



**FY 2013 Food for Progress KENYA SEMI-ARID LIVESTOCK
ENHANCEMENT SUPPORT
(K-SALES) PROJECT**

FINAL EVALUATION REPORT

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ACRONYMS AND ABBREVIATIONS

AgGDP	Agriculture Gross Domestic Product
ASDS	Agricultural Sector Development Strategy
BCS	Body Condition Scoring
BSPs	Business service providers
CIDP	County Integrated Development Plan
DiD	Difference-in-difference
FFS	Facilitated Farmer Field Schools
FTF	Feed the Future
GDP	Gross Domestic Product
GoK	Government of Kenya
HDDS	Household Dietary Diversity Score
HRI	High Rainfall Zone I
KII	Key informant Interviews
Km	Kilometer
KNBS	Kenya National Bureau of Statistics
K-SALES	Kenya Semi-Arid Livestock Enhancement Support
LIPs	Local Implementing Partners
LoL	Land O'Lakes International Development
M&E	Monitoring and evaluation
MOALF	Ministry of Agriculture, Livestock and Fisheries
MTIP	Medium Term Investment Plan
NEMA	National Environmental Management Authority
PMP	Performance Management Plan
PSM	Propensity score matching
SA2	Semi-Arid Zone 2
SOs	Strategic Objectives

USDA

United States Department of Agriculture

USG

United States Government

WUAs

Water User Associations

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CONFLICT OF INTEREST STATEMENT

Bayesian Consulting Group Limited in undertaking the Final Evaluation of the Kenya Semi-Arid Livestock Enhancement Support (K-SALES) Project has no real or potential conflicts of interest with Land O'Lakes International Development (the client) or United States Department of Agriculture USDA (the donor).

EXECUTIVE SUMMARY

The Kenya Semi-Arid Livestock Enhancement Support (K-SALES) project was implemented by Land O'Lakes International Development with funding from United States Department of Agriculture (USDA) in six Semi-Arid Zone 2 (SA2) counties of Kenya (i.e. Meru, Tharaka-Nithi, Machakos, Kitui, Makueni and Taita Taveta) over a period of four years (2013-2017). The project had two strategic objectives (SOs); (1) SO1 to increase agricultural productivity and (2) SO2 to expand trade in the livestock and meat value chain (including the by-products) with a focus on cattle, sheep and goats. To achieve its objectives the project applied a 'light touch' approach that entailed working with existing community-based organizations and business development service providers (BDPs) to improve access to clean water systems, improve infrastructure, work with Farmer Field Schools (FFS), hold county trade shows, facilitate agriculture lending, provide training in post-harvest handling and processing, develop the business capacity of cooperatives and associations and develop BSPs.

Final evaluation of the project was conducted to address thematic areas of relevance, effectiveness, impact, efficiency, sustainability, cross-cutting issues (gender and environment) and lessons learnt. Both quantitative and qualitative data were collected. To isolate project impacts, robust quasi-experimental analysis was applied using propensity score matching (PSM) and difference-in-difference methods (DiD). A total of 967 households, 144 business service providers, and 232 livestock processors were interviewed during the end-line survey. In addition, 34 focus groups discussions and 34 key informant interviews were conducted. The analysis was conducted using both baseline and end-line data.

The key findings of the evaluation by theme are highlighted as follows:

1. Relevance of the project

Relevance criteria seeks to understand whether the project intervention did the 'right thing' in terms of identifying the problem, prescribed the appropriate solutions, was aligned to local and national development priorities and targeted the right localities and beneficiaries among others. The key findings were as follows:

- The problem of low productivity and poor market access was well identified. Based on published literature, KIIs, and FGDs, the problems of poor access to water (for domestic and livestock), poor access to production inputs, low awareness and access to advanced production technologies and techniques, low value addition and poor access to output markets are real.
- The project was well aligned to national and county development agenda. The Vision 2030 and the County Integrated Development Plans explicitly sought to address problems identified by K-SALES project including increasing livestock productivity, enhancing value addition and trade among others. The project goals are also well aligned to international development agenda including the achievement of sustainable development goals (SDGs).
- The project activities were found to be appropriate in addressing the identified problems. These included: developing business service providers (BSPs) to serve

farmers better; mobilizing farmers for collective action and training through the farmer field schools; developing on-farm and off-farm infrastructure to enhance productivity and trade; enhancing access to water by rehabilitating water points; enhancing financial access by facilitating financial services to farmers.

2. Project effectiveness

Project effectiveness is measured through the extent to which project objectives were achieved and targets met. Below is a highlight on K-SALES effectiveness:

- The project met most of its targets. For example, the project intended to reach 60,000 farmers but exceeded the target and reached 78,728 (31% above the target).
- Through training offered by K-SALES project, 63% of the target farmers had adopted technologies that were being promoted by the project.
- Access to clean water for domestic use and for livestock has been achieved. A total of 229 water points were constructed or rehabilitated. The beneficiary farmers are now able to access water during dry season at a closer distance (average distance of 2.4 Km) compared to their control group counterparts that must travel 3Km away,
- In some instance the project targets were not met. For instance, while the project targeted 48,000 farmers to adopt improved farm management practices, about 35,428 adopted (a shortfall of 26%). This is attributable to farmer-level factors such as their financial endowment to acquire and use the technology and techniques. It also points to a challenge of setting too high targets for aspects of the project that were not directly under the control of the project.

3. Project impact

From the results of PSM and DiD, the final evaluation found that participation in the K-SALES project had a definite positive and significant impact on the beneficiary households (relative to their control counterparts) on the following outcomes:

i. Proximity to suppliers of inputs

The project aimed at improving access to agricultural inputs by building the capacity of business service providers to better serve livestock farmers. At baseline, the average distance to the suppliers was very similar for beneficiary and control group farmers (3.1 Km and 3.2 Km for the control and treatment households respectively). At the end-line, the distance remained 3.1 Km for the control households but declined to 2.8 Km for the treatment households, a 0.3 Km advantage over their control counterparts. Overall, because of project intervention, the DiD results showed that proximity to input supply had improved by 0.5 Km in favor of beneficiary farmers relative to their control group counterparts. Therefore, we concluded that the project had improved access to agricultural inputs.

ii. Livestock ownership

a) Number of cattle owned

Cattle ownership on average increased by one cattle among the beneficiary household compared to their control group counterpart. At the baseline, control group owned an average of 3.5 cattle which reduced to 2.6 at the end-line. The beneficiary group on the other hand, averagely owned 2.3 cattle at baseline and increased ownership to 2.7 cattle at the end-line.

b) Number of goats owned

For goat ownership, the control households had an average of 12 goats while beneficiary households had 8, giving the control households an advantage of 4 goats. At the end-line, the control households had an average of 7 goats while the beneficiary households had an average of 9 goats. Overall, goat ownership changed to the advantage of beneficiary households which owned an average of 6 goats more than their control counterparts.

The number of livestock lost in a year did not change across time and between farmer's groups. Livestock represent a store of wealth for the farmers hence loss through death has a negative impact on their wealth and income. Avoiding loss through death (especially drought-related) is very important for the farmers. The results on number of goats owned indicate that beneficiary households have increased access to feeds and fodder, water and supportive infrastructure to maintain higher numbers of livestock than their control counterparts. This outcome can be attributed to the activities undertaken by K-SALES project.

iii. Livestock body condition score

Body condition scoring (BCS) is a simple technique used to estimate the body fat in livestock based on a standardized set of visual criteria. In this evaluation study, a 5-point scale was applied in scoring the average livestock condition of the farmer's herd of cattle, goats and sheep. A score of 1 indicates an emaciated animal with very poor body condition (with prominent back bone and ribs showing). A score of 5 indicates a fat animal with hip bone and ribs covered in fat. The body condition is influenced by the nutrition status of the livestock and its general health. Body condition plays an important role in maximizing fertility in a breeding herd and determines price the livestock can fetch at the market.

a) Cattle body condition score

Average body score condition for cattle among control group farmers was 2.8 at baseline while that of beneficiary farmers was 2.6 indicating fair body conditions. At the end-line, it had worsened for both groups to 2.2 (poor body condition) among control group farmers and 2.5 (fair body condition) for beneficiary farmers. This would be expected especially because of the prevailing dry condition at the time preceding the end-line survey. However, due to project intervention, the relative cattle body score for the beneficiary group rose by 0.3 points relative to their control group counterparts. The project interventions prevented more severe worsening of cattle body condition score among the beneficiary farmers by helping them maintain fair body condition of their cattle while the condition of cattle among the control group became poor.

b) Goat body condition score

The average goat body condition score at baseline for control farmers and beneficiary farmers was 2.9 and 2.6 respectively indicating fair body condition for both groups. At the end-line the score had dropped to 2.5 for both group of farmers. This means that the score worsened more among control group farmers relative to their beneficiary counterparts. In real sense, the beneficiary group experienced an improvement of 0.3 points relative to their control counterparts.

c) Sheep body condition score

At the baseline, average sheep body condition for control farmers was 3.2 while that of beneficiary farmers was 2.6. The score dropped to 2.2 among control farmers (indicating drop from fair body condition to poor body condition) while for the beneficiary farmers it remained fair at 2.5.

These relative stability and/or improvements in average livestock body condition scores in favor of beneficiary group could be attributable to training in livestock management provided by the project through the local implementing partners, increased access to water, improved access to veterinary services and production of fodder and feeds by the beneficiary farmers.

iv. Livestock sales

Control farmers, on average, sold one cow at baseline while their beneficiary counterparts sold two in a year. At end-line, both control and beneficiary farmers sold 2 cattle each, on average, in a year. Overall, therefore, based on difference-in-difference computation, the project reduced sale of livestock among the beneficiary group by one animal relative to the control group. Annual sale of goats and sheep did not change across farmers and time. Notice that the period preceding the end-line survey had been characterized by prolonged drought which would have led to increased livestock sales. The fact that beneficiary farmers sold reduced numbers of cattle can only imply that they had access to more fodder and/or feeds, and water to maintain their cattle, and avoided distress sales which were prevalent in these areas.

v. Farm gate price

The project had a positive and significant impact of the average farm gate price of cattle and goats. On average, the beneficiary farmers fetched about US\$ 30 above their control counterparts for every cattle sold. They also obtained about US\$ 7.7 more for every goat they sold compared to their control group counterparts.

Other outcome indicators were computed at an aggregate level but important for illustrating the direction of progress in agricultural productivity and expanded trade. They are highlighted below:

- About 49,599 farmers (29,184 women and 20,415 men) had adopted the new/improved agricultural techniques/technologies propagated by the project. This shows that 63% of the targeted farmers had adopted these techniques/technologies. By gender, 58% of the targeted women and 72% of the targeted men had taken up the

technologies. Although the progress was good, it did not meet the project target of 80% although it was a huge improvement over the mid-term figure of 40%.

- About 35,428 (10,983 women and 24,445 men) of the target farmers and other stakeholders had adopted improved farm management practices such as financial management and good governance. Although this was below the project target of 48,000, it was a major improvement over the mid-term achievement of 3,638. This was attributable to training on farm management by the project through the farmer field schools (FFS).
- 46% of farmers can access farm inputs within 5Km of their homesteads. These beneficiaries include women who accounted for 66% of the total women targeted while the beneficiary men accounted for 34% of the men targeted. The project, however, failed to meet its target of bringing 80% of the target farmers within the 5-Km range of input supply.
- About 61% of the target farmers could demonstrate a threshold level of proficiency in at least 5 new livestock husbandry and herd management techniques, and had applied 60% of the recommended improved farm management practices. This exceeded the project target of 60% and 50% for the two indicators, respectively. The proportion of target farmers who could identify key characteristics of a well-managed farm was 45% (69% women and 31% men) against the project target of 80% and a mid-term achievement of only 11%.
- Value of incremental sales rose from \$347 at baseline to \$386 at end-line, an increase of 11%, though being 3% short of the project target of \$399. This could be attributed to improved livestock marketing systems supported by the revamped cooperatives, and improved livestock body conditions.
- Value of locally traded livestock products improved by about 73% over the mid-term values. The value was \$ 36,004,569 for meat, \$414,216 for hides, and \$142,058 for skin (total of \$36,560,843). The average margin was \$0.9 for beef, \$1.2 for goat meat and \$0.8 for mutton. From the mid-term values, the margins dropped by 40% for beef, 23% for goat meat and 50% for lamb, with these drops plausibly caused by improved farm gate prices of livestock¹. For goat meat and lamb, the drop may have been deepened by reduced carcass weight (from 12-kg to 9-kg for goat and from 10-kg to 8-kg for sheep). Unlike goat and sheep, carcass weight for cattle increased from 120-kg to 153-kg (28% increase against the project target of 30%).
- Post-harvest processing cost per animal decreased from \$5.01 to \$4.5 (10%) for cattle, from \$2.12 to \$1.8 (15.1%) for goat and from \$2.10 to \$1.6 (23%) for sheep. Total decline was 16% against the project target of 20%. This could be attributed to an improvement in post-harvest handling processes at the slaughter houses and butcheries. About 57% (6% women and 94% men) of the processors had adopted these of modern equipment in their operations while 72% (6% women and 94% men) had already adopted improved techniques.

¹ It is important to note that processors obtain their livestock from a wider market NOT just the beneficiary farmers. Changes in the other source market will therefore influence the margin. During the end-line survey, there was a major drought that could have suppressed supply of animals hence increasing prices and therefore reducing margin between farm gate price and price of processed products.

4. Project efficiency

This was looked at through three lenses: project management structure, activities implemented, and the approach employed, and how well they combined to transform the available resources into the intended results. The project was generally implemented in an efficient way. In terms of project management structure, K-SALES team provided clear directives/guidance to implementing partners on how to effectively implement and monitor project activities, deployed qualified staff, committed funds to partners in a timely manner, and always promptly responded to partners' needs. Regarding project activities, there was sufficient evidence to show that activity achievements demonstrated value for money. Despite the start-up challenges, most activities earmarked for implementation were completed, though some fell short of meeting the set targets, partly due to limited implementation time, but also due to other risk factors, like the severe drought experienced in 2016/17, which significantly slowed down project activities. In addition, the cost-share approach with community members was very effective, and promoted a sense of ownership. As of September 2017, a total cost share of about \$2.0 million (133% against the target of \$1.5 million) had been realized. Most project activities were implemented at relatively higher costs than earlier planned. Re-adjustments done on activity budgets hints to some unbalanced matching of project resources to the expected or desired outputs. On implementation approach, the light touch model resulted in horizontal and vertical linkages across the livestock value chain, a factor that will likely ensure that the desire, skills and momentum for change is maintained beyond the life of the project.

5. Project sustainability

This theme considers the likelihood that project benefits will endure after its completion and is assessed based on various facets of an exit and sustainability strategy.

Definite exit strategy: the 'light touch' approach used in project implementation was deemed an effective way of ensuring sustainability, as it ensured local implementing partners developed and offered demand led commercial services to the communities.

Local ownership: the project explicitly built local ownership of project activities. Discussions with most actors on ground (communities, implementing partners and other service providers) revealed that K-SALES team involved them in problem identification, implementation (through cost-sharing), monitoring and evaluations of the project activities at different stages. Besides participation, most of the completed project activities, were handed over to the communities. However, there are still concerns about the ability of local communities to continue making sustained financial investments required to sustain the on-farm and off-farm infrastructures. Local communities are poor and may have challenges raising

money required for major repairs of the structures. This is a threat to sustainability because when the structures usage stops due to non-repair, they communities are likely to lose interest in them.

Formation of strategic partnerships: the project facilitated formation of strategic partnerships by creating linkages between beneficiary households, local implementing partners and other essential service providers during the project life-time, and these have potential to continue in the future. However, in some instances the project was not successful in ensuring different LIPs worked jointly in serving the farmers. While each LIP was successful in achieving its goals, the opportunity to work jointly could have strengthened synergies between them and ensured greater likelihood of working together beyond the project.

Alignment with national and county level development priorities: the activities implemented under the K-SALES project were fully in line with the national and county governments' strategies and immediate priorities for the livestock sub-sector. In effect, the gains realized under the project so far, are bound to continue enjoying adequate policy and strategic support from both levels of government.

Welfare improvement: interactions with project beneficiaries revealed a strong desire to continue enjoying benefits accrued from interaction with the project. With improved livestock productivity came improved household incomes and quality of life. Sufficient evidence was generated from the field to show that "self-interest" from the communities, was an effective motivator that will allow them to continue engaging in livestock enterprises, despite the challenges and risks.

6. Cross-cutting issues (gender and environmental conservation)

The project targeted to work with male and female farmers and the youth. The choice of the Farmers Field Schools as the focal point for reaching farmers inevitably attracted more women farmers than male farmers. In the end-line survey, most farmers (64%) interviewed were women. Women tend to be more active in group participation than their male counterparts. A reverse scenario is observed among the livestock processors; the trade is clearly dominated by men who constitute 94% of all interviewed. The dominance of women in the K-SALES project somewhat contradicts general dominance of men in livestock ownership and marketing in the agro-pastoral systems. The dominance of women is therefore not necessarily a negative observation given that they are involved in taking care of livestock on a day-to-day basis. The project therefore empowered them through trainings and access to water resources and other infrastructure that enhance livestock productivity.

Project activities enhanced resilience to climate change and environmental conservation:

- The establishment of new and rehabilitation of existing water points and the concurrent training on their management will enhance conservation of water, reduce its pollution and enhance the efficiency of its use. This is a direct contribution to environmental conservation.
- The enhanced access to water points (which was one of the project impacts) will build the resilience of livestock farmers against frequent and severe drought.

- The training on hay making and conservation of fodder combined with construction of hay barns will enhance the ability of farmers to deal with lack of fodder during the dry season.

7. Key lessons learnt and recommendations

The following aspects of project design and implementation worked well in ensuring success of K-SALES project and can be replicated for similar projects in future:

- a) The '*light touch*' approach helped create strong partnership with local implementing partners that were familiar with project areas and direct contact with local communities.
- b) A *participatory approach* that involved all the key actors in the livestock value chain, including government, local communities, development partners, and other service providers, and where each of the actors' roles was well defined, was key for successful implementation of the project.
- c) The project sought *the support and deliberate involvement of county government* and their partnership. This was very critical for success and long-term sustainability of project impacts.
- d) The '*cost-sharing*' arrangement in establishing and rehabilitating infrastructures embedded direct community ownership and inbuilt sustainability at the initial stages.
- e) *Flexibility* in some aspects of the project design proved very critical in success of the project. For instance, the no-cost extension was very critical in achieving project success.
- f) *Some aspects of the infrastructure related targets set in project design were not realistic.* The project was expected to achieve very high targets in rehabilitating on-farm and off-farm structures with a limited budget. To achieve these targets, the project focused on a very small-scale infrastructure rehabilitation/repairs to meet the set targets.
- g) *Some project targets on adoption of new technologies and techniques were not met.* This was mainly because they depended on farmer-level factors that were beyond the control of the project. These should have been considered in setting the targets.
- h) *Managing partnerships is critical for project success and its sustainability.* K-SALES project worked with many partners at different levels. While these partnerships largely worked well, there were opportunities for making them work even better. For example, county-level inception meeting between LIPs working on different aspects of the project would have helped create awareness of what each partner is doing, explore synergies between them and create a harmonious working relationship amongst them.
- i) *The donor requirement of baseline survey approval resulted in a six-month delay in starting the project.* While this is a normal practice with many donors, the project hired staff at the beginning who were not meaningfully engaged in actual project activity implementation for that period.

