2013/10/CREATING-A-COUNTY-DEVELOPMENT-INDEX-TO-IDENTIFY-MARGINALISED-COUNTIES.pdf> (accessed September 11, 2019).

subsidized loans to enable them to develop. However, this did not happen and is the main reason for the poor development outcomes shown in Table 1.

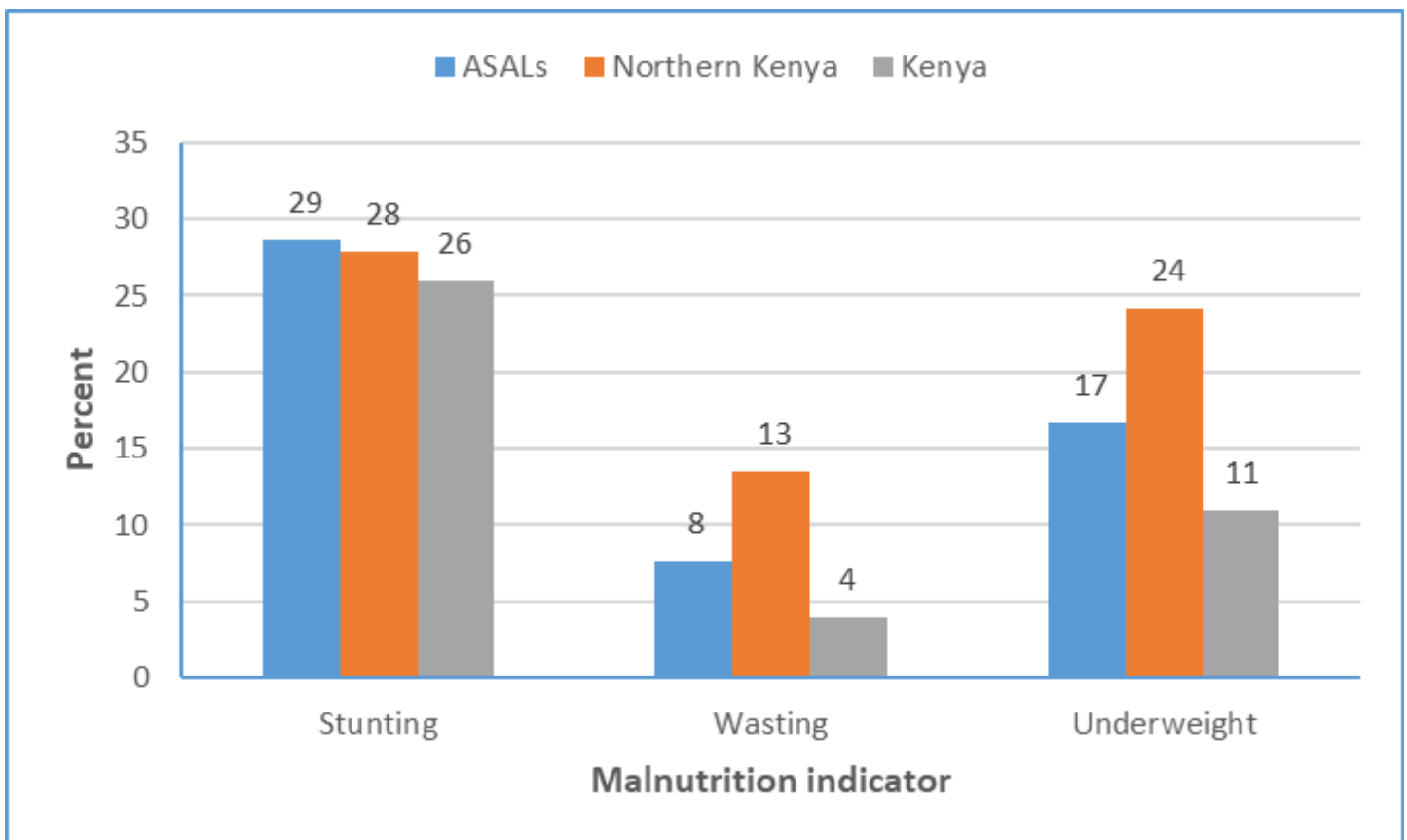
As if that is not enough, the scaling down of government-provided public services following the adoption of neoliberal structural adjustment programs (SAPs) in the 1990s that were forced onto developing countries by the Bretton Woods institutions left ASALs largely devoid of basic services, and particularly life-defining ones such as education, health, and veterinary services (Ng’ethe and Kanyinga 1992; Irungu et al. 2006). In a bizarre social experiment, the Bretton Woods institutions had expected that the private sector would step in and take over from the state by rationalization of roles along economic lines, which did not happen. The government was seen as having critical regulatory roles and handling public goods but grossly inefficient in regard to providing private goods. The unique attributes of ASALs, namely high poverty, aridity, social insecurity, and poor infrastructure, aggravated transaction costs such

that the private sector had no incentive to invest in the ASALs (Irungu et al. 2006; Catley et al. 2004). In addition, the private service providers had to contend with unfair competition from government officers and non-governmental organizations (NGOs). The NGOs have continued filling in the void left by both the state and the private sector. Granted that the county governments have increasingly attempted to step up to the plate, the NGOs still run the show in the ASALs, largely due to the low human and fiscal capacity of county governments, and the politicization of the development agenda. Nevertheless, ASALs have demonstrated potential for private sector-driven services as exemplified by the hugely successful supply of live livestock, meat, and milk (especially camel milk) to major towns and cities in Kenya.

