Food and Agriculture Organization of the United Nations

REVIEW OF THE LIVESTOCK/MEAT AND MILK VALUE CHAINS AND POLICY INFLUENCING THEM IN SIERRA LEONE

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Published by the Food and Agriculture Organization of the United Nations and
the Economic Community of West African States
2016

Cover photos

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LIST OF ACRONYMS AND ABBREVIATIONS

ADF	African Development Fund
AGOA	African Growth and Opportunity Act
APD	Animal Production Division
ASBP	African Seed and Biotechnology Programme
ASREP	Agricultural Sector Rehabilitation Project
AU/IBAR	African Union/Inter-African Bureau for Animal Resources
CAADP	Comprehensive African Agricultural Development Programme
CIF	
CWIQ	Core Welfare Indicator Questionnaire
DC	District Council
DelPHE	Development Partnership for Higher Education
DFPP	Diversified Food Production Project
EBA	Everything But Arms
ECOWAP	Economic Commission of West African Agricultural Programme
ECOWAS	Economic Commission of West African States
ENADIS	Epidemio-surveillance Network for Animal Diseases in Sierra Leone
EPA	Economic Partnership Agreement
FAO	Food and Agricultural Organization
FARA	Forum for Agricultural Research in Africa
GDP	Gross Domestic Product
GEF	Global Environment Fund
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbei
GoSL	Government of Sierra Leone
IAEA	International Atomic Energy Agency
ICT	Information Communication Technology
IDB	Islamic Development Bank
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
JICA	Japan International Cooperation Agency
LIP	Livestock Inspection Posts
LSD	Livestock Services Division
MAFFS	Ministry of Agriculture, Forestry and Food Security
MDGs	Millennium Development Goals
MoA	Ministry of Agriculture
MSMEs	Micro, Small & Medium Enterprises
MTI	Ministry of Trade and Industry
NAIP	National Agricultural Investment Plan
NATC	National Agricultural Training Centre
NCD	Newcastle Disease
NEPAD	New Partnership for Africa's Development
NGOs	Non-Governmental Organizations
NLDP	National Livestock Development Plan
NSADP	National Sustainable Agriculture Development Plan

NU	Njala University
OIE	World Animal Health Organization
ONBS	Open Nucleus Breeding Schemes
PPMS	Project Performance Monitoring Systems
PPR	Peste de Petit Ruminants
PRSP	Poverty Reduction Strategy Paper
PSDSP	Private Sector Development Strategy Programme
RAIP	Regional Agricultural Investment Plan
RCPRP	Rehabilitation and Community-Based Poverty Reduction Project
RFCIP	Rural Finance and Community Improvement Projects
RPSDP	Rural and Private Sector Development Project
Salone BEST	Salone Business Expansion scheme
SCP	Smallholder Commercialization Programme
SFERA	Special Funds for Emergency Rehabilitation Activities
SFW	Sub-regional Office for West Africa (FAO)
SLARI	Sierra Leone Agricultural Research Institute
SLAWS	Sierra Leone Animal Welfare Society
SLIEPA	Sierra Leone Investment and Export Promotion Agency
SPINAP-AHI	Support Programme to the Integrated National Action Plan for Avian and Human Influenza
SPS	Sanitary and phytosanitary
TADs	Trans-boundary Animal Diseases
TCP	Technical Cooperation Project
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VACNADA	Vaccines for the Control of Neglected Animal Diseases in Africa
VAM	Vulnerability Analysis Mapping
VC	Value Chain
WECARD	West and Central African Council for Agricultural Research and Development
WFP	World Food Programme

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EXECUTIVE SUMMARY

The livestock industry contributes about 1.6 percent to the Agricultural Gross Domestic Product (GDP). Despite this low contribution to the GDP, livestock rearing is an important agricultural activity though most of it is practiced under traditional system of management. Whilst less than 5 percent of the population own cattle, 75 percent of the estimated 450 to 500 thousand farm families raise at least sheep and/or goats. Livestock are important economically for household food security and as a source of cash income as well as being required for various cultural and ceremonial functions.

Statistical information on production and related activities from the livestock sector are scarce. According to the literature the national cattle herd provides probably no more than 16 000 slaughtered animals per year or less than 1 kg of beef per capita per year. No information is available on the volume of meat produced from cattle, sheep/ goats, and eggs. FAO (2004) estimated a maximum of 27 000 litres of fresh milk produced daily in the Koinadugu District. At present production levels are very low for all livestock species and demand far exceeds supply. In 2008, a total of 1 706.4 tonnes of eggs, 2 294 tonnes of poultry and poultry products, 324 tonnes of frozen buffalo meat, and 155.8 tonnes of pig products were imported. A substantial part of the cattle supply in the country originates from neighboring Guinea with an estimated value of US$ 48 million dollars per annum (MAFFS, 2008). This trend in importation seriously affects local production of livestock which can hardly compete with foreign imports.

In 1979 the estimated per capita consumption of meat and milk was 2 kg and 8 kg respectively. Estimates of current levels of consumption are not available but what is certain is that consumption levels might be the same or lower as most Sierra Leoneans can hardly afford to eat meat on a daily basis because of their low income level and high cost of livestock products. Considering the high level of poverty in the country estimated at 66.4 percent (47 percent in urban areas versus 79 percent in rural areas), average consumption levels falls far below the minimum consumption level recommended by FAO of 50 kg of meat, 200 litres of milk and 300 eggs per capita needed for sustainable human growth and development. This is reflected by the rampant level of protein malnutrition one of the major causes of infant and under-five mortality and morbidity in Sierra Leone.

According to a survey conducted by Hunting Technical Services (1979); ruminant livestock estimates were 333 000 cattle, 244 000 sheep and 134 000 goats. There are no reliable estimates for pig and poultry population but reported figures are 29 000 and 3 million respectively. Apart from the conventional livestock, other livestock species play an important role in provision of food in Sierra Leone. These include rabbits, cane rats, snails and guinea fowls hens. The civil war which started in 1991 saw severe depletion of the livestock population in the country. At the end of the ten year war in 2002, the Sierra Leone Integrated Household Survey (2003/2004) estimated cattle at 40 988; sheep 102 502 goats 212 039 and chicken 3 534 787 indicating a significant reduction in livestock population. Following a number of restocking programmes at the end of the war in 2002, MAFFS (2008) reported livestock population for cattle at 517 000; sheep at 682 000; goats at 803 000; poultry at 9 460,000 and pigs at 47 364 heads indicating a percentage increase of 33.3 percent for cattle, 25 percent for sheep, 28.6 percent for goats 40 percent for pigs and 267 percent for poultry.

The present low contribution of the livestock sector to GDP can be attributed to many factors depending on the type of animal species and type of production system. Ruminants and most pigs are raised under subsistence management with no commercial orientation and barely very little input and therefore low output. Constraints identified under this system include: low meat and milk yield from indigenous species; low population of ruminants; indigenes not interested in rearing cattle; near absence of standard animal rearing practices; limited and periodic access to animal health services; limited physical infrastructure; water scarcity during dry season; crop farmers versus the cattle farmers conflicts; lack of capital; a large proportion of sales are on credit and incur late payment; limited transparency on quality, health, and weight of animals.

The pig industry also faces similar challenges and constraints. Feed unavailability is the most significant constraint, disease outbreaks, inferior genetic materials and lack of post-slaughter processing, packaging and storage. According to PPFASL interim Executive Committee Report (2010) constraints affecting the industry include: little cooperation and networking between farmers; lack of capital and little access to credit; irregular and high feed cost mostly of poor quality; inadequate skilled labour; unfair competition with importers; unavailability of essential drugs (available drugs expensive); unfavourable government policies in relation to taxes.

Despite these challenges the country has all the right agro-climatic factors and ingredients – low livestock population compared to the forage resources, abundant natural resources in terms of abundant forest cover, grass fodder, rich soil, and abundant rainfall, low population pressure estimated at 79.2/km^{2}on the land as vast tracts of land unutilized or underutilized with no adverse consequences on the environment on additional livestock population. Majority of rural households have the tradition of keeping animals though rudimentary. Local breeds of cattle, sheep, goats and chicken are fairly tolerant to diseases and a large number of donor agencies are providing humanitarian aid and development grants for a large number of programmes related to livelihoods, health and education providing the necessary enabling environment. The Government of Sierra Leone (GoSL) "agenda for change" has infrastructure as its top priority.

Rationale for livestock sector development

The increasing human population is creating increased demand for livestock and livestock products. Furthermore, the formation of regional economic blocks opened up new markets for livestock and livestock products which the country can exploit. Currently the sub-sector is unable to meet domestic demand. This further challenges the sub-sector in Sierra Leone to identify and exploit the emerging global market opportunities, as the country re-orients the agriculture sector towards commercialization. Technologies and information that will enable the country meet these short falls in demand and make the industry competitive at both regional and international markets will be required to meet the objectives of vision 2025.

Globalization, regional integration and changes in the national economy offer opportunities for rural and urban development by providing markets for live animals and animal products. The hidden potential of livestock sub-sector is likely to positively impact the livelihoods of a vast majority of people employed (and likely to be employed) in the livestock value chains – only if suitable interventions are made to remove constraints.

Policy context

The major challenge facing the livestock sub-sector is to increase supply of livestock and livestock products. The agricultural sector in general has never lacked good policy contents neither has there been a dearth of policy which is nevertheless, much more in favour of crop production than livestock. In both situations the problems that have plagued past agricultural policies mainly stemmed from two broad issues: (a) the policies lacked the necessary stakeholder support (both financial and moral) or commitment and ended up been poorly and inconsistently implemented; and (b) the inadequate and poor capacity of the agriculture sector to absorb and sustain policy implementation activities and control exogenous factors. Policy problems that emanated from the first instance relate to policy parody, inconsistency, limited financial and material support and administrative mismanagement. Problems from the second instance come from issues relating to inadequate administrative capacity, limited research, inputs, etc.

There is no national livestock development plan and most of what has happened in the past and what is currently going on both in terms of research and development is ad hoc without a sustainable plan. As a result there is no growth target for the sector at a national level which makes it difficult to determine whether any progress has ever been made.

In order to improve on the productivity, commercialization and competitiveness of the various value chains in the livestock sector the following policy interventions are suggested:

- Develop a National Livestock Sector Development Plan in line with CAADP and ECOWAP policies which must be adhered to by all stakeholders.
- Government should encourage financial institutions to provide loans to farmers at favourable conditions
- Government should develop and implement policies to protect land for farming
- Government should create an environment that will encourage private investments that target the provision of pig breeding stock, feed mills, and essential veterinary services and drugs
- Government should assist farmers to have ownership of the feed mills and processing plants that are under the control of MAFFS;
- The GoSL should fully implement tax legislations and policies on imported pig products as a disincentive for importation and thereby boosting local production
- Government and private interest groups should strengthen delivery of extension services to farmers
- Provide adequate budgetary allocations to the LSD
- Recruit and provide incentives for professional and technical staff;
- Implement refresher training courses for staff.
- Provide adequate incentives to staff in remote areas in terms of housing and mobility.
- Providing veterinary drugs, vaccines and equipment together with mobility for the Livestock Extension staff.
- The Central Veterinary Clinic should be upgraded and livestock inspection posts re-established.
- Train community health workers to complement activities of the livestock extension staff
- District veterinary pharmacies should be established to provide easier access of drugs to livestock producers.
- Disease surveillance and control mechanisms should be strengthened.
- Strengthen collaboration with research and academic institutions

- Government should give reasonable tax relief to pig farmers to assist them in developing and strengthening the sector;
- Government to subsidize the cost of wheat bran
- Build value adding infrastructure:
- Construct and maintain rural roads for easy access to producing areas
- Provide constant electricity supply
- Put in place effective veterinary services
- Improve common infrastructure like paddocks
- Set up modern abattoirs and meat processing plants

Specific policy interventions in livestock meat and milk value chains

- Drive and support commercial orientation of farmers
- Increase livestock population by facilitating broad based livestock ownership by encouraging crop farmers to venture into livestock production
- Improve farming practices
- Undertake and support breed improvement programmes
- Establish cattle settlement schemes,
- Facilitate the extension of credit to farmers for livestock housing, fencing, veterinary drugs
- Provide capital to local traders
- Organize traders at different levels into trade bodies
- Improve transportation facilities
- Provide improved market infrastructure, and stimulate the establishment of more local markets
- Establish mechanism for disseminating pricing information

Milk value chain

- Organize local aggregators and wholesalers into trade bodies.
- Facilitate access to capital and credit for aggregators and the wholesalers
- Set up a processing centre in Koinadugu to stimulate value added milk processing

Prioritized areas of interventions

- Rehabilitate training and breeding/multiplication centres
- Provide credit facilities to farmers
- Prepare a short 'Best Practices in Animal Husbandry' training curriculum for farmers
- Encourage crop farmers to start raising cattle through a series of meetings and workshops with community representatives
- Train livestock farmers (including the crop farmers) based on a comprehensive curriculum that includes in: housing, feeding, general health, hygiene, and fodder cultivation
- Organize periodic fairs and provide incentives for best kept farm, best animal, highest milking cow etc.
- Engage, support and incentivize research institutions to generate appropriate technologies
- Prepare a 3 to 4 month veterinary training curriculum
- Select potential youths for para-vet training and provide rigorous field based training
- Provide for sheds and water facilities in paddocks
- Establish small veterinary clinics in each district.

