

THE UNITED REPUBLIC OF TANZANIA



MINISTRY OF LIVESTOCK AND FISHERIES

**LIVESTOCK SECTOR TRANSFORMATION PLAN
(LSTP)**

2022/23 - 2026/27

February, 2022

EXECUTIVE SUMMARY

Although Tanzania ranks the second in terms of cattle population in Africa, contribution of livestock sector into the national income is not enormous, as livestock-related activities contribute only 27% of the Agricultural Sector contribution to the economy and 7.1% to Tanzania's GDP in particular; with sector growth at 5.0% (NBS 2020). This growth largely reflects increases in livestock numbers, rather than productivity gains. The low contribution of livestock in the economy is attributed to many factors, such as animal breeds with low productivity; presence of livestock diseases; shortage of water infrastructure and pasture; inadequate markets and value addition of livestock and livestock products; and inadequate extension services.

Although the Agriculture Sector Development Plan phase two (ASDP II) has identified strategic interventions that should be implemented to increase agricultural production, productivity, and commercialization which is inclusive of the livestock sector; absence of a transformational plan for the livestock sector has persistently hindered successful implementation of previous investment initiatives for the sector. Thus, the Government has decided to formulate the Livestock Sector Transformation Plan (LSTP) which sets out livestock-sector investment areas, including productive high-quality livestock breeds; water, pasture and animal feeds; animal health; extension services; livestock research and training services; value addition of livestock products; and national ranching company.

The key targeted investment areas for transformation of livestock sector will be implemented for a period of five years from fiscal year 2022/23 to 2026/27, and the LSTP is estimated to cost a total of TZS 1,949,671,644,815. If the identified investment areas will be successfully implemented, the anticipated transformation of the sector has potentially positive impact to the economy through increased supply of raw materials into the meat, milk and hides/skin processing industries, and rural livestock keepers in increasing their incomes while urban consumers will be assured of reliable supply of animal products. The success of the LSTP is also essential to the achievement of food and nutrition security at household and national levels.

During the five years of its implementation, the LSTP intends to strengthen the livestock sector to be more productive, contribute to industrial economy and widening the extent of domestic and foreign market of livestock and livestock products. More specifically, it intends to improve livestock breeds in order to increase livestock productivity; improve access to pasture and water for livestock; strengthen animal health systems, veterinary public health, quality control of livestock inputs and facilitate achievement of safety standards of livestock products for domestic and foreign trade; enhance provision of extension services for commercialization of livestock farming; to strengthen provision of research and training services; to promote value addition of livestock products; and create enabling environment for business and investment in the livestock sector.

**SUMMARY OF FINANCIAL RESOURCES REQUIREMENT FOR IMPLEMENTANTION OF LIVESTOCK SECTOR
TRANSFORMATION PLAN FOR A PERIOD 2022/2023 – 2026/2027**

Table No.1: Summary of Financial Resource Requirements for Implementantion LSTP

SN.	AREA	2022/23	2023/24	2024/25	2025/26	2026/27	TOTAL (Tsh)
1	Productive Livestock Breeds	30,491,162,452	21,812,226,572	21,162,577,342	15,752,595,513	15,725,050,119	104,943,611,999
2	Pasture Feed and Water for Livestock	92,690,000,000	266,880,000,000	190,001,000,000	184,001,000,000	145,821,000,000	879,393,000,000
3	Animal Health	142,010,400,000	160,970,400,000	173,442,400,000	163,560,400,000	134,103,800,000	774,087,400,000
4	Livestock Extension Services	13,968,320,030	8,584,400,000	7,993,600,000	7,220,000,000	6,020,000,000	43,786,320,030
5	Livestock Research and Training	12,726,909,961	12,820,658,125	10,797,444,700	11,683,000,000	13,683,800,000	61,711,812,786
6	Value Addition of Livestock Products	11,850,000,000	11,948,000,000	2,940,000,000	2,940,000,000	540,000,000	30,218,000,000
7	National Ranching Company	19,407,500,000	19,415,500,000	10,469,500,000	1,969,500,000	4,269,500,000	55,531,500,000
	TOTAL (TZS)	323,144,292,443	502,431,184,697	416,806,522,042	387,126,495,513	320,163,150,119	1,949,671,644,815

TABLE OF CONTENTS

1. INTRODUCTION.....	3
2. PUBLIC INVESTMENT IN LIVESTOCK SECTOR	5
3. THE LIVESTOCK SECTOR TRANSFORMATION PLAN IN LINE WITH OTHER PLANNING DIRECTIONS	6
4. OBJECTIVES OF THE PLAN	6
5. KEY AREAS OF THE LIVESTOCK SECTOR TRANSFORMATION PLAN	7
5.1 Access to Livestock Breeds with High Productivity	7
5.1.1 Artificial Insemination (AI).....	8
5.1.2 Use of Improved Bulls.....	8
5.1.3 Strengthening Livestock Multiplication Units (LMU)	9
5.1.3.1 Cost- Benefit Analysis on Investment at Mabuki Livestock Multiplication Unit.....	9
5.1.3.2 Cost- Benefit Analysis on Investment at Kitulo Livestock Multiplication Unit	10
5.1.3.3 Cost-Benefit Analysis on Investment at Ngerengere Livestock Multiplication Unit	11
5.1.3.4 Cost- Benefit Analysis on Investment at Nangaramo Livestock Multiplication Unit.....	12
5.1.3.5 Cost- Benefit Analysis on Investment at Sao Hill Livestock Multiplication Unit.....	12
5.2 Strengthening Pasture and Water Services for Livestock.....	13
5.2.1 Pasture.....	13
5.2.2 Water for Livestock.....	14
5.2.2.1 Cost-Benefit analysis of Investing in Enhancing pasture and Water availability for Livestock	16

5.3	Strengthening Animal Health	16
5.3.1	Control of Tick-borne Diseases	16
5.3.2	Availability of Vaccines in the Country.....	17
5.3.3	Strengthening Research and Production of Vaccines.....	18
5.3.4	Strengthening TVLA's ability to Test Livestock Pesticides and Chemical Residues on Livestock Products for Ensuring Drug Stability and Food safety.....	19
5.3.5	Ensure the Safety of Livestock and Livestock Products to Facilitate International Trade ..	19
5.3.6	Private Sector Involvement in Strengthening Livestock Health	19
5.3.7	Strategic Activities for Improving Animal Health	20
5.3.7.1	Cost-Benefit analysis of Investing in Animal Health	20
5.4	Improving extension services	21
5.5	Strengthening Livestock Research and Training Services	22
5.5.1	Livestock Research	22
5.5.2	Livestock Training.....	24
5.6	Value Addition of Livestock Products	24
5.6.1	Leather Industries.....	24
5.6.2	Meat Industries.....	25
5.6.2.1	Livestock Fattening	25
5.6.2.2	Poultry and Piggery Farming	27
5.6.2.3	Livestock Markets.....	28
5.6.3	Milk Processing Industries.....	29
5.6.3.1	Analysis of Cost-Benefit for Investing in Livestock Products Value Addition	31
5.6.4	Livestock Development Fund.....	31
5.6	Strengthen National Ranching Company	32
6	IMPLEMENTATION PLAN	34

1. INTRODUCTION

Tanzania ranks second in Africa after Ethiopia in terms of cattle stockpiling. According to National Sample Census of Agriculture 2019/20, Tanzania stocks 33.9 million cattle, other livestock species include 24.5 million goats, 8.5 million sheep and 87.7 poultry. In addition, the Economic Survey Report of 2020, indicates that the livestock sector accounts for 27% of the Agricultural Sector contribution to GDP, of which 40% arises from beef production, 30% from the dairy industry, and the remaining 30% is contributed by other livestock products such as eggs, hides and skin.

The National Sample Census of Agriculture further indicates that approximately 33% of households in the country are engaged in both crops and livestock production. In addition, the proportion of the percentage of household income generated from animal husbandry come from chickens (53%), cattle (32%), goats (10%), pigs (4%); and sheep (1%).

Despite recorded achievements, the sector in the country continues to face some challenges, including: -

- (i) **Animal breeds with low productivity:** The national herd is dominated by indigenous cattle which are currently displaying low productivity, but they have much potential if feed, health and breed improvements can be made. The main breeds of beef cattle in the country include: Tanzania Shorthorn Zebu (TSHZ) characterized by small size mature body weight (200–350 kg); Longhorn Cattle (LHC) such as the Ankole which is characterized by large matured body weight (500–730 kg); and the Boran which has a large body weight (500–800 kg). On the other hand, milk production for native cow per day remains low at between 0.5 to 2 litres compared to pure dairy breed that could produce between 20 to 30 litres per day. Similarly, the productivity from local chickens stands at 45 eggs per hen per

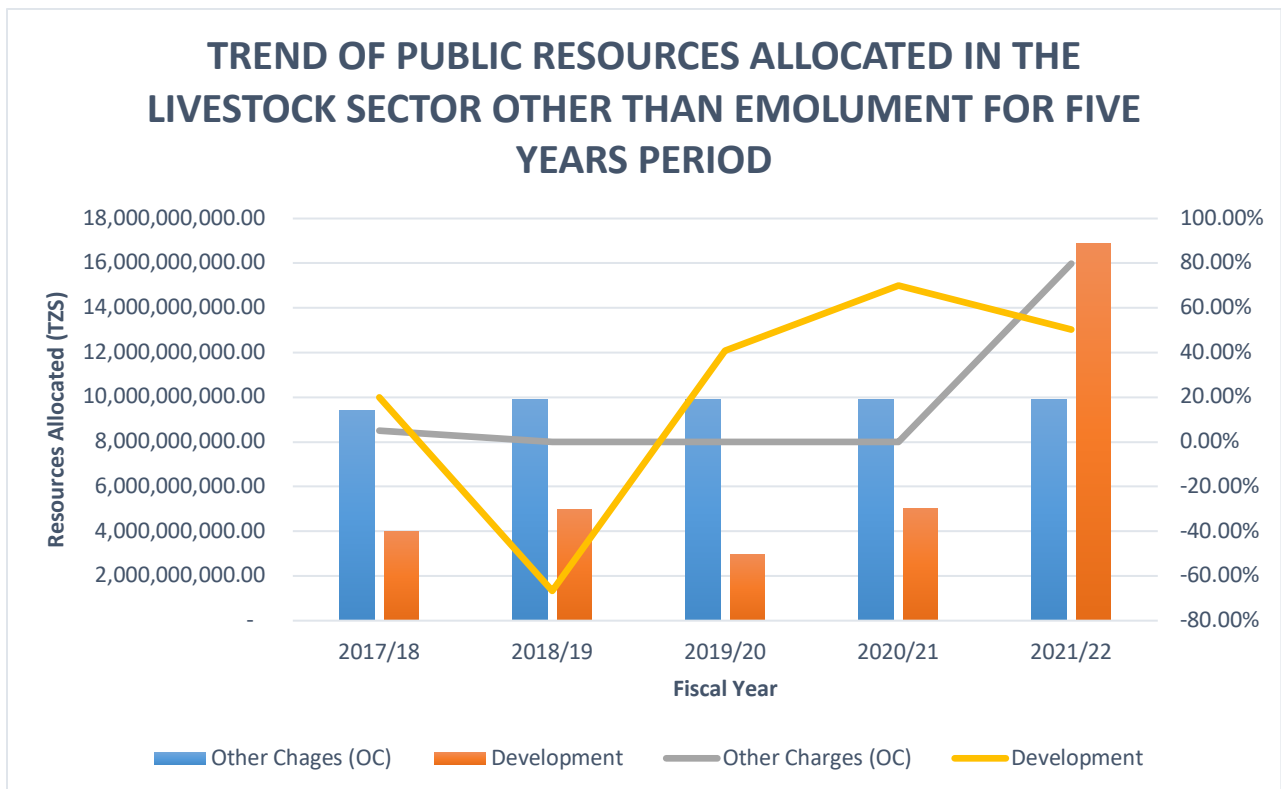
year comparing to layers with capacity to produce an average of 250 eggs per hen per year.

- (ii) Presence of livestock diseases:** Livestock diseases continue to impose huge operation costs on farmers and it is estimated that total cost from treating Foot and Mouth Disease (FMD), Peste des Petits Ruminants (PPR) and Newcastle Disease (ND) in the country stands at 101.8 Billion Shillings per year. Meanwhile, the loss estimates from Tick-borne diseases is estimated at 150 billion shillings per annum. In addition, the diseases not only affect human health but also deter meat trade; nationally and internationally.
- (iii) Shortage of water infrastructure and pasture:** water and pasture shortages contribute greatly to livestock deaths and production of substandard livestock to meet market requirements especially in the meat and milk processing industry. During dry seasons, milk and meat production comes to minimum, hampering value chain. Also, search of water and pasture leads to conflicts between pastoralists and other users of land resources.
- (iv) Inadequate markets and value addition of livestock and livestock products:** the livestock sector is facing critical shortage of appropriate infrastructure necessary to facilitate trade within domestic and foreign markets. There is also limited value additions to livestock products, thus limiting availability of various livestock commodities.
- (v) Inadequate extension services:** shortage of Extension Officers at the Village, Ward and District Council levels as well as inadequate working tools and facilities; including transport and extension tool-kits remain a matter of concern in the livestock sector. The Extension Staff also do not undertake regular refresher training courses to acquire updated knowledge according to technological and economical changes.

2. PUBLIC INVESTMENT IN LIVESTOCK SECTOR

Livestock sector in Tanzania is growing at a slow rate of 5.0% while contributing only 7.1% to the national GDP. That slow growth rate and little contribution of the sector to the GDP are attributed to low investment in the livestock sector, from both public and private stakeholders. Over the past five years (2017/18 to 2021/22), the amount of public financial resources allocated to the livestock sector has been insignificant compared to actual needs. It is estimated that an average of at least TZS 400 billion per year from public investments is needed in order to allow the livestock sector to optimally contribute to the economy. Over the past five years, the budget allocated to livestock sector has been at most 4 percent of its actual annual demand.

Public investment in the livestock sector is shown in the graphs below: -



3. THE LIVESTOCK SECTOR TRANSFORMATION PLAN IN LINE WITH OTHER PLANNING DIRECTIONS

This plan, which aims at transforming livestock sector along with commodity value chains is being developed in line with the:

- National Development Vision 2025;
- National Long-term Development Plan (2011/12 - 2025/26);
- The Five-Year Development Plan Phase III (2021/22 - 2025/26);
- Agricultural Sector Development Program Phase II (ASDP II).
- The National Livestock Policy of 2006 and
- Tanzania Livestock Master Plan (TLMP),

Procedures for financing, implementing and monitoring of strategic areas are guided by the structure and framework of the Agricultural Sector Development Program Phase II (ASDP II). The target is to improve livestock production and productivity in order to accelerate investment in livestock processing industries and livestock trade (both domestically and internationally).

It is highly anticipated that implementation of this plan will increase productivity to the livestock sector through enhancing reliable market access for livestock and livestock products; increase employment opportunities; expand tax base and non-tax revenue; and improve food security and nutrition in the country.

4. OBJECTIVES OF THE PLAN

The overarching objective of the plan is “Strengthening the livestock sector to be more productive, contributing to industrial economy and widening the extent of domestic and foreign market of livestock and livestock products”.

Specific objectives are to: -

- (i) Improve livestock breeds in order to increase livestock productivity;
- (ii) Improve access to pasture and water for livestock;
- (iii) Strengthen animal health systems, veterinary public health, quality control of livestock inputs and facilitate achievement of safety standards for livestock products for domestic and foreign trade;
- (iv) Enhance provision of extension services for commercialization of livestock farming;
- (v) Strengthen provision of research and training services;
- (vi) Promote value addition of livestock products; and
- (vii) Create enabling environment for business and investment in the livestock sector.

5. KEY AREAS OF THE LIVESTOCK SECTOR TRANSFORMATION PLAN

Key targeted areas for transformation of livestock sector over a period of next five years (2022/23 - 2026/27) are estimated at total cost of TZS **1,949,671,644,815** (**Appendix**

No.1). These areas include: -

- (i) Productive High-quality Livestock Breeds;
- (ii) Water, Pasture and Animal Feeds;
- (iii) Animal Health;
- (iv) Extension Services;
- (v) Livestock Research and Training Services;
- (vi) Value Addition of Livestock Products; and
- (vii) National Ranching Company.

5.1 Access to Livestock Breeds with High Productivity

The national herd is dominated by indigenous livestock which are currently displaying low productivity, but they have much potential if feed, health and breed improvements can be made. Various interventions have been set; including Massive Artificial Insemination (AI),

the use of improved bulls, and strengthening production and dissemination of heifer for beef and milk.

5.1.1 Artificial Insemination (AI)

The AI benefits include rapid dispersal of quality livestock breed, avoiding inbreeding, disease control and reduce breeding cost. However, the insemination programmes face some difficulties including shortage of modern equipment and machinery at the National Artificial Insemination Center (NAIC) in Arusha and 7 Zonal Artificial Insemination centers; shortage of extension Officers and limited knowledge from livestock farmers. In order to accelerate massive Artificial Insemination, the following strategies will be adopted: -

- (i) Strengthening the NAIC to produce 1,500,000 doses of livestock siemens per annum and support seven (7) Zonal Artificial Insemination Centers by providing modern equipments including seven (7) motorcycles, 21 cylinders with a capacity of 35 and 50 litres of Liquid Nitrogen, pistols and AI Tool Kits;
- (ii) Inseminating 500,000 cattle per year in strategic areas; and
- (iii) Providing training on Artificial Insemination to 920 Extension Officers in Local Government Authorities and the private sector.