Based on the evaluation we make the following recommendations:

- i. Given the clear success achieved through K-SALES project in the six counties, USDA and other donors should strongly consider out-scaling similar intervention in other livestock producing counties.
- ii. In undertaking future projects, USDA should consider revising the way targets are set especially for infrastructure projects and for adoption of technologies. To relieve the project implementers the pressure of doing very small-scale infrastructure activities to meet too high targets, it would be more efficient to set manageable targets commensurate to the budgets.
- iii. In future projects, project managers should synchronize hiring of staff with start of actual project implementation to maximize on efficiency of using project resources.
- iv. The decision by USDA and Land O' Lakes international development to undertake a rigorous impact evaluation project is commendable for building evidence on what development intervention work (or don't work). We recommend that project of magnitude such as K-SALES should in-built a robust impact evaluation analysis to continue building on a rather thin body of literature that currently exist on impacts of development projects especially in arid and semi-arid zones
- v. More development partners should embrace the 'light touch' approach applied by K-SALES project because it builds the capacity of partners at local level and enhances project ownership at the local level.
- vi. County governments of the six project counties endeavor to build on success of K-SALES by upscaling and out scale the successful activities by continuing to support their farmers through the relevant department given that livestock development is a devolved function.
- vii. County governments should prioritize development of the livestock sector in their counties by allocating adequate funding to the sector and prioritize activities and enhance productivity and trade.
- viii. National and county governments still retain the overall policy formulation function for agriculture and livestock sectors. Therefore, the national government should ensure existing policies support increased production and trade in livestock products.
- ix. The national government should continue to allocate adequate funds to counties for livestock development but also invest in infrastructures (e.g. abattoirs, roads, disease control, livestock research etc.) that would promote productivity increases and trade in livestock.

1.0 INTRODUCTION

1.1 General background

Livestock production is the dominant economic activity in the semi-arid zones of Kenya. About 80% of Kenya's landmass is arid or semi-arid. Pastoralists and agro-pastoralists living in these areas make up about 25% of the population and own 50% of all livestock (Republic of Kenya, 2010). They rely extensively on livestock which provide about 90 percent of the total employment and over 95 percent of household incomes and is a major source of food (NEMA, 2011).

At the national level the livestock sector contributes about 10-13% to the national GDP and 40% of the agricultural GDP and 7% of total export earnings (MoALF, 2015). Besides contributing to daily food and cash needs of many Kenyan people, livestock provides employment to about 10 million people. The sector also has strong forward and backward linkages with other economic sectors. It is a significant user of products from feeds, drugs, vaccines and equipment manufacturing industries and is a major provider of raw materials for agro-processing industries. The sector is on a growth trajectory; available evidence point to a rapidly growing demand for the livestock products in Kenya (Herrero *et al.*, 2014). The demand is driven by among others, the growing human population which is predicted to double and reach 97.2 million by the year 2050 in Kenya, (You *et al.*, 2014). Other drivers of demand are increasing urbanization, rising incomes and changing consumption patterns. The rising demand is projected to lead to a short fall in supply. For instance, the annual milk consumption per person is projected to double from the 2008 levels and reach 220 liters by 2030 (FAO, 2013). The rise in demand is projected to create a substantial shortfall in production of about 381.6 million liters in 2022 (Fintrac Inc., 2014). The projected shortfall in production points to the necessity of increasing livestock productivity in Kenya. Low productivity is caused by many factors including poor breeds, inadequate animal health and disease control systems, poor markets and information systems, poor inputs and service delivery systems, and low levels of value addition.

Livestock farmers living in the Semi-Arid Zone 2 (SA2) of Kenya face many challenges in production, processing and marketing of livestock and livestock products. These include; recurrent drought that poses major challenge on the availability of pasture and water, prevalence of pests and diseases, poor access to inputs and services, poor access to markets and information among others. To address these challenges and improve the competitiveness of the livestock value chain in SA2, Land O'Lakes International Development, with funding from the United States Department of Agriculture (USDA), initiated the Kenya Semi-Arid Livestock Enhancement Support (K-SALES) program.

1.2 Project description and objectives

K-SALES project was implemented in six Semi-Arid Zone 2 (SA2) counties of Kenya namely; Meru, Tharaka-Nithi, Machakos, Kitui, Makueni and Taita Taveta over a period of four years (2013-2017). The project had two strategic objective (SOs); (1) to increase agricultural

productivity and (2) to expand trade in the livestock and meat value chain (including the by-products) with a focus on cattle, sheep and goats.

To achieve SO1 on increasing productivity the project undertook the following interventions:

- i. Developed business service providers (BSPs) to deliver productivity enhancing inputs and services. A total of 973 BSPs were trained on areas such as business planning and management, financial management, marketing and after-sale services.
- ii. Facilitated Farmers' Field Schools (FFS) through Local Implementing Partners (LIPs). A total of 78,728 FFS members were trained on improved agricultural techniques and technologies, farm management and financial literacy.
- iii. Worked with Water User Associations (WUAs) to increase access to water by rehabilitating water points. A total of 229 community-based water points were established/rehabilitated. WUAs received training on their operations and maintenance.
- iv. Worked with FFS groups to rehabilitate or construct 337 on-farm structures such as cattle dips, crushes and hay barns.
- v. Facilitated farmers to access increased agriculture lending from financial institutions. A total of 6,882 enterprises obtained loans worth USD 558,359 in addition to financial literacy training.

To achieve SO2 on expanding trade the project undertook the following interventions:

- i. Provided trainings on post-harvest handling and processing (PHH-P) techniques. The project provided sub-awards to business development services (BDS) organizations to train 3,267 processing facility employees on improved processing techniques.
- ii. Rehabilitated 575 off-farm infrastructures including slaughterhouses/slabs, livestock markets, hide and skin shops and loading ramps.
- iii. Developed cooperative business capacity by training 1,034 livestock farmer cooperatives members on marketing, business plan development and making linkages to new markets.

K-SALES project was implemented to improve the competitiveness of the livestock value chain by addressing the major challenges that agro-pastoralists in semi-arid areas face including unreliable access to water, frequent droughts, prevalence of livestock diseases and limited inputs and services. The project addressed these challenges by reducing drought-related losses, building the technical capacity of value chain actors and reducing marketing inefficiencies. The approach targeted key value chain points through partnership with local service providers to facilitate sustainable and innovative business models, new technologies and investments, and a responsive financial services sector. K-SALES implementation model ('light touch' approach) entailed working with existing community-based associations and business service providers (BSPs) to improve access to clean water systems, improve infrastructure, working with Farmer Field Schools (FFS), holding county trade shows, facilitating agriculture lending, provided training in post-harvest handling and processing, developed the business capacity of cooperatives and associations and developed BSPs. The

project applied a demand-driven, private sector facilitative approach to help businesses grow and build linkages with livestock smallholders by providing competitive sub-awards to key service providers. At the end of the project period, K-SALES project targeted to directly benefit 63,200 individuals including 3,200 agribusinesses including women-owned Micro, Small and Medium Enterprises (MSMEs), inputs wholesalers, retailers and exporters.

I.3 Final Evaluation

I.3.1 Purpose of final evaluation

The application of evidence-based decision-making is integral to the effective management of development projects. It is in line with this principle that USDA and Land O'Lakes have set out to undertake an independent, objective and comprehensive final evaluation of the K-SALES project. USDA M&E policy indicates commitment to a strong culture of evaluation and learning experience in which programming is driven by evidence and not anecdote. The USDA M&E policy highlights the following criteria for evaluation; independence, utility, transparency, relevance, partnerships, credibility, rigor and timeliness. At the operational level, Land O' Lakes International Development developed the K-SALES Performance Management Plan (PMP) as a management tool for USDA M&E team to plan and manage reporting of progress toward achieving USDA's strategic objectives. The PMP has four components; (i) Results Framework (RF) (ii) Performance Indicators Reference Sheets (PIRS) (iii) Annual Performance Data Table (APDT) and (iv) Performance Management Task Schedule (PMTS). The final project evaluation builds on all these components and is anchored in the PMTS.

The impact evaluation of the project was undertaken from the perspective of the beneficiary households (and their control group counterparts), the business service providers, livestock processors and livestock cooperatives across the six counties. Robust analytical (quasi-experimental) methods were applied in isolating the impact of the project. Specifically, the evaluation used propensity score matching (PSM) and difference-in-difference methods (DiD) in identifying project impact. This is in line with the USDA M&E policy that proposes that as a general principle, the evaluations should be designed using the most rigorous evaluation methodology appropriate.

The final evaluation was guided by an evaluation framework that encompasses six broad evaluation criteria. These include; (1) Relevance (2) Effectiveness (3) Efficiency (4) Impact (5) Sustainability and (6) Cross cutting issue (gender and environmental conservation). Under each of these evaluation criteria a set of evaluation questions guided analysis as expounded in the next sub-section.

I.3.2. Scope of the final evaluation

The evaluation covered seven (7) key evaluation themes including:

I. Relevance

Under this theme, the evaluation answered whether the;

- Problems were clearly identified and addressed

- Project was aligned with *Vision 2030*, County Agriculture Investment Strategies, USG development goals, objectives and strategies
- Activities undertaken were appropriate for the identified problems
- Activities met the needs of the beneficiary

2. Effectiveness

Under the theme of project effectiveness, the evaluation answered the following questions;

- Did the project achieve its objectives?
- To what extent did the project contribute to observed results/objectives?
- Did the farmers and other actors in the value chain adopt improved techniques and technologies?
- If they have adopted the techniques and technologies, what factors contributed to the adoption?
- Did trainings undertaken improve agricultural productivity?
- Did the project facilitate access to loans and other financial products?
- Did the training on post-harvest handling, processing and investment in off-farm infrastructure lead to increase in the value of locally traded livestock products?
- Did training, mentorship and linkages to markets for the livestock enterprises increase sales and better prices?

3. Efficiency

Under the theme of project efficiency, the evaluation set out to answer the following questions;

- To what extent did project resources lead to results?
- Could the same results have been achieved with fewer resources?
- Could alternative approaches have been adopted to achieve the same results?

4. Impact

Under the theme of project impact, the evaluation answered the following questions:

- What were the medium and long-term impacts (intended and unintended) of the project interventions?
- To what extent were these impacts due to project interventions?

5. Sustainability

Under the theme of sustainability, the evaluation answered the following questions:

- What is the likelihood that the benefits of project will endure after its completion?
- Is there likelihood that farmers will continue the proposed activities after the project is completed?
- To what extent did the project plan for the continuation of activities, developed local ownership and develop sustainable partnerships?
- Did the project have a well-developed exit and sustainability strategy?
- Did the project staff initiate implementation of any aspects of the exit strategy?

6. *Cross-cutting Issues*

- How did the project address and integrate cross-cutting issues such as gender, environment, climate change and youth?
- Was the project gender and or/youth sensitive in its approach?
- What specific elements of the project were gender/youth sensitive?
- Did the project outcomes close gender gaps if any? Did it empower the youth?
- Were the project outcomes different for men compared to women?
- Was the project sensitive to environmental issues relating to livestock that were affecting the implementation areas?
- How did the project outcomes promote environmental conservation?

7. *Lessons learnt*

- What best practices can be captured for replication in future projects?

2.0 METHODOLOGY AND IMPLEMENTATION

2.1 The evaluation design and execution

The study used two data collection modules to cover the diverse impact pathways of the project. The modules used were: i) household module targeting the individual farm households; and ii) other stakeholders such as livestock processors, business service providers and agriculture sector experts. The households interviewed were those previously interviewed during the baseline and the mid-term surveys. Other stakeholders were randomly sampled for semi-structured interviews. To triangulate the information from the individual interviews, Key Informant Interviews and Focus Group Discussions were conducted.

2.2 Sampling

The sampling procedures for the final evaluation inevitably depended on how the same were conducted at baseline (and at mid-term as well). Ideally, final evaluation involves a comparison of the situation at the baseline (for the beneficiary households and control counterparts) and at the end of the project. For this evaluation, there were some slight deviation to this standard procedure because of the particularities of K-SALES project implementation. As per discussions held with the project M&E team, the consultant was asked to create the baseline data for the beneficiary group from both baseline and the mid-line surveys. The 'control households' were however all derived from the baseline survey. In essence, 'beneficiary households' were obtained from two cohorts; cohort 1 was the baseline survey and it had a total of 611 households while cohort 2 was the mid-term survey and had 911 households. It was agreed with the K-SALES project team that the beneficiary group would be constructed from the two surveys proportionate to the households interviewed in each of the cohorts. Therefore, the targeted 600 beneficiary households in the end term survey were drawn from the two cohorts, proportionately. Thus, 240 households (40%) were drawn from cohort 1 and 360 households (60%) from cohort 2. The specific households to be interviewed were randomly selected from the full list of households. To pick the specific households from the two cohorts for interview, we used online research randomizer (www.randomizer.org). For the control households, however, we used the entire list of the households interviewed during the baseline.

In addition to the household surveys, interviews were also conducted with business service providers (BSPs) and livestock processors (LPs). The actual respondents for the BSPs and LPs were randomly selected from list of project beneficiaries that was provided by K-SALES project team. The actual targeted numbers were derived from optimal standard sample size computation based on target population. FGDs and KIs participants were purposively selected based on expertise and level of interaction with the project or other related projects. The Key Informants were drawn from local implementing partners, financial institutions, K-Sales technical staff and other sector experts. The FGD participants were drawn from FarmerField School members, water Users Associations and Livestock Cooperatives.

Table 2.1 provides a summary of the sample sizes planned to be covered and those eventually realized.

Table 2.1: Samples planned and covered for the study

Module	Targ et	Achiev ed
Household	1219	967
Business Service Providers (BSPs)	276	144
Livestock Processors (LPs)	344	232
Focus Group Discussions (FGDs)	36	34
Key Informant Interviews (KII)	31	34

Source: Survey data, 2017

As shown indicated in Table 2.1 there was a shortfall on the actual samples achieved for the household, BSPs and LPs. In evaluation studies this is an anticipated phenomenon (attrition) and is factored in the sampling at baseline to ensure that the sample obtained at the end-line (after attrition) can support a robust analysis. Considering that the end-line survey was being conducted four years after the baseline, some changes had occurred that would inevitably affect the survey. The end-line survey was conducted in a political campaign period for the repeat presidential election of October 2017 and at the beginning of rainy (crop planting) period. Several households were busy tilling their land and planting way from their homesteads and therefore unavailable for interviews. Several households had migrated away from their homesteads, and a few had unfortunately died. Some households were simply unwilling to be interviewed for various reasons. The heightened political situation also posed some unique challenges; the local administrators that we relied upon to help us in identifying ‘control’ group households would in some instances be unwilling or out rightly impede the survey work. These challenges were regularly shared with the K-SALES project team and they helped intervene where they could. Overall, the sample sizes achieved were large enough to undertake robust impact evaluation as per established standards.

2.3 Data collection

2.3.1 Literature review

Review of secondary literature provided background information on the project and the impact path ways. Among the project documents reviewed included: K-SALES projectprogram description; USDA monitoring and evaluation policy; K-SALES evaluation plan; K- SALES PMP; K-SALES internal practice area indicators (PAIs); performance management plan; monitoring data; special studies conducted during the project implementation; baseline and mid-term evaluation reports, and their respective data collection tools; and semi-annual technical progress reports submitted to USDA. These documents provided background information on the project and the possible impact pathways. Additional literature reviewed included national and county development plans and general literature on project evaluation based on internationally recognized good practice.

2.3.2 Structured questionnaire

Structured surveys were administered on the individual households, and the BSPs and livestock processors. Variables captured were guided by indicators and information contained in relevant project documents, the seven key evaluation questions, and the baseline survey (See Annex 3).

2.3.3 Key informant interviews

Key informant interviews were conducted in each county with relevant project stakeholders to provide insights into specific county-level issues. Key informant interviews were guided by a set of broad questions to allow for pertinent issues to emerge because of the discussion (see Annex 3).

2.3.4 Focus group discussions

These helped assess opinions on K-SALES project in terms of its relevance, effectiveness, efficiency, impact and sustainability. FGDs helped bring out the challenges experienced in the implementation and possible ways of overcoming them. The method generated focused insights and complimented information from key informants. The discussions were guided by carefully crafted questions (See Annex 3).

2.3.5 Direct observation and photography

This method was used during visits to farmers and other stakeholder groups. The method complemented information provided by individuals and/or provide basis for further probing the respondents. In addition, high resolution photographs were taken to show current field activities and capture the status of the beneficiaries and present practices/situations. The method was important, particularly, for identifying and documenting success stories. In addition, this method was used during field visits to facilities and/or infrastructures developed or rehabilitated through the K-SALES project.

2.4 Data analysis and presentation

2.4.1 Quantitative data analysis

The focus was on estimation of means, totals, ratios and proportions on the key control and outcome variables. The results were disaggregated by counties and gender of the farmer, where applicable. The results are documented along different themes. Household data are analyzed through econometrics with focus on possible drivers of participation in the project, and impact of such participation on household welfare as measured by specific project outcome indicators.

To model probability of participation in the project, we used a binary probit approach while controlling for household, farm level and institutional factors. Because the coefficient of the probit model cannot be interpreted directly, we computed the marginal effects, interpreted as probabilities of participation in the project.

The main task, however, was to compute the project impact. Whether a farmer would use the livestock productivity enhancing or trade enhancing technologies/approaches being propagated by K-SALES or not is a deliberate decision that can be influenced by farmer or farm-level factors. That is, it is an endogenous decision dependent on both observable and unobservable factors. Thus, any analysis that produces robust results must deal with selection bias. Consequently, we used quasi-experimental approach, combining Difference-in-Differences (DID) as suggested by Smith and Todd (2005) with Propensity Score Matching (PSM).