- Set up a modern Abattoir and meat processing plant in strategic areas
- Train entrepreneurs in milk processing – making products like butter and cheese
- Set up milk cooling units and a milk pasteurising/packing plant in high potential milk producing areas.

A five year project and investment plan worth US$ 50 million is proposed with the overall objective of transforming and adding economic value to the livestock sector in order to provide sustainable food security, reduce poverty and provide decent income for those working in the sector while preserving the natural resources. The immediate outcome is to improve livestock productivity and profitability through (i) enhancing the productivity of livestock production systems, (ii) structuring and building the capacity of various stakeholders, for community driven livestock development (CDLD), and (iii) supporting project implementation and management. The Project will contribute to sustainable livelihoods through improved cash incomes, increasing food security among households facing food shortages and malnutrition, which include some of the poorest segments of the population. It will achieve this by providing access to appropriate livestock production and management technology, improved management practices, and marketing systems, rationalizing household labour requirements, and improving returns to labour, particularly women's labour. It will contribute to gender equity by providing rural women with increased opportunities and support to participate in the selection and implementation of community and household investments for improved income generation and asset creation. It will support the formation of farmer and trade based organizations and their technical training in livestock rearing and marketing, as well as in savings and credit management. Women will be enabled to participate equitably in all training, group formation, and activities aimed at improved extension, production, and marketing.

In order to achieve the outcomes of a sustained livelihood through livestock development three outputs are envisaged.

- Enhanced productivity of livestock production systems;
- Structuring and capacity building of producers and livestock farmer based organizations for community driven livestock development (CDLD), and
- Implementation management.

The vision for the National Sustainable Agriculture Development Plan (NSADP) and the Smallholder Commercialization Programme (SCP) for commercializing agriculture emphasizes the critical role agricultural research and extension is expected to play in the development of the agricultural sector. From the regional and global perspective, the project is in line with the Comprehensive African Agricultural Development Programme (CAADP) ECOWAP, West and Central African Council for Agricultural Research and Development (WECARD), and the Millennium Development Goals (MDGs) in extending the area under sustainable land management, improving rural infrastructure and trade-related capacities for market access, increasing food supply and reducing hunger and Agricultural research, technology dissemination and adoption. In this regard, this project is expected to play a major role in addressing the many challenges facing the livestock sector which must be incorporated into a National Livestock Development Plan (NLDP) linked to the recently launched Sierra Leone's "Agenda for Prosperity" that was developed to deliver the economic growth envisioned in the Vision 2025.

1. INTRODUCTION

Sierra Leone lies in the West Coast of Africa between latitudes 6°55' and 10°00' N and longitudes 10°16' and 13°18'W, and covers a geographical area of 72 000 km^2. Elevations range from less than 50 m in the coastal areas to more than 500 m in the uplands. The climate is a monsoon humid tropical type with two distinct seasons: rainy season from May to October and dry season from November to April. The annual rainfall averages about 3 000 mm, ranging from 2 000 mm in the north to 4 000 mm in the south. Rainfall distribution is uni-modal, with a peak in August. Despite the abundant rainfall, about 20 to 50 percent is generally lost as surface runoff. Even though the country has a very high rainfall, it also has a prolonged dry season in which many streams and rivers cease to flow, and water deficits are a common feature with annual rainfall of only 500 mm and lasting for only 160 to 170 days in some agro-climatic regions. The onset of the rains is quite variable with important consequences for the dominant practice of rain-fed agricultural production. Average monthly temperatures range from 23°C to 35°C

The country has an estimated total water resources potential of about 160 km^3/year comprising both surface and ground water. A total of 9 major river systems which have a total catchment area of about 72 080 km^2 contribute to the surface water. Majority of the soils are ferralitic with low natural fertility (low pH, organic matter content and cation exchange capacity) and low water holding capacity due to generally coarse nature of the top soil, the results of centuries of weathering under a high rainfall regime.

Results of the 2004 population census showed a total population of 4 979,000 million people in Sierra Leone. The population has been growing at a rate of 2.3 to 2.8 percent per annum and the projected population for 2010 was 7 014,000 with a very healthy sex ratio of 1.0 men to 1.03 women, and a projected 19.6 percent of the population aged 15 to 24 years, and a population density of 86 persons / km^2. The results of the Core Welfare Indicator Questionnaire (CWIQ) survey (2007) showed that the proportion of economically active population (aged 15 years and above) was 69.7 percent with rural area population accounting for 77.2 percent of the population. Furthermore, the CWIQ survey of November 2007 showed that 56.3 percent males and 60.4 percent female workers were engaged in crop farming and livestock. According to the study while rural population has a more economically active population (79.3 percent), 35.2 percent were under-employed. Adult literacy rate for males and females was estimated at 40 and 21 percent respectively. This is similar to the findings from the 2005 Vulnerability Analysis Mapping (VAM) survey which reported 44 and 15 percent for males and females respectively.

The main stay of the economy is agriculture (crops, livestock, forestry & fisheries) which contributes over 75 percent of livelihoods and about 47.2 percent of GDP. Rice is the major food crop followed by cassava and potato. Other crops cultivated are maize, groundnuts, sorghum, palm oil and millet. Mining is the second major sector of the economy. The country is endowed with minerals such as diamond, bauxite, titanium oxide (rutile), as well as gold, iron and chromite. The manufacturing industry makes a very small contribution. All these sectors suffered severe setbacks during the conflict but with several recovery measures taken, they are beginning to show some improvement. The economy is still heavily foreign dependent. Inflation, youth unemployment, high level of illiteracy, and food insecurity are still major challenges. About 70 percent of the population is living below the

poverty line and about 26 percent of the people cannot afford the minimum requirement of 2 700 calories per adult equivalent.

The new estimates of poverty suggest that 66.4 percent of the population is poor (47percent in urban areas versus 79 percent in rural areas). The average person's total consumption falls 27.5 percent short of the minimum consumption level necessary in order not to be classified as poor. The national poverty profile of Sierra Leone reveals that rural households headed by farmers have the highest incidence (83 percent) and the highest intensity (39percent) of poverty, in spite of the agriculture sector (including livestock) employing over 75 percent of the rural population and contributing 47.2 percent of GDP. Subsistence farmers, who are the principal food producers, are amongst the poorest members of the population. These facts emphasize the vital need to rapidly improve the performance of small-scale farming if there is to be significant progress towards addressing the problem of hunger and poverty in Sierra Leone.

2. SOCIO-ECONOMIC CONTEXT OF THE MEAT AND MILK VALUE CHAINS

2.1 Current GDP of the country and trends in recent years

Growth in Sierra Leone's real GDP increased from 5 percent (excluding iron ore) in 2010 to 6 percent in 2011. Driven by the mining sector – particularly iron ore- real GDP growth accelerated from 6 percent in 2011 to 16.7 percent in 2012 as a consequence of iron ore production. It has also been supported by agriculture, services and expansion in construction. GDP growth is projected to stabilize around 7.2 percent in 2013 before reaching 12.1 percent in 2014 as iron ore projects become fully operational.

2.2 Contribution of each of the meat and milk value chains to the national GDP and its trend

The main stay of the economy in Sierra Leone is agriculture (crops, livestock, forestry and fisheries) which contributes over 75 percent of livelihoods and about 47.2 percent of GDP. Within the agriculture sector, livestock contributes 5.7 percent of the agricultural GDP contribution. On an overall basis the contribution of livestock sector to the GDP has been in the range of 2.7% to 3.2 percent.

Estimates of the contributions of each of the meat and milk value chains to national GDP are not available. The main livestock species contributing to the meat and milk value chain are cattle, goats, sheep, and pigs. All of the animals are indigenous types found in the traditional sector. In Sierra Leone, there is only one breed of cattle the Ndama used for both meat and milk production. Of the meat producing animals, cattle are the most important as they produce most of the red meat and ruminants provide about 21 percent of protein in the diet of all Sierra Leoneans (MAFFS, 2008).

2.3 Contribution to house-hold income, wellbeing and employment

Cattle and small ruminant are primarily kept for subsistence purposes and are sold only when the owners are in dire need of cash. Data is not available on the actual contribution of livestock to household income. General observation shows that livestock farming generates more income to farmers (especially large cattle owners) compared to other agricultural activities. In terms of household income and wellbeing cattle owners generally have more income compared to their counterpart crop farmers. Small ruminants are generally a good source of short term small cash needs for the families especially in paying school fees for children or for medical bills. Currently, employment levels in the livestock sector are low because of the subsistence nature of production system.

2.4 Proportion of population engaged in meat and milk value chains

The proportion of the population that is engaged in the meat and milk value chain is yet to be determined. The cattle livestock/meat and milk value chain is dominated by the Fullahs who makes up about 5 percent of the population. Surveys indicate that of the 450 to 500 000 farm families in the

country's rural sector about 85 percent are involved in mix crop-livestock (small ruminant and chicken) systems. Pigs are the least widely owned constituting less than 1 percent of the population.

2.5 The main objectives of producing meat and milk

Currently the main objective of producing meat and milk is for local consumption. Cattle are kept mostly as a symbol of prestige by their owners with little or no commercial orientation and are sold only when the owners are in dire need of cash. Small ruminants (goats and sheep) have a huge market in Sierra Leone. Goat meat is a delicacy and the most favoured animal among the Kpa Mende tribe who use the animal for rituals. Sierra Leone has a predominant Muslim population (70 percent) and sheep are important for the Islamic religious festival of the Eid-ul Adha. Sheep and goats are also commonly used in other traditional ceremonies common in various communities in the country. Pig meat is primarily for consumption.

3. DESCRIPTION AND MAPPING OF THE MEAT AND MILK VALUE CHAINS

3.1 The structure of the meat and milk value chains

The structure of meat and milk value chain in Sierra Leone comprises a loose network of individuals and groups/associations of varying sizes and activities. These include:

a. Owners / Producers – Cattle are owned and managed mostly by the Fullahs and the few non-Fullahs who own cattle employ Fullah herders to care for them. However, small ruminants are owned by 70 percent of rural households. They get their animals either by bartering or buying them from other cattle/small ruminants' owners. In several instances animals are also given as gifts for occasions like marriage.
b. Agents – these are people who buy the animals from the owners or sometimes contracted by owners to sell their animals in the market to traders or other customers at a profit. Owners at times prefer agents since they save on the travel and time going to the markets (usually situated far away from their villages). They also feel it is a risk if they are not able to sell their animals even after going to the markets. There is also a risk of prices going down the longer they have to stay in the market.
c. Traders (Wholesalers) – they are usually capital rich traders from far away major towns to buy livestock from the weekly markets especially in the Koinadugu District. They transport the animals with help of cowboys to motorable roads where they are then loaded into trucks.
d. Local traders (Retailers) – these are normally small traders usually resident within the locality of the market who buy animals from markets and sell them in the local community.
e. Local butchers - are small butchers cum retailers who purchase animals directly at market site (usually for a whole week) and trek them to their slaughter facility and sell the meat at their shops.
f. Major town butchers - buy the animals from traders (wholesalers) and transport them to their slaughter houses for converting them to meat. They sell the produce to local retail shops as well as supermarkets (High quality meat).
g. Retail meat stall owners (Freetown) – These are market stall owners who buy meat from butchers from the main slaughter house for sale to the general public.
h. Supermarkets – outlets for the sale of meat and mutton supplied from the slaughter house.