5.1.2 Use of Improved Bulls

The Ministry through its institutions and the private sector continue to produce and promote the utilization of improved bulls for enhancement of breeds. However, there are challenges persisting such as: -

- (i) Limited statistics on improved bulls in the country due to weak registration systems;
- (ii) Expensive purchasing and caring costs of improved bulls comparing to Artificial Insemination technology; and
- (iii) Inadequate control among existing bulls over inbreeding.

Strategies to be implemented to enhance the use of improved bulls include: -

- (i) Creating enabling environment for private sector engagement in importation of improved bulls as well as providing incentives and relieve levies involved in importation of improved bulls;
- (ii) Strengthening livestock identification, registration and traceability systems;
- (iii) Establishing and operationalizing bulls' identification and selection from existing farms and farmers within Tanzania ; and
- (iv) Produce improved bulls from Livestock Multiplication Units and sale to livestock farmers.

5.1.3 Strengthening Livestock Multiplication Units (LMU)

In order to step up production of beef and dairy cattle in 14 NARCO ranches and 5 Government Livestock Multiplication Units, the following strategies will be implemented:

- (i) Increasing breeding stock in five (5) Livestock Multiplication Units from 5,109 to 21,200;
- (ii) Constructing of water infrastructure; boreholes and charcoal dams for livestock in LMUs ; and
- (iii) Purchasing of farm machinery (bailers, choppers, mowers, hay rake, tractors and vehicles) for pasture production.

The aim is to increase the population of pure and crossbreed's heifer for sale to livestock farmers at affordable price.

5.1.3.1 Cost- Benefit Analysis on Investment at Mabuki Livestock Multiplication Unit

The Costs and Benefits analysis performed at Mabuki Livestock Multiplication Unit (LMU) reveales that if the farms are invested at full capacity and efficiently utilized, it has the potential to make significant profit. These benefits are outlined in the following commercial indicators: -

(i) Cost- Benefit Ratio

Costs and Benefits analysis on investment provides that the Benefit Cost Ratio for Mabuki Livestock Multiplication Unit (LMU) is TZS. 2.51 of which every one shilling invested in Mabuki (LMU) will in turn produce two shillings and fifty-one only.

(ii) Net Present Value - NPV

The analysis reveals that, the Net Present Value is TZS. 17,653,657,877 and repayment period is 13 months.

(iii) Internal Rate of Return – IRR

Production costs analysis of Mabuki LMU and the revenue to be generated from the sale of cattle and milk also reveals that, the Internal Rate of Return (IRR) is 92%.

5.1.3.2 Cost- Benefit Analysis on Investment at Kitulo Livestock Multiplication Unit

Costs and Benefits analysis on investment at Kitulo Livestock Multiplication Unit (LMU) reveals that the farm has huge potential to make a significant profitability as compared to the costs to be invested. Analysis indicates that even without the economic and social benefits considerations, strengthening the Kitulo Livestock Multiplication Unit, has the potential to generate profits for every Shilling invested, (attachment No. 1b). as outlined in the following indicators: -

(i) Cost- Benefit Ratio - BCR

Costs and Benefits analysis on investment indicates that the Benefit Cost Ratio for Kitulo Livestock Multiplication Unit (LMU) is TZS. 2.21, which means for every one shilling invested in Kitulo (LMU) it will in turn produce two shillings and twenty-one cents.

(ii) Net Present Value – NPV

The Net Present Value is TZS. 28,520,420,484 with the repayment period of 13 month.

(iii) Internal Rate of Return – IRR

Production costs analysis in the Kitulo LMU reveals that the Internal Investment Cost Rate (IRR) is 70%.

5.1.3.3 Cost-Benefit Analysis on Investment at Ngerengere Livestock Multiplication Unit

Costs and Benefits analysis on investment at Ngerengere Livestock Multiplication Unit (LMU) reveals that even without the economic and social benefits the farm has the potential to generate profits for every Shilling invested, (attachment No. 1c). These benefits are outlined in the following indicators: -

(i) Cost- Benefit Ratio

The Benefit Cost Ratio for Ngerengere Livestock Multiplication Unit (LMU) is TZS. 2.10. This reveals that for every one shilling invested in Ngerengere (LMU) it will produce two shillings and ten cents.

(ii) Net Present Value - NPV

The Net Present Value is TZS. 3,344,206,058 with the repayment period of 15 months.

(iii) Internal Rate of Return – IRR

Production costs analysis provides that the Internal Investment Cost Rate (IRR) is 43%

5.1.3.4 Cost- Benefit Analysis on Investment at Nangaramo Livestock Multiplication Unit

Costs and Benefits analysis on investment at Nangaramo Livestock Multiplication Unit (LMU) revealed that if it is capitalized for full investment, using the resources available and utilized at full capacity, it has the potential to make a significant profit compared to the costs to be invested. Analysis also provides that even without the economic and social benefits of strengthening the Nangaramo LMU, still the farm has the potential to generate profits for every Shilling invested, (attachment No. 1d). These benefits are outlined in the following indicators: -

(i) Cost- Benefit Ratio

The Cost- Benefit Ratio for Nangaramo Livestock Multiplication Unit (LMU) is TZS. 1.44, which means for every one shilling invested in Nangaramo (LMU) it will generate one shilling and forty-four cents.

(ii) Net Present Value - NPV

The Net Present Value is TZS. 2,297,209,701 and the repayment period is 18 months.

(iii) Internal Rate of Return – IRR

Production costs analysis in the Nangaramo LMU and the various revenue generated from the sale of cattle and milk reveals that the Internal Investment Cost Rate (IRR) is 23%.

5.1.3.5 Cost- Benefit Analysis on Investment at Sao Hill Livestock Multiplication Unit

Like other farms, the Costs and Benefits analysis on investment at Sao Hill Livestock Multiplication Unit (LMU) also reveals that the farm has the potential to generate profits

for every Shilling invested, (attachment No. 1e). These benefits are outlined in the following indicators: -

(i) Cost- Benefit Ratio

The Cost- Benefit Ratio for Sao Hill Livestock Multiplication Unit (LMU) is TZS. 4.52. This means that for every one shilling invested in Sao Hill (LMU) it will generate four shillings and fifty-two cents.

(ii) Net Present Value - NPV

The analysis shows that, the Net Present Value is TZS. 21,588,419,427 and the repayment period is 12 months.

(iii) Internal Rate of Return – IRR

Production costs analysis in the Sao Hill LMU and the various revenue generated from the sale of cattle and milk has revealed that the Internal Rate of Returns (IRR) is 180%, if the investment produces at full capacity.

5.2 Strengthening Pasture and Water Services for Livestock

5.2.1 Pasture

A total number of Livestock Units (LU) in Tanzania is 41.2 million requiring a grazing area of 103¹ million hectares. As of 2022, the grazing land demarcated from the villages through Village Land Use plan (VLU) is only 3.06 millions hectares. In order to meet pasture requirement for 41.2 millions Livestock Units per year, the grazing lands must be developed and managed through acts such as planting pastures, reducing shrubs/bush, clearing and removing invasive weeds.

¹ This demand of grazing lands is based on the ratio of one Livestock Unit to 2.5 Hacters of grazing land.

While demand for Pasture seeds in the country is approximately 22,954 tonnes per year, the production of pasture seeds from Government and private farms is 11.41 tonnes per year, thus resulting in shortage of 22,943 tonnes per year.

The following challenges continue to hamper efforts in pasture and pasture seeds production in the country: -

- (i) Limited access to pasture seeds;
- (ii) Presence of prolonged drought;
- (iii) Presence of invasive weeds species in grazing lands;
- (iv) Most of Grazing lands have not been demarcated, registered and gazetted; and
- (v) Inadequate awareness of farmers on pasture farming to ensure availability of pasture throughout the year.

Strategies for developing grazing areas and pasture seeds production include: -

- (i) Increasing pasture seeds production in Government farms and encouraging the private sector to invest in pasture and pasture seeds production;
- (ii) Establishing commercialized Pasture Seeds production Farms such as Shishiyu Holding Ground (Maswa), Hanga Ngadinda Farm (Ruvuma) and Mivumoni (Pangani);
- (iii) Allocating, demarcating, surveying, issuing title deeds and gazetting grazing areas;
- (iv) Certification of pasture seeds;
- (v) Undertaking researches and developing appropriate technologies for invasive weed control; and
- (vi) Establishing Farmers Field Schools for raising awareness on pasture farming and pasture varieties according to ecology.

5.2.2 Water for Livestock

The production of healthy and productive livestock highly depends on the availability of reliable water sources. The 41.2 million livestock units consume an average of

5,263,300,000 liters of water per year equivalent to 35 liters of water per day per livestock unit.

To date, the existing total number of charcoal dams are 1,384 compared to actual demand of 1,843 charcoal dams, creating a gap of 456 charcoal dams. Likewise, the existing bore holes are 104 while the actual demand stands at 225.

Inadequacy of pasture and water has led to several deaths of livestock particularly in Arusha, Kilimanjaro, Manyara, Morogoro, Tanga and Coast regions.

Challenges facing availability of water for livestock include: -

- (i) Limited participation of livestock farmers and the private sector in construction and maintenance of water infrastructure for livestock;
- (ii) Inadequate management and sustainability of water infrastructures upon completion and handing over; and
- (iii) Presence of prolonged and severe drought in some areas.

In collaboration with livestock farmers and other stakeholders, the following strategies will be implemented to improve accessibility to water: -

- (i) Sensitizing and engaging livestock farming communities to contribute on construction of water infrastructure for livestock;
- (ii) Constructing 300 charcoal dams;
- (iii) Drilling 250 bore holes;
- (iv) Providing education to livestock farmers on water conservation and management ;
and
- (v) Incorporating water requirements for livestock into water projects for human consumption.

5.2.2.1 Cost-Benefit analysis of Investing in Enhancing pasture and Water availability for Livestock

Analysis of Benefits and Investment Costs using the 9% interest rate, on grazing area and water for livestock reveals that this area is not commercially viable compared to the costs to be invested. However, the area plays a key role in increasing productivity of livestock products and thus contributing to the availability of raw materials in the meat and dairy processing industries as well as food security in the country. The analysis is as outlined below: -

(i) Cost-Benefit Ratio

The Cost Benefits Analysis set out in Appendix No.2 indicates that the ratio of Profit and Costs in the grazing and water area for livestock is 0.53. This means that every single shilling invested in strengthening availability of pasture and water for livestock will produce fifty-three cents.

(ii) Net Present Value - NPV

The Net Present Value is TZS (113,131,416,095). Thus, investment in the pasture production and water area for livestock creates a loss of shillings 113,131,416,095. However, the area has significant economic and social benefits (Socio-Economic Variability) such as increased productivity in livestock products especially dairy products as well as reduction of land conflicts between pastoralists and other land users.

5.3 Strengthening Animal Health

5.3.1 Control of Tick-borne Diseases

Uncontrolled tick-borne diseases account for 72 percent of all cattle deaths in the country. These include East Coast Fever (ECF), Anaplasmosis, Babesiosis and Heart Water. The losses are at 150 billion shillings per year due to deaths and medical expenses. Other negative consequences include reduced quality products, leather value depreciation, weakening working of animals (oxenization); abortion and calf stunting.

Timely livestock dipping and vaccination in a period of three years could assist in reducing mortality from 72% to 36% and losses by 70% from 150 billion shillings to 45 billion shillings per year. In addition, other zoonoses diseases such as rabies, anthrax and Brucellosis, continue to affect human's health. Therefore, intervention to vaccinate and eradicate these diseases remains crucial. Prevalency of Transboundary Animal Diseases (TADs) such as Foot and Mouth Disease (FMD) constraints trade in livestock and animal products locally and abroad, depriving revenue of the country.

Through coordinated vaccination efforts nationwide, diseases such as Rinderpest has been eradicated in Tanzania. According to the World Animal Health Organization (OIE), up to 70% of existing livestock vaccines are needed in order to produce positive results in the control of Livestock diseases. Tanzania has attained only 10% of required livestock vaccination, and factors contributing to low rate include –

- (i) Unaccessible vaccines for some veterinary diseases when needed;
- (ii) The high cost of animal vaccines imported from abroad;
- (iii) Inadequate awareness of farmers on the importance of regular animal vaccination; and
- (iv) Lack of necessary infrastructure to facilitate international trade (eg. quarantine centers and holding grounds).

5.3.2 Availability of Vaccines in the Country

Despite of producing vaccines from 3 factories, the imports continue to account 60% to 70% of the country's demand. In reducing the burden of foreign exchange spending from importation, the country could benefit from the following massive internal production: -

- (i) Obtaining vaccines that are consistent to parasites present in the country;
- (ii) Controlling the potential for introduction of new animal disease parasites into the country through imported vaccines;
- (iii) Building capacity of local experts; and

- (iv) Selling at affordable prices and guaranteeing adequate coverage of vaccines to farmers.

5.3.3 Strengthening Research and Production of Vaccines

The country's production of vaccines stands at 65,000,000 doses per year compared to 841,104,000 doses required per year. Out of 13 critical identified diseases in the country, only seven (7) vaccines are being produced by the Tanzania Veterinary Laboratory Agency (TVLA) through its Tanzania Vaccine Institute (TVI) which are: -

- (i) Anthrax;
- (ii) Black Quarter;
- (iii) Combination of Anthrax and Black Quarter (Blanthrax);
- (iv) New Castle;
- (v) Brucellosis;
- (vi) Contagious Bovine Pleuropneumonia (CBPP); and
- (vii) Contagious Caprine Pleuropneumonia (CCPP)

Efforts to enhance production capability of existing vaccine and new vaccines must be complimented by strengthening of the Agency's storage and distribution infrastructure. In addition, various concerted efforts are being deployed to enhance the Agency's internal capacity to be able to produce vaccines for the following diseases: -

- (i) Foot and Mouth Disease (FMD);
- (ii) East and Coast Fever (ECF);
- (iii) Peste des Petits Ruminants (PPR);
- (iv) Lumpy Skin Diseases (LSD);
- (v) Rabies;
- (vi) African Swine Fever; and
- (vii) Infectious Bursitis.

5.3.4 Strengthening TVLA's ability to Test Livestock Pesticides and Chemical Residues on Livestock Products for Ensuring Drug Stability and Food safety

The Government's role to test and register animals' pesticides as well as monitoring the quality and effectiveness of pesticides, will be maintained and improved accordingly. Therefore, efforts by the Agency to provide quality services, to have laboratories capable of testing samples of animal pesticides, efficacy of dip wash and animal products, will involve building the capacity of human resources to function in internationally accepted standards.

5.3.5 Ensure the Safety of Livestock and Livestock Products to Facilitate International Trade

In order to ensure safety of livestock and livestock products to meet international trade requirements we need to improve livestock facilities. The facilities will be improved to cater for needs of livestock health and animal products safety, including livestock holding grounds and quarantine stations in accordance to safety requirements of conducting foreign trade as articulated by the World Animal Health Organization (OIE) and World Trade Organization (WTO).

5.3.6 Private Sector Involvement in Strengthening Livestock Health

The involvement of stakeholders including private sector, financial institutions, industrial investors, livestock farmers, traders, processors in areas of veterinary services, production of vaccines, as well as construction of veterinary infrastructure such as dips, fittings and veterinary clinics; will be emphasized. The government plan is to make bulk procurement of East Coast Fever; and Foot and Mouth Disease vaccines and distribute them to private sector at affordable prices for effective dissemination of vaccines and diseases control.

5.3.7 Strategic Activities for Improving Animal Health

In order to improve animal health, quality control of livestock inputs and facilitate the achievement of safety standards for livestock and livestock products to meet domestic and international trade requirement, the following functions will be implemented: -

- (i) Strengthening vector born disease control;
- (ii) Strengthening surveillance system, prevention and control of viral and bacterial diseases;
- (iii) Strengthening vaccines production institutions specifically TVLA and other private companies;
- (iv) Stregthening research on vaccines and animal diseases; and
- (v) Establishing comprehensive ICT systems for disease surveillance.

5.3.7.1 Cost-Benefit analysis of Investing in Animal Health

Analysis of Profits and Investment Costs using the 9% interest rate in the area of livestock improvement, reveals that if this area is fully funded and invested by using available resources; then the area has the potential to make a profit compared to the costs involved as follows: -

(i) Benefit Cost Ratio

Cost Benefits analysis provides that the ratio of Profit and Costs in the area of animal health improvement is 1.03 shillings, meaning that in every single shilling invested in improving animal health, it will generate one shilling and three cents.

(ii) Net Present Value (NPV)

Analysis also provides that, if the area to improve animal health is invested properly it is possible to repay the money within 37 months. In addition, the Net Present Value is TZS 24,487,410,006. Thus, investment in the livestock health

sector may increase the Livestock Sector's contribution to Government revenue and GDP as a whole.

(iii) Internal Rate of Return (IRR)

Analysis of production costs in improving animal health and the various benefits that can be gained from washing and selling vaccines for Foot and Mouth Disease (FMD), East Coast Fever (ECF), Rabies, Lumpy Skin Disease (LSD), Gumboro and PPR in Goat and Sheep indicates that the Internal Investment Cost Rate (IRR) is 13.8 percent.

5.4 Improving extension services

Extension services are important to livestock farmers in learning and adoption of appropriate farming technology. The available data indicates that there are only 3,642 extension officers compared to the actual demand of 13,279 extension officers. This situation results in a shortage of 9,995 extension officers in the country.