PSM is useful in ensuring that analysis of the impact of the project is confined to appropriately matched, in terms of observable characteristics, participating and non-participating households (Dehejia and Wahba, 2002; Smith and Todd, 2005). This controls for endogeneity attributable to observable time-varying factors. The observable characteristics on which matching was done include: (1) Household size (2) Gender of the farmer (3) Size of landholding, (4) Distance to the nearest agro-vet outlet (5) Transport to the nearest livestock market, and (6) Household asset value (7) Education level and (8) Main occupation of the farmer. The analysis was based on a class of matching known as propensity score matching (PSM). The process started with the estimation of propensity scores, $P(\mathbf{z})$, using a binary probit model for participation in the project. In the specification of the probit model, we avoided the use of potentially endogenous variables. Inclusion of such variables would cause problems in interpretation of results as noted by Caliendo and Kopeinig (2008). Nearest Neighbour Matching (NNM) algorithm was used. NNM selects a treated subject and then selects as a matched control subject, the untreated subject whose propensity score is closest to that of the treated subject. If multiple untreated subjects are equally close to the treated subject, one of them is selected at random. This approach to matching results in estimates with minimal bias and would be preferred over the other algorithms (Austin, 2014).

The use of DID was able to control for endogeneity of participation in the project from households attributable to unobservable time-invariant effects. This leads to consistent estimates of impact of participation on household welfare (Abadie, 2005). A combined PSM and DID, therefore, controls for both time-variant and time-invariant observable and unobservable factors to produce reliable estimate of impact.

The two-period (baseline and end-line) panel data difference of the First Difference (FD) estimator and the DID estimator of the matched sub-sample will be computed as follows:

$$y_{i1} = \mu_0 + \beta_1 X_{i1} + \tau_i + e_{i1} \quad (1)$$

$$y_{i2} = (\mu_0 + \omega) + \beta_2 X_{i2} + \tau_i + e_{i2} \quad (2)$$

The difference between Equation 2 and Equation 1 gives:

$$\Delta y_i = \omega + \beta \Delta X_i + \Delta e_i \quad (3)$$

Where y_i is the outcome of interest of the intervention (number of cattle, goats and sheep; current average price of cattle, goat and sheep; number of cattle, goats and sheep sold; livestock body condition score; and the Household Dietary Diversity Score); X_i is a vector of independent factors (household size; household land holding; main occupation of the household head; education of the household head; gender of the household head; distance to the nearest agro-vet shop; distance to the nearest livestock market; distance to the source of water during the dry season; and the household estimated asset value); e_i is the disturbance term; β is the coefficient of change in the independent variables between the baseline and the end-line; ω is the change in intercept between the two periods; and Δ is the differencing operator. The time-invariant unobservable effect has been removed through differencing. This is the strength of the DID approach.

Equation 3 will be computed for both beneficiary and non-beneficiary households. Consequently, the final impact of on productivity will be computed as:

$$DID = \Delta y_A - \Delta y_{NA} \quad (4)$$

where Δy_A is the change in outcome variable of interest for the households benefitting from the project between the baseline and the end-line, while Δy_{NA} is the change in the same variable for the households not benefitting for the same period. The actual impact of the project, are not mere before-and-after difference but rather how the project benefits (or not benefits) the beneficiary household relative to the control household².

The DID approach has an additional advantage of capturing variations over time by estimating time-varying parameters (Abadie, 2005). However, it is incapable of eliminating time-varying unobserved heterogeneity. As indicated earlier, this informed the use of PSM to restrict our analysis to participating and non-participating households suitably matched on observable characteristics. The matching was done using the baseline data pooled from cohort 1 and cohort 2 as earlier explained in sub-section 2.2.

In this evaluation, PSM-DiD was applied in computation of the following agricultural productivity indicators that were assessed at the household level:

- i. The proximity to agricultural input suppliers,
- ii. Proportion of improved technologies and/or techniques adopted,
- iii. Proportion of improved farm management practices adopted by the households,
- iv. Number of livestock kept, sold or lost in a specific period,
- v. Average livestock body condition,

² For example, if the baseline control group farmers, on average, sold one cow while their beneficiary counterparts sold two cows and the end of the project, both control and beneficiary farmers sold 2 cattle each, what is the impact of the project on the beneficiary farmers? DiD results are generated and interpreted by getting initial difference, in this case it is $2-1=1$. Then the second difference $2-2=0$ then you obtain the difference between the two i.e. $1-0=1$. How do we interpret the DiD value of 1? It means that the project has had a net effect of reducing sale of 1 cow among beneficiary group relative to the control household. Positive impact of the project is not merely shown by improvement in an indicator but also by how the project prevents 'worsening' of the indicator.

Other agricultural productivity indicators as captured in the Performance Monitoring Plan (PMP) Indicator table (see Annex I) whose values could only be computed at group/aggregate rather than household level were analyzed based on differences between baseline and end-line figures. This is because, PSM-DiD analysis would not be practical for indicators measured at aggregate level. These included the following:

- Percentage of farmers participating in project interventions who have applied new techniques or technologies as a result of USDA assistance
- Percent farmers who can demonstrate a threshold level of proficiency in at least five new livestock husbandry and herd management techniques as a result of USDA assistance.
- Percentage of farmers who have applied 60 percent of recommended improved farm management practices as a result of the USDA assistance.
- Percentage of farmers in target regions who can identify key characteristics of a well-managed farm as a result of USDA assistance.

Two trade expansion related indicators measured at household level and analyzed using PSM-DiD in were:

- i. Farm gate prices of different livestock types and
- ii. Value of incremental sales.

Other trade expansion indicators were computed based on cross-sectional data from livestock processors. No baseline data had been collected from these livestock processors and therefore DiD could not be applied in analysis. The analysis was based on simple differences between baseline and end-line figures. These indicators included the following:

- Percent increase in the value of locally traded livestock products (meat and skin)
- Percentage increase in average weight of post-production carcass from indicative standard weight to Fair Average Quality (FAQ) weight
- Percent increase in average margin between farm gate price and price of processed product
- Average percentage decrease in post harvesting pricing costs per animal
- Percentage of livestock enterprises using modern equipment to process livestock products as a result of USDA assistance
- Percentage increase in number of distinct market to which livestock and livestock products are sold as a result of USDA assistance

2.4.2 Qualitative data analysis

Qualitative data was collected from FGDs and KII. The audio conversation of the FGDs were recorded and notes taken. Notes were transcribed during the KIIs. The qualitative data was analyzed using Nvivo software and documented along specific themes. It was used in triangulating findings from qualitative data analysis.

3.0 FINDINGS

This chapter is organized into eight sections each focused on a major aspect of the evaluation. Section 3.1 provides a highlight of the baseline variables that were used in matching the beneficiary and control households for purposes of evaluating impact of the project. In section 3.2 the analysis on determinants of households' participation in K-SALES project are discussed. The results of matching are presented while in section 3.3. In section 3.4 the results of final evaluation are presented under the eight major themes: relevance; effectiveness; impacts; efficiency; sustainability; cross cutting issues of gender and environmental conservation; and lessons learnt.

3.1 An overview of key household characteristics at the baseline

The project was designed to impact on households through improvements in agricultural productivity and expanded trade.

In selecting the treatment sites, the following factors were considered:

- Program objectives; that the areas selected meet the criteria set out for support in the various program components such a livestock marketing, water infrastructure, value addition etc.
- Consultations with county livestock and water officials regarding on-going initiatives, county priorities and plans for developing the livestock sector: This was to ensure synergy with planned county initiatives in the livestock sector
- Enterprise of interest: cattle, sheep or goats depending on county context
- Livestock population density (Tropical Livestock Units, TLUs).

In selecting actual households that participated in the project, the following issues were considered;

- People who reside in the community or come from same locality.
- All ages and gender if they own the relevant animals.
- Active farmers keeping livestock or wiling to start keeping livestock.
- Willingness to participate in project activities and share experiences with other members

Before examining the impacts, we explore the initial conditions of the households on key household, farm and institutional factors. A comparison of the beneficiary and control households on these key factors is summarized in Table 3. From the results, it is evident that the control households were better off on most of the factors compared to their beneficiary group counterparts. It is evident that the control households had significantly larger household size and land holding than their beneficiary counterparts. Each of the control households had one more member and about 3 acres more relative to the beneficiary households.

Table 3.1: Summary statistics on the initial conditions of the households

Variable	Mean			t-value
	Treatment	Control	Difference	
Household size	5.81	6.55	-0.74***	-3.64
Land size (acres)	5.24	7.99	-2.75***	-3.34
Distance to the nearest agro-vet (Km)	8.76	9.00	-0.24	-0.37
Distance to the nearest livestock market (Km)	7.79	8.69	-0.91**	-1.89
Distance to water source during drought (Km)	2.84	4.40	-1.56***	-4.59
Transport cost to nearest livestock market (Ksh)	92.58	53.69	38.89***	4.23
Household asset value (Ksh)	26622 ³ (US\$ 266.2)	28646	-2024	-0.47
Number of cattle owned	2.46	3.40	-.94***	-3.35
Number of goats owned	7.47	10.28	-2.81***	-3.58
Number of sheep owned	1.10	1.41	-0.31	-1.34
Number of cattle lost	2.28	3.53	-1.24	1.24
Number of goats lost	2.91	4.48	-1.57**	-1.93
Number of sheep lost	2.22	3.33	-1.10	-1.27
Current unit price of cattle (Ksh)	30662 (US\$ 306.6)	26157	4505**	2.48
Current unit price of goat (Ksh)	3864 (US\$ 386.4)	3677	187	1.57
Number of cattle sold	2.50	1.39	1.11***	5.15
Number of goats sold	4.53	3.10	1.43***	3.74
Cattle average body condition score	2.67	2.70	-0.03	-0.60
Goats average body condition score	2.66	2.85	-0.19***	-4.05
Sheep average body condition score	2.63	2.91	-0.28***	-2.90
Household Dietary Diversity Score (HDDS)	5.85	4.15	1.70***	12.23

*, **, *** Significant at the 10%, 5%, and 1% level

Source: Baseline Survey data

The control group were also further away from livestock markets and sources of water. On average, control households were 0.91 Km further away from livestock markets and 1.56 Km further away from water sources compared to the beneficiary households. In terms of transport cost to the livestock market, however, the beneficiary households incurred about \$0.39 more than their control counterparts. Most probably the difference in cost of transport was due to accessibility of the control sites. For example, in Taita Taveta, the control villages were along the Nairobi-Mombasa Highway while the treatment villages were in the remote villages of Mwatate, Kasigau, Wundanyi, Kishushe, Ngolia and others, off the main highway. It should be noted that accessibility does not necessarily imply proximity to water sources and livestock markets.

In terms of livestock ownership, the control households owned one more cow and about three more goats than the beneficiary group. The two were, however, not different in terms of ownership of sheep. For the livestock lost during the year, the two groups were not different except for the goats which the control households lost three more than the treatment households. The beneficiary households sold one more cow and one more goat than their control counterparts.

³ Exchange rate is 1 US\$=Ksh.100

Livestock farm gate prices were different only for cattle. The beneficiary households secured higher prices than the control households. On average, they got \$45 more for one unit of cattle than their control counterparts.

For livestock average body condition score, the control households registered better score than the beneficiary households. The score was 0.19 higher for goat and 0.28 higher for sheep among the control households than the beneficiary households. The difference was, however, not significant statistically for cattle.

Household dietary diversity score which measures food and nutritional security was also different among the households. The beneficiary households had a better score than the control households. On average, they consumed 2 more food groups in a day than the control households.

3.2 Determinants of household participation in K-SALES project

Comparison of the households at baseline shows that beneficiary and control households were different in several ways as discussed in section 3.1. This justified the need for matching to create sub-samples that were similar in observable characteristics. Matching was based on the propensity scores generated from the probit model of participation in the project. The results of the probit model are presented in Table 3.2.

Table 3.2: Predictors of Participation in K-Sale Project

Variable	Marginal Effect	Z-Score
Household size	-0.01	-1.03
Female farmers ^a	0.08*	1.66
Land size (acres)	-0.01***	-4.11
Distance to nearest agro-vet	0.002	1.22
Distance to the nearest livestock market	-0.0004	-1.09
Transport cost to livestock market	0.0002***	3.65
Distance to water source during drought	-0.004	-1.59
Log asset value	0.01**	1.96
Household Dietary Diversity Score (HDDS)	0.05***	7.69
<i>Education of household head ^b</i>		
Primary (incomplete)	0.05	1.05
Primary (complete)	0.10**	2.17
Secondary (incomplete)	0.24***	4.28
Secondary (complete)	0.11**	2.13
Post-secondary	0.28***	4.29
<i>Main occupation of household head ^c</i>		
Livestock farming	-0.02	-0.48
Formal employment	-0.47***	-14.04
Informal employment	-0.18***	-4.32
Small/micro enterprise	-0.29***	-6.09
Petty trade	-0.32***	-3.54
Other occupations	-0.34***	-3.34

*** $P < 0.01$; ** $P < 0.05$; * $P < 0.10$; ^areference is male farmers; ^breference education level is no formal education; ^creference occupation is crop farming

Source: Baseline survey data

Female farmers had a higher probability of participating in the project than the male farmers. This was mainly because the project interventions were undertaken through membership to Farmer Field Schools which had more women membership than male. Furthermore, some of the intervention by the project relate to issues that in a rural setting are women's domain. For example, the idea of increasing access to water for both livestock production and domestic use would be more favorable to women because women are responsible for fetching water, especially for domestic use among rural communities.

The size of land owned lowered the probability of participation in the project. Most probably this was because the project promoted more intensive production as opposed to extensive production. Farmers with more land have more grazing area and may be hesitant to invest in activities like fodder production because free range grazing would be cheaper for those with expansive grazing area.

Farmers who incurred higher transport cost were more likely to participate in the project. This was not surprising because the project was meant to improve market access. Thus, farmers incurring higher costs to market would be attracted to participate to reduce their cost of marketing livestock and livestock products.

Household asset ownership and dietary score encouraged participation in the project. Households with higher asset value and dietary diversity scores are probably wealthier households. It is possible such households are motivated to participate because they have resources to invest in some of the technologies and innovations being promoted. They can pay for AI services, they can build modern structures to improve their livestock production and they can secure the associated veterinary services. This would encourage them to join the project unlike poorer households who, even after benefitting from training, may not implement any of the project components.

Unlike farmers without education, the farmers with complete primary school education or higher were more likely to participate in the project. Perhaps this was because the project involved training with some technical components which required some formal education to understand better. The technical aspects may, thus, discourage farmers without education from participating.

Farmers whose primary occupations were not agriculture had a lower probability of participating in the project. Those whose main occupation was formal employment had about 0.5 lower chance of participating, those in informal employment had about 0.2 lower chance, and those in small/micro enterprises, petty trade and other occupations had about 0.3 lower chance of participating. This was probably because those in other occupations had little time for livestock production and would be hesitant to invest in the sub-sector. Moreover, participation would require time to attend meetings and training which those engaged in other activities may not have.

3.3 Results of propensity score matching (PSM)

Results of PSM showed that not all the farmers had suitable matches (See Figure 3.1). A few of the treatment households were off the region of the matched households.

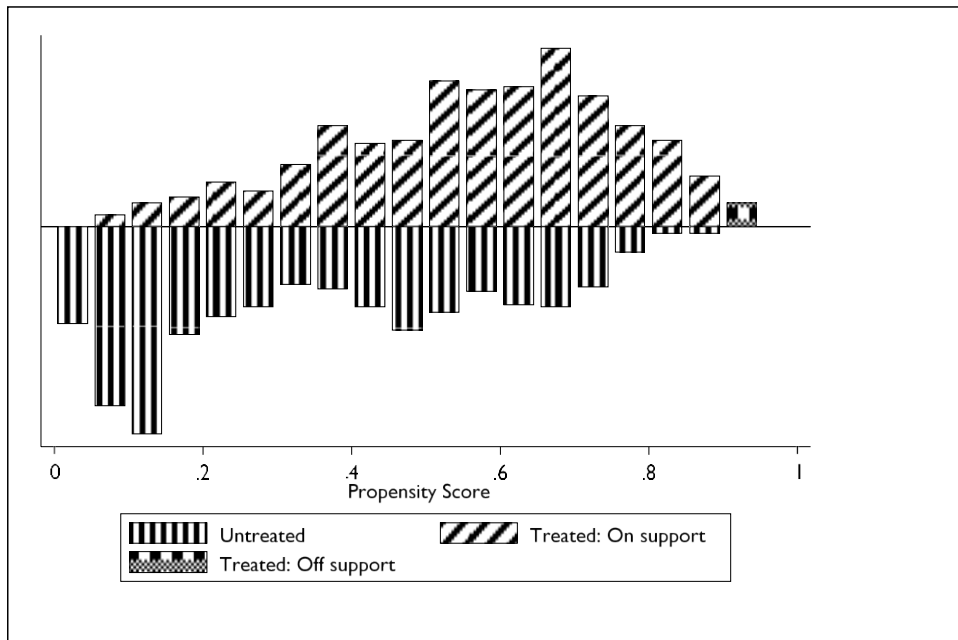


Figure 3.1: Propensity score matching graph

Source: Baseline data

The fact that some farmers lacked appropriate matches was a clear justification of use of propensity score matching in the analysis. This ensured that the eventual comparison was based on only the matched farmers. Our test showed that matching could significantly reduce selection bias attributable to observable factors (Table 3.3). Matching reduced outcome bias by between 5% and 59%. Matching reduced bias on number of livestock owned by the farmers by 55% although some bias remained as shown by the P-value on the matched sub-sample.

Table 3.3: Indicators of covariate balancing before and after matching

Outcome	Median absolute bias(before matching)	Median absolute bias (after matching)	% bias reduction	Pseudo R (unmatched)	Pseudo R (matched)	p-value of LR (unmatched)	p-value of LR (matched)
Cattle owned	16.2	7.4	55	0.416	0.063	0.000	0.000
Goats owned	16.2	7.4	55	0.416	0.063	0.000	0.000
Sheep owned	16.2	7.4	55	0.416	0.063	0.000	0.000
Average price of cattle (Ksh)	13.2	8.8	33	0.447	0.051	0.000	0.156
Cattle lost	16.2	7.4	55	0.416	0.063	0.000	0.000
Cattle body condition	12.3	7.8	37	0.439	0.081	0.000	0.003
Goats lost	24.2	18.3	24	0.582	0.125	0.000	0.256
Average price of goat (Kshs)	17.7	7.3	59	0.423	0.075	0.000	0.000
Goat body condition	16.7	7.5	55	0.409	0.091	0.000	0.000
Average Sheep price (Ksh)	31.6	16.9	47	0.507	0.177	0.000	0.347
Sheep body condition	26.2	19.6	25	0.527	0.400	0.000	0.012
Cattle sold	19.2	18.3	05	0.862	0.652	0.000	0.007
Goats sold	12.0	10.5	13	0.509	0.100	0.000	0.088

Source: Computation based on Baseline data

The same was observed on cattle lost, average body condition of cattle, farm gate price of goats, average body condition of goats, average sheep body condition, and number of cattle and goats sold. However, matching eliminated bias on such impact indicators as farm gate price of cattle, goats lost, and farm gate price of sheep. The bias observed after matching of the farmers could be due to unobservable farmer-specific factors. This justified the use of DID on the matched farmers, to mop out the effects of unobservable time-fixed effects. The results of DID on the matched farmers reflect the true impact of project on the farmers. These results are presented and discussed in section 3.4.4.