<u>Support services providers are</u>

a. Chiefdom Authorities - A typical chiefdom has a paramount chief at the helm; sub chiefs or section chiefs; headmen and other administrative staff who help to manage the affairs of the chiefdom. Their key role is to complement government efforts in enforcing law and order, and taking appropriate action on defaulters.
b. Land Owners - They are indigenes and owners of the land where cattle are reared. Usually, the compensation for such land is in form of cattle or cash in rare cases.
c. LSD staff (Veterinary technicians) – responsible for ante and post mortem inspection and care of animal and other animal health related problems. Also maintain livestock inspection posts monitoring the movement of animals and checking on their health status.
d. Cowboys – These usually belong to the Fullah community and are used by various stakeholders to transport animals by trekking them from one location to another or accompanying trucks loaded with livestock being transported to major towns. Their services are mainly required

when animals need to be transported to the market place or to the truck loading points (where motorable roads are available for animals' transportation). Sometimes, they may be asked to take animals for grazing when they are kept at the butcher/market paddocks.

e. Truck operators - provide vehicles used for transporting animals from one location to another.
f. Animal feeders - They work in paddocks and slaughterhouses, and are usually hired by traders for cutting and feeding grass to animals.
g. Waterers and cleaners - They work in paddocks and slaughterhouses and usually provide drinking water to animals and cleaning of paddocks and slaughter houses.

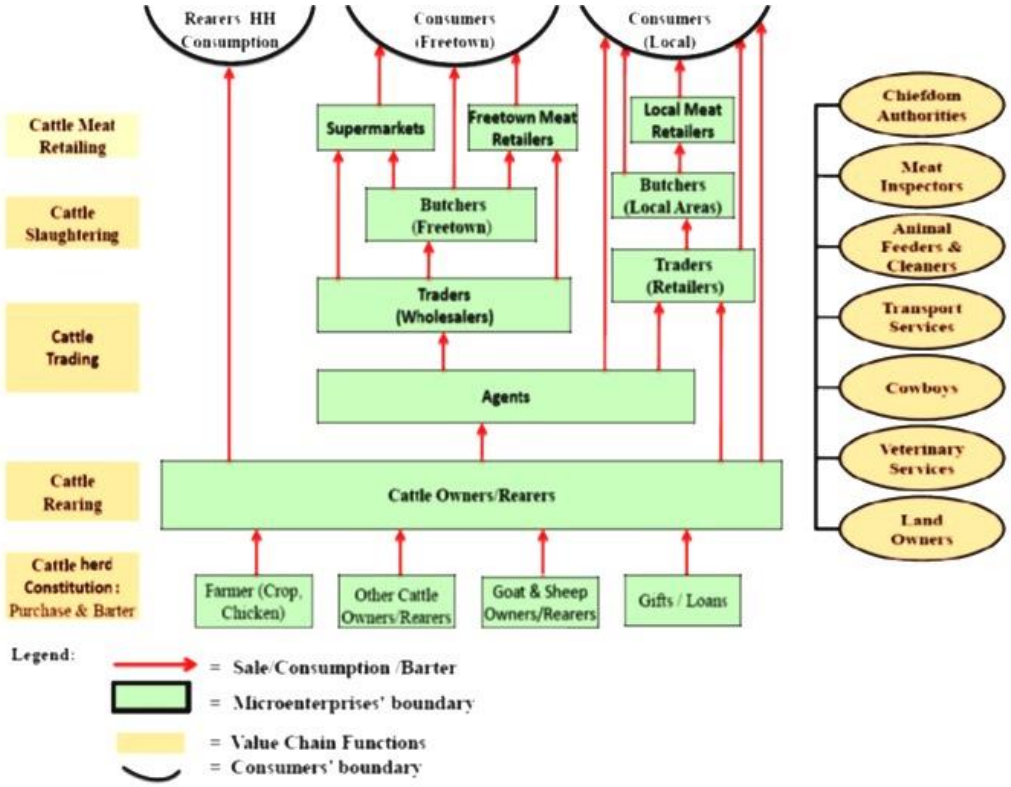
3.2 Physical flows of meat and milk among the different components (actors)

3.2.1 Cattle Value Chain Map and distribution channels

Figure 1 shows the physical flows of live cattle and beef products. Some of the channels of distribution are as follows:

- Channel 1: Here cattle are used for household consumption by farmers or is given to someone like relatives, land owners or is even exchanged for small ruminants.
- Channel 2: Local butchers buy live cattle from the owners or agents and sell the meat in local markets, like Kabala.
- Channel 3: Traders purchase cattle in bulk from agents or local market traders and then transport them to Freetown, Makeni, Bo, Kenema etc.
- Channel 4: Traders sell live cattle to butchers or directly to private consumers
- Channel 5: Butchers sell to hotels, restaurants or consumers

Figure 1: Cattle value chain map



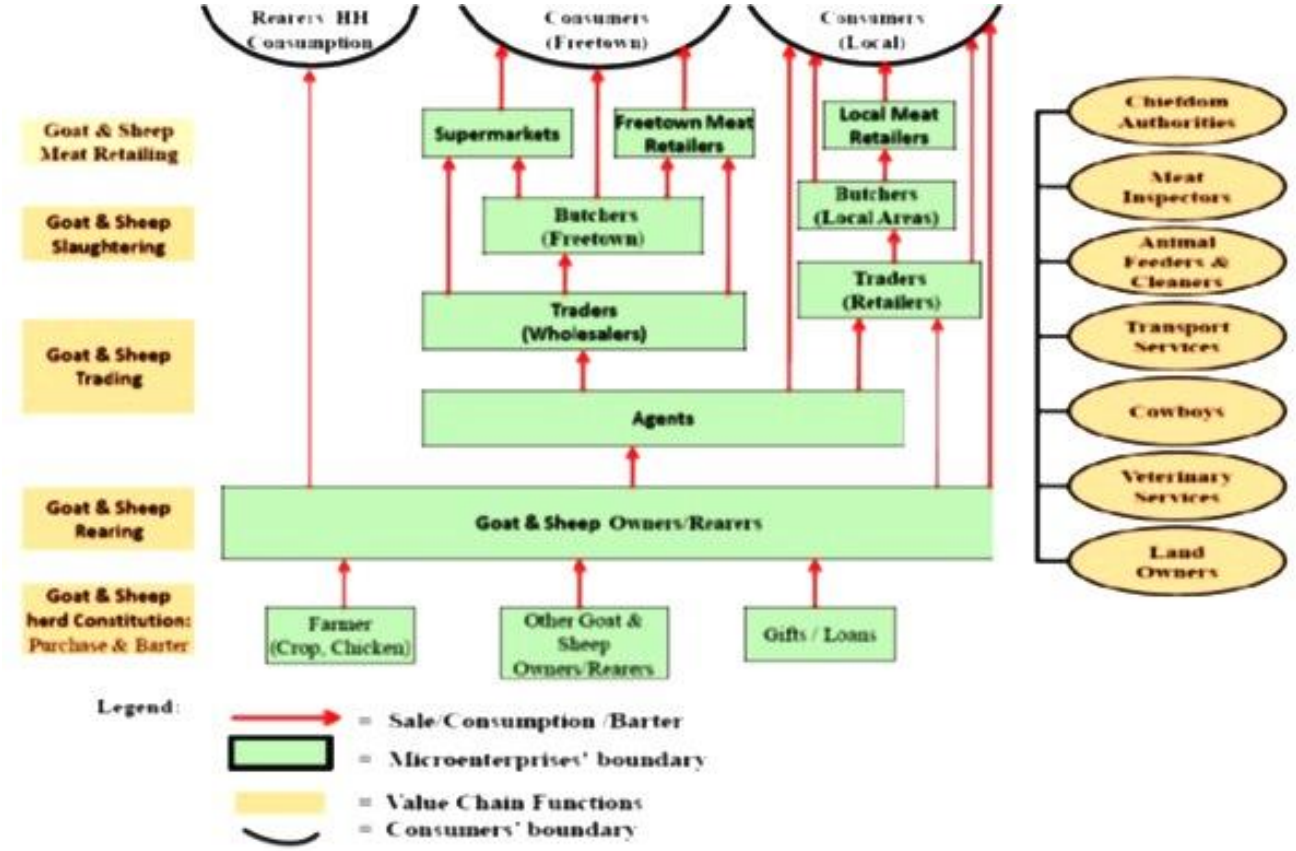
Source: Milk and Meat Value Chain Study, 2010

3.2.2 Small ruminants

Figure 2 shows the small ruminants' value chain map and distribution channels. Some of the distribution channels identified in the value chain include:

- Channel 1: Here goats and sheep are used for household consumption by owners or as gifts to relatives.
- Channel 2: Local butchers buy the goat and sheep from the owners or agents and sell the meat in local markets.
- Channel 3: Traders purchasing small ruminants in bulk, which are then transported to major towns.
- Channel 4: Traders selling live sheep or goats directly to consumers
- Channel 5: Traders selling to butchers and then selling retail to consumers

Figure 2: Small Ruminant Value Chain Map



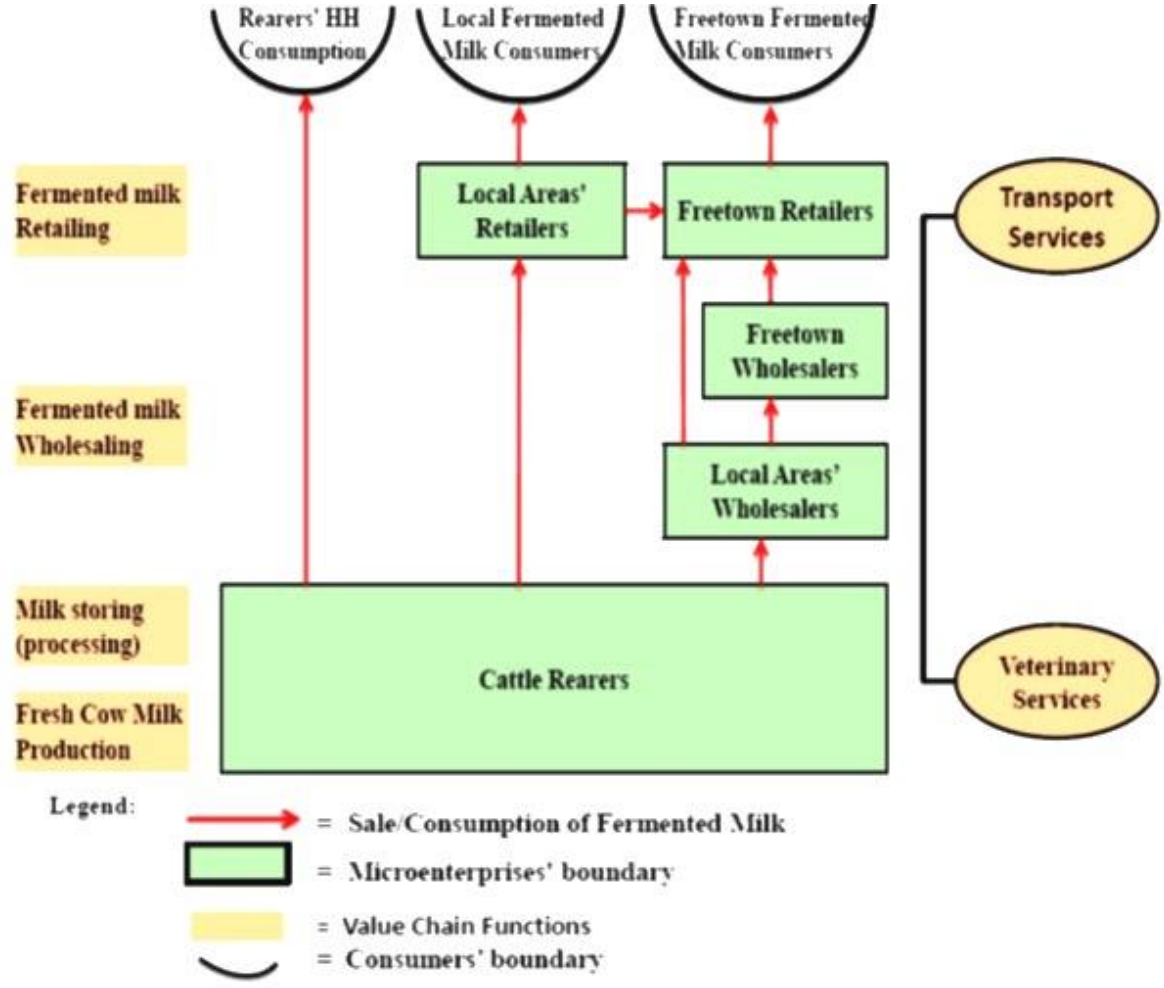
Source: Milk and Meat Value Chain Study, 2010

3.2.3 Milk value chain map and distribution channel

Figure 3 shows the physical flows of milk and milk products. Some of the channels of distribution are as follows:

- Channel 1: In this channel, the fermented milk is consumed directly by the worreh household. It can also be given to neighbours and/or family members if required. If any cow milk butter has been collected, it is treated similarly as the fermented milk.
- Channel 2: The fermented milk produced at the worreh is sold directly to local retailers. The local retailers are the women dedicated to the sale of fermented milk in the neighboring towns and villages. Retailers can sell directly to the consumers through a fixed selling point (a stall on the border of roads, etc.); the local markets or even bring directly the product to the consumers' house. Although it is not the focus of the process, an insignificant quantity of cow milk butter is also collected during the milk fermenting and sold along with the fermented milk.
- Channel 3: The fermented milk is collected from the local market by wholesalers, who bring it directly to Freetown and other major towns. The wholesalers sell to retailers who in turn sell to the general consuming public. Despite its small quantity, the cow milk butter is also sold along with the fermented milk.