The provision of extension services is constrained by inadequate training centers, inadequate equipment and transport facilities especially motorcycles and vehicles, as well as limited availability of demonstration farms/farmer field schools to enable hands-on skills for professionals and extension officers in the country.

Strategies to address challenges associated with extension services include: -

- (i) Strengthening extension services delivery and increasing coverage to livestock farmers; and equipping extension officers with transport facilities including 4,016 motorcycles and 184 vehicles for extension officers in 184 Councils, 3,956 wards and 61 Ministry centers;
- (ii) Purchasing Artificial Insemination Kit for Livestock Extension Officers (WLEOs and VLEOs) in strategic areas of the Southern and Northern highlands, Central and Western regions, and Coastal and Lake Zones;
- (iii) Building capacity to farmers on commercial livestock farming;
- (iv) Building capacity to livestock extension officers through training and provision of extension delivery tool kits in Local Government Authorities;

- (v) Strengthening forums with livestock stakeholders across the value chain;
- (vi) Facilitating establishment and strengthening of livestock cooperatives;
- (vii) Establishing and strengthening e-Extension services;
- (viii) Developing an electronic livestock registration system, provision and management of extension services;
- (ix) Strengthening extension services management systems including performance contract agreement; and
- (x) Strengthening Youth and Women Incubation Centres for commercial livestock farming in 3 areas (Lugoba, ZVC Sumbawanga and ZVC Iringa) and establishing 830 Livestock Farmers Field Schools (FFSs).

5.5 Strengthening Livestock Research and Training Services

5.5.1 Livestock Research

Livestock research in the country is managed by the Tanzania Livestock Research Institute (TALIRI). TALIRI carries out its responsibilities through seven centres located in six ecological zones namely; Eastern Zone (TALIRI Tanga), Central Zone (TALIRI Mpwapa and TALIRI Kongwa), Northern Zone (TALIRI West Kilimanjaro), Southern Zone (TALIRI Naliendele), Southern Highlands Region (TALIRI Uyole) and Lake Region (TALIRI Mabuki).

Research in the livestock sector aims to enhance and improve livestock production and productivity, hence contribute to commercialized farming, food security and nutrition and reducing poverty. Currently, researches conducted in the country aim to identify and develop appropriate technologies that will contribute to the development of the livestock sector. In general, livestock research faces various challenges including: -

- (i) Limited investment of financial and human resources to facilitate supportive infrastructures for conducting research activities (eg. modern laboratories and installation of tools and equipment);
- (ii) Inadequate innovative researches that are tailored to address main challenges in livestock sectors;

- (iii) Inadequate dissemination of research findings; and
- (iv) Limited involvement of private sectors in investment on livestock research.

The following results are expected to occur when training and research is strengthened:

- (i) Secure access to quality livestock breeds (cattle, goats, pigs and poultry) that enable productive and commercial farming by producing more and quality livestock products;
- (ii) Availability of quality animal feeds including animal feeds formulation skills based on a combination of natural and low-cost raw materials;
- (iii) Availability of quality fodder seeds which includes seeds from grass pasture, creeping legumes and tree fodders. Such studies will help to reduce the challenge of pasture and ensure secured and commercial livestock keeping;
- (iv) Increase productivity in goat meat production by using the best Bucks and Does that will be obtained through identification, analysis and selection of quality livestock;
- (v) Capacity building of local livestock researchers and facilitate networking and partnerships with other international researchers; and
- (vi) Increase productivity of livestock sector and stimulate investment to processing industries, contributing to an increase in the total GDP.

The strategies to be implemented are: -

- (i) Building capacity for livestock researchers;
- (ii) Strengthening livestock research institutions with appropriate research infrastructure and facilities;
- (iii) Dissemination of research information using simple language and methodologies;
- (iv) Establish mechanisms for research, training and extension linkages;
- (v) Organize monthly consultative meetings with stakeholders for experience sharing;
- (vi) Promoting innovative and action-based researches; and
- (vii) Strengthening livestock research collaborations.

5.5.2 Livestock Training

Livestock training aims to develop human resources capacity for the livestock sector through training programs and skills development. Livestock Training Agency (LITA), private sector colleges and institutions of higher learning especially Sokoine University of Agriculture (SUA), and the Nelson Mandela African Institute of Science and Technology (NM-AIST) are major sources of expertise in livestock training in the country.

Strategies for training improvement are as follows: -

- (i) Strengthening livestock training institutions;
- (ii) Improving teaching and learning infrastructure to livestock training institutions;
- (iii) Curriculum for Livestock Training Institute reviewed in order to meet demand of the sector;
- (iv) Strengthening out-reach programmes; and
- (v) Demarcating and securing land of training institutions owned by the Ministry of Livestock and Fisheries to reduce land conflicts.

5.6 Value Addition of Livestock Products

In adding value to livestock products, this plan focuses on creating a conducive environment for the private sector to invest in the value chain for production and processing of livestock products especially meat, dairy and hides/skin. The Plan focuses on facilitating investment in the livestock products industry.

5.6.1 Leather Industries

In 2022, Tanzania has four (4) Tanneries which include Himo Tanneries and Planters, Moshi Leather Industries Ltd, Ace Leather Ltd and Phiss Tannery. These tanneries have the capacity to process 2,196,000 pieces of hides and 14,538,000 pieces of goat/sheep skin per year. Also, there are six (6) leather goods factories which are Bora Industries Ltd, Himo Tanneries and Planters Ltd, Woiso Shoes, Ital Shoes Ltd, Kilimanjaro International

Leather Company Ltd and Small-Scale Enterprises (SMEs). These tanneries produce 3,051,000 pairs of shoes per year.

Challenges of the leather processing industry include: -

- (i) Poor quality of hides and skin produced as a result of poor animal husbandry that does not adhere to the principles of good husbandry especially improper branding and poor dehidng techniques;
- (ii) Inadequate awareness of traders on leather market standards and requirements;
- (iii) Inadequate drying and storage facilities of hides/skin;
- (iv) Presence of alternative markets for hides and skin which do not require quality graded hides and skin; and
- (v) Shortage of abattoirs with modern technology and equipment for handling of hides and skin.

In order to facilitate the leather industries, the following strategies will be implemented:

- (i) Promoting marketing of livestock, hides and skin, and leather through electronic Warehouse Receipt System;
- (ii) Promoting quality of hides and skin through building capacity of livestock farmers, traders, Flayers, Hides and Skin Inspectors and Graders;
- (iii) Promoting value addition of leather products; and
- (iv) Strengthening policy and legal framework for leather industry development.

5.6.2 Meat Industries

5.6.2.1 Livestock Fattening

In order to ensure availability of quality meat for existing meat processing industries in the country, the Government will embark into establishment of livestock fattening projects to empower employability to graduates in the livestock sector. The process will be implemented through Women and Youth Incubation Centres, whereas, the centers will be established in areas with reasonable proximity to meat processing industries such as Elia Foods Overseas Limited (Arusha); TanChoice (Pwani); Alpha Choice; and Chobo

(Mwanza). The fattening will be done under a semi-intensive grazing system where the animals will graze on existing natural pastures and be supplemented with additional feed including maize bran, sunflower cake, premix and salt.

The project is expected to start with livestock weighing approximately 200 kg. At the end of the fattening period (approximately three months), the animals are expected to weigh an average of 290 kg following a daily increase of 1 kg per animal. In addition, the project will involve 60 groups of 40 young people per group where they will be provided with a capital of 23,302,750.00 shillings per group for facilitation of fattening. The funds will be in the form of a revolving fund to cover the costs specified in the table below: -

Table No.2: Operational and Investment Cost for Fattening Through Youth Incubation Centers

S/N	DESCRIPTION	QTY	WEIGHT(KGS)	RATE (TSHS.)	AMOUNT PER YEAR
Expenses for buying beef cattle					
1	Buying Cattle	40	200	400,000	16,000,000.00
Sub-Total					16,000,000.00
Other expenses					
2.	Vaccination				
	- FMD	1	Vial/100	350,000.00	350,000.00
	- CBPP	1	Vial/100	25,000.00	50,000.00
	- ECF	1	Vial/40	350,000.00	350,000.00
3.	Dipping-Accaricide • Supona	1	Litres	95,000	95,000.00
4.	Antibiotics				
	i. Pen strep and OTC injections	2(25 0mls)	Bottle	25,000	50,000.00 20,000.00
	ii. OTC powder & spray	2	Bottle	10,000.00	
5.	Ant inflammatory - Dexamethazone	10 (30mls)	Bottle	8,000.00	80,000.00
6.	Anthelmintic - Albendazole 10%	3	Litre	15,000.00	45,000.00
7.	Antiprotozoal - Butarex	2	Bottle	80,000.00	160,000.00
8	Beef house construction				500,000.00
9	Feed and water troughs				300,000.00

10	Cleanliness equipment	-			
	-Gun boots +overcoat/overall			40,000.00	80,000.00
	-Brooms	10		1000.00	10,000.00
	-Slasher	2		5,000.00	10,000.00
	-Spade	2		10,000.00	20,000.00
	-Hand hoes	2		5,000.00	10,000.00
11	supplement				
	-Cotton seed cake	1,06 3 kgs		1,000	1,063,000
	-Mineral block	90		3,000	270,000.00
	-Maize bran	2,126kgs			1,275,750.00
	-Salt	160 kgs			44,000.00
12	Wages for labours	2	Month	210,000.00	2,520,000.00
	SUB- TOTAL (OTHER EXPENSES)				7,302,750.00
	INVESTMENT CAPITAL				23,302,750.00

5.6.2.2 Poultry and Piggery Farming

Poultry Farming

Out of 35% of subsistence households in Tanzania, 53% of them are involved in poultry farming, while 1% are involved in pig farming. According to the analysis in the Tanzania Livestock Master Plan (TLMP) poultry farming can contribute to bridging the gap between meat production and consumption in the country. If there is sufficient investment in poultry farming, white meat production can close the meat supply gap, resulting a surplus of 35% of the white meat that can be exported to generate foreign currency.

Investment in the poultry industry, with analysis on identification and selection of good quality poultry; control of poultry diseases especially Newcastle and Gumboro; extension services for poultry farmers; and mobilization of the private sector to invest in the production of chicks and poultry feed, will enable the poultry industry to contribute effectively to the development of society and the economy as a whole. The analysis revealed that, poultry industry has the potential to contribute to improving food security and nutrition for households and increase the poultry industry's contribution to GDP by

182 percent from 256 billion shillings to 723 billion shillings; contributing significantly in bridging the meat production and consumption gap in the country.

Pig Farming

Interventions to improve commercial pig production will increase pork production by 59%. Production could increase from 22,025 to 37,191 tons within five years (2022/23 - 2026/27). Commercial pig farming can enable households to increase income and enhance food and nutrition security, reducing poverty and contribute to social and economic development in general. Analysis has shown that, if pig farming is properly invested, it could contribute to GDP by 83%, generating 80 billion shillings from 44 billion shillings within five years (2022/23 - 2026/27). This will eliminate a deficit in pork production and consumption from 8,000 tonnes to an additional 1,350 tonnes by 2026/27.

Moreover, an increase in pork production will reduce the country's meat prices and increase pork exports, which will contribute to an increase in foreign exchange earnings. The Ministry in collaboration with various stakeholders will provide education and encourage good husbandry in pig farming to increase meat production and consumption to bring leaven to industry and improve meat processing in the country.

5.6.2.3 Livestock Markets

Livestock auctions are conducted in accordance by the Meat Act No. 10 of 2006 and the Animal Diseases Act No.17 of 2003 and their regulations. In addition, there are three types of livestock markets which are primary (504), secondary (14) and border (12) markets. In order to enable the livestock trade to be successful in livestock market, there is a need to build appropriate infrastructure, rehabilitate existing infrastructure to bring it to the required standards by the country's meat processing industry, as well as the export markets.

Many livestock markets in the country have inadequate necessary infrastructure for facilitating livestock trade including perimeter fencing, barns and water infrastructure. As a

result, it reduces service delivery efficiency and increase revenue loss. Challenges facing livestock marketing include; -

- (i) Inadequate awareness to livestock farmers on the fattening system to ensure the best raw materials for cattle processing industries;
- (ii) Inadequate information on market opportunities for livestock, livestock products and low integration between livestock farmers, producers, processors and modern abattoirs especially those on exporting facilities;
- (iii) Inadequate quarantine stations that meet the requirements of the World Trade Organization (WTO) and World Animal Health Organization (OIE); and
- (iv) Existence of nuisance levies/taxes affecting competitiveness of meat produced from Tanzania for foreign markets.

To a large extent, the strategies to develop the meat industry involve creating a conducive environment for better livestock production and trade. Thus, the following strategies will be implemented to facilitate the meat processing industry: -

- (i) Promoting value addition through processing and fattening of livestock for domestic and export markets;
- (ii) Enhancing and strengthening digital market information sharing for livestock and livestock products;
- (iii) Reviewing fees and levies on livestock products that are nuisance for investment in value addition of livestock products; and
- (iv) Constructing and improving livestock markets.

5.6.3 Milk Processing Industries

Tanzania has a total of 105 dairy factories with a capacity of 711,000 litres per day, of which five factories (ASAS, Milkcom, Tanga Fresh, AZAM Milk and Kilimanjaro Creameries) process milk that can be stored for six months without spoiling (UHT). The milk processed in 2020/21 were 75.9 million litres. Despite of the increase in milk production from year to year, the processing capacity is low (3%). In addition, the livestock sector's goal is to increase the number of dairy cows through Artificial

Insemination of 1,000,000 cows annually in order to facilitate supply of raw materials for industrial processing.

Existing Milk Collection Centers are managed and operated by cooperatives of dairy livestock farmers, processors and vendors or traders who collect milk and sell it to factories or to consumers directly. There are currently 69 milk collection centers operating in the country. These centers are estimated to collect 97,319,306 litres of milk per year which is equivalent to 55% of the milk that enters the formal market system. About 30% are equipped with milk coolers. Inadequate milk collection centers with appropriate facilities contributes to existing dairy processing plants in the country using an average of 5% of the installed capacity.

The dairy industry faces the following challenges:

- (i) Shortage of milk collection centers with appropriate facilities and equipment;
- (ii) Informal market systems which take more than 97% of locally produced milk;
- (iii) Inadequate Dairy Technologists; and
- (iv) Shortage of milk supply in areas with dairy processing industries.

Strategies to facilitate milk processing includes: -

- (i) Improving business environment for dairy industry;
- (ii) Expanding milk market demand by promoting milk consumption including school milk feeding programs;
- (iii) Establishing and promoting the use of milk collection centers;
- (iv) Establishing and strengthening dairy farmers' cooperatives; and
- (v) Encouraging the private sector to construct processing plants for strategic dairy commodities (including powdered milk).

5.6.3.1 Analysis of Cost-Benefit for Investing in Livestock Products Value Addition

The analysis of profitability and cost of investment using 9% interest rate, in the area of value addition of livestock products has revealed that if this area is efficiently invested and available resources are optimally utilized, the area has the potential to make a profit compared to costs to be invested as follows: -

(i) Cost-Benefit Ratio

Cost Benefits Analysis shows that the ratio of benefits and costs in the area of value addition is 3.09 shillings. This means that every single shilling invested will produce three shillings and nine cents.

(ii) Net Present Value - NPV

The analysis revealed that, if the value addition is properly invested, it is possible to repay the money within 2 years. In addition, Net Present Value is TZS 57,835,038,927. Thus, public investment in the area of value addition could increase the contribution of the livestock sector to Government revenue.

(iii) Internal Rate of Return – IRR

Analysis of the cost of investment in strengthening livestock infrastructure has revealed that the Internal Investment Cost Rate (IRR) is 83%.

5.6.4 Livestock Development Fund

In order to ensure availability of funds for the development of the livestock sector, Livestock Development Fund (LDF) will be strengthened. Sources of revenue for the fund will include levies arising from the livestock trade and its products. In addition, 15% of the revenue collected by Local Government Authorities from the livestock sector will be included in the LDF. Among other responsibilities, the Fund will be used to carry out the following functions: -

- (i) Improving pastures and water for livestock;
- (ii) Improving livestock marketing infrastructure;
- (iii) Improving animal health facilities;
- (iv) Equipping and retooling livestock Extension Officers; and
- (v) Capacity building of livestock farmers in modern and commercial farming.

The strategies to strengthen and operationalize LDF will be: -

- (i) Institutionalizing LDF into policy and legal framework; and
- (ii) Engaging stakeholders including livestock farmers in mobilizing financial resources for LDF.

5.6 Strengthening National Ranching Company

The number of livestock in the National Ranch Company (NARCO) has been declining between the period of 2003/04 to 2013/14 from 39,187 cattle to 14,405 cattle. In addition, between the period 2013/14 to 2021/2022 the number of livestock increased from 14,405 to 16,601 cattle. Also, the Company has started a dairy cattle project at Kikulula Ranch where there are currently 72 dairy cows. However, there are various challenges facing NARCO including: -

- (i) Decreased production after lack of investment for approximately 14 years (1992 - 2006) the period under which the Company was placed under Bankrupt;
- (ii) Lack of capital which leads to sale of livestock in order to raise funds for various activities of the Company which hinders restocking rate;
- (iii) Frequent droughts resulting in shortages of pasture and water due to NARCO's limited investment; and
- (iv) Invasion of ranch areas from other land users which has led to a decrease in ranch areas, resulting in frequent outbreaks of livestock diseases.