3.4 Final Evaluation Results

3.4.1 General household characteristics

In this section, we provide a highlight of selected demographic and socio-economic characteristics of households that were interviewed during the final evaluation survey. The findings compare the beneficiary and control group farmers.

Age

Distribution of farmers across the age categories was very similar between the two categories as shown in Figure 3.2. It is notable that the youth are disproportionately represented among farmers (in both groups) compared to the overall national population.

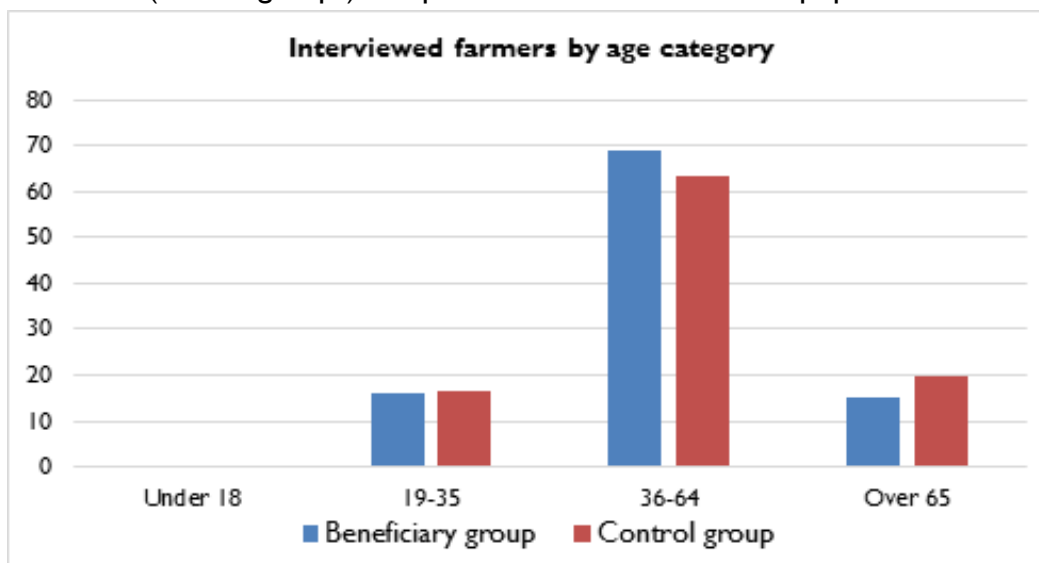


Figure 3.2: Farmer age by category

Source: Survey data, 2017

Nationally, youth below 19 years represent about 52% of the population (Obudho *et al.*, 2015). Majority of farmers interviewed were in the age category 36-64 years. This is however not surprising because farming in rural areas depends on land ownership which is under the control of parents through the established system of land inheritance.

Household size

The beneficiary and control households had an average of 5.89 and 6.22 members respectively. The two categories have comparable household sizes. This number is higher than the national average of 4.4 people/household in rural areas of Kenya (Obudho *et al.*, 2015).

Education level

The education levels of two categories of farmers are very similar except the higher numbers of farmers in the control group with no formal education (5% more) as shown in Figure 3.3. Majority of farmers have primary school education and below with only about 15% having completed secondary school.

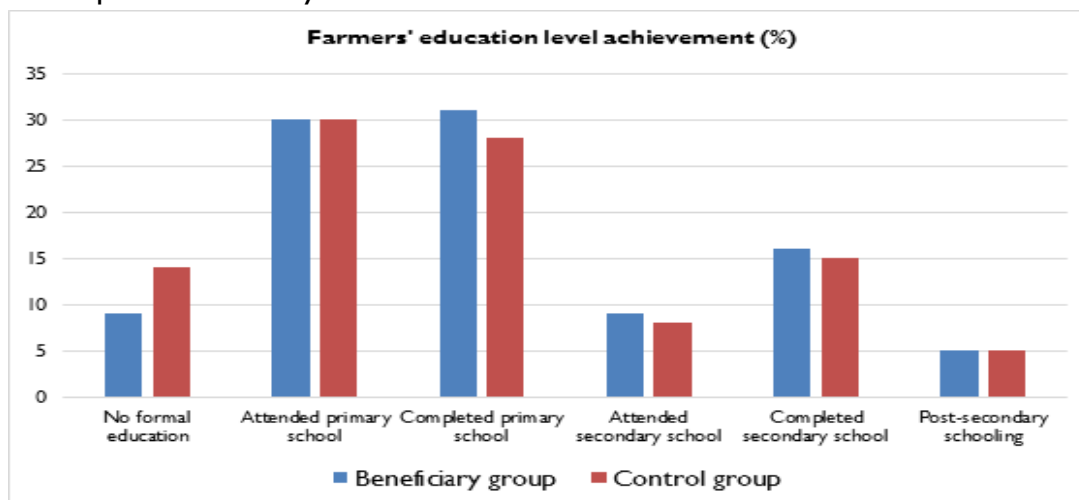


Figure 3.3: Farmers' education level

Source: Survey data, 2017

About 5% of the interviewed farmers for both categories had post-secondary schooling. This is higher than the national average for rural Kenya which stands at 3% (Obudho *et al.*, 2015). Available evidence show that education attainment is a key determinant of wealth attainment and ability to overcome poverty.

Main occupation

Majority of farmers interviewed indicated that crop farming was their main occupation. About 40% and 35% cited crop farming as their main occupation among the beneficiary and control group, respectively. This is as expected because the farmers in the counties that K-SALES targeted were actually agro-pastoralists (growing crops and raising livestock). Less than 10% of farmers in both categories were in any formal employment. About 20% were in informal employment as shown in Figure 3.4.

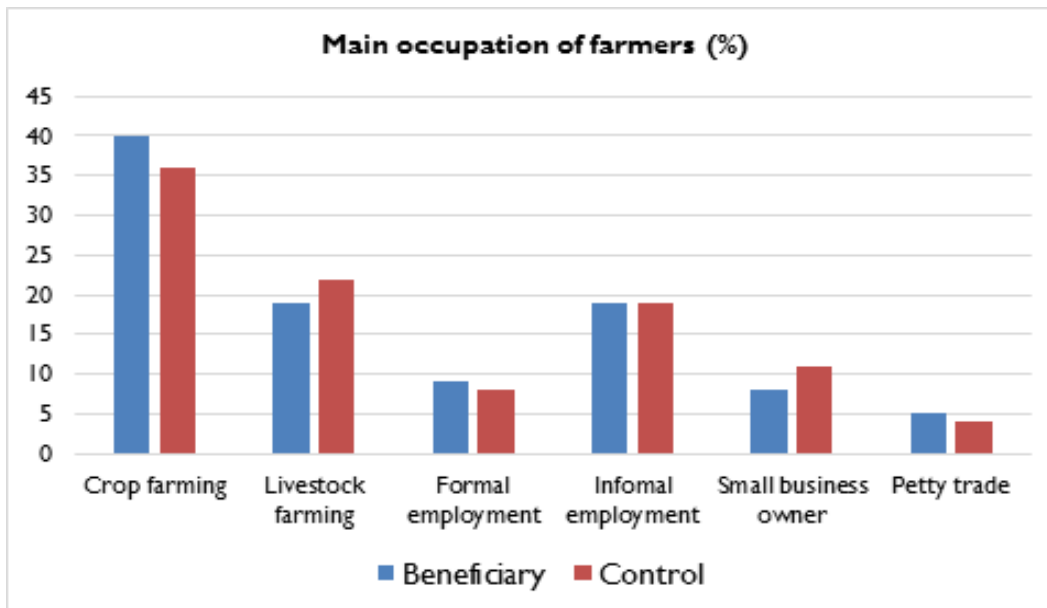


Figure 3.4: Main occupation of interviewed farmers

Source: Survey data, 2017

Monthly income

Figure 3.5 shows the distribution of farmers by different categories of monthly income they earn. The distribution is very similar between the beneficiary and control groups. Majority of farmers earn between Ksh 5,000 -10,000 (about US \$ 50 to 100) per month translating to between US \$ 1.7 and US \$ 3.3/day.

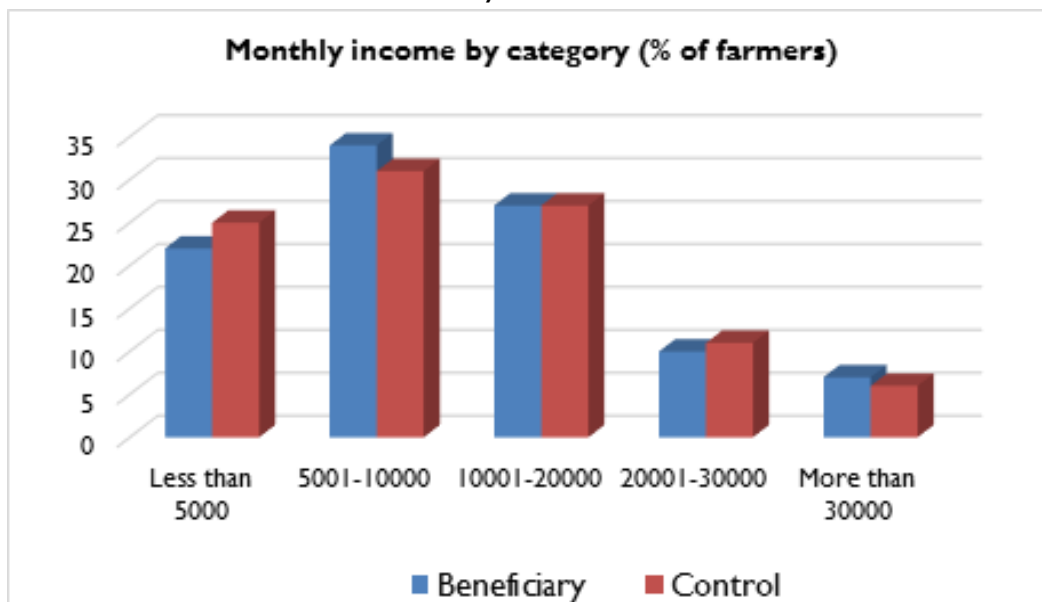


Figure 3.5: Farmers' monthly income by category

Source: Survey data, 2017

Given the international poverty line of US \$ 1.9 per day, about 24 % and 21% of control and beneficiary group farmers live in poverty.

Livestock ownership

The average livestock ownership by different livestock type is summarized in Figure 3.5.

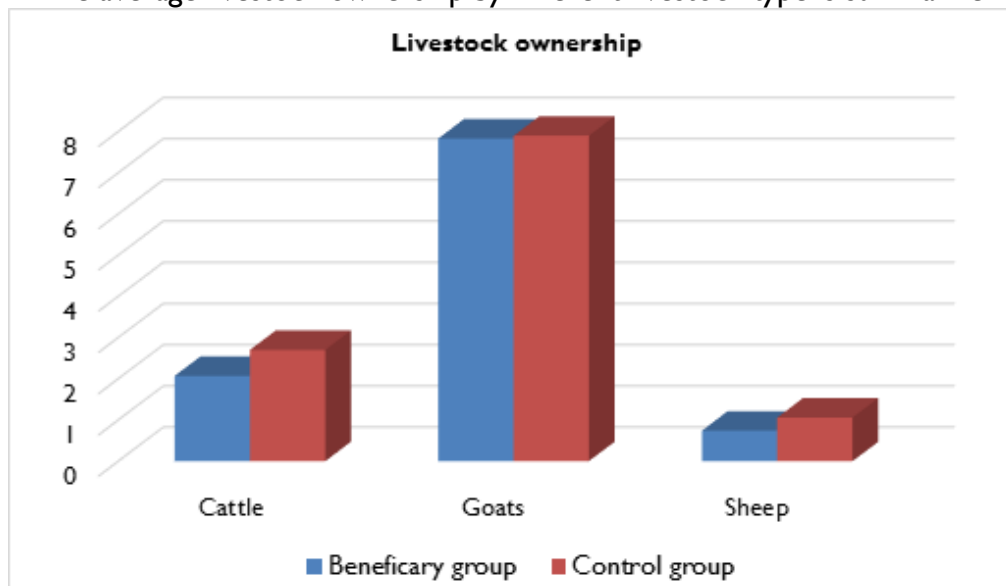


Figure 3.6: Farmers' ownership of different livestock types

Source: Survey data, 2017

For both group of farmers' numbers of goats owned is higher than cattle and sheep. Both categories own very few sheep. The control group farmers own slightly more cows than their beneficiary counterparts.

In the subsequent sections, we present and discuss the evaluation findings under the seven (7) thematic areas set out in Chapter 1 (sub-section 1.3.2).

3.4.2 Relevance of K-SALES Project

Relevance criteria seeks to understand whether the project intervention did the 'right thing' in terms of identifying the problem, prescribed the appropriate solutions, was aligned to local and national development priorities and targeted the right localities and beneficiaries among others. Relevance of K-SALES project was assessed under those sub-themes:

3.4.2.1 Problem identification

As described in Section 1.2 the project addressed the problem of low productivity and market access (trade) among the target livestock farmers. Majority of farmers in the target areas face a problem of poor access to water (for domestic and livestock), poor access to production inputs, low awareness and access to advanced production technologies and techniques, low value addition and poor access to output markets. Key informant interviews conducted among livestock sector experts in the target counties confirmed that indeed farmers in those areas faced these challenges. Focus group discussions done among members of the farmer field schools and water user associations also confirmed that livestock is a key economic activity

in the area and the identified challenges are major hindrance to increasing productivity and trade in the livestock sector. For instance, members of a FFS group in Machakos indicated that that water scarcity in the area is a real challenge due to frequent droughts and the nearest water dams were about 10Km away from their homesteads. K-SALES project was designed in a way that addressed these priority needs.

3.4.2.2 Alignment to national, county and international development agenda

The project objectives and activities were well aligned with development objectives of the national government and the corresponding county governments. The Kenya *Vision 2030*⁴ explicitly identifies increasing agriculture productivity, value addition and expanding trade as a key development goal (see box 1).

Within the agriculture sector itself, Kenya's medium-term investment plan (MTIP) for the Agriculture Sector Development Strategy (ASDS 2010-2020) recognizes the urgent need for investments into the agricultural sector by government, development partners and the private sector. It sets an investment framework for the sector with an ambitious budget that goes beyond government resources to include development partners and private sector.

Box 1: Excerpts from Vision 2030 on productivity and value addition

'...Specific strategies will involve the following: (i) transforming key institutions in agriculture and livestock to promote household and private sector agricultural growth; and (ii) **increasing productivity of crops and livestock...**' (Page 13 of the abridged version of Vision 2030)

"...Kenya will raise incomes in agriculture, livestock and fisheries ... This will be **done by processing and thereby adding value to her products before they reach the market.** ... This will be accomplished through an innovative, commercially oriented and modern agriculture, livestock and fisheries sector..." (Page 13 of the abridged version of Vision 2030).

To meet the aggressive investment targets envisaged in national agricultural investment plan, participation of development partners and the private sector is vital. K-SALES project provided an opportunity to mobilize the private sector to invest in improved livestock production and marketing technologies and techniques with the support of USDA. Furthermore, K-SALES project objectives were aligned to the broader county development goals as espoused in the County Integrated Development Plans (CIDPs) for the period 2013-2017.

A review of the first generation of County Integrated Development Plan (CIDP) of the six SA2 counties revealed a good convergence between the project objectives and the county development objectives for the livestock sector.

The Meru County CIDP identified livestock production as a major economic activity in the county and set the following objectives for the sector:

⁴ The country development blue print for the period 2008-2030.

- Increase livestock production
- Enhance access to affordable inputs and credit
- Promote market access
- Provide water for livestock and
- Mainstream cross-cutting issues in the livestock sector (environment, emergency preparedness, gender equality and HIV/AIDS)

The Tharaka Nithi County CIDP also identified livestock production as the main source of livelihood especially in the semi-arid Tharaka sub-county. The CIDP highlights the following development objectives for the sector:

- Breed improvement through AI services
- Water supply
- Improving market infrastructure
- Control of livestock diseases
- Improving livestock productivity by increasing access to production inputs

Similarly, Makueni County CIDP had the following relevant highlights for the livestock sector:

- Livestock is recognized as a common, viable economic activity on which majority of the population depends
- Improving access to water for livestock is cited as an important development goal
- Strengthening livestock cooperatives and technology transfer on improved animal husbandry practices is noted as a priority
- The CIDP also undertook training of livestock processors (including 200 flayers) to improve the quality of hides and skins.

The Machakos CIDP acknowledges livestock keeping as a key economic activity in the County. It cites several aspects as development priority:

- Increasing livestock productivity
- Provision of water for livestock and improving quality of pasture
- Improving skills on livestock husbandry

Kitui County cited the following development objectives among others:

- Management of alternative sources of livestock fodder
- To increase water supply for domestic and livestock use
- Strengthening livestock cooperatives and improve market access
- Improve livestock markets and value addition

The Taita Taveta CIDP identifies livestock sector as the largest employer in the county and contributor to household income. It highlights the following development goals among many:

- Increasing livestock productivity
- Reduce loss of livestock to human-wildlife conflicts
- Availing water for livestock production and
- Improving value addition and livestock marketing

Based on these highlights, K-SALES was well aligned to the county goals and aspiration for the livestock sector. In many instances, there was a clear concurrence of K-SALES objectives and those of the counties. This was even confirmed by many of the key informant interviews conducted with County government official (see box 2 for views expressed by some of them).

Box 2: View of some county government officials on relevance of K-SALES project

“K-SALES has provided a good structural support to the livestock sector in the area. The construction and rehabilitation of on-farm structures like vaccination crushes, hay barns and cattle dips are a big milestone in the Mwingi west sub-county area. The on-farm structures are not only of help to livestock farmers only, but also to livestock officers in the area as their work is made easy.”