Figure 3: Milk Value Chain Map



Source: Milk and Meat Value Chain Study, 2010

3.2.4 Pig value chain

A typical pig value chain in Sierra Leone will start with local farmers who rear the pigs either free range or intensively, slaughter them after attaining market weight (40-60 kg) or offer them for sale to opportunistic traders who will slaughter and sell retail to consumers. Other actors within the value chain include: input providers (compound feed, drugs etc.).

3.3 Primary production process

3.3.1 Cattle production process

The Fula are semi-nomadic pastoralists who have no land rights in Sierra Leone (other than those acquired by inter-marriage) and no security of tenure (except within established villages and urban areas). Cattle herders with their family live in encampments called a "worreh" within the grazing land allocated to them by the village community. Worreh sites are usually moved from one place to the other on a three year interval; however, there are worrehs known to have established and settled in one site for over 30 years. About 40 percent of the worrehs in the Koinadugu district are permanently settled. The worreh is constructed with local materials collected from the surrounding bush. Cattle are normally herded by day in controlled areas and enclosed at night in an enclosure called a "dinkra" within the worreh. The size of the dinkra varies considerably and it depends on the number of cattle kept. Some worrehs might have as many as 250 to 300 cattle but not necessarily under the same ownership. Cattle tend to be managed in units of 30 to 40 animals although the range recorded by Tommy (1983) was from 5 to 188, and individual Fula may own more than one unit each unit herded by 2 to 3 herdsmen.

The grazing areas allocated to the Fula are normally away from the cropping areas to minimize risk of crop damage but altercations between herders and farmers are reportedly common, and are usually arbitrated by a "cattle settlement committee". Crop residues provide a useful dry season fodder for Fula livestock but their dependence upon them seems to be variable. Livestock return nutrients in the form of dung and urine to the cropped soil, so the grazing of crop residues provides benefits to both parties.

Apart from periodic movements of the whole encampment to a different part of the chiefdom, or into another chiefdom, there are regular seasonal movements across short distances of usually only a few kilometers between uplands and lowlands. During the wet season (May to November) cattle graze the upland savanna and grassland, being herded by day and enclosed at night. Care is supposed to be taken to keep them out of the upland cropping areas. In November/December when rice has been harvested in the lowlands *bolis* and inland valley swamps cattle are allowed to move unrestrained to these lowlands to find water and to graze on the crop residues, fallow lands and riverine grasslands. In some areas the inland valley swamps are now double cropped with rice, in which case they are never available to livestock. In January/February the Fula set fire to the upland areas to remove the coarse and fibrous tall grasses and to stimulate palatable regrowth on residual soil moisture. The *bolis* are inland valley swamps to be cultivated for the next season are burned in March by the farmers, while cattle continue to graze the lowland grasslands and fallows, then in April/May when the rains start the fula move their cattle back to the uplands and the cycle starts again.

A mixture of salt, termite mound and various herds (*tupal*) is fed to cattle about three times a year. Most Fula households also keep a few sheep and goats, but are less actively managed than the cattle. They are normally housed off the ground at night to reduce foot problems. The Fula tend to cultivate small areas for subsistence purposes around their houses but their livelihood is essentially livestock dependent. The main period of nutritional constraint is the dry season, which is also the calving season. Although the tall grasses common in the upland areas become coarse and unpalatable as the growing season progresses, livestock can maintain an adequate diet through selective grazing. Milking cattle and producing ghee, for home consumption and for sale, is the women's responsibility while cattle herding is performed by men and boys. Milk is usually allowed to curdle, when it produces *cossan* (soured milk), a staple Fullah diet. The Fullah do not normally drink fresh milk but sometimes sell it. If there is ample milk, it is allowed to curdle for up to three days and the cream is skimmed off for the manufacture of *neban nehi* (cow butter) or ghee. The butter is normally eaten with rice or sold.

Under village conditions, the typical age at first calving is from 36 to 48 months (FAO, 1971). Calving interval may be between 12 to 14 months, but usually it is closer to 16 months (Holt 1973) and the calving season extends from November to March. Mortality rates tend to be higher under village conditions: Holt (1973) reports 23.5 percent mortality from birth to one year, accompanied by a 5 percent abortion rate. Touchberry (1967) gives a good deal of precise data on N'Dama performance at the Musaia Stock Farm from the period 1949 to 1965. Concerning reproductive performance, the average age at first calving was recorded as 39.4 months for 231 cows at Musaia. The average calving interval at Musaia was 407 days, with a range of 267 to 1 062 days. At Musaia, the calving season is longer, but 67 percent of the cows calve between September and February. The average lifetime production for the cows at Musaia was 3.7 calves. Touchberry (1967) recorded an annual mortality rate of 7 percent for animals under two years old.

Based on cold dressed weights for livestock slaughtered in slaughter houses, carcass weights average 108 kg/head for cattle, 10 kg/head for sheep and 8 kg/head for goats, all of which are below the average productivity of all least developed countries. Inferior carcasses from this system can be attributed to many important factors, including but not limited to the following: (a) low genetic potential for indigenous cattle, (b) nutritional stress in terms of both quantity and quality of pastures during the dry season, (c) inadequate dry season supplementation when pastures cannot provide sufficient feed, and (e) heavy parasite burdens, especially ticks, intestinal worms and liver flukes as a result of inadequate animal husbandry and veterinary practices.

3.3.2 Small ruminant production process

An estimated 75 percent of rural households in Sierra Leone own sheep and/or goats and the average flock size are from 2 to 15 animals. The production system of sheep and goat is entirely traditional characterized by low input and low output levels. There is no commercial sector. Sheep and goats receive little active management other than trying to prevent them from causing crop damage. Many villages enforce the tethering of small ruminants (and even cattle) during the cropping season, but they are allowed to range free after the rice harvest in November. Stock management is the responsibility of women, assisted by children. In some situations, sheep and goats are normally housed off the ground at night, particularly in the wet season, for security and to reduce the incidence of foot rot whilst many other are left to roam and occupy whatever vacant places are

available. Breeding is uncontrolled with high level of inbreeding. The principal forage resource is the patches of grass and shrubs between the houses and fields, and access to crop residues and recent fallow, as well as scavenging household food waste.

The animals have so far been identified with low growth performance resulting in mature weights of 20 to 30 kg for sheep and 20 to 25 kg for goats, long calving intervals (over ten months), low twinning rates (less than 12 percent), late puberty (between 15 to 18 months) and high mortality rates among lambs, ranging from 16 to 67 percent resulting in high wastage and lowered productivity. Off-take has been estimated at no more than 20 percent. Ewes probably lamb for the first time at 15 to 18 months of age, and thereafter twice yearly. Their lambing percentage per annum is approximately 280.

3.3.3 Pigs

Two main types of pig production systems exist in Sierra Leone; the rural and urban free (scavenging) system, and the rural and urban intensive production system. In rural and urban areas particularly those around refuse dumps, free range production of pigs is predominant. Pigs roam at will in search of food and water and during the process of scavenging they are likely to pick up infected materials and heavy metals concentrated in refuse dumps thereby predisposing consumers to diseases. Little inputs with respect to providing feed, basic health service or housing is provided for the animals. The farm size of such producers usually ranges between 2 to 20 pigs, and the dressed carcass weight ranges between 40-60 kg.

Contrary to the free range system, substantial numbers of pigs are reared on intensive production systems. There are various levels of management and intensity of production. At the lowest is the smallholder semi-intensive production in which 2 or 3 sows are kept in simple houses with concrete floors and thatched roofs, and are fed largely or entirely from home grown feeds, notably cassava, and locally available by products. Fully commercial units rely on compound feeds and producers mill or mix their feeds for their own use, but not for sale.

In rural areas, the intensive system is mostly confined to big livestock establishment or research stations where exotic pig populations may range between 20 to 50 pigs, and live and dressed carcass weights of the exotic breeds are in the range between 120 to 80kg, and 100 to 60 kg, respectively. However, small scale intensive backyard pig farming is also experienced in both rural and urban areas. The bulk of the intensively managed pigs are concentrated in urban areas where mostly exotic breeds are reared with the provision of improved inputs such as feeds and medication.

3.3.4 Milk production system

The traditional smallholder system in the rural areas produces 100% of the total milk production using the indigenous N'Dama breed. This sector is largely dependent on low levels of input and the indigenous N'Dama breed which produces about 0.6 litres per cow per day. Under this production system, milking cows are allowed to graze together with the total herd and there is no special feeding regime to these cows. Calves are allowed to suckle partially for the first three to five

minutes to stimulate milk let-down. The newly born calves stay around the worreh whilst the dams go out to graze. Milking is done in the morning only by the women after washing their hands.

3.4 Inputs and factors for primary production

In the present system of cattle production, the main input is land due to extensive management system. The Fullahs who mostly own and manage cattle are migrants from Guinea and have no land rights and no security of tenure. The few non-Fullahs who own cattle employ Fullah herders to care for them. Generally, grazing right is acquired by cattle farmers through an agreement with the village community, section and paramount chiefs of the locality. In the Koinadugu district a head of cattle is usually paid at each stage of the agreement thereafter the cattle farmer is required to make generous donations of cattle during important festivals and ceremonies conducted by local village or chiefdom authorities.

Breeding stock is usually acquired from other cattle owners. Each worreh is usually managed by 3 to 5 herdsmen on a contract basis with the owner. Payment is usually in the form of a head of cattle paid annually to the herdsmen. Women generally provide manual labor milking the cows in the morning and the cleaning of the dinkra of cow dung. Sheep, goats and chicken kept at the worreh are mostly owned by the herders. Milk collected from the herd also forms one of the income streams of the herders household.

Inputs for small ruminants usually involve acquiring breeding stock and in a few cases ropes for tethering the animals during the cropping season. Housing of small ruminants in the villages is very limited and where it exist a few owners use corrugated iron sheets and nails in constructing the roof and the rest of the materials acquired locally. Use of veterinary drugs is also very rare.
The use of drugs and other veterinary services is very limited mainly due to either inaccessibility or affordability. Most livestock producers rely on government for the supply of free drugs and vaccine. Most herders use traditional herbs in the treatment of sick animals.

Input requirements for pig production are dependent on the intensity of production with regards capital, labour and feed. Under intensive management system capital is required for housing and purchase of feed. Labour requirements are also very high. Housing and feed are the major input requirements for commercial pig production.

3.5 Processing stages up to the final commodity

There is very little processing or value addition for all livestock meat and milk value chains in Sierra Leone. From the producers and thereafter only live animals change hands from one trader to the other until the animal is slaughtered for meat and consumed. Similar to cattle value chains no processing or value addition takes place in the small ruminant value chain. Most sheep and goats sold at the market to consumers are for ceremonial purposes. Apart from the main sale of live goats and sheep, a few goats are slaughtered and meat sold to consumers or to restaurant owners. Goat soup is a delicacy for most Sierra Leoneans. Pigs are slaughtered and sold as fresh pork without

further processing. Every part of the animals is consumed with the exception of the hair, blood and hooves usually left to waste.