In order to address the challenges facing the National Ranch Company, significant investment is needed in enhancing quality livestock production to increase trade in meat, dairy and livestock products. In strengthening livestock production, the Company will construct and rehabilitate various infrastructures including livestock fattening, purchase of

machinery, tools and farm machinery at eight (8) out of fourteen (14) ranches owned by NARCO. If NARCO is enabled to invest fully (production at full capacity), it can make a significant contribution into the development of the livestock sector to benefit livestock farmers and other livestock stakeholders.

Some of the benefits of strengthening NARCO include: -

- (i) Increase in the number of livestock farmers receiving education on fattening and pasture farming from 324 pastoralists to 600 pastoralists per annum thus increasing productivity.
- (ii) Increase meat production from 400 tons to 800 tons per year.
- (iii) Increase milk production from 20,000 to 1,800,000 litres per year
- (iv) Number of cattle bought for fattening will increase from 1,500 to 5,800 cattle per year.

Over the next 10 years from 2022/2023, it is envisaged that, NARCO will increase production and marketing of livestock and livestock products. The investment benefits are outlined as follows;

(i) Cost-Benefit Ratio

Analysis of the benefits and investment costs of strengthening the National Ranch Company has revealed that if the Company is provided with capital for full investment and utilizing 100% of the available resources, the Company can make a significant profit compared to the costs invested. Analysis has shown that even without including the economic and social benefits of strengthening the National Ranch Company (Appendix No. 6), it can make profit on every shilling invested. These benefits are outlined in the following indicators:

(ii) Profit Cost Ratio

Using the 9% interest rate, Cost-Benefit Analysis shows the Benefit-Cost Ratio of TZS 2.14 for the Company. This means that for every shilling to be invested in the Ranch Company it will generate two and fourteen shillings.

(iii) Net Present Value - NPV

Funds invested for NARCO can be returned within two years and one month. The Net Present Value is TZS 68,627,296,690.32. Thus, NARCO will be able to make a budget contribution to the Government instead of being dependent to the Ministry.

(iv) Internal Rate of Return (IRR)

An analysis of the trend in production costs and the various revenues that can be obtained from sale of cattle, sheep, goats, hay, pasture seeds, milk, skin and other livestock products have revealed that the IRR is 40%. Thus, NARCO is highly productive if the investment is done at its optimal capacity.

6 IMPLEMENTATION PLAN

The Livestock Sector Transformation Plan (LSTP) will engage all stakeholders for financing and implementation. The Ministry will develop action plan in collaboration with stakeholders for effective implementation. For effective communication, the Ministry will develop a profile of livestock stakeholders, conduct monthly online dialogue and collect feedback from stakeholders' activities in quarterly basis. Furthermore, the plan will involve monitoring and evaluation according to developed performance indicators and milestones.

Attachment No.2 Cost for Implementation of the Transformation Plan for the period of 2022/23-2026/7

AREA	ACTIVITIES TO BE IMPLEMENTED	2022/23	2023/24	2024/25	2025/26	2026/27	Total
Access to Quality Livestock breeds	1.1 Inseminating 1,000,000 cows annually for five (5) years.	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	60,000,000,000
	1.2 Strengthening the National Artificial Insemination Center (NAIC) Arusha by providing improved and equipment including 3 Nitrogen Cold rooms and seed cooling machines.	1,005,000,000	1,880,000,000	645,000,000	405,000,000	225,000,000	4,160,000,000
	1.3 Strengthening Mabuki Livestock Multiplication Unit	3,925,747,203	1,965,484,243	1,994,244,627	823,837,622	854,545,974	9,563,859,669
	1.4 Strengthening Kitulo Livestock Multiplication Unit	6,238,070,879	4,480,541,781	4,822,304,081	1,758,029,443	1,804,430,809	19,103,376,993
	1.5 Strengthening Ngerengere Livestock Multiplication Unit	1,590,414,174	191,960,284	199,823,414	208,017,245	216,556,064	2,406,771,182
	1.6 Strengthening Nangaramo Livestock Multiplication Unit	2,507,396,432	657,524,265	758,585,283	252,884,908	282,766,909	4,459,157,797
	1.7 Strengthening Sao Hill Livestock Multiplication Unit	3,224,533,765	636,715,998	742,619,937	304,826,294	341,750,364	5,250,446,358
Sub total		30,491,162,452	21,812,226,572	21,162,577,342	15,752,595,513	15,725,050,119	104,943,611,999
Strengthening Water services, pasture and feeds for livestock.	1.8 Construct 300 livestock charcoal dams in areas worst affected by drought and predominantly livestock regions.	36,000,000,000	144,000,000,000	72,000,000,000	72,000,000,000	36,000,000,000	360,000,000,000
	1.9 Drilling 250 boreholes for livestock in drought-affected areas and predominantly livestock regions	20,000,000,000	10,000,000,000	10,000,000,000	6,000,000,000	4,000,000,000	50,000,000,000
	1.10 Allocating and measuring 3,000,000 hectares of lands including livestock holding ground and grazing land.	30,000,000,000	105,000,000,000	105,000,000,000	105,000,000,000	105,000,000,000	450,000,000,000

	1.11 Bush pruning of 2500 Hectares of Government and institutions including Langwira and Vikuge LMU	AND	360,000,000	360,000,000	360,000,000	180,000,000	1,500,000,000	
	1.12 To purchase pastures seeds	175,000,000	25,000,000	1,000,000	1,000,000	1,000,000	203,000,000	
	1.13 To purchase tractor and its equipment	1,250,000,000	1,250,000,000	0	0	0	2,500,000,000	
	1.14 To purchase 10 bailers, 10 Mower and 10 hay rakes	725,000,000	725,000,000		0	0	1,450,000,000	
	1.15 To install irrigation system for seed and pastures at Langwira and Vikuge Livestock Multiplication Units	3,000,000,000	2,200,000,000	100,000,000	100,000,000	100,000,000	5,500,000,000	
	1.16 To construct warehouses for storage of seed and pasture in 10 Livestock Multiplication Units of Government institutions.	1,000,000,000	2,000,000,000	2,000,000,000			5,000,000,000	
	1.17 To purchase 2 vehicles (Land Cruiser) for office operations at Vikuge and Langwira Livestock Multiplication Units	0	400,000,000	20,000,000	20,000,000	20,000,000	460,000,000	
	1.18 To purchase feed trucks	0	420,000,000	20,000,000	20,000,000	20,000,000	480,000,000	
	1.19 To procure fertilizers and herbicides	300,000,000	500,000,000	500,000,000	500,000,000	500,000,000	2,300,000,000	
Total area		92,690,000,000	266,880,000,000	190,001,000,000	184,001,000,000	145,821,000,000	879,393,000,000	
2	Strengthening livestock health	2.3 To construct 8,657 cattle dips in 184 Local Government Authorities	12,500,000,000	50,000,000,000	75,000,000,000	50,000,000,000	28,925,000,000	216,425,000,000
		2.4 To purchase 84 liters of acaricides per dip per year	13,910,400,000	22,310,400,000	34,910,400,000	43,310,400,000	48,169,800,000	162,611,400,000
		2.5 To construct, retool and install equipment for viral and bacterial diseases (Rabies, Skin rash, Gumboro and Pest des Petits Ruminants - PPR) and production	10,500,000,000	4,500,000,000	4,432,000,000	11,150,000,000	14,059,000,000	44,641,000,000

	2.6	To procure equipment for filling and packaging of vaccines (automation machines)			4,000,000,000	4,000,000,000		8,000,000,000
	2.7	To purchase 6 cooling vehicles; and vaccination storage facilities for 160 Local Government Authorities.	0	1,060,000,000	0	0	0	1,060,000,000
	2.8	To strengthen and equip the Research and Immunization Development and Operation Unit		2,000,000,000	1,000,000,000	1,000,000,000	800,000,000	4,800,000,000
	2.9	To purchase East Coast Fever (ECF) vaccines through bulk procurement and sell with reasonable price to pastoralists through private companies.	60,000,000,000	36,000,000,000	24,000,000,000	24,000,000,000	12,000,000,000	156,000,000,000
	2.10	To purchase Foot and Mouth Disease (FMD) vaccines through bulk procurement and sell with reasonable price to pastoralists through private companies.	45,000,000,000	45,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	180,000,000,000
	2.11	To capacitate 64 livestock professionals on vaccine production and biological waste management.	100,000,000	100,000,000	100,000,000	100,000,000	150,000,000	550,000,000
Total area			142,010,400,000	160,970,400,000	173,442,400,000	163,560,400,000	134,103,800,000	774,087,400,000
3	Improving extension services	3.3 To purchase 4,016 motorcycles for Village, Ward Extension Officers and non-tax revenue collection centers.	5,934,000,030	3,560,400,000	2,373,600,000			11,868,000,030

	3.4	To purchase Artificial Insemination Kit for four (4) Livestock Extension Officers in each District Council at Local Government Authorities in two strategic zones.	364,320,000	1,104,000,000	500,000,000	600,000,000	800,000,000	3,368,320,000	
	3.5	To develop electronic livestock registration system, provision and management of extension services and Procurement of Computer facilities and accessories at the Regional and Council level	600,000,000	-		1,500,000,000	1,500,000,000	3,600,000,000	
	3.6	To facilitate computer facilities, telephones and accessories for extension services in Local Government Authorities.	2,800,000,000		1,400,000,000	1,400,000,000		5,600,000,000	
	3.7	To capacitate pastoralists, professionals and livestock stakeholders on the use of the electronic system to provide information and business	500,000,000	600,000,000	400,000,000	400,000,000	400,000,000	2,300,000,000	
	3.8	To strengthen t Farmers Training Centers (FTC) in 3 areas; Lugoba, ZVC Sumbawanga and ZVC Iringa; and establishing 830 Livestock Farmers Field Schools (LFFSs)	3,770,000,000	3,320,000,000	3,320,000,000	3,320,000,000	3,320,000,000	17,050,000,000	
	Sub Total			13,968,320,030	8,584,400,000	7,993,600,000	7,220,000,000	6,020,000,000	43,786,320,030
4	Strengthening livestock research and training	4.3	To conduct research on livestock, grazing and diseases to increase production and productivity.	5,026,909,961	6,920,658,125	6,197,444,700	9,683,000,000	13,683,800,000	41,511,812,786

	4.4	To facilitate LITA to improve teaching and learning environment by building six (6) new lecture halls; seven (7) new hostels; eight (8) new laboratories; eight (8) new libraries; and 120 houses for LITA staff	6,500,000,000	4,000,000,000	3,500,000,000	2,000,000,000		16,000,000,000
	4.5	To strengthen practical training for LITA graduates through outreach programs and excursions to increase competence, resilience and self-employment by purchasing 8 buses in 8 LITA campuses.	1,200,000,000	900,000,000	300,000,000			2,400,000,000
	4.6	To construct and strengthen three training centers in dairy and processing industries of Dairy products at Tengeru (Training for dairy production and processing); Leather at Morogoro (Training in production and processing of leather products); and Meat at Mabuki (Training on production, live livestock trade, meat inspection and meat processing).		1,000,000,000	800,000,000			1,800,000,000
Sub total			12,726,909,961	12,820,658,125	10,797,444,700	11,683,000,000	13,683,800,000	61,711,812,786
5	Facilitating Value Added Livestock Products.	5.3 To build infrastructure at the National Veterinary Inspection Centre and Holding ground for export market in Kwala Coast Region	200,000,000	0	60,000,000	60,000,000	60,000,000	380,000,000

	5.4 Construction of 31 new secondary livestock markets according to Model Drawings in areas with the pre-upgraded market.	7,500,000,000	8,000,000,000	372,000,000	372,000,000	372,000,000	16,616,000,000
	5.5 Develop an electronic system for registration, inspection, approvals, licensing and quality control of Dairy and its products.	250,000,000	48,000,000	48,000,000	48,000,000	48,000,000	442,000,000
	5.6 To build 100 milk collection centers in strategic areas.	3,600,000,000	3,600,000,000	2,400,000,000	2,400,000,000		12,000,000,000
	5.7 To build and rehabilitate six (6) National holding ground with infrastructure facilities for the purpose of domestic and foreign markets	300,000,000	300,000,000	60,000,000	60,000,000	60,000,000	780,000,000
Sub total		11,850,000,000	11,948,000,000	2,940,000,000	2,940,000,000	540,000,000	30,218,000,000
6	To Strengthen National Ranching Company (NARCO)						
	6.5 To purchase 15,000 breeding herds for cattle	7,500,000,000	9,000,000,000	6,000,000,000			22,500,000,000
	6.6 To purchase 5,200 breeding herds for goats	600,000,000	440,000,000				1,040,000,000
	6.7 To purchase 5,200 breeding herds for sheep	600,000,000	440,000,000				1,040,000,000
	6.8 To construct 40 livestock shading	60,000,000	60,000,000				120,000,000
	6.9 To construct 48 paddocks	480,000,000	480,000,000	144,000,000	144,000,000	144,000,000	1,392,000,000
	6.10 To construct 21 feedlotting/fattening infrastructures	160,000,000	176,000,000	1,680,000,000	1,680,000,000	1,680,000,000	5,376,000,000
	6.11 To construct 16 charcoal dams	4,800,000,000	8,000,000,000				12,800,000,000
	6.12 To drill 3 Deep boreholes and establish its infrastructure	600,000,000					600,000,000
	6.13 To purchase 1 bulldozer D6 type	500,000,000	12,000,000	12,000,000	12,000,000	12,000,000	548,000,000
	6.14 To Purchase 8 tractors and their accessories	240,000,000	400,000,000	96,000,000	96,000,000	96,000,000	928,000,000
	6.15 To purchase 8 bailers, 8 mowers and 8 rakes.	1,160,000,000					1,160,000,000

	6.16 To purchase 3 refrigerated vans for handling meat	200,000,000	400,000,000	30,000,000	30,000,000	30,000,000	690,000,000
	6.17 To enhance 3,000 hectares for pasture by purchasing 375 kg annually	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	37,500,000
	6.18 To Slash 10,000 hectares of shrubs	2,500,000,000		2,500,000,000		2,300,000,000	7,300,000,000
Sub total		19,407,500,000	19,415,500,000	10,469,500,000	1,969,500,000	4,269,500,000	55,531,500,000
Grand total		323,144,292,443	502,431,184,697	416,806,522,042	387,126,495,513	320,163,150,119	1,949,671,644,815

Appendix No.2a Cost-Benefit Analysis in Heifer Production - Mabuki Farm

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back period	0	1	2	3	4	5	6	7	8	9	10
Interest	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
COST											
Fixed cost	3,220,500,000	1,200,000,000	1,200,000,000	-	-	-	-	-	-	-	-
Parent breeds for cattles	1,200,000,000	1,200,000,000	1,200,000,000								
Deep borehole	45,000,000										
Charcol dams	500,000,000										
Drum disc	12,000,000										
Hay baller	75,000,000										
Tractor and its implements	501,000,000										
Stall barn (Livestock shading)	140,000,000										
Calf Pens	10,000,000										
Dip tanks	25,000,000										
Land cruser pickup	120,000,000										
TRUCK	160,000,000										
Motorbycles Yamaha DT	36,000,000										
Rehabitation of worker's houses	214,000,000										
Electrical installation to workers houses	44,000,000										
(Frisian bulls)	60,000,000										
(Boran bulls)	16,000,000										
To remove bush encroachment in 250 hacters	62,500,000										
Variable Cost	705,247,203	765,484,243	794,244,627	823,837,622	854,545,974	886,412,336	919,481,023	953,798,074	989,411,326	1,026,370,482	1,064,727,184
Payment for casual labour	64,800,000	68,040,000	71,442,000	75,014,100	78,764,805	82,703,045	86,838,198	91,180,107	95,739,113	100,526,068	105,552,372

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back period	0	1	2	3	4	5	6	7	8	9	10
Interest	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Personal Emoluments	390,333,408.98	425,071,400.15	440,526,576.35	456,385,533.10	472,815,412.29	489,836,767.14	507,470,890.75	525,739,842.82	544,666,477.16	564,274,470.34	584,588,351.27
Supplies; Goods, Works and Services	236,571,373.52	257,625,206.20	266,992,204.20	276,603,923.56	286,561,664.80	296,877,884.74	307,565,488.59	318,637,846.18	330,108,808.64	341,992,725.75	354,304,463.88
Development	13,542,420.09	14,747,637.11	15,283,846.63	15,834,065.11	16,404,091.45	16,994,638.74	17,606,445.74	18,240,277.78	18,896,927.78	19,577,217.18	20,281,997.00
Total cost	3,925,747,203	1,965,484,243	1,994,244,627	823,837,622	854,545,974	886,412,336	919,481,023	953,798,074	989,411,326	1,026,370,482	1,064,727,184
Revenue											
Revenue Estimates:-	802,858,342	1,736,295,575	612,074,354	2,600,279,780	2,731,240,972	2,868,797,928	3,013,282,840	3,165,044,629	3,324,449,790	3,491,883,275	3,667,749,425
Heifer	574,286,572	1,307,008,609	-	1,957,378,748	2,055,960,699	2,159,507,657	2,268,269,683	2,382,509,429	2,502,502,776	2,628,539,500	2,760,923,972
Bulls/Steers	228,571,770	387,261,810	552,155,181	579,964,073	609,173,540	639,854,121	672,079,906	705,928,720	741,482,304	778,826,518	818,051,547
Culled cattle	-	42,025,156	59,919,173	62,936,959	66,106,733	69,436,150	72,933,251	76,606,481	80,464,710	84,517,256	88,773,906
Estimated Revenue from dairy milk and its products	668,042,235	1,131,842,507	1,613,773,132	1,695,049,637	1,780,419,574	1,870,089,105	1,964,274,777	2,063,204,041	2,167,115,806	2,276,261,010	2,390,903,233
Dairy Milk	668,042,235	1,131,842,507	1,613,773,132	1,695,049,637	1,780,419,574	1,870,089,105	1,964,274,777	2,063,204,041	2,167,115,806	2,276,261,010	2,390,903,233
Yogurt											
Cheese											
Total Revenue	1,470,900,577	2,868,138,082	2,225,847,487	4,295,329,417	4,511,660,546	4,738,887,033	4,977,557,617	5,228,248,670	5,491,565,595	5,768,144,285	6,058,652,658
Raw Profit/Loss	(2,454,846,625)	902,653,838	231,602,860	3,471,491,796	3,657,114,572	3,852,474,697	4,058,076,594	4,274,450,596	4,502,154,269	4,741,773,803	4,993,925,474
Present Profit /Loss value	(2,454,846,625)	828,122,788	194,935,493	2,680,628,616	2,590,792,163	2,503,844,221	2,419,698,483	2,338,270,854	2,259,479,413	2,183,244,383	2,109,488,089
Net Present Value	17,653,657,877										
Benefit - Cost Ratio	2.51										
Payback Period	1.12										