1.2 Research problem

The Nawiri Program in Northern Kenya is implemented in Marsabit and Isiolo Counties by Catholic Relief Services (CRS)-Kenya, with research

Figure 2. Indicators of malnutrition in children under five in Kenya.



Source: KDHS (2014)

support from Feinstein International Center, Friedman School of Nutrition Science and Policy at Tufts University (Boston, MA, USA). Nawiri is a five-year program funded by USAID's Bureau of Humanitarian Assistance (BHA) with the goal of sustainably reducing levels of persistent acute malnutrition in Kenya's ASALs. Indeed, studies show that ASALs—and particularly those in Northern Kenya—suffer from acute malnutrition, especially among children under five, pregnant and lactating mothers, and the elderly. Data from the Kenya Demographic and Health Survey (KDHS, 2014) indicate that counties in Northern Kenya fare extremely poorly in terms of wasting and underweight of children under five relative to the rest of the country (Figure 2). Malnutrition has persisted in the ASALs despite changing livelihoods and apparent development. For example, Galvin et al. (2015) found poor nutrition status among Maasai pastoralists despite numerous changes to the social-ecological system, including livelihood diversification, sedentarization, human population growth, and greater market integration since the 1930s (Galvin et al. 2015, 411).

ASAL household nutrition is inextricably intertwined with livestock production, particularly considering the low crop production potential of these areas. As such, livestock health and productivity are key to ASAL household nutrition. For example, Fratkin et al. (2004) indicate that dietary stress among pastoralists in Northern Kenya usually occurs at the end of the dry seasons (November–March and May–August) when livestock pasture and water become scarce, which, in turn, reduces the availability of milk for human consumption. In order to enhance the contribution of livestock to household nutrition and wellbeing, there is a need to understand the constraints that limit livestock production as well as the opportunities available for enhancing livestock service delivery in the ASALs and particularly in Northern Kenya. Availing this information could help interest groups (including policy makers and practitioners) to design appropriate interventions to promote livestock production in the ASALs for enhanced household nutrition.

After much neglect of Northern Kenya right from independence in 1963, the third President, Mwai Kibaki, established the Ministry of State for the Development of Northern Kenya and other

Arid Lands in 2008 specifically to spearhead the development agenda of the region to address its worsening socioeconomic and development indicators. The Ministry adopted Sessional Paper No. 8 of 2012 on the National Policy for the Sustainable Development of Northern Kenya and other Arid Lands (simply called the ASAL policy) to guide the said development agenda in terms of: (i) closing the developmental gap between Northern Kenya and the rest of the country; (ii) protecting and promoting pastoralism; and (iii) promoting food and nutrition security across the ASALs (RoK 2012). However, except for the recent construction of the Isiolo-Moyale road, few significant investments have so far been made by the government in Northern Kenya. Nonetheless, various non-state actors have implemented development programs in the livestock sector, including the USAID-funded Feed the Future Kenya Livestock Market Systems (2017–2022), the Accelerated Value Chain Development (AVCD) program (2015–2018), the National Livestock Marketing information System (LINKS) (2007–2009), Farm Africa's goat project (2018–2021), and the Department for International Development (DFID)-funded International Livestock Research Institute (ILRI)-led weather index-based livestock insurance project (2009–2018). Some of these projects have been involved in the construction of livestock markets, training of community-based animal health workers (CBAHWs), capacity building of pastoralists to produce fodder along riverbeds and during the rainy season, and sporadic provision of veterinary services. Surprisingly, the approaches used in most of these projects haven't really changed since the 1970s. Notably, the projects have largely focused on construction of markets, fodder production, and provision of veterinary services, 50 years on.

While the few development projects undertaken in Northern Kenya have provided some relief to the inhabitants of the region, they have not alleviated poverty for most Kenyan pastoralists (Warner and Alemu 2018). The projects failed to improve the lives and livelihoods of pastoralists, largely because most of the interventions were project driven and ceased as soon as the project ended. Others such as fodder production were just pilots and neither horizontally or vertically upscaled nor adequately entrenched in community traditions. As such, the experience of what works and why has not been

systematically synthesized. In particular, there is no well-synthesized information on the constraints and opportunities of improved veterinary, fodder, and extension services in Northern Kenya that could guide the identification of key issues and questions for further enquiry through systematic action research. The Nawiri Program therefore seeks to review these experiences with the aim of strengthening livestock service delivery in Marsabit and Isiolo Counties. This scoping study will guide Nawiri activities to support livestock service provision in these areas, focusing especially on the delivery of animal health, extension, and feed/fodder production services in Northern Kenya. This will help to enhance the contribution of livestock to household nutrition and wellbeing in the region.