Sub-County Livestock Officer, Kitui County

3.4.2.3 Appropriateness of project activities in addressing the identified problem

Under this section, we assessed whether the project activities were appropriate for the identified problems. As noted earlier, the project undertook five major activities under the strategic objective 1 (SO1) and two activities under strategic objective 2 (SO2). The appropriateness of each of the activities is discussed below:

1. Developing business service providers

Access to good quality inputs and services is essential for achieving high livestock productivity. Unfortunately, majority of livestock farmers lack access to inputs such as veterinary drugs, mineral supplements, feed concentrates, artificial insemination services, vaccination and other veterinary services. To address this challenge K-SALES project targeted to work with business service providers (BSPs) who are the ‘intermediaries’ through whom the farmers access production inputs and services. This activity involved contracting Business Development Service (BDS) providers to train the BSPs who operate in the livestock value chain such as agro-dealers and veterinarians to deliver productivity enhancing inputs (agro-veterinary medicines, animal feeds) and services. The project trained a total of 973 BSPs on business planning, financial management, marketing and after-sale service. Besides the training, the project also connected the trained BSPs to livestock farmers through their Farmer Field Schools (FFSs).

The rationale of this activity was to empower the BSPs to serve farmers better by managing their business professionally and profitably. In rural areas, due to shortage of trained livestock experts, agro-dealers are often the only people who can give farmers ‘technical advice’ on what inputs/service to use improve livestock productivity. Therefore, empowering them with technical knowledge on the livestock inputs and services would help them serve livestock farmers better. Furthermore, it was expected that better run businesses would be more profitable for the BSPs and consequently they are able to stock more inputs and therefore better to meet the needs of livestock farmers. This approach is appropriate and more likely sustainable than an approach that either seeks either to provide inputs to farmer either for

free or at a subsidized price. Furthermore, since the business owners are part of local community, establishing good working relationship with their clients (i.e. farmers) is likely to be sustained even after the end of the project.

2. Facilitating farmers field schools

The concept of Farmers Field Schools was started in the late 1980s in South East Asia as an alternative extension approach to the prevailing top-down approach used by governments (Braun and Duveskog, 2008). It has since been adopted in most developing countries. The approach seeks to decentralize agricultural education for farmers by organizing them into small groups within a common locality. It seeks to make extension participatory where farmers become “experts” in managing the ecology of their fields by coming both external technical knowledge by experts and their own local knowledge through sharing experiences and peer learning. Additionally, it helps farmers to mobilize collective action to undertake common projects that require pooled efforts. The FFS require a technically competent facilitator to lead members.

K-SALES used the FFS as the focal point of its activities to enhance productivity and expand trade for the target livestock farmers. The local implementing partners were given the task of mobilizing the farmers by recruiting them and organizing them into Farmer Field Schools groups. From the FGDs that were conducted among the FFS, we learnt that some of the FFS groups existed before the K-SALES project. For instance, one youth group started in 2010. Using existing groups is a good strategy for ensuring sustainability of efforts. Farmer trainings on production techniques and management practices were done through the FFS. On-farm infrastructure such as hay barns and cattle crushes were constructed for FFS groups. The project had a target of training 60,000 farmers through the FFS but it overachieved the target by training 78,728. The FFS approach was useful in mobilizing farmers into organized groups for delivery of training. One of the consistent complaints we heard from the farmers was that too few of them per group were trained. This however could have been limited by amount of resources available for the training. Furthermore, it was expected that the farmers who received training would later train other group members.

3. Increase access to clean water systems

Smallholder farmers who live in the semi-arid areas experience water shortages and drought due to unreliable and poorly-distributed rains (Hansen *et al.*, 2009). This has become even worse due to increased frequency of droughts which have become more severe due to impacts of climate change (GoK, 2013; Kabubo-Mariara and Karanja, 2006). Interventions meant to increase access to water for domestic and livestock use is very appropriate for the SA2 zone.

K-SALES project used the water user association (WUA) groups which were registered with the Social Services Department as self-help groups to make water related interventions. They are made up of individuals or groups coming together for the common goal of increasing access to water within a given geographical location. The WUAs were assisted by the project

to construct or rehabilitate water points. They were also trained on how to administer and maintain the community-based water points. Most of the water points involved construction of a watering trough for the livestock like the one shown in photo 3.1.



Photo 3.1: A water trough constructed with Support of K-SALES project
Source: K-SALES project

Focus group discussions held with WUAs revealed that the K-SALES intervention was very appropriate for them. For instance, members of dam water users in Machakos County had the following to say about the intervention (see box 3):

Box 3: Sentiments from the FGD of dam water users in Machakos County

“The project helped us by fencing the area around our dam. This has helped reverse pollution that was previously occurring as people and livestock were accessing the water. They have also helped us organize management of the water point. We now make monthly contribution and have employed a guard”

The shallow well water point in Kitui County was in bad state before intervention by K-SALES project through a partner. During FGD members had this to say about the well(see box 4):

Box 4: Sentiments from the FGD of shallow well in Kitui County

“The water was very dirty and could not be used for domestic activities without filtering and filtering. The well was just open and very risky to the users. There was no controlled access to the well either...”

When a K-SALES local implementing partner, rehabilitated the well it was transformed. The group members noted the following success:

- The water is very clean and ready for use when fetched.
- The well was rehabilitated- it is now enclosed with a lid that encloses it for safety and there is a padlock to control the opening.
- The method of drawing water changed from using rope and bucket to use of a hand well pump. This ensures water quality and safety is preserved.
- The area around the well is now fenced and a gate at the entrance to restrict movements. There is also a well-done trough for watering animals hence contamination from animal waste is controlled.
- The newly rehabilitated well is now stable with no more risk of collapsing

4. Developing on-farm infrastructure

Lack of basic on-farm infrastructure such as crushes, dips or barns can be a hindrance for livestock production. For instance, lack of a cattle crush can make it difficult to vaccinate animals or even administer artificial insemination. To address this challenge, K-SALES project provided grants to LIPs to partner with FSS groups to construct or rehabilitate on farm infrastructures.

Farmers indicated that hay barns were very important in helping them store fodder for the dry period. Members of a group in Machakos said that before a hay barn was built for them they had a big challenge with fodder storage as summarized in box 5.

Box 5: Sentiments from the FGD with a group in Machakos County on importance of hay barn

“We used to store fodder on tree branches. The fodder would be destroyed by rainfall or ants. The hay barn has solved this problem. We are now planning to build a hay barn for each group member in a rotational manner”

The demonstration effect for the hay barn technology seem to have worked well based on the expressed desire by the group members to build individual hay barns. Other structures constructed include cattle crushes.

The evaluation indicated that farmers have found this infrastructure very useful in enhancing livestock production. Members of a group in Meru said that the establishment of a cattle crush had helped reduce instances of livestock diseases because they take their animals for vaccination and spraying

5. Facilitating financial services (to allow agricultural lending)

Financial services (including agricultural lending) are essential for driving agricultural growth and expanding economic opportunities in agriculture. The shift from subsistence to commercial agricultural production requires adequate financing. Financial services provide an avenue for mobilization of savings and provision of credit and insurance. Unlike other sectors of the economy, agriculture depends heavily on biological systems and weather hence is prone to high risks. Financial institutions are reluctant to accept the risks prevalent in the agriculture sector, such as droughts, floods, pests and diseases, or the transaction costs of covering large

geographical distances (Ruede, 2015). The project intervention in this area was very appropriate. However, the initial idea of approaching commercial banks to lend to livestock farmers did not work very well. Interviews with key project staff indicated that they had to change tact along the way and approach Savings and Credit Cooperatives (SACCOs) (See box 6).

Box 6: Excerpt of KII interview with K-SALES staff on project activity on agricultural lending

“The commercial banks did not come through to lend our farmers as we had anticipated. Only [ONE BANK] gave some loan through its foundation at zero interest rate. We had to change tact and use SACCO’s where we achieved more success...”

--KSALES Staff

For facilitating lending among small-scale farmers, the approach to use commercial bank was therefore not very appropriate. The situation was however, reversed when the project decided to use other local financial institutions.

Under Strategic Objective 2 (SO2) K-SALES under took the following activities:

6. Improving off-farm infrastructure

Value addition is often a missing element in production and marketing of livestock in SA2 zone. A value chain links the steps a product takes from the producer to the final consumer. The livestock value chain can be defined as the full range of activities required to bring a product (e.g. live animals, meat, milk, eggs, leather, etc.) to final consumers passing through the different phases of production, processing and delivery (IDRC, 2000). The core processes of a value chain include production, processing, distribution, wholesaling/retailing and final consumption.

To enhance value addition, there is need to invest in off-farm infrastructure such as livestock markets, slaughter houses/slabs, hides and skins preservation bandas, and local tanneries which are often lacking. To fill these gap, K-SALES working with local implementing partners and other stakeholders set to establish and rehabilitate off-farm infrastructures in the counties of operation. Key informant interviews conducted with K-SALES Livestock Processing Advisor indicated that K-SALES approach was to work with private sector players in improving infrastructures. Any infrastructure repair or establishment done with public institutions had to be structured as a public-private partnership to ensure sustainability.

This intervention was very appropriate because the infrastructures were either non-existent or in a dilapidated state. The rehabilitated infrastructures have led increased trade and value addition in the livestock value chain.

The project also assisted small-scale tanneries that were working in the open to establish mini-tanneries that use standardized procedures.

According to K-SALES Livestock Processing Advisor these off-farm infrastructure projects required heavy financial investments to be established or even to rehabilitate. Given budget limitations of the project, innovative ways of achieving set targets. This was done by undertaking many rehabilitation projects and building a few new ones.

7. Providing trainings on post-harvest handling and processing (PHH-P) techniques

In addition to establishing and rehabilitating off-farm infrastructures, K-SALES carried out capacity building activities for the livestock value chain actors on PHH-P techniques. They targeted the livestock processing facilities owners and their employees and trained them on processing techniques, hygiene and value addition for meat and other by-products. The content of training included: animal transportation, handling of animals after they leave the market, keeping before slaughter, slaughtering process-hygiene and equipment needed during slaughter, transportation of hot carcass, and food hygiene for food handlers.

The K-SALES project could introduce the processing of several livestock by-products that have been rather neglected. These include:

- Use of horn and bones to make ornaments by a group in Machakos for export market. They had already exported ornamental curved products worth Ksh 450,000.
- Improved processing of hides and skins through establishment of tanneries (in Taita Taveta county for instance)
- Value addition of pizzles for export to China for manufacture of dog food.

8. Developing cooperatives business capacity

Under this activity, K-SALES set out to strengthen the collective action of livestock farmers (by helping them form cooperatives or strengthening existing ones) to enable them to trade more effectively. As noted by KSALES staff in key informant interviews, the idea behind business development capacity is to enable livestock farmers corporately to engage in buying and selling of livestock as trading agents. The process started with mobilizing farmers to register their cooperatives, establish governance structures, training on business skills and marketing of livestock products and creating a linkage with new markets for their products.

This activity was appropriate because livestock farmers are individually very challenged in accessing markets as expressed in the various focus group discussion held with livestock cooperative groups and FSSs. Examples of sentiments expressed by livestock farmers in their groups are summarized in box 7:

Box 7: Farmers views on challenge of market access for their livestock

‘Issue of market access is very critical for us. We trek with our goats to the Masinga market which is 50Km away. If we are lucky and all the goats are bought, we can use a Matatu (public service vehicle) to travel back home. If not, we have no choice but to trek back with our goats. The weak animals often die on the way due to the long trek...’

Members of a group in Machakos.

‘The nearest market for us is 10Km away while the furthest is over 100Km away. To take our animals to the market we have to pay trekkers to drive our animals. Otherwise we have to sell to brokers at a very low price...’

Members of a group in Tharaka

3.4.2.4 Targeting: Location and beneficiaries

As noted in the introduction section, livestock rearing is a major economic activity and source of livelihood in the semi-arid regions of Kenya. Furthermore, farmers in this area face the challenge of low livestock productivity and limited market access. It can therefore be concluded that K-SALES project not only targeted the right location, but it also addressed felt need among the target beneficiaries.

3.4.3 Effectiveness of K-SALES Project

Effectiveness measures the extent to which a project met its set objectives and targets. In this section five aspects of effectiveness are presented and discussed: (1) Achievement in meeting set objectives and targets at the output level; (2) Adoption of improved technologies and techniques that were promoted by the project; (3) Access to clean water; (4) Access to financial services and (5) Processing and value addition of livestock and livestock products. Outcomes indicators are discussed in sub-section 3.3.4 on impact.

3.4.3.1 Achievement of objectives and targets

Review of project official records and key informant interviews with project staff indicated that project targets were achieved and even exceeded (see Table 3.4).

Table 3.4: Status of achievement of K-SALES objectives and targets

Strategic Objective I: Increasing agricultural productivity			
Objective	Target	Status	Comments
Develop business service providers (BSPs) to deliver productivity enhancing inputs and services	700 business service providers trained to deliver inputs and services that enhance agricultural productivity	973 BS Ps trained	Target achieved and exceeded
Facilitated Farmers' Field Schools (FFS)	Reach 60,000 farmers	78,728 farm ers reach ed	Target achieved and exceeded
Increase Access to Clean Water systems	200 community-based water points constructed	229 done	Target achieved and exceeded

Strategic Objective 1: Increasing agricultural productivity			
Objective	Target	Status	Comments
	rehabilitated		
Establish on farm infrastructure to enhance agricultural productivity	310 on-farm infrastructure projects carried out	337 done	Target achieved and exceeded
Facilitate farmers' access to agricultural lending from financial institutions	800 loans disbursed to livestock enterprises	6,882 loan disbursed	Target met and exceeded
Strategic Objective 2: To expand trade			
Objective	Target	Status	Comments
Establish off farm infrastructure to expand trade	550 off farm infrastructure carried out	664 done	Target met and exceeded
Provide trainings on post-harvest handling and processing (PHH-P) techniques	2500 employees trained in improved processing techniques	2503	Target met
Develop cooperative business capacity by training livestock farmer cooperatives	600 livestock enterprise staff trained on improved business management	1034	Target met and exceeded

Source: K-SALES internal Report of Project indicators, 2017

The Table 3.4 is a summary on the objectives, set targets and the achievements. Further details on these indicators are provided in the indicator Table in Annex I. Based on the observation in Table 3.4, we conclude that K-SALES project was effective in meeting the set objectives and targets.

3.4.3.2 Adoption of improved techniques and technologies

In this sub-section, we discuss whether the farmers and other actors in the value chain actors adopted improved techniques and technologies promoted by K-SALES project.

Farmer training

Trainings were conducted among beneficiary farmers to create awareness about the improved techniques/technologies and improved farm management. These include training on breed improvement, animal feeding and nutrition, fodder and feed production, management of on-farm structures, animal health, keeping of farm records and business planning, among others. Trainings were provided by business service providers contracted by the project. This was the first step in enabling farmers to adopt these techniques and technologies.

The project had planned to train 60,000 farmers in improved agricultural techniques/technologies, and improved farm management practices. The project met and surpassed the target on the number of farmers trained. The end term evaluation showed that 78,728 farmers (31% above the target) had been trained in improved agricultural techniques while 72,169 farmers (20% above the target) had been trained in improved farm management practices. More women farmers (64%) than men (36%) were trained. Most of the farmers

(94%) trained were satisfied with the training. This indicates that farmers found the training useful in acquiring new knowledge to improve livestock production. This was collaborated by FGDs conducted among FFS group (see box 8 on the views of FFS members in Makueni County).

Box 8: Perception of trainings to improve livestock productivity by member of FFS in Makueni County

“Before K-SALES project, we lacked knowledge on modern techniques of livestock rearing. The training on improved production techniques have really helped us improve livestock rearing”.

Adoption of improved technologies

Improved technologies are important for productivity enhancement especially if adopted correctly and sufficiently. Because of training received, 49,599 (29,184 female and 20,415 male) have adopted new production technologies. However, only 35,428 farmers had adopted improved farm management practices, against a target of 48,000. On this indicator, the project fell short of the target by 26%. In addition, fewer female farmers (only 31%) applied improved farm management practices.

There were also farmers benefitting directly from the 337 on-farm structures rehabilitated by the project. These structures include 125 hay barns, 3 cattle dips, 165 vaccination crushes, and 44 water troughs. About 40,753 of the trained farmers trained have access to these structures for livestock production. This is a shortfall of about 32% of the project target of 60,000 farmers. Enterprises trained to manage and maintain the on-farm infrastructure projects are 275.

Farmers attributed non-adoption to lack of requisite inputs and the limited number of structure established relative to the number of farmers. For example, production of fodder was constrained by lack of seeds while hay making was hindered by prolonged periods of drought, making grass scarce. Some farmers indicated that timber for making hay boxes was expensive. In some cases, non-adoption was blamed on inadequate technical know-how especially where training sessions were short but highly technical. For some training, the scheduling was not convenient hence some farmers had to miss the training and no rescheduling opportunities were provided.

3.4.3.3 Access to clean water systems for domestic and livestock use

Kenya is a water scarce country. On average, it has 640 cubic meters of renewable freshwater per capita whose availability is characterized by high variability both in space and time. The already dire water situation in Kenya is made worse by the frequent and severe droughts (Institute of Economic Affairs (IEA), 2001). As noted by IEA, droughts in Kenya used to occur in ten-year cycles in the 1960s, there was a reduction to a five-year cycle in the 1980s and since then, there has been a further reduction to a two-year cycle. The situation has increased the vulnerability of the agro-pastoralists in Kenya.

Given this situation of water scarcity intervention mean to conserve available water resource and increase access to both human and livestock are very appropriate. K-SALES project constructed/rehabilitated 229 community water points against a target of 200. It also conducted training for 227 water user associations on administration and maintenance of community-based water points. Number of farmers and community members benefiting from the new or rehabilitated community based water points was reported as 239,232 against a target of 189,000. In terms of actual distance to water sources during the dry season the beneficiary group farmers' access water at an average distance of 2.4Km from their homesteads compared to their control group counterparts that must travel half a kilometer further to access water at 3Km away from their homesteads.

Focus group discussion held with a group in Taita-Taveta indicated that an organization through K-SALES project built then a water tank that supply water to several villages (Singila, Majengo and parts of Peleleza, Kariobangi and Madunguni).

3.4.3.4 Access to financial services

Commercial lending to the agriculture sector in Kenya is disproportionate accounting for about 4% of the total lending portfolio for the period 2013-2015 (see Figure 3.7).