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back period	0	1	2	3	4	5	6	7	8	9	10
Interest	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
PV of Benefits Expected	1,470,900,577	2,631,319,341	1,873,451,298	3,316,782,417	3,196,174,074	3,079,951,419	2,967,954,975	2,860,031,063	2,756,031,595	2,655,813,865	2,559,240,358
PV of Costs Expected	3,925,747,203	1,803,196,554	1,678,515,804	636,153,802	605,381,912	576,107,198	548,256,491	521,760,209	496,552,181	472,569,482	449,752,269

Assumptions:

Calving Rate	75%
Cattle Death Rate	3%
Productive Age of Cattle	9 Years
Sales of aged cattle (culling) starting 2023/24	20%
Production of Milk per day (Liters)	20
Inflation Rate	4%
Price for Selling of Pregnant Heifer	1,500,000
Price for selling Bull	400,000
Price for selling fresh milk (Liter)	900
Price for selling culled cattle	300,000
Depreciation of farm machines (year)	10%

Appendix No.2b Cost-Benefit Analysis in Heifer Production- Kitulo Farm

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
COST											
Fixed Cost	5,172,390,000	3,073,000,000	3,073,000,000	-	-	-	-	-	-	-	-
Parent breedsof cattle (<i>Friesian</i>)	3,073,000,000	3,073,000,000	3,073,000,000								
Pasture seeds	4,800,000										
Deep boreholes	-										
Charcol Dams	-										
Mowers	-										
Tractor with it impliments	440,000,000										
Stall barn (Livestock shading)	-										
Calf Pens	14,190,000										
Dip tanks	100,000,000										
Motor vehicles	320,000,000										
Motorcycles	14,000,000										
Staff houses	-										
Office Premises	-										
Milking Machine	200,000,000										
(Milk Cooling Tank	56,400,000										
Truck – 7 tons	250,000,000										
Weeding	700,000,000										
Variable cost	1,065,680,879	1,407,541,781	1,749,304,081	1,758,029,443	1,804,430,809	1,852,502,623	1,902,305,023	1,953,900,309	2,007,353,026	2,274,770,040	2,332,140,627
Technician wages	181,440,000	190,512,000	200,037,600	181,440,000	181,440,000	181,440,000	181,440,000	181,440,000	181,440,000	181,440,000	181440000

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Assitant Technician wages	75,000,000	78,750,000	82,687,500	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000	75,000,000
Supporting staff Wages	95,400,000	100,170,000	105,178,500	95,400,000	95,400,000	95,400,000	95,400,000	95,400,000	95,400,000	95,400,000	95,400,000
Payment for Casual Labor	70,680,000	88,350,000	106,020,000	106,020,000	106,020,000	106,020,000	106,020,000	106,020,000	106,020,000	318,060,000	318,060,000
Artificial Insemination (A.I)	7,843,111	11,581,973	15,320,834	15,872,384	16,443,790	17,035,766	17,649,054	18,284,420	18,942,659	19,624,594	20,331,080
Bank charges	1,662,038	2,454,343	3,246,647	3,363,526	3,484,613	3,610,059	3,740,021	3,874,662	4,014,150	4,158,659	4,308,371
Building repair	8,704,482	12,853,965	17,003,447	17,615,571	18,249,732	18,906,722	19,587,364	20,292,509	21,023,040	21,779,869	22,563,944
Concentrates/minerals	192,212,743	283,841,787	375,470,830	388,987,780	402,991,340	417,499,029	432,528,994	448,100,037	464,231,639	480,943,978	498,257,961
Dairy expences	6,275,158	9,266,566	12,257,974	12,699,261	13,156,434	13,630,066	14,120,748	14,629,095	15,155,742	15,701,349	16,266,598
Detergent	3,610,487	5,331,630	7,052,772	7,306,672	7,569,712	7,842,222	8,124,542	8,417,025	8,720,038	9,033,960	9,359,182
Diesel	136,275,928	201,239,534	266,203,140	275,786,453	285,714,765	296,000,497	306,656,515	317,696,149	329,133,211	340,982,006	353,257,358
Electricity	22,453,934	33,157,867	43,861,801	45,440,826	47,076,696	48,771,457	50,527,229	52,346,210	54,230,673	56,182,977	58,205,565
Farm infrastructure repair	20,071,906	29,640,312	39,208,717	40,620,231	42,082,560	43,597,532	45,167,043	46,793,056	48,477,606	50,222,800	52,030,821
Farm machinery repair	31,234,282	46,123,864	61,013,445	63,209,929	65,485,487	67,842,964	70,285,311	72,815,582	75,436,943	78,152,673	80,966,169
Farm structure	10,767,760	15,900,820	21,033,880	21,791,100	22,575,579	23,388,300	24,230,279	25,102,569	26,006,262	26,942,487	27,912,417
Fence repair	8,029,909	11,857,818	15,685,727	16,250,413	16,835,428	17,441,503	18,069,397	18,719,896	19,393,812	20,091,989	20,815,301
Fertilizer/pasture improvement	36,308,489	53,616,977	70,925,466	73,478,783	76,124,019	78,864,483	81,703,605	84,644,935	87,692,152	90,849,070	94,119,636
Fire break	2,651,475	3,915,450	5,179,425	5,365,885	5,559,057	5,759,183	5,966,513	6,181,308	6,403,835	6,634,373	6,873,210
Hay	108,925	160,851	212,776	220,436	228,372	236,593	245,111	253,935	263,076	272,547	282,359
Human drugs	2,214,187	3,269,704	4,325,222	4,480,930	4,642,243	4,809,364	4,982,501	5,161,871	5,347,698	5,540,215	5,739,663
Loading/offloading	5,758,717	8,503,935	11,249,152	11,654,122	12,073,670	12,508,322	12,958,622	13,425,132	13,908,437	14,409,141	14,927,870
Lubricant oil	4,963,753	7,330,005	9,696,258	10,045,323	10,406,955	10,781,605	11,169,743	11,571,854	11,988,440	12,420,024	12,867,145
Motivation/incentives	4,204,141	6,208,282	8,212,422	8,212,422	8,212,422	8,212,422	8,212,422	8,212,422	8,212,422	8,212,422	8,212,422
Motor vehicle repair	67,171,074	99,191,955	131,212,835	135,936,497	140,830,211	145,900,099	151,152,502	156,593,992	162,231,376	168,071,706	174,122,287

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Nanenane exhibition	3,860,166	5,700,331	7,540,497	7,811,955	8,093,185	8,384,540	8,686,383	8,999,093	9,323,060	9,658,691	10,006,403
Office machine repair and accessories	114,658	169,317	223,975	232,038	240,392	249,046	258,011	267,300	276,923	286,892	297,220
Office supplies	1,865,301	2,754,502	3,643,702	3,774,876	3,910,771	4,051,559	4,197,415	4,348,522	4,505,069	4,667,251	4,835,272
Pasture establishment	1,012,816	1,495,631	1,978,447	2,049,671	2,123,459	2,199,904	2,279,101	2,361,148	2,446,150	2,534,211	2,625,442
Petrol	5,876,280	8,677,541	11,478,801	11,892,038	12,320,152	12,763,677	13,223,169	13,699,204	14,192,375	14,703,300	15,232,619
Phone charges	993,706	1,467,412	1,941,118	2,010,998	2,083,394	2,158,396	2,236,099	2,316,598	2,399,996	2,486,396	2,575,906
Postage	435,113	642,535	849,956	880,554	912,254	945,095	979,119	1,014,367	1,050,884	1,088,716	1,127,910
Rates/rents	3,451,217	5,096,435	6,741,652	6,984,352	7,235,788	7,496,277	7,766,143	8,045,724	8,335,370	8,635,443	8,946,319
Security Services	114,658	169,317	223,975	232,038	240,392	249,046	258,011	267,300	276,923	286,892	297,220
Silage	687,950	1,015,901	1,343,851	1,392,230	1,442,350	1,494,274	1,548,068	1,603,799	1,661,536	1,721,351	1,783,319
Stationary/Printing	2,052,003	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206	3,030,206
Transport charges	29,788,248	43,988,497	58,188,745	60,283,540	62,453,748	64,702,083	67,031,358	69,444,486	71,944,488	74,534,489	77,217,731
Vetty drugs	18,524,018	27,354,535	36,185,053	37,487,715	38,837,272	40,235,414	41,683,889	43,184,509	44,739,151	46,349,761	48,018,352
Water system maintenance	1,598,529	2,360,558	3,122,587	3,235,000	3,351,460	3,472,113	3,597,109	3,726,605	3,860,762	3,999,750	4,143,741
Workshop tools and Accessories	263,714	389,429	515,143	533,688	552,901	572,805	593,426	614,790	636,922	659,851	683,606
Total Cost	6,238,070,879	4,480,541,781	4,822,304,081	1,758,029,443	1,804,430,809	1,852,502,623	1,902,305,023	1,953,900,309	2,007,353,026	2,274,770,040	2,332,140,627
Revenue											
Estimated Revenue:	1,067,726,400	1,633,480,262	2,238,584,629	2,319,173,676	2,153,866,605	2,419,652,295	2,224,323,352	1,943,914,536	2,003,510,179	2,065,251,266	2,129,215,031
Heifer	734,061,900	1,123,017,680	1,539,026,933	1,594,431,902	1,365,981,758	1,564,509,849	1,270,777,857	820,557,883	850,097,967	880,701,494	912,406,747
Bulls/Steers	333,664,500	510,462,582	699,557,697	724,741,774	710,604,847	777,862,447	805,865,495	834,876,653	864,932,212	896,069,772	928,328,284
Aged/Culled cattle	-	-	-	-	77,280,000	77,280,000	147,680,000	288,480,000	288,480,000	288,480,000	288,480,000

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Estimated revenue from diary and its products	1,618,785,00	2,969,367,60	4,415,094,326	5,683,659,554	5,572,793,202	6,100,249,064	6,319,858,031	6,547,372,920	6,783,078,345	7,027,269,165	7,280,250,855
M Milk	1,618,785,000	2,969,367,660	4,415,094,326	5,683,659,554	5,572,793,202	6,100,249,064	6,319,858,031	6,547,372,920	6,783,078,345	7,027,269,165	7,280,250,855
Yogurt											
Cheese											
Total revenue	2,686,511,400	4,602,847,922	6,653,678,956	8,002,833,230	7,726,659,807	8,519,901,360	8,544,181,383	8,491,287,456	8,786,588,524	9,092,520,431	9,409,465,886
Raw Profit/Loss	(3,551,559,479)	122,306,141	1,831,374,875	6,244,803,787	5,922,228,998	6,667,398,737	6,641,876,360	6,537,387,146	6,779,235,498	6,817,750,391	7,077,325,260
Present Profit/Loss Value	(3,551,559,479)	112,207,469	1,541,431,592	4,822,134,320	4,195,456,328	4,333,351,704	3,960,333,863	3,576,174,641	3,402,269,699	3,139,081,674	2,989,538,674
Net Present Value	28,520,420,484										
Benefit - Cost Ratio	2.21										
Payback Period	1.11										
Present Value of Benefits Expected	2,686,511,400	4,222,796,259	5,600,268,459	6,179,655,614	5,473,760,605	5,537,351,302	5,094,616,194	4,645,025,021	4,409,692,494	4,186,448,992	3,974,660,078
Present Value of Costs Expected	6,238,070,879	4,110,588,790	4,058,836,866	1,357,521,294	1,278,304,277	1,203,999,598	1,134,282,331	1,068,850,380	1,007,422,795	1,047,367,318	985,121,404

Assumptions

Calving Rate	75%
Cattle Death Rate	3%
Productive Age of Cattle	9 Years
Sales of aged cattle (culling) starting 2023/24	20%
Production of Milk per day (Liters)	20
Inflation Rate	4%
Price for Selling of Pregnant Heifer	2,200,000
Price for selling Bull	1,000,000

Price for selling fresh milk (Liter)

900

Price for selling culled cattle

800,000

Depreciation of farm machines (year)

10%

Appendix No.2c Cost-Benefit Analysis in Heifer Production -Ngerengere LMU Farm

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
COST											
Fixed costs	1,406,000,000	-	-	-	-	-	-	-	-	-	-
Parent breeding herdsof cattle	960,000,000										
Hay bailer	85,000,000										
Carf Pens	15,000,000										
3 Motorcycles	9,000,000										
Staff houses	60,000,000										
Office building	55,000,000										
Hay ban	30,000,000										
Cattle Crush	6,000,000										
Water intake	10,000,000										
Tractor	60,000,000										
Disc Plough	10,000,000										
Harrow	20,000,000										
Trailer	20,000,000										
Hay rake	10,000,000										
Chisel plough	6,000,000										
Mower	50,000,000										
Variable costs	184,414,174	191,960,284	199,823,414	208,017,245	216,556,064	225,454,789	234,729,004	244,394,983	254,469,724	264,970,982	275,917,302
Casual labour wages	64,800,000	68,040,000	71,442,000	75,014,100	78,764,805	82,703,045	86,838,198	91,180,107	95,739,113	100,526,068	105,552,372

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Working Gear	736,000	762,496.00	789,946	818,384	847,845.73	878,368.17	909,989.43	942,749.05	976,688.01	1,011,848.78	1,048,275.34
Animal feeds	7,514,500	7,785,022.00	8,065,283	8,355,633	8,656,436	8,968,067.45	9,290,918	9,625,391	9,971,905	10,330,894	10,702,806
Annually Leave	1,636,000	1,694,896.00	1,755,912	1,819,125	1,884,614	1,952,460	2,022,748	2,095,567	2,171,008	2,249,164	2,330,134
Bank charges	1,064,024	1,102,328.86	1,142,013	1,183,125	1,225,718	1,269,844	1,315,558	1,362,918	1,411,983	1,462,814	1,515,476
Casual laboures	28743825	29,778,602.70	30,850,632	31,961,255	33,111,860	34,303,887	35,538,827	36,818,225	38,143,681	39,516,854	40,939,460
Contribution to Ngerengere	500,000	518,000.00	536,648	555,967	575,982	596,718	618,199	640,455	663,511	687,397	712,144
Development Activities	16,335,470	16,923,546.92	17,532,795	18,163,975	18,817,878	19,495,322	20,197,154	20,924,251	21,677,524	22,457,915	23,266,400
Extra duty	5,023,000	5,203,828.00	5,391,166	5,585,248	5,786,317	5,994,624	6,210,431	6,434,006	6,665,630	6,905,593	7,154,194
Farm machinery service	7,209,900	7,469,456.40	7,738,357	8,016,938	8,305,547	8,604,547	8,914,311	9,235,226	9,567,694	9,912,131	10,268,968
Fuel,Oil & Lubricants	9,766,345	10,117,933.42	10,482,179	10,859,537	11,250,481	11,655,498	12,075,096	12,509,800	12,960,152	13,426,718	13,910,080
General Overhead	4,192,300	4,343,222.80	4,499,579	4,661,564	4,829,380	5,003,238	5,183,354	5,369,955	5,563,273	5,763,551	5,971,039
Hay Making Materials cost	392,500	406,630.00	421,269	436,434	452,146	468,423	485,286	502,757	520,856	539,607	559,033
Nane Exhibition	9,171,000	9,501,156.00	9,843,198	10,197,553	10,564,665	10,944,993	11,339,012	11,747,217	12,170,117	12,608,241	13,062,137
Proceeding and Conference	820,700	850,245.20	880,854	912,565	945,417	979,452	1,014,712	1,051,242	1,089,087	1,128,294	1,168,912
Travelling Allowances	8,635,000	8,945,860.00	9,267,911	9,601,556	9,947,212	10,305,311	10,676,303	11,060,649	11,458,833	11,871,351	12,298,719
Utility; Stationary and Electricity	4085500	4,232,578.00	4,384,951	4,542,809	4,706,350	4,875,779	5,051,307	5,233,154	5,421,547	5,616,723	5,818,925
Veterinary Drugs	13,788,110	14,284,481.96	14,798,723	15,331,477	15,883,411	16,455,213	17,047,601	17,661,315	18,297,122	18,955,818	19,638,228
Total Cost	1,590,414,174	191,960,284	199,823,414	208,017,245	216,556,064	225,454,789	234,729,004	244,394,983	254,469,724	264,970,982	275,917,302
Revenue											
Estimated revenue from:-	290,858,647	325,077,569	368,822,124	418,453,233	474,763,027	538,650,233	611,134,519	693,372,762	984,251,418	1,033,822,522	1,085,890,238
Sales of Heifers	207,158,317	224,518,705	254,731,405	289,009,72	327,900,75	372,025,21	422,087,35	478,886,179	740,902,123	778,217,117	817,411,454