1.3 Objectives of the study

The scoping study was designed as preparatory work for an in-depth field assessment of livestock services in Marsabit and Isiolo Counties. The objectives of the scoping study were:

1. To identify and prioritize key opportunities and constraints to improved veterinary, fodder, and extension services in Marsabit and Isiolo Counties. This focused on such issues as policy and institutional constraints, as well as wider contextual issues, e.g., weak infrastructure and insecurity. Opportunities were framed within the context of the realities of government budget and capacities, and devolution in Kenya;
2. To identify key issues and questions for a field assessment in Marsabit and Isiolo Counties.

2. Methodology

The scoping study used two main methods, viz., key informant interviews and an initial review of literature. The key informant guide in Appendix I was used to undertake key informant interviews with six Kenyan experts, who were selected on the basis of having wide experience working in livestock services in the ASALs of Kenya. Key informant 1 (FC) has over 35 years of experience working in ASALs with government and NGOs and is now a retired independent consultant. Key informants 2 (JN) and 3 (SM) are retired university lecturers who have worked extensively in the ASALs consulting for both government and NGOs. Informant PM worked with the government before shifting to the NGO sector operating in ASALs. Key informants OW and BD currently work with the country's premier university and research institute respectively. In particular, OW's research work has focused on livestock and fodder production in ASALs, while BD has a pastoralist background and is a resident of one of the ASAL counties.

The approach was to take stock of their wide experiences and suggestions, which were later used to identify and frame key issues and questions for the more in-depth assessment. The focus of the key informant interviews was on livestock services delivery in the three domains of animal health, extension services, and feed/fodder production in Northern Kenya. The information collected from the key informants was collated, summarized, and synthesized for common thematic areas and topics around the three domains.

3. Findings

3.1 Constraints in animal health service delivery in Northern Kenya

3.1.1 Constraints

According to the key informants, the main constraints that limit effective delivery of animal health services in Northern Kenya are:

- **Mobility and transaction costs**—the mobile way of livestock keeping, remoteness, sparse population, and long trekking distances make it too expensive for any service provider (be it government or private sector) to deliver animal health services in these areas. Mobility also hinders targeting of service provision;
- **Insecurity**—the remoteness, banditry, and insecurity that hinders service provision in many areas in Northern Kenya, as well as disease reporting;
- **Inappropriate emphasis on crop production**—the government preference for crop production and other livelihoods options such as ecotourism and conservancies over livestock production. This is depicted by more resource allocation to crop farming relative to livestock production, even in areas where crop agriculture is hardly viable;
- **Undervaluation of pastoral livestock sub-sector**—thus limited interest by the government to allocate resources. In addition, there is lack of incentive for investment in ASALs, leading to limited private sector participation;
- **Inappropriate government policy that prohibits CBAHWs** from animal health service delivery, even in areas that trained/formal health providers seldom reach;
- **Availability of personnel**—limited number of trained animal health providers (vets and livestock health assistants) and extension officers, especially at the grassroots level (pastoral grazing grounds). The outlawing of CBAHWs made the situation worse. Most of the vet services are provided by quacks or livestock owners who have limited knowledge on the drugs to use, dosage to give, and type of disease they are treating;
- **High cost of vaccines** even for notifiable diseases (e.g., foot and mouth disease, lumpy skin disease, and contagious bovine pleuropneumonia (CBPP)). Mass production of these vaccines and providing them at a cheaper price could help a lot;
- **Low demand for professional animal health services**, as livestock keepers tend to prefer to treat their own livestock, e.g., they purchase veterinary drugs and administer them themselves;
- **Limited use of geospatial technology** in disease surveillance and monitoring;
- **Weak infrastructure**—especially roads and communication networks; this does not support/encourage private investment;
- **Limited pastoral livestock mobility**⁵ across the region due to diminishing land resources and incessant resource-based conflicts. Mobility is also hindered by lack of harmonized cross-county policies;
- **Unregulated cross-border herd movements**—makes it difficult to mount effective disease control initiatives. It also exacerbates cross-border resource-based conflicts;
- **Limited flow of information**—from the government and particularly trained professionals to pastoralists—the information reaches either too late or not at all;

5 During periods of good rains, pastoralists move around their county; during periods of severe drought, they move across counties or into wildlife conservancies in search of water and pasture. However, sometimes they have to force their way through those counties/conservancies, as the landowners are often reluctant to allow them in.