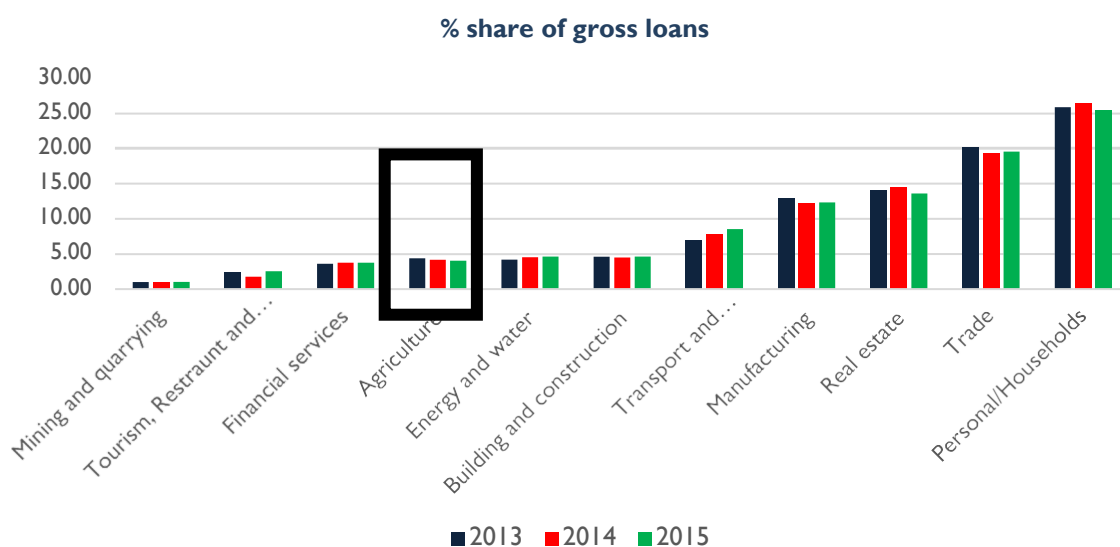


Figure 3.7: Commercial lending by sector in Kenya (2013-2015)

Source: CBK (2013, 2014 and 2015)

The recorded level of commercial lending to agriculture is rather low given that the sector's

contribution of about 25% directly to the national GDP. Banks consider agriculture to be a risky sector and therefore avoid lending to it. But commercial lending is critical in providing capital investments required to increase productivity.

K-SALES project sought to identify potential financial lenders and connect them to livestock farmers and facilitate financial access through training on financial literacy and record keeping. A total of 11 financial institutions (against a target of 10) were identified and linked to farmers. A total of 7,987 livestock enterprises (both individual farmers and cooperatives) were linked to the financial institutions. Because of this linkage, a total of 6,882 loans worth (\$558,359) were disbursed against a target of 800 loans worth \$200,000. A total of 57,907 farmers received training on financial matters and record keeping against a target of 50,000.

3.3.4.5 Livestock and livestock products processing and value addition

Majority of livestock commodities are marketed in their raw forms, hence losing the opportunities for higher earnings and generating employment through value-addition. Agro-processing and trade provides a tremendous potential for increasing income through value addition. K-SALES project sought to increase trade and value addition of livestock and livestock products by establishing off-farm infrastructures, trainings on PHH_P techniques and by developing the business capacity of livestock farmer cooperatives. In this section, we discuss the recorded impacts of these interventions:

Value of locally traded livestock products

The evaluation findings show that the value of locally traded livestock products improved markedly, by up to 73% against the project target of 15%. This change is largely attributable to K-SALES project through its numerous interventions like trainings on good livestock husbandry practices, adoption of modern techniques, disease control, better marketing strategies including through cooperatives, improved livestock market facilities among others, which cumulatively led to increase in volumes supplied to the markets, and at better prices.

Use of modern off infrastructure and equipment

This indicator considered livestock enterprises like slaughterhouses and butcheries who were investing in value addition equipment, after interacting with the K-SALES project. Evaluation findings indicate that about 56% of enterprises had adopted use of modern equipment against project target of 50%. K-SALES through the local implementing partners, assisted in rehabilitating structures like slaughterhouses, provided water tanks, rails and rollers, holding pens among others through a cost share approach with communities.

The use of improved/modern technological equipment is considered a prerequisite for increasing livestock productivity.

Linkage between livestock buyers and sellers

The approach of linking producers to markets assumes the development of long-term business relationships rather than support for *ad hoc* sales. Through this approach, the project was able to facilitate development of about 408 marketing contracts between livestock producer groups and processors, against a project target of 300. This evaluation found good evidence

that sales were being made through producer cooperatives which had been supported by the project. This indicator demonstrates progress towards improved linkages between buyers and sellers within the livestock value chain, and offers a greater possibility of success beyond project life.

Improved market and trade infrastructure

Studies have shown that market access constraints can be alleviated through improvements in market infrastructure, which the K-SALES project set out to address. This indicator was measured by the value of cost share investment under the project. During implementation, K-SALES provided about 75% of cost of infrastructure, while the communities and public agency actors were to contribute the remainder. The evaluation exercise established that a total of \$2,303,915 was provided as cost share by the communities against a target of \$1,500,000, which lends itself to efficiency and effectiveness with which the project was implemented.

New post-harvest handling infrastructure completed

Improving post-harvest handling facilities is critical for improving the quality of agricultural products and farmers' livelihoods. Substantial amounts of agricultural produce get lost in postharvest operations due to a lack of knowledge, inadequate technology and/or poor storage infrastructure, key aspects that the K-SALES project sought to address. The project facilitated improvements in cold storage facilities, modern production lines, proper drainage at slaughterhouses, processing lines at slaughterhouses among other facilities. The evaluation found that about 52% of post-harvest infrastructure in the project regions were improved and/or rehabilitated, against a project target of 50%.

3.4.4 Impact of K-SALES Project

3.4.4.1 Impacts of K-SALES on agricultural productivity

To examine the impact of the project on agricultural productivity, we examine several indicators as earlier described under section 2.4.1 in the methodology chapter. The results are summarized in Table 3.5 and further discussed for each indicator below:

Proximity to suppliers of improved input

The aim of the project was to improve access to agricultural inputs. At baseline, the average distance to the suppliers was 3.1 Km for the control households and 3.2 Km for the treatment households. This implied that the treatment households were 0.1 Km further from the suppliers compared to their control counterparts, on average. At the end-line, the distance remained 3.1 Km for the control households but declined to 2.8 Km for the treatment households, a 0.3 Km advantage over their control counterparts. Overall, because of project interventions, the beneficiary farmers had input suppliers 0.5 Km closer than they were before the intervention. In this respect, we conclude that the project had improved access to agricultural input.

Adoption of modern techniques or technologies⁵

At the baseline, control households had adopted 27% of improved techniques and/or technologies of the type that the project was introducing. Their treatment counterparts were already adopting 46% of such technologies and/or techniques. At end-line, control households were adopting only 12% of the techniques and/or technologies while the treatment households were adopting only 18%. This showed that, because of the project, there was a 13% drop in the proportion of modern technologies and/or technologies being adopted by the households. It's important to note that technologies promoted under the project were not mutually exclusive. In effect, adoption of some technologies would substitute for others. For instance, adoption of improved feeding techniques and production of fodder and feeds are likely to restrict the use of such techniques as destocking and culling. This could further imply that the farmers are getting more specialized in their activities, undertaking only those in which they have a comparative advantage, which is good for productivity enhancement.

Adoption of improved farm management practices

Farm management practices such as business planning, record keeping, saving and reinvesting are important in enhancing farm performance and expansion. They are also vital for individual farmers in application for funding from third parties. It was, however, observed that the project had not been able to trigger improvements in improved uptake of improved farm management practices. The treatment households were not any different from their control counterparts in this respect. Perhaps the scale of operation does not warrant adoption of improved farm management practices. But it is important to note that most of the farmers under the project were members of farmer cooperatives, which provided valuable support to members on farm production and management practices. Plausibly, this reduced the burden of adopting improved farm management practices at individual farmer level.

Livestock ownership

The number of cattle owned changed from an average of 3.5 to 2.6 among the control households, and from 2.3 to 2.7 among the project beneficiaries. This means that, at baseline, the control households had an advantage of 1.2 cattle over the beneficiary households. At the end of the project, cattle ownership changed in favor of the beneficiary households who owned at least one cow above their control counterparts. For goat ownership, the control households had an average of 12 goats while beneficiary households had 8, giving the control households an advantage of 4 goats. At the end-line, the control households had an average of 7 goats while the beneficiary households had an average of 9 goats. Overall, goat ownership changed to the advantage of beneficiary households which owned an average of 6 goats more than their control counterparts. There was, however, no difference in ownership of sheep between the two household categories, right from the baseline to the end of the project. Similarly, the number of livestock lost in a year did not change across time and between

⁵ In this section, we report on the percentage of actual technologies that farmers were adopting out of the 13 promoted technologies. The difference in percentage reported is therefore not contradictory.

farmer's groups. These results show that beneficiary households have increased access to feeds and fodder, water and supportive infrastructure to maintain higher numbers of livestock than their control counterparts.

Livestock sales

Control farmers, on average, sold one cow at baseline while their beneficiary counterparts sold 2. At end-line both control and beneficiary farmers sold 2 cattle each, on average. Overall, therefore, annual cattle sale by beneficiary households relative to control households reduced by one animal. Annual sale of goats and sheep did not change across farmers and time. Notice that the period preceding the end-line survey had been characterized by prolonged drought which would have led to increased livestock sales. The fact that beneficiary farmers sold reduced numbers of cattle can only imply that they had access to more fodder and/or feeds, and water to maintain their cattle.

Farm gate price

The project had a positive and significant impact of the average farm gate price of cattle and goats. On average, the beneficiary farmers fetched about US\$30 above their control counterparts for every cattle sold. They also obtained US \$7.7 more for every animal they sold compared to their control group counterparts.

Livestock body condition score

Body condition scoring (BCS) is a simple technique used to estimate the body fat in livestock based on a standardized set of visual criteria (see Annex 6.4 for details on BCS scoring applied in this evaluation). In this evaluation study, a 5-point scale was applied in scoring the average livestock condition of the farmers' herd of cattle, goats and sheep. A score of 1 indicates an emaciated animal in very poor body condition (with prominent back bone and ribs showing). A score of 5 indicates a fat animal with hip bone and ribs covered in fat. The body condition is influenced by the nutrition status of the livestock and its general health. Body condition plays an important role in maximizing fertility in a breeding herd and determines price the livestock can fetch at the market.

Livestock average body condition for control farmers was 2.8 (cattle), 2.9 (goats) and 3.2 (sheep) and, for beneficiary farmer, 2.6 for all the livestock categories at baseline. These figures indicate livestock in fair body condition. The scores changed to 2.2 (cattle), 2.5 (goats) and 2.2 (sheep) for the control farmers, and 2.2 (cattle) and 2.5 (goats and sheep) for the beneficiary farmers. Based on difference-in-difference computation as explained in page 10 of the methodology chapter, the project prevented worsening of livestock average body condition among the beneficiary farmers relative to their control group counterparts.

Table 3.5: Results of Propensity Score Matched Difference in-Differences

Outcome	Baseline				End-line				Diff-in-Diff	
	Control	Treated	T-C	t-stat	Control	Treated	T-C	t-stat	Coefficient	t-stat
Cattle (No.)	3.5	2.3	-1.2**	-2.55	2.6	2.7	0.09	0.36	1.3**	2.44
Goats (No.)	12.100	7.425	-4.676***	-3.71	7.836	8.759	0.923	1.15	5.599***	3.65
Sheep (No.)	1.387	1.155	-0.232	-0.76	1.042	1.023	-0.019	-0.08	0.213	0.49
Cattle lost	2.437	2.472	0.035	0.05	2.801	2.670	-0.131	-0.25	-0.166	-0.18
Goats lost	3.785	3.123	-0.662	-0.90	3.942	3.976	0.034	0.06	0.696	0.73
Sheep lost	2.569	2.016	-0.553	-1.06	2.557	2.609	0.052	0.10	0.605	0.86
Cattle sold	1.1	2.5	1.4***	4.73	1.9	2.0	0.1	0.33	-1.3***	-3.03
Goats sold	3.5	4.2	0.7	1.41	4.9	4.8	-0.1	-0.29	-0.9	-1.21
Sheep sold	2.6	2.4	-0.2	-0.24	3.4	3.4	0.0	0.1	0.3	0.25
Cattle body condition	2.836	2.577	-0.259***	-4.07	2.217	2.240	0.023	0.36	0.282***	3.10
Goat body condition	2.876	2.613	-0.263***	-4.80	2.467	2.461	-0.006	-0.11	0.257***	3.29
Sheep body condition	3.177	2.592	-0.585***	-4.91	2.207	2.468	0.261	1.64	0.846***	4.25
Farm gate price of cattle (\$)	280	270	-10	-0.97	210	230	20**	2.04	30**	2.15
Farm gate price of goats (\$)	51	47	-4.7*	-1.77	46	49	29	1.13	7.7**	2.06
Farm gate price of sheep (\$)	25	32	7.1***	4.09	25	28	3	1.25	-4.1	-1.31
Value of incremental sales (\$)	271	265	-6.0	-0.19	223	255	33	1.05	39	0.87
Proximity to Agro-vets (Km)	3.054	3.224	0.171	0.89	3.136	2.794	-0.342**	-2.01	-0.512**	-2.00
Technologies adopted	27	46	19***	22.6	12	18	6***	7.2	-13***	-

Outcome		Baseline				End-line			Diff-in-Diff	
(%)										11.1
Improved management practices (%)	57	69	12	1.3	6	4	-2	-0.4	-13	-1.4

*** $P < 0.01$; ** $P < 0.05$; * $P < 0.10$

Source: Computation based on survey data, 2017

From the results summarized in Table 3.5, we can conclude that participation in the K-SALES project had a definite positive and significant impact on the beneficiary households (relative to their control counterparts) on the following indicators:

- i. Proximity to input supply
- ii. Number of cattle owned
- iii. Number of goats owned
- iv. Cattle body condition
- v. Goat body condition
- vi. Sheep body condition
- vii. Farm gate price of cattle
- viii. Farm gate price of goats
- ix. Number of cattle sold (reduced the number)

Other indicators computed at an aggregate level but important for illustrating the direction of progress in agricultural productivity were: number of farmers who applied new/improved agricultural techniques and technologies, number of farmers and other stakeholders who applied improved farm management practices, proportion of beneficiary farmers who applied new techniques or technologies, proportion of farmers with 5-Km range of suppliers of agricultural input, proportion of farmers who could demonstrate a threshold level of proficiency in at least 5 new livestock husbandry and herd management techniques, proportion of farmers who had applied 60% of recommended improved farm management practices, and proportion of beneficiary farmers who can identify key characteristics of a well-managed farm.

It was observed that 49,599 farmers (29,184 women and 20,415 men) had adopted the new/improved agricultural techniques/technologies propagated by the project. This shows that 63% of the targeted farmers had adopted these techniques/technologies. By gender, 58% of the targeted women and 72% of the targeted men had taken up the technologies. Although the progress was good, it did not meet the project target of 80% although it was a huge improvement over the mid-term value of 40%.

About 35,428 (10,983 women and 24,445 men) of the target farmers and other stakeholders had adopted improved farm management practices such as financial management and good governance. Although this was below the project target of 48,000, it was a major improvement over the mid-term achievement of 3,638. This was attributable to training on farm management by the project through the farmer field schools (FFS).

One of the primary objectives was to improve access to agricultural inputs. The aim was to ensure that inputs were available within a range of 5 Km. While not all the target farmers were within the targeted range, 46% of all the target farmers were already within the range by end-line time. The beneficiary women accounted for 66% of the total women targeted while the beneficiary men accounted for 34% of the men targeted. The project, however,

failed to meet its target of bringing 80% of the target farmers within the 5-Km range of input supply.

About 61% of the target farmers could demonstrate a threshold level of proficiency in at least 5 new livestock husbandry and herd management techniques, and had applied 60% of the recommended improved farm management practices. This exceeded the project target of 60% and 50% for the two indicators, respectively. The proportion of target farmers who could identify key characteristics of a well-managed farm was 45% (69% women and 31% men) against the project target of 80% and a mid-term achievement of only 11%.

3.4.4.2 Impacts of K-SALES on trade expansion

The indicators of trade expansion considered were: value of incremental sales, percent increase in mean farm gate price of livestock sold, percent increase in the value of locally traded livestock products (meat and skin), percentage increase in average weight of post-production carcass from indicative standard weight to Fair Average Quality (FAQ) weight, percent increase in average margin between farm gate price and price of processed product, average percentage decrease in post harvesting pricing costs per animal, and percentage of livestock enterprises using modern equipment and/or improved techniques to process livestock products as a result of USDA assistance.

Value of incremental sales increased from \$347 at baseline to \$386 at end-line. This was an increase of 11% (see Table 3.5) although it was 3% short of the project target of \$399. The mean farm gate price increased by \$30 (10%) for cattle and \$7.7 (15%) for goats. It, however, dropped by \$4 (12%) for sheep. This shows improved livestock marketing, either because of improvement in body condition of the livestock or expanded markets, offering better prices for most of the livestock. One possible explanation is collective action by farmers through their cooperatives which have been revamped by the project.

Value of locally traded livestock products improved by about 73% over the mid-term values. The value was \$ 36,004,569 for meat, \$414,216 for hides, and \$142,058 for skin (total of \$36,560,843). The average margin was \$0.9 for beef, \$1.2 for goat meat and \$0.8 for lamb. From the mid-term values, the margins dropped by 40% for beef, 23% for goat meat and 50% for lamb. The decline in margins may have been caused by improved farm gate prices of livestock. For goat meat and lamb, the drop may have been deepened by reduced carcass weight (from 12-kg to 9-kg for goat and from 10-kg to 8-kg for sheep). Unlike goat and sheep, carcass weight for cattle increased from 120-kg to 153-kg (28% increase against the project target of 30%).

Post harvesting pricing cost per animal decreased from \$5.01 to \$4.5 (10%) for cattle, from \$2.12 to \$1.8 (15.1%) for goat and from \$2.10 to \$1.6 (23%) for sheep. Total decline was 16% against the project target of 20%. This could be attributed to increase in the number of livestock processors using modern equipment and techniques. About 57% (6% women and 94% men) of the processors had adopted the use of modern equipment in their operations while 72% (6% women and 94% men) had already adopted improved techniques. Modern

equipment and improved techniques make processing of livestock products more efficient, thereby lowering costs. Adoption of modern equipment exceeded the project target of 50% while adoption of improved techniques exceeded the project target of 60%.

3.3.5 Efficiency of K-SALES Project

This sub-section looks at how well the project resources were utilized to achieve the observed results. The evaluation looked at the project management structure, activities implemented, and the approaches employed, and how well they combined to transform the available resources into the intended results. Overall, the project was generally efficient, sentiments shared also by various stakeholders who were interviewed during the final evaluation process.

3.3.5.1 Project management structure

The K-SALES project was implemented by a lean staff and worked well with other partners, through a 'light-touch' approach, reaching many beneficiaries across the six counties. From discussions with project staff and other implementing partners, it was clear that K-SALES project management team provided clear directives to implementing partners to effectively implement and monitor project activities. K-SALES provided guidance, deployed qualified staff, committed funds to partners in a timely manner, and always promptly responded to partners' needs. K-SALES further took appropriate actions to ensure the contracted implementing partners performed adequately in delivering all the intended services to the project beneficiaries. However, there were concerns from some partners that flexibility to amend activities, or alter budgets and outputs, was not provided, despite some external factors which could have hindered implementation being outside the control of implementing partners. For instance, the severe drought which hit the project counties in 2016/17 period disrupted smooth implementation as community members diverted attention from project activities towards search for scarce forage and water resources. Getting them to timely provide their share of contribution (in form of labor) to project activities, like rehabilitation of on-farm and off-farm infrastructure, became difficult, affecting timely completion of some activities. Several implementing partners interviewed also felt that in certain aspects, expectations from the K-SALES management and implementing partners were different (see quote in box 9).