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
				3	4	6	4				
Madume/Maksai Sales of Bulls/Steers	83,700,330	90,714,628	102,921,780	116,771,605	132,485,153	150,313,219	170,540,345	193,489,365	219,526,555	230,582,849	242,195,986
Sales of Aged/Culled cattle	-	9,844,235	11,168,940	12,671,905	14,377,119	16,311,798	18,506,820	20,997,218	23,822,741	25,022,556	26,282,798
Estimated revenue from diary and its products	181,206,900	196,392,494	222,820,348	252,804,506	286,823,528	325,420,371	369,211,056	418,894,502	475,263,676	499,199,983	524,341,826
Sales of Milk	181,206,900	196,392,494	222,820,348	252,804,506	286,823,528	325,420,371	369,211,056	418,894,502	475,263,676	499,199,983	524,341,826
Yogurt											
Cheese											
Total revenue	472,065,547	521,470,063	591,642,472	671,257,739	761,586,554	864,070,604	980,345,575	1,112,267,263	1,459,515,094	1,533,022,505	1,610,232,064
RawProfit / Loss	(1,118,348,627)	329,509,778	391,819,058	463,240,493	545,030,491	638,615,815	745,616,570	867,872,280	1,205,045,370	1,268,051,524	1,334,314,762
Present Profit/LossValue	(1,118,348,627)	302,302,549	329,786,262	357,706,656	386,113,340	415,056,462	444,586,799	474,755,857	604,771,637	583,846,147	563,628,975
Net Present Value	3,344,206,058										
Benefit - Cost Ratio	2.10										
Payback Period	1.25										
Present Value of Benetits Expected	472,065,547	478,412,902	497,973,632	518,334,137	539,527,115	561,586,605	584,548,035	608,448,283	732,481,410	705,846,148	680,179,425
Present Value of Costs Expected	1,590,414,174	176,110,353	168,187,370	160,627,480	153,413,775	146,530,144	139,961,236	133,692,425	127,709,774	122,000,001	116,550,450

Assumptions

Calving Rate	75%
Cattle Death Rate	3%
Productive Age of Cattle	9 Years
Sales of aged cattle (culling) starting 2023/24	20%
Production of Milk per day (Liters)	20
Inflation Rate	4%
Price for Selling of Pregnant Heifer	2,200,000
Price for selling Bull	1,000,000
Price for selling fresh milk (Liter)	1000
Price for selling culled cattle	300,000
Depreciation of farm machines (year)	10%

Appendix No.2d Cost-Benefit Analysis in Heifer Production – Nangaramo LMU Farm

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
COST											
Fixed cost	2,374,433,333	492,433,333	492,433,333	-	-	-	-	-	-	-	-
Removal of Bush encroachment in 1,000 Ha.	125,000,000										
Parent breeding herds for cattles	492,433,333	492,433,333	492,433,333								
1 Charcoal dam	850,000,000										
Tractors and its impliments	166,000,000										

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Vehicles	160,000,000										
2 Motorcycles	6,000,000										
Dip tanks rehabilitation	10,000,000										
Completion the Construction of Grade B Houses	50,000,000										
Rehabilitation of staff houses	290,000,000										
Office buildings	50,000,000										
Deep boreholes	120,000,000										
stall barn (livestock shading)	35,000,000										
Calf Pens	20,000,000										
Gharama Zinzobadilika Variable cost	132,963,098	165,090,932	266,151,950	252,884,908	282,766,909	281,241,276	297,139,761	309,031,827	345,584,389	344,614,620	373,668,162
Casual labour wages	64,800,000	68,040,000	71,442,000	75,014,100	78,764,805	82,703,045	86,838,198	91,180,107	95,739,113	100,526,068	105,552,372
AI equipment & training	4,477,961.17	6,760,255.59	13,282,500	13,760,670	14,256,054.12	14,769,272.07	15,300,965.86	15,851,800.63	16,422,465.46	17,013,674.21	17,626,166.48
Animal feeds (Hay and maize brane)	581,553.40	877,955.27	1,725,000	1,787,100	1,851,436	1,918,087.28	1,987,138	2,058,675	2,132,788	2,209,568	2,289,113
Anthelminths/Albendazole/Nilsan/Milsan (lts)	108,556.63	163,884.98	322,000	333,592	345,601	358,043	370,933	384,286	398,120	412,453	427,301
Anti-inflammatory (bottles)	48,462.78	73,162.94	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Antiseptic (Lt)	19,385.11	29,265.18	57,500	59,570	61,715	63,936	66,238	68,623	71,093	73,652	76,304
Anti-theileria (bottles)	940,177.99	1,419,361.02	2,788,750	2,889,145	2,993,154	3,100,908	3,212,540	3,328,192	3,448,007	3,572,135	3,700,732
Antivirus	77,540.45	117,060.70	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
Automatic syringe (pc)	348,932.04	526,773.16	1,035,000	1,072,260	1,110,861	1,150,852	1,192,283	1,235,205	1,279,673	1,325,741	1,373,468
Battery (doz)	232,621.36	351,182.11	690,000	714,840	740,574	767,235	794,855	823,470	853,115	883,827	915,645
Battery (wet cell) (pc)	290,776.70	438,977.64	862,500	893,550	925,718	959,044	993,569	1,029,338	1,066,394	1,104,784	1,144,556
Calcium (bottles)	38,770.23	58,530.35	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Check book (pc)	145,388.35	219,488.82	431,250	446,775	462,859	479,522	496,785	514,669	533,197	552,392	572,278
Clinical thermometer (pc)	38,770.23	58,530.35	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608
Cotton/Sunflower Seed cake	3,721,941.75	5,618,913.74	11,040,000	11,437,440	11,849,188	12,275,759	12,717,686	13,175,523	13,649,841	14,141,236	14,650,320
Dehorning wire (roll)	38,770.23	58,530.35	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608
Diesel (Lt)	7,269,417.48	10,974,440.89	21,562,500	22,338,750	23,142,945	23,976,091	24,839,230	25,733,443	26,659,847	27,619,601	28,613,907
Diminazene diacetate (sachet)	1,507,386.41	2,275,660.06	4,471,200	4,632,163.20	4,798,921.08	4,971,682.23	5,150,662.79	5,336,086.65	5,528,185.77	5,727,200.46	5,933,379.68
Drenching gun (pc)	193,851.13	292,651.76	575,000	575,000	575,000	575,000	575,000	575,000	575,000	575,000	575,000
Ear tags (pc)	387,702.27	585,303.51	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Engine oil (Lt)	271,391.59	409,712.46	805,000	833,980	864,003	895,107	927,331	960,715	995,301	1,031,132	1,068,253
Eye/ear drop/ointment (pc)	23,262.14	35,118.21	69,000	71,484	74,057	76,723	79,486	82,347	85,312	88,383	91,565
File cover, envelope, stamp, pen, ledger books, office pins etc	969,255.66	1,463,258.79			3,085,726	3,196,812			3,554,646	3,682,613	3,815,188
General service	1,938,511.33	2,926,517.57	5,750,000	5,957,000	6,171,452	6,393,624	6,623,795	6,862,251	7,109,292	7,365,227	7,630,375
Gumboot (pc)	581,553.40	877,955.27			1,851,436	1,918,087			2,132,788	2,209,568	2,289,113
Imizol (bottles)	29,077.67	43,897.76	86,250	89,355	92,572	95,904	99,357	102,934	106,639	110,478	114,456
Inlet hose pipe (m)	77,540.45	117,060.70	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
Isometadium chloride (gm)	3,814,990.29	5,759,386.58	11,316,000	11,723,376	12,145,418	12,582,653	13,035,628	13,504,911	13,991,087	14,494,767	15,016,578
Leave grant	2,035,436.89	3,072,843.45	6,037,500	6,254,850	6,480,025	6,713,305	6,954,984	7,205,364	7,464,757	7,733,488	8,011,894
Liquid paraffin (Lt)	48,462.78	73,162.94	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Maize bran: 2kg x 25 animals x 365 days	7,075,566.34	10,681,789.14	20,987,500	21,743,050	22,525,800	23,336,729	24,176,851	25,047,217	25,948,917	26,883,078	27,850,869
Mask (pc)	19,385.11	29,265.18	57,500	59,570	61,715	63,936	66,238	68,623	71,093	73,652	76,304
Minerals (kg)	969,255.66	1,463,258.79	2,875,000	2,978,500	3,085,726	3,196,812	3,311,897	3,431,126	3,554,646	3,682,613	3,815,188
Needles (doz)	77,540.45	117,060.70	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
New computer (laptop) purchases	2,907,766.99	4,389,776.36	8,625,000	8,935,500	9,257,178	9,590,436	9,935,692	10,293,377	10,663,939	11,047,840	11,445,563
Otc 10% (bottles)	174,466.02	263,386.58	517,500	536,130	555,431	575,426	596,142	617,603	639,836	662,870	686,734

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Otc 20% (bottles)	155,080.91	234,121.41	460,000	476,560	493,716	511,490	529,904	548,980	568,743	589,218	610,430
Oxymast (doz)	23,262.14	35,118.21	69,000	71,484	74,057	76,723	79,486	82,347	85,312	88,383	91,565
Paddock, dip tank & calf pen rehabilitation	5,815,533.98	8,779,552.72	17,250,000	17,871,000	18,514,356	19,180,873	19,871,384	20,586,754	21,327,877	22,095,681	22,891,125
Paranex	1,938,511.33	2,926,517.57	5,750,000	5,957,000	6,171,452	6,393,624	6,623,795	6,862,251	7,109,292	7,365,227	7,630,375
PD gloves (pc)	96,925.57	146,325.88	287,500	297,850	308,573	319,681	331,190	343,113	355,465	368,261	381,519
Penstrep (bottles)	333,423.95	503,361.02	989,000	1,024,604	1,061,490	1,099,703	1,139,293	1,180,307	1,222,798	1,266,819	1,312,425
Pessaries (pc)	116,310.68	175,591.05	345,000	357,420	370,287	383,617	397,428	411,735	426,558	441,914	457,823
Petrol	96,925.57	146,325.88	287,500	297,850	308,573	319,681	331,190	343,113	355,465	368,261	381,519
Post charges (Prepaid services)	387,702.27	585,303.51	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Printer and cartilage	387,702.27	585,303.51			1,234,290	1,278,725			1,421,858	1,473,045	1,526,075
Pusture plot management	775,404.53	1,170,607.03	2,300,000	2,382,800	2,468,581	2,557,450	2,649,518	2,744,901	2,843,717	2,946,091	3,052,150
Pyegrease (kg)	29,077.67	43,897.76	86,250	89,355	92,572	95,904	99,357	102,934	106,639	110,478	114,456
Rain coat (pc)	581,553.40	877,955.27			1,851,436	1,918,087			2,132,788	2,209,568	2,289,113
Sargical kit (pc)	135,695.79	204,856.23	402,500	416,990	432,002	447,554	463,666	480,358	497,650	515,566	534,126
Service and repair	387,702.27	585,303.51	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Services	6,978,640.78	10,535,463.26	20,700,000	21,445,200	22,217,227	23,017,047	23,845,661	24,704,105	25,593,453	26,514,817	27,469,350
Staff houses rehabilitation	3,877,022.65	5,853,035.14	11,500,000					13,724,503	14,218,585	14,730,454	15,260,750
Stethoscope (pc)	58,155.34	87,795.53	172,500	178,710	185,144	191,809	198,714	205,868	213,279	220,957	228,911
Sulfur powder (kg)	48,462.78	73,162.94	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Torch (pc)	193,851.13	292,651.76	575,000	595,700					710,929	736,523	763,038
Tyres (pc)	3,877,022.65		11,500,000		12,342,904		13,247,589		14,218,585		15,260,750
Vitamins (bottles)	116,310.68	175,591.05	345,000	357,420	370,287	383,617	397,428	411,735	426,558	441,914	457,823
Wound spray (pc)	271,391.59	409,712.46	805,000	833,980	864,003	895,107	927,331	960,715	995,301	1,031,132	1,068,253
Total Cost	2,507,396,432	657,524,265	758,585,283	252,884,908	282,766,909	281,241,276	297,139,761	309,031,827	345,584,389	344,614,620	373,668,162

Projected Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Pay back Period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
MAPATO REVENUE											
Makadirio ya Mapato kutokana na:- Revenue estimated from	262,632,956	451,508,927	663,286,868	696,692,827	731,781,252	768,636,881	807,348,716	848,010,244	890,719,660	935,580,105	982,699,914
Mitamba Sales of Heifer	202,602,566	339,876,495	499,293,818	524,440,387	550,853,444	578,596,775	607,737,379	638,345,628	670,495,439	704,264,452	739,734,217
Madume/Maksai Sales of bulls	60,030,390	100,704,147	147,938,909	155,389,744	163,215,835	171,436,081	180,070,335	189,139,445	198,665,315	208,670,949	219,180,509
Ngombe Wazee/ Sales of Culled cow	-	10,928,285	16,054,141	16,862,696	17,711,973	18,604,024	19,541,002	20,525,170	21,558,906	22,644,704	23,785,188
Makadirio ya Mapato kutokana na Maziwa na Bidhaa Zake Estimated revenue from diary and its products	129,962,700	218,019,287	320,280,113	336,410,786	353,353,870	371,150,280	389,842,992	409,477,150	430,100,167	451,761,848	474,514,503
Milk	129,962,700	218,019,287	320,280,113	336,410,786	353,353,870	371,150,280	389,842,992	409,477,150	430,100,167	451,761,848	474,514,503
Mtindi											
Jibini Cheese											
Total revenue	392,595,656	669,528,213	983,566,981	1,033,103,614	1,085,135,122	1,139,787,160	1,197,191,708	1,257,487,394	1,320,819,828	1,387,341,953	1,457,214,417
Faida/Hasara Ghafi Profit/Loss	(2,114,800,775)	12,003,948	224,981,698	780,218,705	802,368,214	858,545,884	900,051,947	948,455,566	975,235,439	1,042,727,333	1,083,546,256
Faida/Hasara ya Sasa Present Value	(2,114,800,775)	11,012,796	189,362,594	602,471,995	568,417,871	557,995,917	536,671,568	518,837,675	489,437,782	480,100,631	457,701,648
Faida Kamili kwa Sasa Net Present Value	2,297,209,701										
Benefit - Cost Ratio	1.44										
Payback Period	1.48										
Present Value of Benetits Expected	392,595,656	614,246,067	827,848,650	797,745,544	768,737,078	740,783,449	713,846,299	687,888,667	662,874,933	638,770,775	615,543,118
Present Value of Costs Expected	2,507,396,432	603,233,271	638,486,056	195,273,548	200,319,207	182,787,532	177,174,731	169,050,992	173,437,151	158,670,144	157,841,470

Assumptions

Calving Rate	75%
Cattle Death Rate	3%
Productive Age of Cattle	9 Years
Sales of aged cattle (culling) starting 2023/24	20%
Production of Milk per day (Liters)	20
Inflation Rate	4%
Price for Selling of Pregnant Heifer	2,200,000
Price for selling Bull	1,000,000
Price for selling fresh milk (Liter)	900
Price for selling culled cattle	800,000
Depreciation of farm machines (year)	10%

Attachment No. 2e: Cost-Benefit Analysis in Heifer Production– Sao Hill LMU

Project period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Payment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Cost											
Fixed Cost	3,049,362,667	426,666,667	426,666,667	-	-	-	-	-	-	-	-
Friesia	426,666,667	426,666,667	426,666,667								
Clearing shrubs	700,000,000										
Tractor and its Implements	80,000,000										
Staff houses	110,000,000										
Lorry 7 tones	160,000,000										
Charcoal dams	850,000,000										
Vehicles (Pick up)	265,000,000										