- **Diversion of funds**—as budgeted in the County Integrated Development Plans (CIDPs) away from livestock officers/livestock-supporting activities;
- **Weak coordination**—uncoordinated/scattered efforts by various organizations (especially NGOs), which wastes resources due to duplication and lack of problem prioritization;
- **Disaster context**—the ASALs are faced with a myriad of challenges/shocks (e.g., drought, conflicts, etc.) that require attention at the same time and so compete for the available resources

3.1.2 Causes of animal health privatization failure in Northern Kenya

The privatization of animal health services in Northern Kenya in the 1990s failed because of:

- The cost of some animal health (e.g., clinical and dipping services) and breeding (e.g., artificial insemination) services rose significantly following the withdrawal of government support after the adoption of SAPs in the 1990s. This made it uneconomical for private veterinarians to operate profitably in marginal areas. Besides, the private vets had to compete with government vets (who had little or no overhead, as they used government facilities) and NGOs. The SAPs led to the scrapping of subsidies in the agricultural sector (including animal health), while extension services were poorly funded, as the World Bank recommended demand-driven extension service models;
- Lack of government commitment to provide a conducive environment in terms of road and communication networks. The government was stuck in the old thinking generated in the Sessional Paper No. 10 of 1965 until recently, when the potential of Kenyan ASALs was realized;
- Influx of counterfeit or illegal drugs in the market, making genuine provision of the drugs less competitive;
- Limited information for guiding private sector investment in animal health service delivery. That is, no accurate information exists in terms

of demand for drugs, livestock numbers, and disease occurrences;

- Unclear privatization policy, e.g.:
 - The government exit plan in favor of privatization in ASALs was not effected, as ASALs were still considered highly prone to notifiable diseases such as rinderpest, CBPP, and contagious caprine pleuropneumonia (CCPP). As such, the government continued undertaking disease control and clinical services in ASALs, which hindered privatization;
 - In addition, the actual cost of animal health service delivery in ASALs and whether or not those services were to be subsidized or provided at full cost recovery was not clear, which discouraged private sector investment.
- Low pastoralist willingness-to-pay for professional animal health services, as they considered animal health services a government responsibility that ought to be provided for free by the government;
- High transaction costs due to aridity, poor infrastructure, and vastness of the area that made it difficult for private service providers to “break even.” For example, very few vets were willing to invest in ASALs, as they (ASALs) were considered less lucrative due to their unique characteristics of remoteness, insecurity, poor infrastructure, and vastness;
- Banks and lending institutions were generally unwilling to lend to vets or other animal health service providers to start private practices in these areas. The money lenders considered ASALs highly risky, with a high likelihood of loan default;
- Professional animal health service providers faced severe competition from quacks and an uncontrolled cross-border livestock drug trade run by the quacks;
- Reliance on indigenous animal health practices by most pastoralists.

3.1.3 Priority areas to invest in

The main areas of intervention to alleviate the above-named constraints are:

- The county government should create an enabling environment to attract private sector investment. This could be in form of:
 - Incentivizing the private sector to come and invest in animal health services. Research shows that pastoralists have the capacity to support privatized animal health services. The private vet can then be linked to other animal health service providers and CBAHWs if they are revived at the grassroots level;
 - In the case of lack of professional livestock personnel at grassroots level, CBAHWs revival could be considered;
 - Investing in auxiliary infrastructure (roads, housing, telecommunications, etc.);
 - Design of appropriate policies on property rights, structure of animal healthcare delivery, and procurement of veterinary pharmaceuticals;
 - Subsidizing animal health services.
- Control of counterfeit drugs;
- Training herders on safe methods of administering veterinary drugs;
- Training more and equipping/tooling of CBAHWs;
- Offering mobile animal health services;
- Research to:
 - Establish the real (total) value of and opportunities in pastoralism (pastoral livestock sub-sector);
 - Map out existing and potential private investors before involving them in identifying entry points for investment.
- Cross-border collaboration:
 - Strengthening joint cross-border disease surveillance by domesticating/operationalizing the existing cross-border agreements and locally negotiated cross-border livestock mobility.
- Adopting One Health approach—an integrated way of addressing animal health challenges that is cognizant of the linkages between livestock and human diseases and environment.

The necessary conditions to implement these interventions include:

- Need to have enabling policies to support and enhance animal health service delivery in ASALs;
- The government should prioritize the livestock sector as the backbone of the ASAL economy; the current 2% annual budget allocation to the livestock sector is grossly inadequate;
- Enable livestock keepers to change their mindset towards more control of their livestock issues instead of heavy dependency on donor and national funding;
- Address the issue of marketing and participation of livestock marketing associations in the livestock value chain to increase income to households;
- Address the issue of livestock feed and drought preparedness;
- Community training to create awareness and influence attitudes;
- Devolution to address the issues of livestock production as a priority within the CIDPs and allocate adequate resources to support animal health services;
- Embrace drought mitigation and preparedness measures;
- Enhance community peacebuilding and conflict management for enhanced cohesion and resource sharing among the communities;
- Review of policy and regulatory instruments/framework to guide the roles of CBAHWs in ASALs;
- Incorporation of the animal health issues in CIDP and Agricultural Development Plans to ensure resource allocation at county government support level;
- Allocation of resources for research to provide the empirical evidence to inform policies and animal health interventions;
- Stakeholder dialogue on animal health investment/provision in ASALs (to bring on board actors, including private sector, county government, researchers, NGOs, civil society organizations, community-based organizations, etc.);

- Collective action by Northern Kenya counties that produce the bulk of livestock to formulate/ domesticate their own policies in favor of the above-named interventions.