There is also very limited processing or value addition in milk apart from the usual fermentation process. However, when there is excess milk a rudimentary technology is used to separate the fat (cow butter) out from the milk and this is also sold. The milk is kept for two to three days before it gets fermented, then consumed by the producers' household or sold at village markets and/or delivered to local retailers who collect milk from the worreh.

3.6 Various by-products and/or joint products

Every part of a slaughtered animal is consumed with the exception of the hair, blood and hooves left to waste. At present there is no indication of by-products made from the wasted materials. No level of processing takes place on materials left to waste.

3.7 Amount of land and other natural resources allocated to the meat and milk value chains

Sierra Leone is endowed with abundant natural resources in terms of abundant forest cover, grass fodder, rich soil, and abundant rainfall. Presently vast tracts of land are unutilized or underutilized. There is no land space exclusively reserved for livestock production in the whole of the country. The northern part of Sierra Leone which holds a greater proportion of livestock is dominated by savannah vegetation with grasses and shrubs and the Bolilands which are low-lying depressions subject to flooding during the wet season. The most suitable areas for grazing livestock are the savannah types totalling 16 738 km^2 or 23.2 percent of the country, and the grassland types totalling 4 411km^2 or 6.1 percent of the country and are both concentrated mostly in the Northern Province. Both upland and swamp cultivation areas also provide a valuable source of dry season forage. In the oil-palm plantation, the pasture underneath the trees provides useful grazing. In general the forest re-growth areas have potential for cattle grazing.

3.8 Competition over the utilization of land or other natural resources

As mentioned earlier, vast tracts of land remain unutilized and there is hardly any serious competition for land use or any other natural resources considered for livestock production. However, some cattle farmers were recently forced to relocate as a result of huge chunks of land taken up by mining companies and other companies involved in crop plantation.

3.9 Impact of the meat and milk value chains on environment

National livestock populations are very low compared to the resources available. During the rainy season the amount of grass and fodder available is far too much in excess as compared to the number of animals. However, there is an acute shortage of water and feed in the dry season. With

the exception of animals going astray and feeding on crops which most times result to conflicts, there is no reported case of any environmental degradation or adverse effect of the meat and milk value chains on the environment.

3.10 Production and value addition potential

In view of the opportunities that exist in terms of abundant natural resources both from the supply and demand side, there is tremendous potential for Sierra Leone as a country for improved livestock production. In the shorter term, cattle and small ruminant development is important from a food security and employment creation standpoint. It also has the potential of providing employment and a fuller employment to underemployed persons, especially women by giving them an opportunity to rear a few cattle and a small herd of small ruminants at the minimum, thus empowering women. In the medium term the sector holds potential to reduce dependency on meat and dairy imports saving the country from expensive imports. And in the long term we also see the possibility of Sierra Leone exporting meat and dairy products. In none of the production systems is there an over use of chemicals, and they could be described as being "organic". This can be a comparative advantage and the country must make use of it.

A large number of people do not prefer the local fermented milk because of hygienic considerations related to milk handling, processing and sale. Nevertheless, if the milk quality could be assured through ensuring standard milk processing procedures and certification some consumers would gladly include milk in their diet.

There is a large demand for new milk products like fresh milk, butter and cheese. These are not available given the already low production levels of milk. Even towns like Kabala which is in the heart of livestock dominated Koinadugu district depend on imported milk and other dairy products like butter and cheese. If these milk products were to be made available locally and at much cheaper rates than the imported ones, a ready and large market would take them up.

3.11 Number of value chain actors by component (chain)

Actual figures are not available with regards to number of the various value chain actors by components. A total of about 784 farmers are registered in the Koinadugu District where the largest cattle population is found. The National Butchers Union has a membership figure of about 3 500 comprising butchers and traders. The Pig and Poultry Farmers Association has a current membership of 55. The number of actors involved in milk trade is not known.

3.12 Current and potential (future) domestic demand of meat and milk

According to MAFFS, local demand for meat is estimated at 912 500 against a production of about 142 334 tonnes. Production levels are very low for all livestock species and demands far exceed supplies. In 1979 domestic production was estimated at 5 500 tonnes of meat and 5 000 tonnes of

milk against a population of 4 million. With net imports of 1 500 tonnes of meat and 24 500 tonnes of milk this gives annual per caput consumption levels of less than 2 kg of meat and 8 kg of milk. According to available information, Sierra Leone was a gross importer of livestock during the period of 1980 to 2002. The total value of imported meat (beef, mutton and goat) was US$ 616 000 in 2002, whereas the country had no exports. Sierra Leone also imports milk (without exporting) and the total milk import was of the value US$7 015 000 in 2002.

In 2008, a total of 1 706.4 tonnes of eggs, 2 294 tonnes of poultry and poultry products, 324 metric tonnes of frozen buffalo meat, and 155.8 tonnes of pig products were imported.

3.13 Current and potential (future) foreign demand of meat and milk

Currently, Sierra Leone is a net importer of livestock and livestock products with no exports. The surge in food prices and the growing demand (estimated at 4 percent annually) for meat, milk and eggs in West Africa can be translated into opportunities for local producers to increase production. The demand for these products is expected to increase in Sub-Saharan Africa, especially in West Africa, by more than 250 percent by 2020 (Club du Sahel/OECD, 1998; Delgado et al., 2001) as a result of population growth, accelerated urbanization, growing incomes and consequently increased purchasing power of the populations.

3.14 The products capacity to fulfill international requirements (sanitary and other standards)

At present Sierra Leone has only limited and isolated capacity to manage food safety, livestock health and environmental risks. Thus, market access for many of Sierra Leone's agricultural products is eroded due to weak SPS standards and poor quality assurance systems. Sierra Leone has a rather rudimentary institutional capacity for management of standards.

4. INFRASTRUCTURE AND OTHER SUPPORT SERVICES

4.1 Transport

There has been a major improvement in the road network linking the major towns in the country. However, beyond these towns the road network is poor especially in those areas with high concentration of cattle production. Most worrehs whether in the Koinadugu district or anywhere else in the country are very isolated and located far off the towns and are inaccessible by vehicle. The roads leading to Gbindi cattle market centre is inaccessible to trucks during the rainy season so cowboys will have to walk animals to a town near Kabala called Kanuka where they are loaded onto trucks.

Road transport is the major avenue for livestock transportation with the use of covered trucks that hold between 15 and 17 heads of cattle or the equivalent in sheep and goats. However, livestock still travel on the hoof to market centers from the producing areas. Transportation is carried out by private operators some of whom have close ties with the producers, traders and butchers.

4.2 Equipment, required investment, facilities and related depreciation

Each of the main urban centers has facilities for slaughtering livestock and market stalls provided by the local municipality. Slaughtering sites are used almost totally for cattle with negligible numbers of sheep, goats and pigs. Only 10 percent of slaughtering is carried out in formal slaughter houses where veterinary inspections are performed. Slaughter facilities in urban centres are usually owned by the local authorities. They vary in construction but normally consist of nothing more than a slaughter slab with a hoist. Running water is usually not available everywhere. All offal are used for human consumption. In the rural areas cattle are slaughtered whenever and wherever convenient. The Danish government funded the abattoir project and built two abattoirs at Pamlap near Makeni and Kossoh Town near Hastings. The abattoirs were handed over to private sector management. However, the abattoirs were not operated in a manner that fulfilled the original objective for which they were constructed.

In Freetown, the central slaughter house located at Dovecot (Guard Street) is about 70 years old and has deteriorated with an inadequate water supply and open drains leading directly into the sea. Six separate stalls are provided for slaughtering cattle, each with a hand operated hoist. Smaller towns have an official slaughter site which is generally very rudimentary and usually consists of an open concrete pad with an inadequate and easily contaminated water supply and no drainage facilities. Meat is sold through sixty market stalls in the three main markets in Freetown: Garrison street market, Lumley market and Congo market. There are no meat vans for distribution of meat to these meat markets. Meat retailers rely on service boys to transport meat on their heads from the slaughter house at Dovecot and other meat markets. The meat markets are constrained by lack of cold room facilities. No cold room or cold chain facilities are available at the meat markets.
Livestock markets especially for cattle are found in the traditional cattle rearing areas of the north. Cross border trading also takes place along the Sierra Leone/Guinea border. Cattle traders from Guinea bring their cattle to livestock centers in the Koinadugu district. Cattle traders from the Western area, Bo, Kenema and Kono converge on these places where they meet with middle men or commission cattlemen to transact cattle trade.

There are fifteen market centers in Sierra Leone situated in towns and villages for marketing of cattle, sheep and goats. Generally, marketing facilities are very limited and the market is little more than a convenient meeting place for the exchange of livestock. The animals are tethered to poles and posts embedded in the ground and buyers and sellers mingle amongst the cattle. Goats and sheep are traded in an adjoining area. There are no pens, weighbridges, water troughs, loading ramps or shade trees.

The Gbindi livestock market currently is a perimeter fenced structure (paddock) constructed with funds provided by GIZ and the European Union and implemented by NaCSA and the Koinadugu District local council primarily to reduce trade cattle theft. The facility has a capacity to hold 500 to 700 heads of cattle, a veterinary office, a dip and a cattle loading ramp. However, the dip was never put into use due to lack of water and drugs. The animals are tethered to wooden poles embedded in the ground and buyers and sellers mingle amongst the cattle. Goats and sheep are traded in an adjoining area.

Commercial production of processed and mixed animal feed in Sierra Leone is relatively small scale and underdeveloped, reflecting the low level of commercial livestock enterprise using processed feeds. The government has two feed mills one located at the agriculture compound in Makeni and the other at Kissy dockyard in Freetown. There is also a privately owned feed mill at Waterloo village near Moyamba but which not functional. There are small functional feed mills however, at the Yele poultry farm, Doray's Poultry Farm and Njala University, Njala campus - Animal production Division (APD) that produce feed for their own poultry production but with the intention of selling excess production on the local market.

4.3 Extension and technical support

Livestock extension is currently the responsibility of the animal health field services and does not form integral part of the extension services offered to crop producers. The present extension system is relatively unstructured with no set schedule of visits or seasonally based extension messages. At the LSD the same personnel is responsible for disease surveillance and animal health delivery as well as livestock husbandry. With regards to training and field work however, emphasis is mainly on animal health aspect. Livestock extension is currently the responsibility of the animal health field services and does not form integral part of the extension services offered to crop producers. The present extension system is relatively unstructured with no set schedule of visits or seasonally based extension messages. No research supportive of extension service is currently being undertaken at the SLARI Teko Livestock Research Station.

Extension staff are trained to certificate and higher diploma level at the National Agricultural Training Centre (NATC) at Njala. Supervisory staff and/or livestock production officers are trained at degree level at the animal science department of the Njala University.

4.4 Training and Research institutions

Livestock research is currently being undertaken at 2 research institutions. These are the Sierra Leone Agricultural Research Institute (SLARI) under the aegis of MAFFS and the Njala University and NATC. The SLARI was established in 2007 as the primary national agricultural research institute. It

is planned that SLARI will operate eight research centres focusing on various commodities and research themes. Only two are in full operations and the others barely functioning with only 8.6 percent full time equivalent researchers engaged in livestock research.

Before the war, public sector activities on livestock production and training were carried out at Government livestock stations of Newton, Teko, Musaia and Malal Marah. Most of these facilities were destroyed during the war, and those that survived are in dire need of rehabilitation.
The Newton Livestock Station was established in 1920 and had served as a research and training centre for extension workers and farmers and also produced poultry, eggs, pork for the Freetown and provincial markets. The station which was functional up to the 1970s started deteriorating after it was privatized to a number of organizations during which period the infrastructure disintegrated. The civil conflict also contributed to the running down of Newton Station. Currently the Newton station is operated by the Sierra Leone Agri-Business Initiative (SABI) sponsored by the UNDP.

The Musaia Livestock Station in the Folsaba-Dembelia Chiefdom, Koinadugu district was established in 1948. The station covers an area of 2 431 acres with a fairly suitable weather for the rearing of all types of livestock. Temperatures for the months of October to January range between 15◦C and 25◦C. Water is available throughout the year from the confluence of the Mongo River and the Khifa and Madogbo streams. The station was abandoned during the war and it is presently in a state of disrepair.

The Malal-Mara livestock station was established in the late 1970s and covers an area of 1 333 acres along the Rokel River in the Mala Mara chiefdom, Tonkolili district. The station has a year round source of drinking water for both the cattle and the human inhabitants.