Project period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Payment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Office Building	200,000,000										
Deep bore holes	170,000,000										
Livestock stallbarn	42,696,000										
Carf stabres	45,000,000										
Variable costs	175,171,098	210,049,332	315,953,270	304,826,294	341,750,364	338,573,904	362,834,020	371,205,800	416,362,060	412,126,175	451,050,294
Casual labour	101,808,000	106,898,400	112,243,320	117,855,486	123,748,260	129,935,673	136,432,457	143,254,080	150,416,784	157,937,623	165,834,504
AI equipment & training	5,477,961	6,760,256	14,282,500	14,760,670	15,256,054.12	15,769,272.07	16,300,965.86	16,851,800.63	17,422,465.46	18,013,674.21	18,626,166.48
Animal feeds (Hay and maize brane)	1,581,553	1,877,955	2,725,000	2,787,100	2,851,436	2,918,087.28	2,987,138	3,058,675	3,132,788	3,209,568	3,289,113
Anthelminths/Albendazole/Nilsan/Milsan (lts)	208,557	263,885	322,000	433,592	345,601	458,043	470,933	484,286	498,120	512,453	527,301
Anti-inflammatory (bottles)	48,463	73,163	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Antiseptic (Lt)	19,385	29,265	57,500	59,570	61,715	63,936	66,238	68,623	71,093	73,652	76,304
Anti-theileria (bottles)	940,178	1,419,361	2,788,750	2,889,145	2,993,154	3,100,908	3,212,540	3,328,192	3,448,007	3,572,135	3,700,732
Antivirus	77,540	117,061	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
Automatic syringe (pc)	348,932	526,773	1,035,000	1,072,260	1,110,861	1,150,852	1,192,283	1,235,205	1,279,673	1,325,741	1,373,468
Battery (doz)	232,621	351,182	690,000	714,840	740,574	767,235	794,855	823,470	853,115	883,827	915,645
Battery (wet cell) (pc)	290,777	438,978	862,500	893,550	925,718	959,044	993,569	1,029,338	1,066,394	1,104,784	1,144,556
Calcium (bottles)	38,770	58,530	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608
Check book (pc)	145,388	219,489	431,250	446,775	462,859	479,522	496,785	514,669	533,197	552,392	572,278
Clinical thermometer (pc)	38,770	58,530	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608
Cotton/Sunflower Seed cake	3,721,942	5,618,914	11,040,000	11,437,440	11,849,188	12,275,759	12,717,686	13,175,523	13,649,841	14,141,236	14,650,320
Dehorning wire (roll)	38,770	58,530	115,000	119,140	123,429	127,872	132,476	137,245	142,186	147,305	152,608
Diesel (Lt)	8,269,417	14,974,441	27,562,500	29,338,750	31,142,945	31,976,091	32,839,230	33,733,443	34,659,847	35,619,601	36,613,907
Diminazene diacetate (sachet)	1,507,386	2,275,660	4,471,200	4,632,163.20	4,798,921.08	4,971,682.23	5,150,662.79	5,336,086.65	5,528,185.77	5,727,200.46	5,933,379.68

Project period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Payment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Drenching gun (pc)	193,851	292,652	575,000	575,000	575,000	575,000	575,000	575,000	575,000	575,000	575,000
Ear tags (pc)	387,702	585,304	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Engine oil (Lt)	271,392	409,712	805,000	833,980	864,003	895,107	927,331	960,715	995,301	1,031,132	1,068,253
Eye/ear drop/ointment (pc)	23,262	35,118	69,000	71,484	74,057	76,723	79,486	82,347	85,312	88,383	91,565
File cover, envelope, stamp, pen, ledger books, office pins etc	969,256	1,463,259			3,085,726	3,196,812			3,554,646	3,682,613	3,815,188
General service	1,938,511	2,926,518	5,750,000	5,957,000	6,171,452	6,393,624	6,623,795	6,862,251	7,109,292	7,365,227	7,630,375
Gumboot (pc)	581,553	877,955			1,851,436	1,918,087			2,132,788	2,209,568	2,289,113
Imizol (bottles)	29,078	43,898	86,250	89,355	92,572	95,904	99,357	102,934	106,639	110,478	114,456
Inlet hose pipe (m)	77,540	117,061	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
Isometadium chloride (gm)	3,814,990	5,759,387	11,316,000	11,723,376	12,145,418	12,582,653	13,035,628	13,504,911	13,991,087	14,494,767	15,016,578
Leave grant	2,035,437	3,072,843	6,037,500	6,254,850	6,480,025	6,713,305	6,954,984	7,205,364	7,464,757	7,733,488	8,011,894
Liquid paraffin (Lt)	48,463	73,163	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Maize bran: 2kg x 25 animals x 365 days	7,075,566	10,681,789	20,987,500	21,743,050	22,525,800	23,336,729	24,176,851	25,047,217	25,948,917	26,883,078	27,850,869
Mask (pc)	19,385	29,265	57,500	59,570	61,715	63,936	66,238	68,623	71,093	73,652	76,304
Minerals (kg)	1,969,256	2,463,259	2,875,000	2,978,500	3,085,726	3,196,812	3,311,897	3,431,126	3,554,646	3,682,613	3,815,188
Needles (doz)	77,540	117,061	230,000	238,280	246,858	255,745	264,952	274,490	284,372	294,609	305,215
New computer (laptop) purchases	2,907,767	4,389,776	8,625,000	8,935,500	9,257,178	9,590,436	9,935,692	10,293,377	10,663,939	11,047,840	11,445,563
Otc 10% (bottles)	174,466	263,387	517,500	536,130	555,431	575,426	596,142	617,603	639,836	662,870	686,734
Otc 20% (bottles)	155,081	234,121	460,000	476,560	493,716	511,490	529,904	548,980	568,743	589,218	610,430
Oxymast (doz)	23,262	35,118	69,000	71,484	74,057	76,723	79,486	82,347	85,312	88,383	91,565
Paddock, dip tank & calf pen rehabilitation	5,815,534	8,779,553	17,250,000	17,871,000	18,514,356	19,180,873	19,871,384	20,586,754	21,327,877	22,095,681	22,891,125
Paranex	1,938,511	2,926,518	5,750,000	5,957,000	6,171,452	6,393,624	6,623,795	6,862,251	7,109,292	7,365,227	7,630,375
PD gloves (pc)	96,926	146,326	287,500	297,850	308,573	319,681	331,190	343,113	355,465	368,261	381,519
Penstrep (bottles)	333,424	503,361	989,000	1,024,604	1,061,490	1,099,703	1,139,293	1,180,307	1,222,798	1,266,819	1,312,425

Project period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Payment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Pessaries (pc)	116,311	175,591	345,000	357,420	370,287	383,617	397,428	411,735	426,558	441,914	457,823
Petrol	96,926	146,326	287,500	297,850	308,573	319,681	331,190	343,113	355,465	368,261	381,519
Post charges (Prepaid services)	387,702	585,304	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Printer and cartilage	387,702	585,304			1,234,290	1,278,725			1,421,858	1,473,045	1,526,075
Pusture plot management	775,405	1,170,607	2,300,000	2,382,800	2,468,581	2,557,450	2,649,518	2,744,901	2,843,717	2,946,091	3,052,150
Pyegrease (kg)	29,078	43,898	86,250	89,355	92,572	95,904	99,357	102,934	106,639	110,478	114,456
Rain coat (pc)	581,553	877,955			1,851,436	1,918,087			2,132,788	2,209,568	2,289,113
Sargical kit (pc)	135,696	204,856	402,500	416,990	432,002	447,554	463,666	480,358	497,650	515,566	534,126
Service and repair	387,702	585,304	1,150,000	1,191,400	1,234,290	1,278,725	1,324,759	1,372,450	1,421,858	1,473,045	1,526,075
Services	6,978,641	10,535,463	20,700,000	21,445,200	22,217,227	23,017,047	23,845,661	24,704,105	25,593,453	26,514,817	27,469,350
Staff houses rehabilitation	3,877,023	5,853,035	11,500,000					13,724,503	14,218,585	14,730,454	15,260,750
Stethoscope (pc)	58,155	87,796	172,500	178,710	185,144	191,809	198,714	205,868	213,279	220,957	228,911
Sulfur powder (kg)	48,463	73,163	143,750	148,925	154,286	159,841	165,595	171,556	177,732	184,131	190,759
Torch (pc)	193,851	292,652	575,000	595,700					710,929	736,523	763,038
Tyres (pc)	4,977,023		12,500,000		16,342,904		19,247,589		20,218,585		22,260,750
Vitamins (bottles)	116,311	175,591	345,000	357,420	370,287	383,617	397,428	411,735	426,558	441,914	457,823
Wound spray (pc)	271,392	409,712	805,000	833,980	864,003	895,107	927,331	960,715	995,301	1,031,132	1,068,253
Total	3,224,533,765	636,715,998	742,619,937	304,826,294	341,750,364	338,573,904	362,834,020	371,205,800	416,362,060	412,126,175	451,050,294
Revenue											
Estimated revenue	629,445,731	812,169,071	1,026,466,871	1,078,164,125	1,132,465,074	1,189,500,850	1,249,409,191	1,312,334,773	1,378,429,555	1,447,853,152	1,520,773,219
Sales of Heifer	485,572,421	611,365,935	772,680,099	811,595,568	852,470,986	895,405,065	940,501,487	987,869,157	1,037,622,465	1,089,881,563	1,144,772,652
Sells of Bulls	143,873,310	181,145,462	228,942,252	240,472,761	252,583,996	265,305,204	278,667,107	292,701,972	307,443,693	322,927,870	339,191,897
Sales of culled	-	19,657,674	24,844,520	26,095,796	27,410,092	28,790,581	30,240,598	31,763,643	33,363,396	35,043,719	36,808,670
Revenue estimated from milk and its products	1,557,391,500	1,960,852,941	2,478,240,869	2,603,055,660	2,734,156,656	2,871,860,459	3,016,499,613	3,168,423,413	3,327,998,743	3,495,610,969	3,671,664,862

Project period	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Payment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Milk	1,557,391,500	1,960,852,941	2,478,240,869	2,603,055,660	2,734,156,656	2,871,860,459	3,016,499,613	3,168,423,413	3,327,998,743	3,495,610,969	3,671,664,862
Youghurt											
Cheese											
Total revenue	2,186,837,231	2,773,022,012	3,504,707,740	3,681,219,785	3,866,621,730	4,061,361,309	4,265,908,805	4,480,758,185	4,706,428,298	4,943,464,121	5,192,438,081
Faida/Hasara Ghafi Profit/Loss	(1,037,696,534)	2,136,306,014	2,762,087,803	3,376,393,491	3,524,871,366	3,722,787,405	3,903,074,784	4,109,552,386	4,290,066,238	4,531,337,946	4,741,387,786
Present Value	(1,037,696,534)	1,959,913,774	2,324,794,044	2,607,195,276	2,497,107,742	2,419,556,379	2,327,275,968	2,248,065,886	2,153,039,583	2,086,353,869	2,002,813,441
Net Present Value	21,588,419,427										
Benefit - Cost Ratio)	4.52										
Payback Period	1.046										
Present Value of Benetits Expected	2,186,837,231	2,544,056,892	2,949,842,387	2,842,577,104	2,739,212,315	2,639,606,186	2,543,622,040	2,451,128,170	2,361,997,661	2,276,108,209	2,193,341,959
Present Value of Costs Expected	3,224,533,765	584,143,118	625,048,343	235,381,829	242,104,574	220,049,807	216,346,072	203,062,284	208,958,078	189,754,340	190,528,519

Assumptions:

Calving Rate	75%
Cattle Death Rate	3%
Productive Age of Cattle	9 Years
Sales of aged cattle (culling) starting 2023/24	20%
Production of Milk per day (Liters)	20
Inflaltion Rate	4%
Price for Selling of Pregnant Heifer	2,200,000
Price for selling Bull	1,000,000
Price for selling fresh milk (Liter)	1000
Price for selling culled cattle	800,000
Depreciation of farm machines (year)	10%

Cost-Benefits analysis on Investment in Animal Feeds and Water Resources for Livestock

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Cost											
Fixed cost	37,617,500,000	55,807,500,000	52,041,000,000	57,041,000,000	51,461,000,000	18,001,000,000	6,381,000,000	6,181,000,000	6,181,000,000	5,681,000,000	5,681,000,000
Build 150 charcoal dams in the areas with persistent drought and with large number of livestock	12,000,000,000	36,000,000,000	36,000,000,000	42,000,000,000	42,000,000,000	12,000,000,000					-
Drilling 250 livestock bore holes in drought-prone areas and 11 predominantly livestock regions	18,000,000,000	9,000,000,000	9,000,000,000	9,000,000,000	3,600,000,000		-	-	-	-	-
Allocating and measuring 3,000,000 hectares of lands including livestock holding	3,000,000,000	5,000,000,000	6,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000	5,000,000,000

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
ground and grazing land.											
Bush pruning of 2500 Hect in Langwira and Vikuge LMU	240,000,000	360,000,000	360,000,000	360,000,000	180,000,000						
To procure pastures seeds	175,000,000	25,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Kununu treka na vifaa vyake Procurement of tractor and its equipments	1,250,000,000	1,250,000,000	-	-	-	-	-	500,000,000	500,000,000	-	-
Procurement of 4 bailers, 4 mowers and 4 rakes	320,000,000	320,000,000	-	-	-	320,000,000	320,000,000	-	-	-	-
Establishment of an irrigation system for Langwira and Vikuge farms	2,000,000,000	2,200,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000
To Build warehouses for storage of seed and	332,500,000	332,500,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
pasture in farms											
To procure 2 vehicles (Land Cruiser) for office operations at Vikuge and Langwira LMU	0	400,000,000	20,000,000	20,000,000	20,000,000	20,000,000	400,000,000	20,000,000	20,000,000	20,000,000	20,000,000
Procurement of feed trucks	0	420,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
Procurement of fertilizers and herbicides	300,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000	500,000,000
Total Cost	37,617,500,000	55,807,500,000	52,041,000,000	57,041,000,000	51,461,000,000	18,001,000,000	6,381,000,000	6,181,000,000	6,181,000,000	5,681,000,000	5,681,000,000
Revenue											
Revenue from Sales of 206,280 heifer bales from Langwira and Vikuge (573Ha) per year	618,840,000	618,840,000	653,220,000	661,815,000	670,410,000	687,600,000	687,600,000	687,600,000	687,600,000	687,600,000	687,600,000
Revenue from Sales of pasture	78,750,000	78,750,000	84,000,000	78,750,000	78,750,000	78,750,000	78,750,000	78,750,000	78,750,000	78,750,000	78,750,000

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
seeds (Langwira and Vikuge)											
Sells from leguminous seeds in (Langwira and Vikuge)	95,000,000	104,500,000	114,000,000	118,750,000	118,750,000	118,750,000	118,750,000	118,750,000	118,750,000	118,750,000	118,750,000
Revenue from Sales of cuttings in (Langwira and Vikuge)	1,260,000,000	1,285,200,000	1,285,200,000	1,285,200,000	1,285,200,000	1,285,200,000	1,184,400,000	1,184,400,000	1,184,400,000	1,260,000,000	1,260,000,000
Provision of drinking water services from the established Chacraal dams is TZS. 30 per cattle	1,642,500,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,806,750,000	1,971,000,000
Provision of drinking water services from the established Chacraal dams is TZS. 30 per goat	410,625,000	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	492,750,000
Provision of drinking water	410,625,000	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	451,687,500	492,750,000

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
services from the established Chacraol dams is TZS. 30 per sheep											
Provision of drinking water services from the established bore hole TZS. 100 per cattle	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000	8,212,500,000
Provision of drinking water services from the established bore hole TZS. 100 per goat	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000
Provision of drinking water services from the established bore hole TZS. 100	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000	2,053,125,000

Project year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Interest rate	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
per sheep											
Total revenue	16,835,090,000	17,116,165,000	17,165,295,000	17,173,390,000	17,181,985,000	17,199,175,000	17,098,375,000	17,098,375,000	17,098,375,000	17,173,975,000	17,420,350,000
Profit/Loss	(20,782,410,000)	(38,691,335,000)	(34,875,705,000)	(39,867,610,000)	(34,279,015,000)	(801,825,000)	10,717,375,000	10,917,375,000	10,917,375,000	11,492,975,000	11,739,350,000
Discount Factor at 9%	1.00000	0.91743	0.84168	0.77218	0.70843	0.64993	0.59627	0.54703	0.50187	0.46043	0.42241
Present Value	(20,782,410,000)	(35,496,637,615)	(29,354,183,150)	(30,785,109,832)	(24,284,118,436)	(521,131,234)	6,390,420,542	5,972,177,989	5,479,062,375	5,291,684,959	4,958,828,306
Net Present Value	(113,131,416,095)										
Benefit - Cost Ratio	0.53										
Payback Period	6.02										
Present Value of Benetits Expected	16,835,090,000	15,702,903,670	14,447,685,380	13,261,008,055	12,172,151,350	11,178,283,651	10,195,202,355	9,353,396,656	8,581,097,850	7,907,375,175	7,358,544,100
Present Value of Costs Expected	37,617,500,000	51,199,541,284	43,801,868,530	44,046,117,886	36,456,269,787	11,699,414,885	3,804,781,813	3,381,218,667	3,102,035,475	2,615,690,215	2,399,715,794

Attachment No.4: Cost-Benefit Analysis for Investment in Strenthening of Animal Health

Years	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Interest Rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Payment Peiod	0	1	2	3	4	5	6	7	8

Project Year	1	2	3	4	5	6	7	8	9
COST									
Construction of 8,657 dip tanks in 184 Local Government Authorities	12,500,000,000	50,000,000,000	75,000,000,000	50,000,000,000	28,925,000,000	-	0	0	0
Purchasing 84 liters of acaricides for each dip tank per year	13,910,400,000	22,310,400,000	34,910,400,000	43,310,400,000	48,169,800,000	48,169,800,000	48,169,800,000	48,169,800,000	48,169,800,000
Construction and installation of equipment at TVLA Laboratory for production of vaccines for treatment of viral and bacterial diseases (Rabies, Lumpy Skin Disease, Gumboro and PPR)	10,500,000,000	4,500,000,000	8,432,000,000	11,150,000,000	14,059,000,000	16,608,000,000	19,226,000,000	21,354,000,000	21,354,000,000
Procurement of automated equipment and machines for filling and packaging of vaccines		4,000,000,000	4,000,000,000						
Bulk procurement of Vaccines against East Coast Fever (ECF) and sell them at affordable price to livestock farmers through private companies.	60,000,000,000	36,000,000,000	24,000,000,000	24,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000