3.2 Constraints in livestock extension service delivery in Northern Kenya

3.2.1 Constraints

The main constraints that limit effective delivery of livestock extension services in Northern Kenya are:

- The mobility of livestock keeping and long trekking distances that make it too expensive to adequately deliver extension services. Sometimes pastoralists move across the border in search of pasture, water, and markets, which hinders extension;
- Inadequate staffing and lack of mobility of extension services due to inadequate facilitation by county governments. This makes it difficult for available staff to adequately cover the vast area;
- Lack of a favorable extension strategy that takes into consideration pastoral production issues;
- Tendency of pastoralists to follow traditional practices; hence, there is low willingness to pay for private extension services, as they are deemed to be the government's responsibility and therefore supposed to be free;
- Ineffective or nonoperational county extension services due to inadequate funding and low prioritization of extension services at the county level. This is partly due to the fact that extension services are not visible as an investment relative to a road, a bridge, a class, or a dispensary. Therefore, most county leadership has neglected extension services, ostensibly because they do not "bring in votes." Actually, livestock extension services have never been taken seriously in Northern Kenya;
- Insecurity, remoteness, vastness of these areas.

3.2.2 Priority intervention areas

The following were mentioned as the main interventions to improve extension services delivery in Northern Kenya:

- Improve staffing in terms of both numbers and quality;
- Provision of mobile extension services to keep abreast of nomadic way of livestock keeping;
- Provision of incentives to enhance mobile extension services;
- Community training to create awareness and influence attitudes.

For this to happen, the following conditions should prevail:

- The government should support and commit to mobile extension services and community training to create awareness and influence attitudes of livestock keepers;
- The county governments should prioritize livestock production as an important industry in the area;
- There should be recognition of changes in the cultural landscape in Northern Kenya, with more children going to school. Pastoralists' aspiration for the future is not to keep moving but to settle down around mushrooming small settlements. In addition, pastoral dropouts are increasingly becoming more dominant; hence, diversify extension service to address new skills needed for survival in these dry areas. This could be achieved by developing different livestock production (e.g., introduce new breeds under restricted grazing systems) and extension approaches (e.g., pastoral field schools);
- Diversification of livelihoods to non-livestock-based livelihoods;
- Provision of county support for the livestock extension officers by allocating more resources to livestock production;
- Finding the best governance model for producing fodder using climate-smart agricultural methods such as soil moisture storage and re-establishment of land productivity. However, this might require the use of modern technology that is not within the reach of ordinary people;

- Creation of a business environment in which investors can drive the fodder production process with the support of local populations. High sensitivity of land ownership can be solved by leasing the land and protecting private investments to bring change. It is worth noting that NGOs and donor-driven projects are not an adequate answer to the challenges in Northern Kenya. The private sector and the county government should take up their responsibility and support the integration of Northern Kenya as taxpayers from the vast livestock wealth and by tapping the great potential of these areas;
- Improvement of governance and human and asset security;
- Promotion of policies that attract local investors to provide private sector-driven interventions under a business model;
- Need for national and county governments to address pastoralists' mindset of dependency and perception of marginalization, even when a lot of resources are now being allocated to these counties;
- Ensure public participation to enhance accountability and transparency of resources earmarked for development.
- Fear of privatizing parts of the otherwise common resources, which disincentivizes investors in fodder production;
- Lack of clean/certified indigenous grass seeds that are adapted to the ASAL environment;
- Lack or limited knowledge of pastoralists on both rainfed and irrigated fodder and pasture production techniques. This is compounded by poor community attitude towards fodder production and storage;
- Mushrooming of sedentary centers along the main livestock grazing corridors, which is having a negative effect on pasture and fodder production and their utilization by livestock;
- Poor market linkages for those who wish to sell surplus hay (currently there are a number of community groups with bales of hay stuck in their stores, leading to heavy post-harvest losses);
- Financial challenges, e.g., lack of financial capital among pastoralists to start up fodder production;
- Perpetual pilot fodder production projects that never go to scale but collapse as soon as the project ends;
- Invasion of grazing areas by the invasive *Prosopis juliflora*, which reduces suitable areas for fodder production;
- Upcoming wildlife conservancies will lead to a reduction in livestock grazing grounds (and therefore fodder production areas) and hence haphazard grazing patterns, leading to overgrazing;
- Use of water for irrigation (e.g., the Ewaso Nyiro River/Kerio River), leading to poor pasture growth and water availability in the lower river areas, e.g., Lorian swamp in Wajir and Kerio valley in Turkana respectively;
- Insecurity and intercommunity conflicts that hinder access to pasture and cultivated fodder.