Box 9: Local implementing partners' view on project implementation

"...harmonization of expectations between the funding partner and implementing partner was lacking... For instance, we did a hay barn for one of the groups which according to us, was properly done, but when the funding partner saw it, they claimed that is not what they expected....we had to pull it down and redo a new one at our own cost..." Key Informant- A Local Implementing Partner

However, from the perspective of K-SALES project team, this observation reflected the somewhat low capacity of some local implementing partners to implement the technical aspects of the project. The inability to meet technical specification of infrastructure projects led to delays in completion occasioned by repeat works due to failure to meet specifications.

3.3.5.2 Project activities

Generally, analysis of the various activities based on planned targets and the achievements so far, it can be said that the K-SALES project was efficiently implemented, and achievements demonstrated value for money. The evaluation further established the financial resources were used for the targeted activities satisfactorily, which is an important facet of efficiency. The initial phase of project implementation was marred by some challenges that resulted in delayed start of implementation of project activities. From the MTE, it is reported that implementation of the project activities started in late 2014, due to delays in getting the baseline survey approved. This led to a reduction in project implementation period. However, to facilitate completion of project activities, K-SALES was granted a one year no-cost-extension, which allowed it to continue implementing activities as planned. Despite the start-up challenges, most of the activities earmarked for implementation under the project have largely been completed, though some falling short of expected project targets, partly due to limited implementation time, but also due to other risk factors- the severe drought that was experienced in the target counties in 2016/17, significantly slowed down project implementation. From discussions with partners in the field, it was evident that the nature of the K-SALES project allowed very limited options for management of such unforeseen risks. Field visits further revealed that some of the beneficiaries were only encountering K-SALES project partners a few months to the close-out, and hence could not comfortably comment on project activities. These circumstances notwithstanding, findings from the final evaluation and from monitoring reports reveal that the project has been able to meet and in most instances, surpass targets sets for the various project indicators. The one year no-cost extension granted to the project not only facilitated the achievement of the initial project targets, but also allowed modification of some of the indicator values.

This evaluation has observed that the inputs used by the project and the corresponding results were up to satisfactory standard, and contributed to efficiency of the project. Initially, K-SALES project entered a cost-reimbursable contract with the implementing partners, but later changed it to a fixed-obligation contract, with K-SALES meeting 80% of the project activities cost and the implementing partners meeting 20% (valued through the beneficiaries' time doing project activities) of the cost. This cost-share approach proved to be very effective, as evident during interaction with communities- it promoted a sense of ownership of the project activities, besides ensuring that communities developed lots of interest in participating in project activities. As of September 2017, a total cost share of about \$2.0 million (133% against the target of \$1.5 million) had been realized. At the same time, there was also some evidence of the cost-share approach having the potential to slow down implementation of project activities, especially when constant control of the communities to fulfil their tasks was required. One challenge expressed by nearly all the implementing partners interviewed was the 'dependency syndrome' from the communities, with some expecting rewards for participating in project activities.

Table 3.6 presents the project budget on the different activities and expenditure to the time of preparing this evaluation report.

Table 3.6: Utilization of project budget as at September 2017

Activity	Initial Budget	Revised budget	Used budget	Percentage Disbursed or committed by end November 2017 (%)
Develop Business Service Providers (BSP)	\$2,075,584	\$924,165	\$1,024,298	110.83
Develop Cooperatives' Business Capacity	\$581,509	\$931,019	\$1,058,027	113.64
Facilitate Farmer Field Schools	\$1,080,788	\$1,099,559	\$1,232,662	112.11
Financial Services: Facilitate Agricultural Lending	\$278,112	\$407,241	\$402,412	98.81
Increase Access to Clean Water Systems	\$1,616,611	\$1,772,760	\$1,939,733	109.42
Infrastructure Off-Farm	\$1,255,543	\$1,293,766	\$1,476,710	114.14
Infrastructure On-Farm	\$815,111	\$950,091	\$1,036,318	109.08
Provide Training in Post-Harvest Handling & Processing	\$1,036,873	\$817,050	\$933,236	114.22

Source: K-SALES project records, 2017

Analysis of the budget and expenditures on project activities reveal that the total cost for completing most of the activities turned out to be relatively higher than earlier envisaged, prompting re-adjustment on budgets, from what was earlier agreed upon. This hints to some unbalanced matching of project resources to the expected or desired outputs. Similar sentiments were also captured during discussions with some implementing partners (see text box 10). Facilitating agricultural lending was the only activity that used less than earlier planned budget. However, none of the activity deviated by more than 15% of the planned budget indicating efficient utilization of funds.

Figure 3.8 illustrates the proportion of estimated costs, earlier planned and later revised, allocated for implementation of the various project activities. Due to data unavailability, this evaluation was not able to deduce the amount of non-project resources leveraged and project cost per beneficiary.

Box 10: Views of some LIPs on project implementation

“...we had a problem of matching contractual deliverables with funding received. For instance, in the farmer field schools, what we were paying our facilitators was really little, and you could see that they were really getting constrained to operate within our budget, something that really affected their morale. We had little room to improve their terms because allocations from the funding partner were also insufficient...” **KII with a Local Implementing Partner**

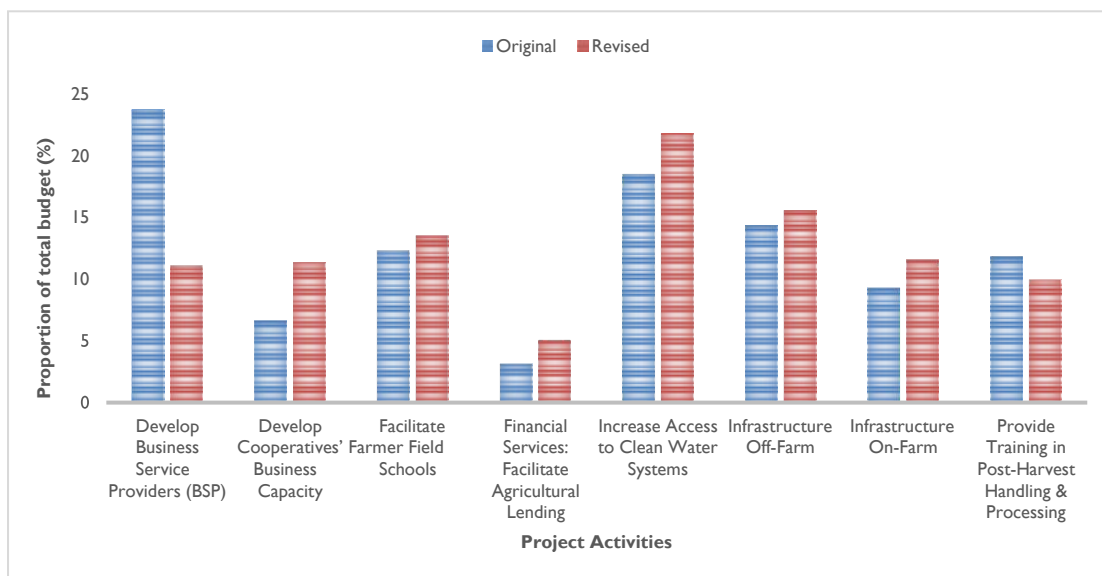


Figure 3.8: Proportion of estimated costs per project activity
Source: K-SALES internal Report, 2017

3.3.5.3 Project implementation approach

The K-SALES implementation model consisted of a light touch approach which entailed working with existing community-based associations and business service providers (BSPs), together with a \$6 million sub-awards program. From an evaluation standpoint, the light touch approach was deemed necessary to deliver success for the K-SALES project which aimed at improving productivity of the livestock enterprise in Kenya. Through this approach, the project has been able to develop horizontal and vertical linkages across the livestock value chain, a factor that will likely ensure that the desire, skills and momentum for change is maintained beyond the life of the project. This approach ensured that no direct assistance was given to project beneficiaries, instead, facilitating commercial linkages and using local implementing partners to provide commercial services and trigger demand for services from beneficiaries. Coupled with the sub-awards, the project facilitated technical assistance, training and capacity building to livestock farmers, private sector stakeholders and government regulatory agencies, though little evidence was deduced from the field to show significant capacity strengthening for the government agencies. Evidently, it was clear that K-SALES project leveraged on Land O'Lakes extensive network with livestock sector stakeholders, in the project areas, to enhance efficiency of its operations.

Other factors that plausibly hampered efficiency in implementation of the project, as captured through discussions with various actors included the drought stress experienced in the targeted counties during most part of 2016 and 2017 slowed down project implementation. Project beneficiaries could not adequately provide the cost share at the right time, while some opted not to participate in project activities like training, instead preferring spend labor on off-farm income, food and forage search.

3.3.6 Sustainability of project outcomes and impact

From the foregoing impact analysis and based on interaction with various actors involved in the K-SALES project implementation, it is highly likely that the gains accrued by project actors, mainly implementing partners and more importantly local communities/farmers will be sustainable beyond the lifespan of the project. The facets enumerated below support this observation:

Definite exit strategy

The 'light touch' approach used in project implementation is an effective way of ensuring project sustainability- being mainly a facilitative approach. This approach allowed the local implementing partners an opportunity to develop and offer demand led commercial services to the local communities/farmers. Evidence from the field indicate that even with exit of the K-SALES project, implementing partners will continue to play a critical and highly valued role, as their services fit the needs and priorities of farmers and other stakeholders along the livestock value chain. Having been equipped with the necessary skills and supportive connections with various actors along the value chain, implementing partners have the capacity and linkages needed to carry out the technical aspects of their job. On the farmers/community side, stirred demand for livestock productivity enhancing services will generally be sustained or increased, as they are highly valued by the community. See sentiments expressed by Ministry of Livestock official who worked closely with the project in box 11.

Box 11: Views on sustainability expressed by Officer at the Ministry of Livestock Machakos County

"...cattle dips and vaccination crushes will mostly continue to operate beyond project life, as farmers pay to use the services and the money banked into accounts with either SACCOs or banks, and used when breakages or repairs are noted...".

'...the hay barns have enabled most farmers to preserve fodder for use during dry seasons and for some, it is also sold hence a source of income. Even with K-SALES coming to an end, our farmers will continue fodder preservation and sell, as they know the benefits of doing so...'.

Besides, K-SALES organized county-level close-out workshops, which gathered stakeholders involved in project implementation, to discuss success, challenges, lessons learnt and more importantly how to sustain project gains. Interaction with the communities though revealed to some extent a clear lack of understanding of the project exit strategy. In some discussions with community members and even local government agencies, there was a feeling that the project ought to have continued its activities, with some expressing fears that gains made might be lost, if support systems stop being in place. Good communication on the intent of the program and its exit strategy are key to enabling the sense of ownership and sustainability.

Local ownership

Overall the project was well-designed to include local ownership which is a great facet of sustainability of project activities. Discussions with most of the actors on ground (communities, implementing partners and other service providers) revealed that K-SALES team involved them in problem identification, implementation, monitoring and evaluations of the project activities at different stages. Besides participation, most of the completed project activities, were handed over to the communities: including on-farm infrastructures (cattle dips and vaccination crushes, fattening lots, hay/forage storage structures, and feed mills), off-farm infrastructure (livestock pens, loading facilities, hide/skin drying structures, slaughter and butcher facilities) and water infrastructure (community based water points)⁶. See box 12 that captures the views of a WUA members in Kitui County on ownership. Ownership is further underscored by the fact that local community members/beneficiaries had also contributed to the project through availing locally available materials like their own labor cost share approach. As with any other small community-based group, all the members' contributions are sometime not up-to-date due to financial constraints but the large number of membership cushions members against total financial collapse. The long-term sustainability will of course depend on continued interest of the members and their ability to continue making the contributions.

Box 12: Views expressed by members of Well during FGD

“...after K-SALES completed rehabilitation of the water point, they trained members of the WUA on management and responsive use of the facility. Currently, the community through its committee has three main roles: control usage of water, repair any damages and collection of contributions from members. We are about 300 members, with each contributing about Kshs 100 per month, so our monthly collection is about Kshs 30,000 (if all members pay), which is adequate for managing the facility. We have employed one caretaker, who is being paid Kshs 3,000 per month...’.

The direct involvement and participation of other actors like government relevant agencies (like use of Ministry of Livestock experts to facilitate certain aspects of training needs) is an asset that will also contribute to sustainability, as the links created are bound to transcend project life.

Targeting of the right group

Women are major contributors in the agricultural economy, but face various constraints that limit them from achieving optimal livestock production and agricultural development (Njuki and Sanginga, 2013). K-SALES project realizing the importance of women, made deliberate efforts to involve them in project activities, with about 64% of project beneficiaries being women as per the end-line survey results. Literature documents that projects that involve mainly women are bound to be sustainable due to their seriousness and commitment to home-based related livelihood activities.

Formation of strategic partnerships

Evidently, the linkages established between beneficiary households, local implementing partners and other essential service providers during the project life-time are bound to continue due to their mutually beneficial nature. There is sufficient evidence to show that the beneficiaries/farmers will continue benefiting from services provided by the service providers.

⁶ In almost all the water user groups visited, group members had formed committees to oversee usage of the water points, and community members were willingly making monthly contributions towards their maintenance.

Capacity building of BSPs and livestock cooperatives will guarantee continuous efforts to support livestock producers. The project's approach of working through local business service providers instead of targeting livestock producers directly increases capacities of service providers and creates the basis for better understanding of the needs of their members. This also increases ownership of the whole process and therefore works towards maintaining its results. The downside to these partnerships is that in the absence of clearly identified measurable outputs, as was required during project life-span, there could be poor service quality experience. Whilst the project worked with already existing and newly established farmer groups/cooperatives, building and strengthening their institutional capacities, some of them did not gain enough capacity to stand by themselves, making it difficult to guarantee their effective sustainability. Furthermore, some failed to establish strong linkages with other actors to ensure continued relations beyond project-life.

Alignment with national and county level development priorities

As discussed in Section 3.4.2 on project relevance, the activities implemented under the K-SALES project were fully in line with the national and county level strategies and immediate priorities for the livestock sub-sector. In effect, the gains realized under the project so far, are bound to continue enjoying adequate policy and strategic support from both levels of government.

Economic improvement

From an economic welfare perspective, K-SALES project has improved the confidence and the ability of project beneficiaries to increase their production of livestock and livestock products, resulting in increased incomes and improved quality of life (see comments in box 13 by an FGD female participant). It is unlikely that project beneficiaries will want these gains to be eroded just easily. Through the enhanced skills and knowledge on livestock improvement technologies, and given the increasing demand for quality livestock products and the high potential for growth, there was sufficient evidence to believe that 'self-interest' from the communities, was an effective motivator, that will allow them to continue engaging in livestock enterprises, despite the challenges and risks.

Box 13: Perspectives of female farmer on sustainability

"...after seeing what it has done for us over the last few years, we are ready and willing to set up systems and structures, take advantage of the resources at our disposal and continue addressing our own problems to make life better for everyone..."

A female farmer during focus group discussion

Furthermore, the farmers are using the rehabilitated infrastructures for income generation e.g. growing hay for sale by storing it in the hay barns and charging for water use from the rehabilitated water points.

3.3.7 Cross-cutting issues

3.3.7.1 Gender considerations

The project targeted to work with male and female farmers and the youth. The choice of the Farmers Field Schools as the focal point for reaching farmers inevitably attracted more women farmers than male farmers. In the end-line survey, most farmers interviewed were women as shown in Figure 3.9. Women tend to be more active in group participation than their male counterparts. A reverse scenario is observed among the livestock processors; the trade is clearly dominated by men who constitute 94% of all interviewed. The dominance of men in commercial enterprises like slaughter houses and butcheries is expected given the high capital investments required and the rather 'heavy manual nature' of these enterprises. On the contrary however, the two gender groups are more equally represented among the business service providers (see summary in Table 3.7).

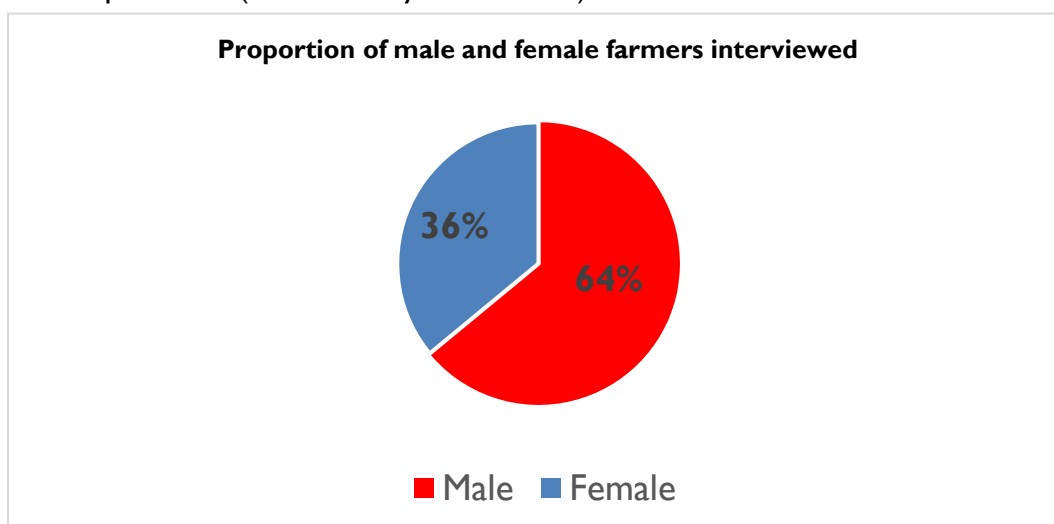


Figure 3.9: Proportion of male and female farmers interviewed

Source: Survey data, 2017

The dominance of women in the K-SALES project somewhat contradicts general dominance of men in livestock ownership and marketing in the agro-pastoral systems. The dominance of women is therefore not necessarily a negative observation given that they are involved in taking care of livestock on a day-to-day basis. The project therefore empowered them through trainings and access to water resources and other infrastructure that enhance livestock productivity.

Table 3.7: proportion of male and female respondents among BSPs and LPs

Category	Gender distribution among interviewees (%)	
	Male	Female
Business service providers (BSPs)	94	6
Livestock Processors (LPs)	51	49

Source: Survey data, 2017

Given the defined gender roles in rural setting where women are majorly responsible for household chores such as fetching water, the enhanced access to water points was clear a big and direct benefit for them. One example is the borehole whose broken pump was replaced with K-SALES project support (See box 14).