Years	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Interest Rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Payment Peiod	0	1	2	3	4	5	6	7	8
Project Year	1	2	3	4	5	6	7	8	9
Bulk procurement of Vaccines against Foot and Mouth Diseases (FMD) and sell them at affordable price to livestock farmers through private companies.	45,000,000,000	45,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000
Procurement of 6 refregirated vans and installation of cold chain infrastructure for storage of vaccines in 160 Local Government Authorities.	0	1,060,000,000	0	0	0	0	0	0	
Strengthening and installation of equipment in Vaccine Research Unit of TVLA		2,000,000,000	1,000,000,000	1,000,000,000	800,000,000	800,000,000	800,000,000	800,000,000	800,000,000
Capacity building to 64 experts on vaccine production and management of biological waste.	100,000,000	100,000,000	100,000,000	100,000,000	150,000,000	150,000,000	150,000,000	150,000,000	150,000,000
TOTAL COST	142,010,400,000	164,970,400,000	177,442,400,000	159,560,400,000	134,103,800,000	107,727,800,000	110,345,800,000	112,473,800,000	112,473,800,000
REVENUE									
Sales obtained from livestock dipping services	23,842,425,600	38,240,025,600	59,836,425,600	74,234,025,600	82,563,037,200	82,563,037,200	82,563,037,200	82,563,037,200	82,563,037,200

Years	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Interest Rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Payment Peiod	0	1	2	3	4	5	6	7	8
Project Year	1	2	3	4	5	6	7	8	9
Sales from rabies vaccines			3,000,000,000	4,500,000,000	6,000,000,000	6,750,000,000	9,000,000,000	9,750,000,000	9,750,000,000
Sales from Lampy Skin Disease vaccines			6,400,000,000	8,000,000,000	10,000,000,000	12,000,000,000	12,800,000,000	14,000,000,000	14,000,000,000
Sales from Gumboro vaccine			440,000,000	550,000,000	605,000,000	660,000,000	770,000,000	880,000,000	9,350,000,000
Sales from PPR Vaccine			5,250,000,000	7,000,000,000	8,750,000,000	10,500,000,000	12,250,000,000	14,000,000,000	15,750,000,000
Sales from vaccines against East Coast Fever (ECF)	60,000,000,000	36,000,000,000	24,000,000,000	24,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000	12,000,000,000
Sales from vaccines against Foot and Mouth Diseases (FMD)	45,000,000,000	45,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000	30,000,000,000
TOTAL REVENUE	128,842,425,600.00	119,240,025,600.00	128,926,425,600.00	148,284,025,600.00	149,918,037,200.00	154,473,037,200.00	159,383,037,200.00	163,193,037,200.00	173,413,037,200.00
Net Profit/Loss	-13,167,974,400.00	-45,730,374,400.00	-48,515,974,400.00	-11,276,374,400.00	15,814,237,200.00	46,745,237,200.00	49,037,237,200.00	50,719,237,200.00	60,939,237,200.00
Discount factor at 9%	1.00000	0.91743	0.84168	0.77218	0.70843	0.64993	0.59627	0.54703	0.50187
Discounted Net Cashflow (Present Value)	(13,167,974,400)	(41,954,471,927)	(40,834,925,006)	(8,707,430,027)	11,203,204,326	30,381,196,816	29,239,302,343	27,745,159,621	30,583,348,260
Net Present Value	24,487,410,006								
Benefit - Cost Ratio (BCR)	1.03								
IRR	13.8%								
Payback Period	4.07								
Discounted Cost	142,010,400,000	151,348,990,826	149,349,718,037	123,209,904,952	95,002,512,820	70,015,678,397	65,795,595,198	61,527,020,248	56,446,807,567
Discounted Benefit	128,842,425,600	109,394,518,899	108,514,793,031	114,502,474,925	106,205,717,146	100,396,875,213	95,034,897,541	89,272,179,868	87,030,155,826

Assumptions

Cost for construction of one dip tank is TZS 25,000,000

Cost for procurement of acaricide is TZS 50,000 per Liter

At the end of the year 2022/23, a total of 2,812 dip tanks will be established, and will increase up to 11,308 dip tanks

Each dip tank will be supplied with 84 liters of acaricides per year

Cost for dipping one cattle is TZS 100

Initial production of vaccines against rabies will be 2,000,000 doses, cost of production is TZS 720 and selling price will be 1,500

Initial production of vaccines against Lumpy Skin Disease will be 16,000,000 doses, cost of production is TZS 230 and selling price will be 400

Initial production of vaccines against Gumboro Disease will be 40,000,000 doses, cost of production is TZS 7.80 and selling price will be 11

Initial production of vaccines against PPR Disease will be 15,000,000 doses, cost of production is TZS 200 and selling price will be 350

Initial production of vaccines against ECF will be 12,000 doses and FMD is 3,000

Revenue collected from dipping services will be returned to the Central Government in order to support livestock sector

Attachment No.5: Cost-Benefit Analysis for Investment in Strengthening Marketing Infrastructure of Livestock and Livestock Products

Implementation period	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Repayment period	0	1	2	3	4	5	6	7	8	9	10
Cost											
Construction of 31 new secondary livestock market in accordance with Model Drawings in areas where primary markets are supposed to be upgraded	7,500,000,00	8,000,000,00	372,000,000	372,000,000	372,000,000	372,000,000	372,000,000	372,000,000	372,000,000	372,000,000	372,000,000
To build infrastructure at the National Veterinary Inspection Center and Kwala holding grounds to facilitate supply of quality livestock to the processing plants for international market.	200,000,000	-	60,000,000	60,000,000	60,000,000	60,000,000	30,000,000	30,000,000	30,000,000	30,000,000	
Develop an electronic system for registration, inspection, approvals, licensing and quality control of Dairy and its products.	250,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000	48,000,000
Building of 100 milk collection centers in strategic areas	3,000,000,000	3,000,000,000	2,000,000,000	2,000,000,000							
Construction and rehabilitation of (6) National Livestock holding grounds and its supportive infrastructure for domestic and foreign markets.	300,000,000	300,000,000	60,000,000	60,000,000	60,000,000	60,000,000	30,000,000	30,000,000	30,000,000	30,000,000	
TOTAL COST	11,250,000,000	11,348,000,000	2,540,000,000	2,540,000,000	540,000,000	540,000,000	480,000,000	480,000,000	480,000,000	480,000,000	420,000,000
REVENUE											
Estimation of Revenue from: -											
Movement Permit fees	727,200,000	1,939,200,000	3,757,200,000	3,151,200,000	3,151,200,000	3,151,200,000	3,151,200,000	3,151,200,000	3,151,200,000	3,151,200,000	3,151,200,000

Implementation period	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Repayment period	0	1	2	3	4	5	6	7	8	9	10
	0	00	00	00	00	00	00	00	00	00	00
Market fee	1,116,000,00	2,976,000,00	4,836,000,00	6,270,804,00	6,270,804,00	6,270,804,00	6,270,804,00	6,270,804,00	6,270,804,00	6,270,804,00	6,270,804,00
Accomodation fee	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00	3,600,000,00
Registration fee	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000
Examination fee	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000	120,000,000
	0	0	0	0	0	0	0	0	0	0	0
Total Revenue	5,623,200,000	8,695,200,000	12,373,200,000	13,202,004,000	13,202,004,000	13,202,004,000	13,202,004,000	13,202,004,000	13,202,004,000	13,202,004,000	13,202,004,000
Net Profit/Loss	(5,626,800,000)	(2,652,800,000)	9,833,200,000	10,662,004,000	12,662,004,000	12,662,004,000	12,722,004,000	12,722,004,000	12,722,004,000	12,722,004,000	12,782,004,000
Discount Factor 9%	1.0000	0.9174	0.8417	0.7722	0.7084	0.6499	0.5963	0.5470	0.5019	0.4604	0.4224
discounted net cash flow (Present Value)	(5,626,800,000)	(2,433,761,468)	8,276,407,710	8,233,023,353	8,970,082,856	8,229,433,813	7,585,715,318	6,959,371,851	6,384,744,817	5,857,564,053	5,399,256,623
Net Present Value	57,835,038,927										
IRR	0.68										
Benefit - Cost Ratio	3.09										
Discounted cost	11,250,000,000	10,411,009,174	2,137,867,183	1,961,346,039	382,549,614	350,962,949	286,208,317	262,576,438	240,895,814	221,005,334	177,412,539
Discounted Benefit	5,623,200,000	7,977,247,706	10,414,274,893	10,194,369,393	9,352,632,470	8,580,396,762	7,871,923,635	7,221,948,289	6,625,640,632	6,078,569,387	5,576,669,162
Total Discounted Benefit	79,940,203,165										
Total Discounted cost	27,504,420,862										
Paback Period	2.04										

Assumptions

Construction of 15 livestock markets in the first year

Construction of 16 livestock markets in the second year

A total of 31 livestock markets will have been constructed in the third year.

Each livestock market will cost TZS 500,000,000 to be constructed.

Cost for operating livestock market per month will be TZS 1,000,000 x 12x 31 =372,000,000

Cost for construction and rehabilitation of National Veterinary Inspection Center and Kwala holding grounds is TZS 200,000,000

Cost for developing an electronic system for registration, inspection, approvals, licensing and quality control is TZS 4,000,000 for each month x12

Cost for constuation of 100 milk collection centers in strategic areas, each MCC will cost TZS 100,000,000. First year 30 MCC, second year 30 MCC, Third year 20 MCC and Fourth year 20 MCC,

Cost for construction of 6 livestock holding grounds, each will cost 100,000,000 for two phases,

Return Period for cost of project investment will be one year and four months after that, the project will start making profit

Benefit cost - ratio; for each 4 TZS invested in the project will produce 10 TZS

Accomodation fee TZS. 1000/=Per cattle and TZS 500 Per goat (GN478)

Registration fee TZS. 500 Per cattle and TZS 200 Per goat (GN 478)

Examination fee niTZS.1000 Per cattle and TZS.500 Per goat (GN 478)

Total Discounted cost < Total Discounted benefit, this project is commercially viable, as the returns are higher than investment cost

Attachment No.6: Cost-Benefit Analysis for Strengthening National Ranching Company (NARCO)

Implementation period	Expenditure 2022/2023 (Y1)	Expenditure 2023/2024 (Y2)	Expenditure 2024/2025 (Y3)	Expenditure 2025/2026 (Y4)	Expenditure 2026/2027 (Y5)	Expenditure 2027/2028 (Y6)	Expenditure 2028/2029 (Y7)	Expenditure 2029/2030 (Y8)	Expenditure 2030/2031 (Y9)	Expenditure 2031/2032 (Y10)
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Repayment period	0	1	2	3	4	5	6	7	8	9
Procurement of 15,000 breeding herd for cattle	7,500,000	9,000,000	6,000,000							
Procurement of 5,200 breeding herd for goats	600,000	440,000								
Procurement of 5,200 breeding herd for sheep	600,000	440,000								
Build 40 Livestock shed	60,000	60,000								
Build 48 paddocks	480,000	480,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000	144,000
Build 21 fattening units for livestock	160,000	176,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000	1,680,000
Digging of 16 charcoal dams and its infrastructures	4,800,000	8,000,000								
Drilling of 3 deep bore holes and its infrastructure	600,000									

Implementation period	Expenditure 2022/2023 (Y1)	Expenditure 2023/2024 (Y2)	Expenditure 2024/2025 (Y3)	Expenditure 2025/2026 (Y4)	Expenditure 2026/2027 (Y5)	Expenditure 2027/2028 (Y6)	Expenditure 2028/2029 (Y7)	Expenditure 2029/2030 (Y8)	Expenditure 2030/2031 (Y9)	Expenditure 2031/2032 (Y10)
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Repayment period	0	1	2	3	4	5	6	7	8	9
Procurement of 1 bulldozer (D6)	500,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000	12,000,000
Procurement of 8 tractors and its equipments	240,000,000	400,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000	96,000,000
Procurement of 8 bailers, 8 mowers and 8 rakes	1,160,000,000									
Procurement of 3 refrigerated vans for meat handling	200,000,000	400,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000	30,000,000
Producing pasture in 1,000 hectares farm	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000
Bush pruning (Hectares)	2,500,000,000		2,500,000,000		2,300,000,000		2,200,000,000	2,100,000,000	2,000,000,000	1,900,000,000
TOTAL COST	19,407,500,000	19,415,500,000	10,469,500,000	1,969,500,000	4,269,500,000	1,969,500,000	4,169,500,000	4,069,500,000	3,969,500,000	3,869,500,000
Sales of cattle (No.)	-	-	8,700,000,000	9,000,000,000	9,150,000,000	10,370,000,000	10,540,000,000	11,520,000,000	12,350,000,000	14,000,000,000
Sales of meat (MT)	-		6,400,000,000	6,480,000,000	7,290,000,000	7,380,000,000	7,650,000,000	8,700,000,000	8,800,000,000	9,000,000,000
Sales of Milk (Litre)	-	1,890,000,000	1,890,000,000	1,890,000,000	1,890,000,000	1,890,000,000	2,079,000,000	2,268,000,000	2,457,000,000	2,646,000,000
Revenue from selling goats		945,000,000	945,000,000	945,000,000	945,000,000	1,260,000,000	1,260,000,000	1,260,000,000	1,260,000,000	1,260,000,000
Revenue from selling Sheep		810,000,000	810,000,000	810,000,000	810,000,000	1,080,000,000	1,080,000,000	1,080,000,000	1,080,000,000	1,080,000,000
Revenue from Hay		2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000	2,250,000,000
Revenue from hides (PCs)	-	4,515,000	9,372,000	10,388,000	12,264,000	15,806,000	21,672,000	29,160,000	35,424,000	47,680,000
TOTAL REVENUE	-	5,899,515,000	21,004,372,000	21,385,388,000	22,347,264,000	24,245,806,000	24,880,672,000	27,107,160,000	28,232,424,000	30,283,680,000

Implementation period	Expenditure 2022/2023 (Y1)	Expenditure 2023/2024 (Y2)	Expenditure 2024/2025 (Y3)	Expenditure 2025/2026 (Y4)	Expenditure 2026/2027 (Y5)	Expenditure 2027/2028 (Y6)	Expenditure 2028/2029 (Y7)	Expenditure 2029/2030 (Y8)	Expenditure 2030/2031 (Y9)	Expenditure 2031/2032 (Y10)
Interest rate	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
Repayment period	0	1	2	3	4	5	6	7	8	9
	0	0	0	000	0	0	0	0	0	0
Net profit / Loss	(19,407,500,000)	(13,515,985,000)	10,534,872,000	19,415,888,000	18,077,764,000	22,276,306,000	20,711,172,000	23,037,660,000	24,262,924,000	26,414,180,000
Discount factor at 9%	1.0000	0.9174	0.8417	0.7722	0.7084	0.6499	0.5963	0.5470	0.5019	0.4604
Discounted net Cash flow (Present value)	(19,407,500,000.00)	(12,399,986,238.53)	8,866,990,994.02	14,992,627,964.32	12,806,743,777.29	14,478,070,440.19	12,349,395,164.98	12,602,388,941.06	12,176,743,401.86	12,161,822,245.14
Net Present Value	68,627,296,690.32									
IRR	0.4									
Benefit - Cost Ratio (BCR)	2.14									
Discounted Cost	19,407,500,000.00	17,812,385,321.10	8,811,968,689.50	1,520,815,363.98	3,024,621,438.64	1,280,039,865.31	2,486,136,619.42	2,226,155,859.39	1,992,158,197.16	1,781,625,292.84
Discounted Benefit	-	5,412,399,082.57	17,678,959,683.53	16,513,443,328.30	15,831,365,215.93	15,758,110,305.50	14,835,531,784.40	14,828,544,800.45	14,168,901,599.02	13,943,447,537.98
Total discounted Benefit	128,970,703,337.68									
Total discounted cost	60,343,406,647.36									
Pay back period	2.12									

Assumptions;

- (i) Price of one cattle is TZS 1,500,000; Price of beef per Metric Tone is TZS 8,000,000
- (ii) Price of Milk per liter is TZS 1,500; Price of hides and skin per piece TZS is 5,000
- (iii) Price of goat is TZS 150,000 - 200,000
- (iv) Price of sheep is TZS 150,000 - 200,000
- (v) Price for Hay bal is TZS. 3,000

- (vi) *Price of tractor is TZS is 80,000,000*
- (vii) *Price for construction of cattle shed is TZS. 3,000,000*
- (viii) *Cost for drilling a bore hole is TZS. 200,000,000*
- (ix) *Cost for purchasing 1 Buldozer is TZS. 500,000,000*
- (x) *Cost for procurement of refrigerated van is TZS. 200,000,000*
- (xi) *Cost for construction of 1 paddock is TZS. 20,000,000*
- (xii) *Cost of 1 Bailer is TZS. 85,000,000*
- (xiii) *Cost of 1 piece of Mower is TZS. 50,000,000*
- (xiv) *Cost of Rake per piece TZS. 10,000,000*
- (xv) *Mating ratio ni 1:25*
- (xvi) *Male-Female calving ratio is 1:1*
- (xvii) *Cost for construction of feedloting infrastructure is 1 is TZS. 16,000,000*
- (xviii) *Cost for digging 1 charcoal dam and its infrastructure is TZS. 800,000,000*
- (xix) *10% of Breeding Cows are Heifers*