The Teko livestock station is the oldest and at one time the most equipped livestock station in the whole country outside Freetown. The station is centrally located to service all parts of the country. The station has some infrastructure for rearing of cattle, small ruminants, pig, poultry and rabbits. Other components of the station are the livestock training centre which was established in1984. The laboratory and other facilities were completely vandalized when the rebels seized control of Makeni and its environs.

4.5 Quality control and certification

The Sierra Leone Standards Bureau (SLSB) is the coordinating body for all standards issues in the country. The SLSB, under the supervision of the Ministry of Trade and Industry, develops and adopts standards, is responsible for inspection of goods and provides testing and quality control services. Although its current efforts are focused on consumer protection, since its mandate is to ensure the safety of food consumed in Sierra Leone, the SLSB (in collaboration with MAFFS) should quickly turn its attention to the standards of goods exported from Sierra Leone. The challenge for Sierra Leone would then be to facilitate in the medium term ,the emergence of standard infrastructure which would facilitate export diversification into new, higher value-added products where standards are critical to market access.

5. MARKETING, TRADE AND PRICES

5.1 Produced and traded quantities of the commodity

Generally, meat and milk production levels are very low. No data is available on the quantity of cattle, sheep, goats or pigs produced and traded in the country. According to MAFFS (2010), the national cattle herd provides probably no more than 16 000 slaughtered animals per year or less than the equivalent of 1 kg of beef per caput per year. An estimated amount of 27 000 litres of fresh milk is produced daily in the Koinadugu district and processed into fermented milk (FAO, 2004). About 40 percent of national cattle herd is located in Koinadugu, and it is estimated that the district contributes 70 percent of the national milk production estimated at 14078571 liters. About 18 percent of the fermented milk produced is consumed within producers' household and remaining quantity (82 percent) is consumed by local and Freetown fermented milk consumers.

5.2 Home consumption and marketed shares of the produced good, if any

Generally, consumption of livestock and livestock products by farmers is very rare except for fermented milk which is a major staple for Fullah herdsmen and their families. Historically, the milk being produced is always matched by the consumption. The milk has a flush season during mango harvest which is when people prefer mangoes to fermented milk. During this time of the year the milk is sold in Freetown.

Most families consume livestock meat mainly during festivals or ceremonial occasions. With the exception of commercial pig production in urban areas, livestock production is purely subsistence and kept as a symbol of wealth and are sold only when the owner is in dare need of cash. Only about 20 percent of cattle and sheep traded at the Gbindi livestock market is produced locally with the rest coming from neighbouring Guinea.

5.3 Producer price of the commodity at various locations

Locally produced cattle are usually bought at the worreh by local traders/agents at a sex, age and body condition dependent price. The indicative price of cattle is shown in table 1. Few cattle owners/farmers sell cattle directly in the markets to avoid agents and get better prices. Selling in the market is risky as the animal loses value the longer it stays in market. If a trader purchases at a worreh he employs 'cowboys' to collect the cattle and deliver them to a market centre. The cost of hiring cowboys to trek cattle depends on the distance from the worreh to the market centre with a minimum of 10 to a maximum of 50 thousand Leones. At least two cowboys are needed to move one cattle at any given time to a maximum of 5 cow boys to trek about 30 to 50 cattle with each cowboy paid separately.

Table 1: Producer price of live cattle

Age of animal	Producer price	Trader/agent price at Gbindi market
4 years and above	2.8 to 3.5 million	3 m to 4 million
3 – 4 years	2.5 to 3 million	2.6m to 3.5 million
2-3 years	1.5 to 2 million	2 m to 2.5 million
1 – 2 years	800 000 to 1.5 million	1m to 1.8 million
Below 1 – 1 year	600 000 to 1 million	800 000 to 1.2
Average	1.9 million Leones	2.3 million Leones

NB: 1$US = Le4 320

Owners sell goat/sheep to agents who come home and act as middlemen or can sell directly to consumers mostly for ceremonial purposes. They make profits by selling the produce at market at a higher price. The price of a mature sheep from the producer may range from eighty to one hundred and twenty thousand Leones.

The women are responsible for selling the milk. The milk is kept for two to three days before it gets fermented and then consumed at cattle farmers' household level and/or taken to other villages or market places for selling. Le5, 000 – Le6, 000 per litre at the farms and village markets level.

5.4 Consumer price of the commodity at various locations

In Freetown, traders and butchers converge at the main market at Kossoh town abattoir on Mondays to transact their business. About 80 percent of the transactions between butchers and traders are on credit basis which is often characterized with delays in payment. Only 20 percent of the transactions are made in immediate cash payment by consumers. Almost all of the traders and butchers are Fullahs, and according to them, a profit margin ranging from 20 000 to 200 000 Leones is acceptable depending on season and market demand.

Butchers sell meat cuts wholesale to meat retailers at a cost of 9 000 Leones per pound. Transactions are also on credit basis often marred delayed payments. The meat is head carried by service boys with no protection against the elements and contamination from slaughter slabs to the various meat markets as there is no meat van for distribution. The price of meat at the major towns in Sierra Leone is shown in table 2.

Trade in small ruminants is not as thriving as cattle trade as the meat is costly in comparison to cattle meat. Goats and sheep are used more for religious and other social ceremonies than for commercial/trade purposes. Sheep are more expensive than goats for the same weight and sex. A matured male sheep at the market may cost anything from Le 250 000 to 300 000. The price could go higher during the Islamic festival of Eid-ul-Adha. A male goat of the same size may cost from Le150 000 to Le200 000. The peak season for pork consumption is in December during the Christmas season when the price of a kilogram of pork could be range from Le10 000.00 to Le25 000.00.

Local milk retailers are all women who sell the fermented milk and cow butter in towns like Gbindi, Dogolia, Kabala, Fadugu, Makoth, Gbomsamba and Freetown and other major towns on a daily basis. Sale of butter and milk forms one of the income streams of women in the household. The cost price of milk and milk products are: milk, Le10 000 to Le12 000 per litre when delivered at home to local retailers home or at selling points; cow butter, Le46 000 to Le50 000 per litre

Table 2: Consumer price of livestock commodities

Location	Beef & bone (lb.)	Beef steak (lb.)	Mutton (lb.)	Goat meat (lb.)	Pork (lb.)
Kabala	8 000	10 000			
Makeni	10 000	12 000			
Freetown retail market	12 000	14 000	15 000 14 000 roast		9 000
Freetown supermarket			48 000/kg Steak	48 000/kg Steak	
Bo	10 000	12 000			
Kenema	10 000	12 000			
Njala campus	10 000	12 000			9 000

5.5 Location of the main markets at national level

Livestock markets especially for cattle and small ruminants are found in the traditional cattle rearing areas of the north. There are fifteen market centers in Sierra Leone situated in towns and villages for marketing cattle, sheep and goats. The 5 main cattle marketing towns are Gbindi, Gbentu, Dogolia, Walia and Fadugu located in the Koinadugu district. Gbindi cattle market is the largest and takes up about 60 to 70 percent of cattle trade in the country. Other smaller cattle marketing centres exist at Kambia and Kono districts bordering Guinea. Cattle transported to Freetown are disembarked at two locations: the Kossoh town abattoir holding facility and at Kissy Mess.

5.6 Numbers of the actual and potential consumers in the relevant destination area.

The main destination for cattle and small ruminants are the Western including Freetown, Lungi, Bo, Kenema, Matotoka and Makeni areas. Freetown which is the capital of Sierra Leone has the largest human population of about 900 000 according to the 2004 census and has the highest actual and potential number of consumers. Between 20 to a maximum of 50 heads of cattle are slaughtered each day in Freetown and its environs.

The level of livestock products consumption depends on the income level of the consumers and the level of economic activities. Poverty level indices show that about 73 percent of the poor live in the rural areas, while in 25 percent reside in urban areas outside Freetown and the remaining 2 percent in Freetown. The poorest districts in order of the incidence of poverty are Kailahun, Bombali, Kenema, Bonthe and Tonkolili. More than 8 out of 10 people in these districts live in poverty. It is

estimated that 4 out of 10 people in Kailahun and 6 out of 10 people in Bombali district live in extreme poverty. The poor in Bombali district in particular cannot meet half of their basic needs while those in Kailahun, Kenema, Bonthe, and Tonkolili districts can meet only about two-thirds of their basic needs. Poverty is also relatively more severe in Bombali and Kailahun districts with severity indices of 30.4 and 21.5 percent respectively.

5.7 Seasonality in prices and quantities of the output

For most parts of the year livestock and livestock products prices remain relatively uniform except during festive occasions like Muslim Eids and on Christmas when the price of most products will increase one or two folds. The Fulas are predominantly Muslims and there is a tendency for an increased number of animals at the market given out by the owners as end of year zakat. During this period there is a slight drop in the price of livestock at the market place.

5.8 Socio-economic features of current and potential customers, including spending capacities

The cessation of hostilities and eventual restoration of security countrywide strengthened confidence, which facilitated economic recovery from 2000 to 2004. Economic activity was spurred by the countrywide reconstruction and rehabilitation work. Real GDP, which had increased by 3.8 percent in 2000, rose sharply by 18.5 percent in 2001. It further increased by 27.5 percent in 2002 and 9.4 percent in 2003, largely on account of the broad recovery in agriculture, mining, manufacturing, construction and services sectors. Real GDP grew by 7.4 percent in 2004, supported mainly by the continued recovery of the agricultural sector, expanded reconstruction and other investment activities. Domestic revenue also increased from 7 percent of GDP in 1999 to over 12 percent of GDP in 2003 and remained about the same level in 2004.

Post-war growth performance to date has indeed been robust – averaging 7.5 percent per year over the last 5 years. If this rate is sustained, the economy will double in size every 10 years. Even with the population growing at 2.8 percent a year, this would mean that by 2018 GDP per capita would rise to $450 which still reflects the status of a low-income country with a per capita income improvement of 80 percent. However, if Sierra Leone were to be more ambitious aiming to become a middle-income country in ten years, it would have to attain a per capita income of $900 - something that could only be achieved with sustained growth of 15 percent per annum.

5.9 The degree of competitiveness (existence of monopolies or otherwise)

There is no organized beef marketing system in Sierra Leone. There is a National Federation of Butchers and Pig and Poultry Farmers Association in Freetown; usually referred to as the nearest approach to market organization. Butchers in the urban areas, the major beef consumer centres, usually belong to such butchers association. These associations exist as virtual monopolies.

By virtue of the family relationships, which comprise mostly Fullahs, in both production and marketing the major objective of the organizations is to stabilize meat prices an objective which they have achieved successfully over the years. The butchers usually receive slaughter cattle on credit from either cattle traders or from producers. They slaughter and sell the beef, and then settle their outstanding accounts to receive another consignment of slaughter cattle.

5.10 Control over prices (how different prices are set and controlled)

Prices in the market place are determined by bargaining with the buyer relying on eye appraisal of the animal. Auctioning is not practiced and there is a resistance to set a price based on live weight. Traders apparently prefer to bargain. Wide fluctuations in prices do not occur between market days and traders are quite prepared to hold over stock of livestock for some days or weeks until they get an acceptable price. Government has no control over prices.

5.11 Wholesale and retail distribution

Wholesale traders usually from the bigger towns buy the animals from the markets and transport them to places like Freetown where they sell to butchers or other customers and fetch higher prices. They are usually capital rich and aggregate the cattle/small ruminants from different parts of the country and even neighbouring countries like Guinea-Conakry. They transport the animals with help of Cowboys to motorable roads and from there by trucks to Freetown or other markets where they are kept in a paddock for selling to possible customers and butchers. Small butchers cum retailers purchase animals directly at market site (usually for a whole week) and walk them to abattoirs for slaughter and later sell the meat at their shops.

Fermented milk is collected from the local markets by the wholesalers, who bring it directly to Freetown and sell to Freetown wholesalers and retailers. Freetown wholesalers sell to other retailers who do not have access to local market wholesalers. During the mango season, local retailers who have stocked a large quantity of fermented milk can also take it to Freetown to supply the retailers who sell to consumers along with the usually limited amounts of milk butter.