3.3 Constraints in feed/fodder production services in Northern Kenya

3.3.1 Constraints

The key informants indicated that the key constraints that affect livestock feed/fodder production services in Northern Kenya are:

- Harsh biophysical environment that does not allow robust fodder production in the region. For example, frequent drought results in failure in establishment of pastures or abandonment of projects as pastoralists move;
- Unclear property right regimes (land tenure) that discourage investors from outside the region from leasing land for private investments, including fodder production;

3.3.2 Causes of failure of feed/fodder production initiatives in Northern Kenya

- Several organizations have piloted fodder production in Northern Kenya. For example, the World Food Programme, the National

Drought Management Authority, Department of Land Resource Management & Agricultural Technology at the University of Nairobi, Kenya Agricultural & Livestock Research Organization (KALRO), and the county governments of Marsabit and Isiolo have previously partnered with communities in fodder production in Kipsing, Isiolo, Kalacha, Marsabit, Garissa, Tana River, and some parts of Turkwel River in Turkana County. However, most of these projects (including World Bank-funded projects) never saw the light of day, due in part to cyclical droughts, unclear property rights regimes, and lack of fodder markets. In addition, reseeding highly degraded environments with hardpans impeded seed germination, leading to seed dispersal by strong winds. Some success in pasture management and utilization through a holistic management approach was achieved in Ileret in Marsabit County and Il Ngwesi in Samburu County. However, the holistic management did not fully work because there were community concerns on pasture utilization that needed county intervention, which did not happen in both Marsabit and Samburu Counties;

- In Wajir County, the government provided incentives to private farmers around Wajir town to produce fodder for drought relief. However, once the farmers responded by producing a lot of fodder, the county government never honored their promise;
- Farmers around Marsabit Mountain tried to grow fodder under a USAID project managed by a private company. However, the project failed as it was never upscaled;
- Inadequate and unpredictable rainfall;
- Lack of pasture seeds and technical know-how;
- Mechanization needed to take away drudgery of farming in hot areas;
- Intercommunity rivalries. For example, in Wajir County, one community enclosed 3 square km of pasture to encourage natural recovery. After three years of protection and recovery, another community forcefully invaded the enclosure with guns and benefitted from others' pasture during the drought period of 2016/2017. This type of pasture insecurity disincentivizes communities from engaging in either fodder production or pasture conservation.

3.3.3 Priority intervention areas for fodder production

The following were identified as the priority areas for enhancing fodder production in Northern Kenya:

- Establish local grass seed system (centers for bulking and preservation of indigenous germplasm). This could be coupled with promotion of climate-smart approaches of feed/fodder production;
- Strengthen market linkages for fodder, probably by securing contracts from various market outlets/buyers or by simply linking the producers to potential buyers;
- Capacity building in fodder agronomic practices of fodder production and storage among pastoralists;
- Provision of start-up funds for fodder production projects;
- Introduction of a guaranteed minimum return to fodder producers to incentivize them;
- Intensification of the in-situ water harvesting technologies to mitigate impacts of drought;
- Approach such projects at landscape level because of the nature of shared resources in ASALs to avoid conflicts:
 - Enforce property rights. Those unwilling to conserve their pasture should be heavily penalized if they invade other people's pasture.
- Reclamation of degraded rangeland using modern technologies;
- Removal and management of the invasive *Prosopis juliflora* to reclaim invaded grazing lands;
- Rethink alternative methods that can be used to successfully re-seed the denuded rangelands.

For this to happen, the following conditions should prevail:

- Organized and registered fodder producer groups;
- Availability of financial resources to fodder producers;

- Supportive policies (at the county level);
- The government should show commitment and support for these interventions;
- Investors should get the political support at the county level to leverage resources from outside the counties;
- Peace, security, respect for property rights, and intercommunity dialogue and joint projects;
- Improve land rights under the existing Community Land Act of 2016;
- Affordable insurance for private investors.
- Existence of policies in support of pastoralism; for example, ASAL policy, Policy Framework for Pastoralism in Africa, the Intergovernmental Authority for Development (IGAD) Policy Framework to End Drought Emergencies;
- Potential of county governments to partner with the private vets and livestock officers to improve the extension service.

3.4 Opportunities for effective delivery of livestock services in Northern Kenya

3.4.1 Opportunities to improve service delivery in Northern Kenya

The main opportunities for improved livestock production in Northern Kenya include:

- CIDPs and county livestock development plans that already prioritize livestock production in the region;
- Devolution and increasing involvement of communities in decision making regarding livestock-related projects;
- Availability of vast land that is suitable for production of diverse livestock species (camels, sheep, goats, cattle);
- Potential of both irrigated (in oasis, lakes, and rivers) and rain-fed (in mountainous areas) pasture production to cushion livestock from climate variability and change;
- Diverse and well-adapted livestock species and breeds. For example, the Borana breed of cattle that is known for its excellent meat production and adaptability to harsh environments is found in Northern Kenya;
- Establishment of financial institutions that offer loans to pastoralists to buy feeds and other livestock production inputs;
- Existence of complementary livelihood options; for example, gum Arabic and resins production, and ecotourism;

3.4.2 Opportunities to enhance livestock marketing in Northern Kenya

The main opportunities to enhance livestock marketing Northern Kenya include:

- Increasing demand for livestock and livestock products in developing countries—dubbed the “livestock revolution”—and also in terminal markets such as Nairobi;
- Availability of livestock markets in neighboring countries, e.g., Ethiopia and in the Middle East;
- Availability of co-managed livestock in some counties; this model enhances livestock marketing and puts the management of the local markets in the hands of the community to ensure sustainability;
- Availability of the Kenya Livestock Marketing Council (KLMC), which offers marketing support services to pastoralists;
- Existence of technology for implementing the animal information and traceability system for accessing lucrative export markets;
- Existing infrastructure, e.g., the Isiolo abattoir, which the county government of Isiolo intends to lease out to a private investor soon;
- Completion of Isiolo-Marsabit-Moyale highway, which has opened up Northern Kenya for trade with the rest of the country and Ethiopia through the Moyale border. In particular, it has reduced the time taken to transport livestock to terminal markets;
- Ongoing Lamu Port-South Sudan-Ethiopia-Transport (LAPSSET) Corridor project, which, once completed, will provide more opportunities for livestock and livestock producers along the corridor and beyond;
- Government investment in livestock marketing sector; for example, the launch of recent

Kenyan shilling (KSh) 3 billion Lamu pre-export project;

- Adoption of appropriate policies (e.g., ASAL policy and National Livestock Production policy), which are supporting livestock production and marketing in Northern Kenya;
- Livestock trade yard bills that have now either been enacted or are awaiting approval of assemblies of various counties in Northern Kenya;
- Existence of Frontier Counties Development Council (FCDC), which acts as a platform for collective action by all the counties in the region.

3.4.3 Opportunities to enhance delivery of animal health services in Northern Kenya

- Existence of community disease reporters (formerly CBAHWs) who complement disease surveillance and control efforts of veterinarians;
- Availability of mobile platforms such as epi-collect that enhance animal health and disease data collection and reporting;
- Bilateral and multilateral cross-border livestock movement agreements;
- One Health Program supported by USAID.

3.4.4 Opportunities to enhance delivery of extension services in Northern Kenya

- Existence of department of livestock under the Ministry of Livestock, Agriculture and Fisheries in all the counties in the regions, which, although understaffed, has well-trained extension services officers;
- Opportunities for establishing links with livestock health assistants, livestock production assistants, and other cadres of animal health workers in remote locations;
- Availability of mobile platforms for livestock extension.

3.4.5 Opportunities to enhance fodder production in Northern Kenya

- Existence of ongoing and past successful fodder production projects, which can be used for peer-to-peer learning/demonstrations and as a source of grass seeds;
- Existing fodder producer groups, which provide entry points for collective action;
- Demand for fodder in urban and peri-urban areas as well as among pastoralist households;
- Availability of major rivers (e.g., Dawa River in Mandera, Tana River in Garissa, Tana River, Turkwel in Turkana, and Ewaso Nyiro River in Samburu and Isiolo, etc.) that could be used for irrigated fodder production;
- Certification of suitable local pasture seed varieties and other exotic species that is going on at KALRO in collaboration with the Kenya Plant Health Inspectorate Service (KEPHIS). In addition, there are many wild, local, uncertified grass varieties that can be used as sources of parent germplasm for research and improvement;
- Political goodwill of county governments, as evidenced by construction of hay barns for storing excess pasture;
- Existence of communities and county staff that are trained on fodder production.

4. Conclusion

This study examined the constraints to and opportunities for improved veterinary, fodder, and extension services in Northern Kenya counties. Using information obtained from six key informants identified on the basis of their wide experience working in Kenya’s ASALs, the study documented a myriad of constraints limiting the delivery of livestock services in Northern Kenya and ASALs in general. Nevertheless, no new or “out of this world”-type constraints were identified. The main ones identified are summarized in Table 2 below.

Table 3 summarizes the opportunities reported by key informants as key to unlocking the potential of livestock production in Northern Kenya.

The next step for Nawiri is to take stock of the long list of constraints and consider which of the opportunities in Table 3 might warrant support from the program. A critical overarching issue is the policy environment in Isiolo and Marsabit Counties and the possibility of shifting policy to be supportive of approaches that have proven to be successful in other countries, and which have been legalized and normalized. A case in point is privatized community-based animal health systems involving private veterinarians or animal health assistants as business owners, working with networks of CBAHWs. These systems are operational in Ethiopia and Sudan, and are supported by national and local governments, as well as international bodies such as the World Organization for Animal Health.

Table 2. Summary of constraints to livestock services delivery in Northern Kenya

Domain	Main constraints
1. Animal health services	1. Pastoralists’ nomadic lifestyle coupled with remoteness, sparse population, and vast area makes it expensive to deliver animal health services due to high transaction costs
	2. Limited number of trained animal health providers (vets and livestock health assistants) and extension officers, especially at the grassroots level
	3. Inappropriate and somewhat discriminative government policy that (i) prioritizes crop agriculture over livestock production; (ii) underinvests in livestock sector; and (iii) criminalizes CBAHWs, who have been shown to offer vital and affordable animal health services in ASALs, which are characterized by low professional veterinary service investment
	4. Uncoordinated/scattered efforts by various organizations (especially NGOs), which wastes resources due to duplication and lack of prioritization
	5. Unregulated cross-border herd movements make it difficult to mount effective disease control initiatives. It also exacerbates cross-border resource-based conflicts