Box 14: Repair of Borehole pump has helped women access water easily

“The water pump for our borehole had been spoiled and remained unrepaired for six months. During that period, we would fetch water from rivers about 5 Km away. K-SALES project through Caritas help replace the spoiled pump and we catch access water nearby from our bore hole”. Views of a member of a bore hole WUA

3.3.7.2 Climate change and environmental conservation

Climate change poses a serious risk to agricultural production and food security in Kenya and the arid and semi-arid zones. The negative impacts of climate change have already been experienced in these areas in the form of more frequent and more severe droughts. The severity of the droughts is made worse because most the population is vulnerable. Droughts lead to the death of animals due to starvation (lack of forage and water) and consequently the livelihoods of people are destroyed (World Bank, 2011). For example, during the drought of 2010/11 about 31% of Kenya’s livestock population was at risk of the debilitating effects of drought with estimated mortalities of 10-15% above normal (World Bank, 2011).

Although climate change and environmental conservation were not explicitly averred to in the project, the goals of increasing productivity and expanding trade would ultimately build the resilience of farmers to climate change and enhance environmental conservation. Below is a summary of how project activities enhanced resilience to climate change and environmental conservation:

- The establishment of new and rehabilitation of existing water points and the concurrent training on their management will enhance conservation of water, reduce its pollution and enhance the efficiency of its use. This is a direct contribution to environmental conservation.
- The enhanced access to water points (which was one of the project impacts) will build the resilience of livestock farmers against frequent and severe drought.

- The training on hay making and conservation of fodder combined with construction of hay barns will enhance the ability of farmers to deal with lack of fodder during the dry season.
- The overall increase in incomes from livestock sales will also help build the resilience of farmers to climate change by economically empowering them to buy food from markets during drought periods.

3.3.8 Lessons learned and implication for future projects

3.3.8.1 Project design and implementation strategy

The following aspects of project design and implementation worked well in ensuring success of K-SALES project and can be replicated for similar projects in future:

1. The '*light touch*' approach helped create strong partnership with local implementing partners that were familiar with project areas and direct contact with local communities. While in some instances, the LIPs lacked the capacity to undertake the projects, K-SALES help build their capacity to undertake such similar projects in the future.
2. A *participatory approach* that involved all the key actors in the livestock value chain, including government, local communities, development partners, and other service providers, and where each of the actors' roles was well defined, was key for successful implementation of the project. More importantly, the involvement of private sector as a provider of essential services, such as agro inputs, is key to sustainability. It enhances local buy-in, ownership, commitment and interest.
3. The project sought *the support and deliberate involvement of county government* and their partnership. This was very critical for success and long-term sustainability of project impacts. While this is not easy given difference in approaches and systems that are county government use, their explicit support and involvement is critical for success.
4. The '*cost-sharing*' arrangement in establishing and rehabilitating infrastructures embedded direct community ownership and inbuilt sustainability at the initial stages. As expected the 30% cost-share for the community proved to be a difficult threshold given the high levels of poverty and prevailing drought during project implementation. However, innovative approaches such as in-kind contribution of materials and labor helped bridge the gap.
5. The *deliverable-based payments* for the LIPS was useful in ensuring quality deliverables (infrastructures) while keeping the administrative cost of sub-award management manageable.
6. *Flexibility* in some aspects of the project design proved very critical. For example, the change in approach for increasing lending from using commercial banks to using local financial institution was very important. Had the project not changed tact and stuck on using commercial banks it is unlikely that the observed success would have been achieved.

7. *Extension of project timeline* was also very critical in ensuring achievement of deliverables after an initial delay of about 6 months at the beginning of the project due to the delay in the approval of baseline survey that had to precede implementation of nay project activity.
8. *Some aspects of the infrastructure related targets set in project design were not realistic.* The project was expected to achieve very high targets in rehabilitating on-farm and off-farm structures with a limited budget. To achieve these targets, the project focused on a very small-scale infrastructure rehabilitation/repairs to meet the set targets.
9. *Some project targets on adoption of new technologies and techniques were not met.* This was mainly because they depended on framer-level factors that were beyond the control of the project. These should have been considered in setting the targets.
10. *Managing partnerships is critical for project success and its sustainability.* K-SALES project worked with many partners at different levels. While these partnerships largely worked well, there were opportunities for making them work even better. For example, county-level inception meeting between LIPs working on different aspects of the project would have helped create awareness of what each partner is ding, explore synergies between them and create a harmonious working relationship amongst them.
11. *The donor requirement of baseline survey approval resulted in a six-month delay in starting the project.* While this is a normal practice with many donors, the project hired staff at the beginning who were not meaningfully engaged in actual project activity implementation for that period.

3.3.8.2 Critical factors for success/failure

The success or failure of a development intervention can be influenced by internal or external factors. Our evaluation has shown that K-SALES project was overall successful in reaching the set objectives and generating positive and incremental impacts on the target beneficiaries. In this section, we highlight factors that in our judgement could have contributed to the observed success. In addition, we also highlight other factors that could have helped to even achieve greater success.

- i. The project identified and addressed priority problem for the livestock farmers in the project areas.
- ii. It involved all major stakeholders in a participatory manner and built on strategic partnership to deliver on the objectives.
- iii. The project resources were leveraged in a way that encouraged local communities to contribute (in-cash and in-kind) to meet project objectives.
- iv. It had a small team of dedicated project staff that divided task in an efficient manner and had a good leadership. Discussion held with technical project staff indicated that the project could have even had greater impacts if more detailed technical inputs had been incorporated in setting targets for off-farm and on-farm infrastructures which require heavy capital investments. It was further evident from these discussions that greater impact could have been achieved if there was a more rigorous project implementation plan for the extension period.

- v. During the start-up phase, different components of the project were awarded to different implementing partners, who were meant to work with the same group of farmers. However, it appears no formal start-up sessions were held with all local implementers within the project areas, resulting in most of the implementers working independently without building on other project components. Synergies and complementarities were not considered sufficiently in the design of the project, which made it difficult to search and exploit these links during implementation. The evaluation team believes that future projects should underscore these links well before implementation starts.
- vi. In an environment where markets are rapidly becoming dynamic, it calls for structures and processes within a project to be market responsive. Whilst it's important to design projects with pre-determined deliverables/activity work plans, some level of flexibility that allows projects to track and respond to opportunities and constraints in the market is critical.
- vii. K-SALES project counties of operation are classified under the arid and semi-arid zones of Kenya, hence prone to recurrent drought conditions. Prevalence of such risks and uncertainties, with potential to adversely affect livelihoods, underscores the need to allow for and accept flexibilities both during planning and implementation of projects.
- viii. One factor that could also potentially affect success of the project is a lack of understanding of K-SALES project's implementation approach by the local communities. While the implementing partners understood the '*light touch*' and tried to establish realistic expectation levels among local communities, it was evident from interaction with the latter that a good number of them still appealed for direct support either in form of money or livestock related inputs.
- ix. Whilst the project's capacity building packages for the various actors focused more on technical aspects of project implementation including monitoring and reporting aspects, the project fell short of providing adequate trainings on inter-component linkage building, inter-group learnings and networking and self-monitoring for the project beneficiaries.

4.0 SUMMARY CONCLUSIONS AND RECOMMENDATIONS

4.1 Summary and conclusions

This final evaluation was commissioned to assess the relevance, effectiveness, efficiency, impacts and sustainability of KALES project. It also sought to understand how cross-cutting issues of gender, youth and environmental conservation were mainstreamed in the project activities. Land O'Lakes International Development and the funding agency (USDA) set out to use a robust quasi-experimental methodology to assess the project impact.

Bayesian Consulting Group was competitively selected to undertake this final evaluation on behalf of LoL and USDA. The evaluation was planned and executed in close consultation with the project team and other partners. Quantitative survey data was collected from a total of 976 households, 144 business service providers and 233 livestock processors spread across six project counties. Qualitative data was collected through 34 focus group discussion with farmers, livestock processors and water user associations across the six counties. In addition, 34 key informant interviews were conducted with project staff, local implementing partners and government officials. The data was analyzed and discussed under the seven thematic areas that underpinned this final evaluation.

The project was found to have been relevant because it addressed real and priority problem for the target beneficiaries. The project objectives were also found to be well aligned to the overall national development goals and county development aspirations for the livestock sector. Activities undertaken were also found to be appropriate for the identified problems.

In terms of effectiveness the project was found to have achieved and exceeded the set targets. The project trained over 900 business service providers against a target of 700 and reached over 78,000 farmers through the Farmer Field Schools against a target of 60,000 (31% above the target). The project increased farmers' access to clean water by building and rehabilitation 229 structures against a target of 200 and established 337 on-farm structures exceeding the set target of 310 structures. The project also facilitated agricultural lending through disbursements of 6,800 loans compared to a set target of only 800 loans. A total of 664 off-farm infrastructures were established or rehabilitated compared to 550 that were initially planned for and 2503 employees of livestock processors were trained on post-harvest handling and processing techniques against the target for 2,500. Through training offered by K-SALES project, 63% of the target farmers had adopted technologies that were being promoted by the project. In some instance the project targets were not met. For instance, while the project targeted 48,000 farmers to adopt improved farm management practices, only 35,428 adopted (a shortfall of 26%).

From the results of PSM and DiD the final evaluation found that participation in the K-SALES project had a definite positive and significant impact on the beneficiary households (relative to their control counterparts) on the following outcomes:

Proximity to suppliers of inputs

The project aimed at improving access to agricultural inputs by building the capacity of business service providers to better serve livestock farmers. At baseline, the average distance to the suppliers was very similar for beneficiary and control group farmers (3.1 Km and 3.2 Km for the control and treatment households respectively). At the end-line, the distance remained 3.1 Km for the control households but declined to 2.8 Km for the treatment households, a 0.3 Km advantage over their control counterparts. Overall, because of project intervention, the DiD results showed that proximity to input supply had improved by 0.5 Km in favor of beneficiary farmers relative to their control group counterparts. Therefore, we concluded that the project had improved access to agricultural inputs.

Livestock ownership

a) Number of cattle owned

Cattle ownership on average increased by one cattle among the beneficiary household compared to their control group counterpart. At the baseline, control group owned an average of 3.5 cattle which reduced to 2.6 at the end-line. The beneficiary group on the other hand, average owned 2.3 cattle at baseline and increased ownership to 2.7 cattle at the end-line.

b) Number of goats owned

For goat ownership, the control households had an average of 12 goats while beneficiary households had 8, giving the control households an advantage of 4 goats. At the end-line, the control households had an average of 7 goats while the beneficiary households had an average of 9 goats. Overall, based on DiD analysis, goat ownership changed to the advantage of beneficiary households. In essence, the beneficiary households on average owned of 6 goats relative to their control counterparts because of the project intervention.

The number of livestock lost in a year did not change across time and between farmer groups. These results show that beneficiary households have increased access to feeds and fodder, water and supportive infrastructure to maintain higher numbers of livestock than their control counterparts. This outcome can be attributed to the activities undertaken by K-SALES project.

Livestock body condition score

Body condition scoring (BCS) is a simple technique used to estimate the body fat in livestock based on a standardized set of visual criteria. In this evaluation study, a 5-point scale was applied in scoring the average livestock condition of the farmers heard of cattle, goats and sheep. A score of 1 indicates an emaciated animal in very poor body condition (with prominent back bone and ribs showing). A score of 5 indicates a fat animal with hip bone and ribs covered in fat. The body condition is influenced by the nutrition status of the livestock and its general health. Body condition plays an important role in maximizing fertility in a breeding herd and determines price the livestock can fetch at the market.

a) Cattle body condition score

Average body score condition for cattle among control group farmers was 2.8 at baseline while that of beneficiary farmers was 2.6 indicating fair body conditions. At the end-line, it had worsened for both groups to 2.2 (poor body condition) among control group farmers and 2.5 (fair body condition) for beneficiary farmers. This would be expected especially because of the prevailing dry condition at the time preceding the end-line survey. However, due to project intervention, the cattle body score for the beneficiary group rose by 0.3 points relative to their control group counterparts. The project interventions prevented more severe worsening of cattle body condition score among the beneficiary farmers by helping them maintain fair body condition of their cattle while the condition of cattle among the control group became poor.

b) Goat body condition score

The average goat body condition score at baseline for control farmers and beneficiary farmers was 2.9 and 2.6 respectively indicating fair body condition for both groups. At the end-line the score had dropped to 2.5 for both group of farmers. This means that the score worsened more among control group farmers relative to their beneficiary counterparts. In real sense, the beneficiary group experienced an improvement of 0.3 points relative to their control counterparts.

c) Sheep body condition score

At the baseline, average sheep body condition for control farmers 3.2 while that of beneficiary farmers was 2.6. The score dropped to 2.2 among control farmers (indicating drop from fair body condition to poor body condition) while for the beneficiary farmers it improved slightly to 2.5.

These improvements in average livestock body condition scores in favor of beneficiary group could be attributable to training in livestock management providers by the project through the local implementing partners, increased access to water, improved access to veterinary services and production of fodder and feeds by the beneficiary farmers.

Livestock sales

Control farmers, on average, sold one cow at baseline while their beneficiary counterparts sold 2. At end-line both control and beneficiary farmers sold 2 cattle each, on average. Overall, therefore, annual cattle sale by beneficiary households declined by one animal. Annual sale of goats and sheep did not change across farmers and time. Notice that the period preceding the end-line survey had been characterized by prolonged drought which would have led to increased livestock sales. The fact that beneficiary farmers sold reduced numbers of cattle can only imply that they had access to more fodder and/or feeds, and water to maintain their cattle.

Farm gate price

The project had a positive and significant impact of the average farm gate price of cattle and goats. On average, the beneficiary farmers fetched about US\$ 30 above their control counterparts for every cattle sold. They also obtained US\$ 7.7 more for every they sold compared to their control group counterparts.

Other outcome indicators were computed at an aggregate level but important for illustrating the direction of progress in agricultural productivity. They are highlighted below:

- 49, 599 farmers (29,184 women and 20,415 men) had adopted the new/improved agricultural techniques/technologies propagated by the project. This shows that 63% of the targeted farmers had adopted these techniques/technologies. By gender, 58% of the targeted women and 72% of the targeted men had taken up the technologies. Although the progress was good, it did not meet the project target of 80% although it was a huge improvement over the mid-term figure of 40%.
- About 35,428 (10,983 women and 24,445 men) of the target farmers and other stakeholders had adopted improved farm management practices such as financial management and good governance. Although this was below the project target of 48,000, it was a major improvement over the mid-term achievement of 3,638. This was attributable to training on farm management by the project through the farmer field schools (FFS).
- 46% of farmers can access farm inputs within 5Km of their homesteads. These beneficiaries include women who accounted for 66% of the total women targeted while the beneficiary men accounted for 34% of the men targeted. The project, however, failed to meet its target of bringing 80% of the target farmers within the 5-Km range of input supply.
- About 61% of the target farmers could demonstrate a threshold level of proficiency in at least 5 new livestock husbandry and herd management techniques, and had applied 60% of the recommended improved farm management practices. This exceeded the project target of 60% and 50% for the two indicators, respectively. The proportion of target farmers who could identify key characteristics of a well-managed farm was 45% (69% women and 31% men) against the project target of 80% and a mid-term achievement of only 11%.

From an efficiency perspective, analysis of the various activities based on planned targets and the achievements showed that the project was efficiently implemented and achievements demonstrated value for money. The evaluation further established the financial resources were used for the targeted activities satisfactorily, which is an important facet of efficiency. The initial phase of project implementation was characterized by some delays by the no-cost extension at the end of the project resolved the challenge of shortened implementation time frames.

From the impact that the project achieved and the well-thought-out exit strategy, there are good indications that the project impacts are likely to be sustained into the future. The 'light touch' approach allows for a good exit strategy through the capacity built for local implementing partners. The local buy-in and ownership through contribution to the project is a good foundation for sustainability. In addition, targeting the appropriate target groups, formation of strategic partnerships (BSPs, LIPs, county governments) is a good foundation for building sustainability. The realization of tangible benefits by the target groups as

demonstrated by the results of impact evaluation is a good indication that the beneficiaries have a vested interest in sustaining the project objectives.

The project activities were relevant and fully in line with the context of climate change resilience building among communities in arid and semi-arid areas. Activities like fodder preservation and improvement of community water infrastructures are critical for improving adaptive capacity of rural communities to climate change. The gender aspects of the project show some mixed results; among the target farmers over 60% were females. This disproportionate representation of women could be a concern but on the other hand empowering women has potential to benefit the entire household.

4.2 Recommendations

Based on the evaluation we make the following preliminary recommendations for different stakeholders:

For USDA/or other donors

- i. Given the clear success achieved through K-SALES project in the six counties, USDA and other donors should strongly consider out-scaling similar intervention in other livestock producing counties. There is also a strong case for considering another phase of the project to build on the success and partnership already built.
- ii. In undertaking future projects, USDA should consider revising the way targets are set especially for infrastructure projects and for adoption of technologies. To relieve the project implementers the pressure of doing very small-scale infrastructure activities to meet too high targets, it would be more efficient to set manageable targets commensurate to the budgets.
- iii. In future projects, project managers should synchronize hiring of staff with start of actual project implementation to maximize on efficiency of using project resources.
- iv. The decision by USDA and Land O' Lakes international development to undertake a rigorous impact evaluation project is commendable for building evidence on what development intervention work (or don't work). We recommend that project of magnitude such as K-SALES should in-built a robust impact evaluation analysis to continue building on a rather thin body of literature that currently exist on impacts of development projects especially in arid and semi-arid zones. Such a commitment will help generate more nuanced information on what works or doesn't work and under what situations. This information will help development partners and governments make informed decisions when deciding to intervene in solving development problems.

For Land o' Lakes International Development and other implementing agencies

- v. More development partners should embrace the 'light touch' approach applied by K-SALES project because it builds the capacity of partners at local level and enhances project ownership at the local level.

For County Governments

- i. County governments of the six project counties endeavor to build on success of K-SALES by upscaling and out scale the successful activities by continuing to support their farmers through the relevant department given that livestock development is a devolved function.
- ii. County governments should prioritize development of the livestock sector in their counties by allocating adequate funding to the sector and prioritize activities and enhance productivity and trade.

For the National Government of Kenya

- i. National and county governments still retain the overall policy formulation function for agriculture and livestock sectors. Therefore, the national government should ensure existing policies support increased production and trade in livestock products.
- ii. The national government should continue to allocate adequate funds to counties for livestock development but also invest in infrastructures (e.g. abattoirs, roads, disease control, livestock research etc.) that would promote productivity increases and trade in livestock.

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