5.12 Balance of trade

The livestock sector in Sierra Leone is seriously affected by a high volume of imported foreign livestock and livestock products. This is as a result of the reduction of tariff for the importation of food stuffs from 46 to 5 percent, which stimulated a high inflow of cheap products from Europe and South America. The major livestock and livestock products imported include whole chicken and assorted parts of chicken; pork meat and beef; milk and milk products. A substantial part of live cattle supply originates from neighboring Guinea with an estimated value of US$ 48 million dollars per annum (MAFFS, 2008). This trend seriously affects local production of livestock especially chicken production which can hardly compete with foreign imports, and has to a large deficit in trade balance. It must be further emphasized that this has created a serious negative impact on livestock production especially among local livestock producers.

5.13 Current and potential foreign competitors

About 80 percent of the cattle traded in the country originates from Guinea with 20 percent produced locally. Guinea is the largest competitor of Sierra Leone in cattle trade within the country. The livestock sector in Sierra Leone is seriously affected by higher trend of importation of foreign livestock and livestock products. This is as a result of the reduction of tariff for the importation of food stuffs from 46 to 5 percent, which stimulated a high inflow of cheap products from Europe and

South America. This trend seriously affects local production of livestock especially chicken production which can hardly compete with foreign imports. There is a high propensity to import and a large deficit in its balance of trade.

6. GOVERNANCE AND INSTITUTIONAL ARRANGEMENT

6.1 Institutional/ national organization for leading the livestock/meat and dairy value chain

The LSD of the MAFFS is the only organization with the responsibility of providing livestock services. The LSD is the product of the amalgamation of the twin activities of Animal Health and Animal Production units. It is headed by a Director who is based at the headquarters in Freetown. Also at the headquarters are two Deputy Directors one in charge of Animal Health and the other in charge of Animal Production. In animal health services, livestock personnel are involved with diagnosis, treatment and control of diseases in cattle, small ruminants, rabbits, poultry etc. It has the responsibility for monitoring livestock movements and meat inspection. Both Ante mortem and post mortem examination of carcasses have been delegated to the LSD under the 2004 Local Government Act. Some districts have complied but in others the Ministry of Health personnel are yet to relinquish this assignment to the livestock division.

As a result of the decentralization process a district livestock officer is assigned to each of the 13 agricultural districts in the country to coordinate and supervise animal production and health activities. Currently there are 68 Livestock Inspection Posts (LIP) scattered all over the country. These posts are manned by livestock assistants charged with the responsibility of monitoring the movement of animals in the country. Movement of animals requires a written permit from the livestock inspector. At the district level funding for livestock activities is provided by the central government through the district councils. In most cases planned activities cannot be implemented either due to inadequate financial resources or untimely availability of funds.

The LSD is currently affected by a shortage of skilled professional staff for the delivery of its mandate. Most of the established positions are vacant and the positions occupied are filled with personnel without the necessary qualifications or requirements. Public expenditure in agriculture reveals that spending on agriculture has increased over time, amounting to about 10 percent of the total budget in 2007. Nevertheless, the amount expended to the livestock sector is just about 4 percent. In addition the sector is highly dependent on donor funding which raises questions about the government's ability to provide the public goods necessary to facilitate the development of the sector. The LSD is therefore faced with inadequate financial resources to cover budgets which results in insufficient human and other logistical resources for effective implementation of livestock activities. Control and supervision of the sector by the LSD is very weak as it is ill equipped to coordinate the affairs of the livestock sector. Apart from the sporadic vaccination campaigns conducted by the LSD there is very little else that is done.

6.2 The organization and interactions among the different value chain actors in vertical integration processes (synergies, actual or potential conflicts etc.)

The various chain actors exist as independent entities with no formal linkages among them. The LSD supervisory role is limited both in terms of human and financial resources in conducting its activities. Very little is being done by the LSD in terms of influencing other chain actors in the livestock sector apart from the periodic vaccination campaigns and inspection of livestock and meat at products. Most of the livestock activities conducted by NGOs and other chain actors are done in

an ad hoc and uncoordinated manner, with very little input from the LSD. This was particularly true for the various restocking programmes conducted by many NGOs without the prior consent of the LSD which brought about the introduction of PPR from sheep and goats imported from neighboring Guinea.

6.3 Existence of association/cooperatives and their strength

National Federation of Farmers of Sierra Leone (NaFFSL) - Farmers in Sierra Leone have formally organized themselves into local farmers' associations or co-operatives to facilitate cooperation in crop production, processing and marketing activities as well as all other operations associated with fish and livestock. The National Federation of Farmers of Sierra Leone (NaFFSL) is an umbrella organisation of "approved" farmer based organisations in Sierra Leone. NaFFSL is intended "to function as an apex body of the approved FBOs to defend members' morale (sic) and material interest at grass-root (villages, chiefdoms, wards, district, and national) and International levels by development actions, constructive dialogue, lobbying, advocacy and experience sharing to meaningfully engage farming as a business."

Traditionally, farmers associations such as the National Association of Farmers in Sierra Leone have worked very closely with technocrats mainly in the Ministry of Agriculture, the co-operative department, NGOs, and agricultural research institutions which offer agricultural extension and other delivery services to them. The establishment of NAFFSL is likely to have a positive impact on this relationship, with a stronger voice for the farmers' organizations. The stated vision of NAFFSL is "to be an umbrella farmers' organisation of Sierra Leone, a framework of reference, of dialogue and coordination, sharing vision and action, which offers better services and security to the members and which influences the policies and strategies as regards sustainable rural development at all levels." Currently 26 commodity organizations and 6 farmer organizations are registered with NAFFSL.

The Pig and Poultry Farmers Association of Sierra Leone (PPFASL) in Freetown is the oldest and currently has a membership of 55 farmers. In the Koinadugu District there are 784 cattle famers organized into four (4) associations: Joni Joni Cattle Farmers Association; Wallidra Cattle Farmers Association; Walliderien Cattle/Crop Farmers Association. Jogodirien Cattle Farmers Association. The United Federation of Butchers has a membership of 700 retail traders and butchers all over the country. It is an amalgamation of the National Butchers Union and the Central Butchers Association. By virtue of the family relationship, which comprises mostly Fullahs, the major objective of the organization is to stabilize meat prices an objective which they have achieved successfully over the years. Contact details of these associations are presented in annex Table 2.

6.4 NGOs acting in support to the value chain

Heifer International works with vulnerable and resource poor communities, especially women and youth, to alleviate hunger and poverty. They help impoverished families become self-reliant through the gift of farm animals and training in order to realize the vision of a country of peaceful communities with sustainable livelihoods for all co-existing in a healthy environment. Its work began in 2008 and currently operates projects in 4 districts throughout the country. Western Rural, Port Loko, Kailahun, and Koinadugu. The four priority areas of intervention are: building sustainable

livelihood; capacity development; influencing systems, policies and practices; and partnership building. Central to what they do is the idea of "passing on the gift" through which participating families share one of their animals offspring – along with knowledge , skills and other resources to others in need in order to expand network of hope, dignity, and self-reliance.

Heifer International is currently supporting up to 5 000 smallholder farmers in Koinadugu, Port Loko, Kailahun and Western Rural Districts by supplying small ruminants (goats and sheep), of which every first off spring is passed on to other needy families, Training and veterinary support services compliment the package. The organization is also promoting intensive livestock management practices thereby initiating the solution to livestock and farmer conflict challenges.

GIZ has been working in Sierra Leone since 1963 on behalf of the German Federal Ministry for Economic and Development (BMZ). Work was suspended in 1990 for ten years because of the civil war. Since 2010, GIZ has once again been represented through a regional office for Sierra Leone and Liberia based in Freetown. GIZ is currently implementing a programme in Sierra Leone to promote employment among young people on behalf of BMZ. This programme focuses on improving the employment and income situation of young people in rural areas and initiates development partnerships with established companies to create new jobs

The Gbindi livestock market currently is a perimeter fenced structure (paddock) constructed with funds provided by GIZ and the European Union implemented by NaCSA and the Koinadugu District local council primarily to reduce trade cattle theft. The facility has a capacity to hold 500 to 700 cattle heads, a veterinary office, a deep and a cattle loading ramp. Also in collaboration with GIZ and FAO, 25 Community Animal Health workers have been trained and equipped to complement the livestock field staff in carrying out animal health activities in the Koinadugu District. Four Sierra Leoneans received DAAD scholarship awards to pursue Bachelor degrees in Veterinary Science in Uganda under the auspices of GIZ to help improve on the delivery of veterinary services in the country.

BRAC opened its offices in Sierra Leone in 2008 and started integrated programmes in 2009. BRAC provides services in microfinance, health, agriculture, livestock and poultry, and by the end of 2009 had reached over a quarter of a million Sierra Leoneans. BRAC provides regular jobs for 169 Sierra Leoneans 83 percent female and supports 323 local volunteers, whose capacity is built, maintained and expanded through training and supervision. BRAC continues to grow and is expected to reach out to more than 18 000 microfinance members - majority are women – their families and the wider community. They provide support through; training, monitoring, research, evaluation and partnership.

7. NATIONAL OR REGIONAL PROJECT FROM WHICH THE VC BENEFITS

Since the end of the war in 2002, a number of livestock development projects financed in partnership with development partners have been initiated. Following the massive loss of livestock during the war period the GoSL and a number of NGOs realizing the significant role livestock play in the daily lives of people embarked on a number of restocking programmes in many parts of the country. The GoSL provided funds for the purchase of veterinary drugs and equipment worth nearly One Billion Leones (Le 1 000 000 000). These drugs were distributed to the various districts to support agricultural business centres in line with the Smallholder Commercialization Programme (SCP). The aim is to enhance decrease in livestock mortality and hence increase in the livestock population.

Six Districts (Bo, Kenema, Bombali, Pujehun, Tonkolili and Port Loko) have established mini demonstration sites to show case improved management practices in animal production. These sites serve as models for livestock farmers in the districts on how best to raise their animals. For now the emphasis is on rapidly producing animals, and pigs and poultry have been targeted for demonstration. Over 200 livestock farmers have received training on basic animal production and management.

With a view to find a permanent solution to the perennial conflicts between crop and livestock farmers in areas where these two group of farmers live side by side, the division in collaboration with the local councils conducted stakeholders' meetings in four of the districts mostly affected (Koinadugu, Kambia, Port Loko and Bombali) in order to identify the main causes of the conflicts. Based on the findings and recommendations of these meetings, a cattle settlement policy was developed and presented at a consultative stakeholders' forum for validation. The observations and amendments made during the forum were incorporated into a draft policy document which has been submitted to the Cabinet for approval.

Other projects from which the value chains benefited from include:

i. Special Funds for Emergency Rehabilitation Activities worth $200 000 over a 2-year period (2007-2008)
ii. Early Detection Reporting and Surveillance for Avian Influenza in Africa worth $24 600 (2009) Support Programme to the Integrated National Action Plan for Avian and Human Influenza (SPINAPAHI) The project was funded by the European Union through the African Union Inter- African Bureau for Animal Resources (AU-IBAR). This was specifically for the early detection, prevention and control of the highly pathogenic avian and human influenza. The project was implemented by the LSD in collaboration with the Wild life Unit of the Forestry Division and the Disease Prevention and Control Unit of the Ministry of Health and Sanitation. (2009-2010)
iii. Vaccines for the Control of Neglected Animal Diseases in Africa (VACNADA) project. This project is also supported by AU-IBAR and funded by the European Union as a nationwide vaccination campaign and is still ongoing. A total of 561 430 animals have been vaccinated against Pestes des Petites Ruminants (PPR) in small ruminants under the worth € 70 000. (2011)

iv. Epidemio - Surveillance Network for Animal Diseases in Sierra Leone (ENADIS) project. An Animal Disease Surveillance Plan developed with the assistance of AU-IBAR which fielded the consultant to design the plan. The plan is currently been implemented to monitor the animal disease situation in the country. Also the division is currently working in collaboration with the Njala University to monitor the disease situation in the country.

v. "Support to strengthen the Veterinary Services" FAO (TCP/SIL/3103E) project. The Teko Central Veterinary Laboratory which was completely destroyed during the war has been rehabilitated and equipped with modern equipment and a 27KVA generator with funds provided by the FAO. The laboratory is of Bio Security Level 2 but not adequately equipped to diagnose most of the common Trans boundary animal diseases in the country. (2007 - 2008)

vi. Improving the productivity of Ndama cattle in Sierra Leone (IAEA TC SIL 5056) aimed to establish a local capability for application of nuclear techniques in improving feeding, breeding and disease control of the native N'Dama breed. This project was a three year project from 2004 to 2007 worth $210 000. Control of economically important livestock diseases (ND and PPR) in Sierra Leone project aimed at controlling two important post restocking livestock diseases (Newcastle disease and Pest de Petit Ruminant) causing serious economic losses to local chickens and small ruminants (goats and sheep), respectively. This project was funded by the IAEA and implemented by the Animal Science Department, NU. (2009 -2012).

vii. Control of Trans boundary animal diseases in Africa (RAF 5057) is a regional collaboration project involving 20 counties in Africa funded by IAEA. The aim is to address the growing threats of Trans-boundary Animal Diseases such as CBPP, ND and PPR, including Rift Valley Fever., which is a zoonotic disease. Project duration of three years from 2009 to 2012

viii. Dual purpose goat development in Sierra Leone (DelPHE- 577) project aims at improving the productivity of the local West African Dwarf (WAD) goat through crossbreeding with exotic dairy breeds. The project was funded by the UK government through DFID for £65 000. Project duration was for three years starting from November 2009 to September 2012

ix. Strengthening Farmer-Researcher-Linkage in Evaluating Integrated Livestock Feeding Systems involving Protein Banks (DelPHE 772). The project aims at an increased application of improved livestock feeding technologies through strengthened farmer researcher linkage by evaluating integrated cattle-chicken feeding systems. Feeding technologies generated disseminated to all communities raising livestock. The project was funded by the UK government through DFID for £45 000. The project duration was for three years starting September 2010 to September 2013

x. IAEA TC project SIL/5/013 "Establishing a dual-purpose cattle development project for the sustainable contribution to food security, poverty alleviation and improved livelihoods of communities raising cattle". The main objective of this project is the establishment of a functional national artificial insemination programme. Beneficiaries of this project are communities raising cattle in all parts of the country. The project is funded by the IAEA at a cost of €120 000. The project duration is for three years starting from January 2012.