2. Extension services	1. Nomadism, which makes it difficult and expensive to offer extension services
	2. Inadequate staffing and lack of mobility of extension services due to inadequate facilitation by county governments
	3. Lack of prioritization of extension services by county governments as these services are not “politically visible”
	4. Lack of a favorable extension strategy that takes into consideration pastoral production issues
	5. Insecurity, remoteness, and vastness of these areas, which make it expensive to offer extension services
3. Fodder production	1. A harsh biophysical environment that does not allow robust fodder production in ASALs
	2. Lack of certified indigenous grass seeds that are well adapted to the ASAL environment
	3. Unclear property right regimes
	4. Limited knowledge of pastoralists on both rainfed and irrigated fodder and pasture production techniques
	5. Invasion of grazing areas by invasive <i>Prosopis juliflora</i> , which reduces suitable areas for fodder production

Table 3. Summary of opportunities to improve livestock service delivery in Northern Kenya

Domain	Main constraints
1. Animal health services	1. Existence of community disease reporters (formerly CBAHWs) who complement disease surveillance and control efforts of veterinarians
	2. Availability of mobile platforms such as epi-collect that enhance animal health and disease data collection and reporting
	3. Bilateral and multilateral cross-border livestock movement agreements
	4. One Health program supported by USAID
2. Extension services	1. Existence of Department of Livestock under the Ministry of Livestock, Agriculture and Fisheries in all the counties in the regions, which, although understaffed, has well-trained extension services officers

2. Opportunities for establishing links with livestock health assistants, livestock production assistants, and other cadres of animal health workers in remote locations

3. Availability of mobile platforms for livestock extension

3. Fodder production

1. Existence of ongoing and past successful fodder production projects that can be used for peer-to-peer learning/demonstrations and as source of grass seeds

2. Existence of fodder producer groups that provide entry points for collective action

3. Existence of major rivers that could be used for irrigated fodder production

4. Certification of local pasture seed varieties and other exotic species that are suitable for ASALs

5. Political goodwill of county governments in support of fodder production and community facilitation

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Appendices

Appendix I: Key informant guide

Key Informant Interview Guide

1. Background

The Tufts University is supporting the Catholic Relief Services (CRS)-Kenya to implement the Nawiri Program in Northern Kenya. Nawiri Program is a five-year initiative funded by USAID Bureau of Humanitarian Assistance (BHA) with the goal of sustainably reducing levels of persistent acute malnutrition in Kenya's arid and semi-arid lands (ASALs). In order to enhance the contribution of livestock to household nutrition and wellbeing, there is need to understand the constraints that limit livestock production as well as the opportunities available for enhancing livestock service delivery in Northern Kenya.

Since the 1980s and in a context of privatization, there have been a myriad of projects and programmes aimed at improving livestock services in Kenya's ASALs. However, experience of what works and why seems not to have been synthesized. The Nawiri Program seeks to review these experiences with the aim strengthening livestock service delivery in Kenya's ASALs. The review will guide Nawiri activities to support livestock service provision in these areas. The aim of this interview therefore is to gather information from you – our key expert – with lots of experience working in livestock services in pastoralist areas of Kenya, to help us take stock of your experiences and suggestions in framing the key issues and questions that will be subjected to a more in-depth field assessment later on. In this interview, we focus on livestock services delivery in three areas:

(i) animal health, (ii) extension services, (iii) feed/fodder production in Northern Kenya.

2. Constraints to livestock services delivery in Northern Kenya

2.1 Animal health services

1. What would you say are the key issues/constraints that limit effective delivery of animal health services in Northern Kenya?
2. Why do you think the privatization of animal health services in Northern Kenya the 1990s failed?
3. If one was to intervene in addressing the above-named constraints, which would be the 3 top priority interventions?
4. What are the necessary conditions for the above-named interventions to work in Northern Kenya?

2.2 Livestock extension services

1. What would you say are the key issues/constraints that limit effective delivery of livestock extension services in Northern Kenya?
- 2(i). Have there been programs to improve livestock extension services in Northern Kenya?
- 2(ii). What worked?
- 2(iii). What did not work and why?
3. If one was to intervene in addressing the above-mentioned constraints, which would be the 3 top priority interventions?
4. What are the necessary conditions for the above-named interventions to work in Northern Kenya?

2.3 Feed/fodder production services

1. What would you say are the key issues/constraints that affect livestock feed/fodder production services in Northern Kenya?
- 2(i). Have there been programs to improve feed/fodder production in Northern Kenya?
- 2(ii). What worked?
- 2(iii). What did not work and why?
3. If one was to intervene in addressing the above-mentioned constraints, which would be the 3 top priority interventions?
4. What are the necessary conditions for the above-named interventions to work in Northern Kenya?

3. Opportunities for effective delivery of livestock services in Northern Kenya

- 3.1 What opportunities exist for improved livestock production in Northern Kenya?
- 3.2 What opportunities exist for enhanced livestock marketing Northern Kenya?
- 3.3 What opportunities exist in Northern Kenya for effective delivery of animal health services?
- 3.4 What opportunities exist in Northern Kenya for effective delivery of livestock extension services?
- 3.5 What opportunities exist for enhancing feed/fodder production in Northern Kenya?

Thank you so much for your time