8. POLICIES AND STRATEGIES

8.1 Natural resource policies

A number of interventions have been implemented in the area of environmental protection. There are in place the National Environment Protection Act, the National Environmental Action Plan, the National Environmental Policy, and the National Environment Protection Board to minimize the adverse environmental impact of economic activities, especially that of large-scale and alluvial diamond mining where the major threat lies. Sierra Leone is a signatory to the three Rio Conventions. A National Capacity Self-Assessment on the three conventions has been undertaken. The UNFCCC First National Communications report is being compiled and the Kyoto Protocol was ratified in 2005. Sierra Leone has prepared a UNCCD country report. Enabling activities are being undertaken with financial and technical assistance from GEF and UNEP on the protection of the ozone layer and Biodiversity. A Wildlife and Biodiversity Conservation Project has been initiated. A project for sustainable land use management is being implemented. The country is in the process of developing a Biodiversity Framework for Cartagena Protocol implementation. A National Action Plan for the implementation of the United National Convention to combat Land Degradation is being prepared. A research and information gathering on the substances that deplete the ozone layer is currently underway. A number of environmental NGOs are collaborating with Government in the area of environmental sensitization, and advocacy. Environmental concerns were also mainstreamed in the PRSP. A National Environmental Commission was set up in 2005 to coordinate environment issues in the country.

8.2 Incentives or disincentives to producers and consumers

Incentives include a reduction of import duties on equipment and material required for agricultural production activities. Raw materials, plant and machinery (tractors and appliances, harvesters, veterinary drugs and implements) may be imported at a duty rate of only 5 percent. Intermediate and final products attract higher rates of 20 percent for intermediate and 30 percent for final goods. All commercial imports are subject to an additional ECOWAS levy of 0.5 percent of the CIF value for imports from non-ECOWAS countries. In addition, a 3 percent withholding income tax is levied on most common imports.

An Investment Promotion Act was enacted and entered into force in August 2004, replacing the 1969 legislative framework, and other laws. The Act is designed to promote and attract both domestic and foreign investment for production and value-adding activities; to improve export and provide employment opportunities; and generally to create an environment conducive to private investment and to provide for other related matters. It is worth noting that the package of incentives which should accompany the Act and give it effect did not get passed by Parliament.

8.3 Credit policies

The current draft of the agricultural development strategy drafted by the Ministry of Agriculture (MoA) calls for a long-term financing vehicle dedicated to agricultural credit. Efforts are being made to develop a plan for the provision of credit by commercial banks to agricultural businesses. A proposal has already been made in this respect by a number of stakeholders for the establishment of a dedicated agricultural finance bank.

In this respect, the Private Sector Development Strategy Programme (PSDSP) of the Ministry of Trade and Industry proposes to motivate banks to lend to Micro, Small & Medium Enterprises (MSMEs) by establishing a pilot partial credit guarantee scheme that will reduce the risk the banks face in advancing loans to MSMEs. The programme is to be known as Salone BEST - Salone Business Expansion Scheme Trust. Management of the scheme will be implemented by a designated organization that will receive technical assistance from the programme. The reduction in the risk from a loan default provided by the partial guarantee should result in lending at significantly reduced cost, i.e. a lower interest rate. Salone BEST guarantee will not exceed 40 percent of the value of each loan ensuring that the banks remain committed to the scheme.

Salone BEST will provide a partial guarantee against loans made to MSMEs of between Le3 000 000 (US$ 1 000) and Le30 000,000 (US$ 10 000) from the participating lending institutions for a wide range of business needs, including buying assets and working capital. Ideally, Salone BEST is designed to guarantee two types of loans:

i. Small loans for working capital purposes up to duration of 12 months.
ii. Larger loans for investment in fixed capital for a period of up to 3 years.

The Salone BEST concept note identifies the key gap in the availability of finance is between small NGO funded microfinance and loans provided by the commercial banks, and declares that it is this gap that Salone BEST is intending to close. The concept note further asserts that in order to ensure that Salone BEST is not misapplied as an umbrella for difficult loans:

- The participating bank will be required to rigorously apply its standard loan evaluation criteria;
- The borrower need not know that the loan is being partially underwritten under the scheme
- The participating bank will request from the Scheme Manager a "no-objection" to proceed with all loans awarded under Salone BEST.

The Salone BEST programme has not yet begun operations due to delays with the establishment of its institutional structure. While the programme is a welcome addition to a more robust and effective financial services sector, the loans it will guarantee are small and the programme depends on the active participation of the commercial banks.

The Ministry of Agriculture manages a $6.3 million IFAD-funded project with the objective of expanding rural finance, through the establishment of new community banks. In addition, both the MTI and MAFFS are collaborating on a US$30 million World Bank-funded rural and private sector development programme that is intended to:

- Consolidate domestic supply chains for specific crops and products
- Improve rural market infrastructure to address critical infrastructure needs for select products
- Provide technical assistance and knowledge management in order to improve access to market information and identification of opportunities

This programme has had some initial teething problems and is to be redesigned to ensure successful implementation.

8.4 International trade policies

Sierra Leone already has preferential access to its current main overseas trading partners. The EU offers duty free and quota free access to all products under its Everything but Arms (EBA) initiative, for an indefinite period. For its part, the US operates the African Growth and Opportunity Act (AGOA) which offers duty free access for most but not all products, until 2015. These schemes however, have not been as effectively used by Sierra Leone; its main agricultural exports are cocoa and coffee, and to some extent ginger, which already qualify for duty free access. Therefore Sierra Leone should be exploring the export of other products which may be eligible under these schemes. Sierra Leone should concentrate on the promotion of exports of new products, particularly agro-industrial products in order to make the shift to a more diverse export base.

The Ministry of Agriculture, Forestry and Food Security (MAFFS) with the support of development partners is designing a National Sustainable Agriculture Development Plan (NSADP). The Plan is being developed in the context of the Comprehensive Africa Agriculture Development Programme (CAADP) of the New Partnership for Africa's Development (NEPAD). There is general recognition that regional and international processes may have implications for the country's agricultural sector, and moreover, that population growth, environmental and economic factors are likely to have a significant impact on the growth of the sector in Sierra Leone. Tax and fiscal policy, the judicial system, financial sector policies, land use planning, tourism development, trade policy, forestry regulations and science and technology issues all have implications for the sustainable development of agriculture.

Materials directly related to production in most agriculture related sectors face few import duties. Raw materials, plant and machinery (tractors and appliances, harvesters, veterinary drugs and implements) may be imported at a duty rate of 5 percent. There is an import duty rate of 20 percent for intermediate and 30 percent for final goods. The import duty on rice has been lowered from 15 to 10 percent. All commercial imports are subject to an additional ECOWAS levy of 0.5 percent of the CIF value for imports from non-ECOWAS countries. In addition, a 3 percent withholding income tax is levied on most common imports.

8.5 Acts, regulations and laws governing the value chain

The decision to establish the veterinary services division in the 1930's with the mandate to provide animal health services, primarily geared towards prevention and control of animal diseases was a government policy for the industry at the time. This policy was maintained over a long period of time. Ancillary to this policy was the provision of the animal diseases ordinance of 1949. This ordinance spelt out provisions for the prevention and control of animal diseases, the related charges, functions and penalties. In order to be in line with International Standards as established by the World Animal Health Organization (OIE), a request was made to the Volunteer Service Overseas (VSO) for the services of a Veterinarian with legal background, to draft a new Animal Diseases Act. The document has been drafted, and validated has been forwarded to the MoA legal adviser for vetting.

8.6 Major constraints requiring policy interventions

The Livestock Services Division (LSD) of the MAFFS is the only organization with the responsibility for providing livestock services. The LSD is currently affected by a shortage of professional skilled staff in the delivery of its mandate. Most of the established positions are vacant and the occupied positions are filled with personnel without the necessary qualifications. Public expenditure in agriculture reveals that spending on agriculture has increased over time, amounting to about 10 percent of the total budget in 2007. Nevertheless, the amount expended to the livestock sector is just about 4 percent. In addition the sector is highly dependent on donor funding which raises questions about the government's ability to provide the public goods necessary to facilitate the development of the sector. The LSD is therefore faced with inadequate financial resources to cover budgets which results in insufficient human and other logistical resources for effective implementation of livestock activities. Control and supervision of the sector by the LSD is very weak as it ill equipped to coordinate the affairs of the livestock sector. Apart from the sporadic vaccination campaigns conducted by the LSD there is very little else going on.

There are a variety of socio-economic and institutional constraints facing livestock development in Sierra Leone. They include the low level of investment in the livestock sector including investment in fixed assets, infrastructure and research and inadequate funding of the non-salary portion of current expenditure for services including research.

Inappropriate pricing, marketing, land tenure system, which is a major constraint to the overall management of grazing land and other policies related to livestock constitute a disincentive to both producers and investors, and negatively affect their willingness to participate in the development of the livestock sector. Administrative and organizational inefficiency surrounding the purchase and distribution of production inputs, extension and credit further exacerbate the problem.

8.7 Suggested policies for smooth operation of meat and milk value chains

<u>Strengthening the Livestock Services division (LSD)</u>

The LSD under the MAFFS is very weak and would therefore require strengthening in key result areas in order to improve performance and co-ordination with key livestock sector related stakeholders. In order to achieve this objective, the following concerted actions are proposed:

- Expand the human resource base of the LSD to enable it face up to the challenges of spearheading the development of the livestock industry
- Expand the budgetary allocation to the LSD so that it can effectively implement policies and activities
- Strengthen links between different stakeholders.

Integrated Agriculture Approach

- Develop productive capacities all along the meat and milk value chain using a clustering approach (production, processing and related services)
- Make constant agricultural growth linkages between small and medium scale farms and local food processing industries for export

Agriculture Investment Policy

- Target investment incentives and tax relief for each component part of the livestock value chain (production, processing and services)
- Revise the Investment Promotion Act package of incentives to reflect the new agricultural incentives in the 2009 GoSL budget. Disseminate the package as widely as possible.
- Deepen the reforms in the general business climate to provide a level playing field, certainty and predictability for domestic and foreign investors.

Agricultural Financing

- MAFFS (and the MTI) should work with the Bank of Sierra Leone to finalize the draft Financial Sector Development Plan which envisages increased lending by the commercial banks to the private sector.
- Establish an efficient (private sector-led) financing vehicle for long term lending to the agricultural sector, providing subsidized lines of credit for farmers and smallholders.
- Establish an export credit guarantee scheme in the medium term to provide support to exporters of traditional and non-traditional export commodities.
- Provide incentives for insurance companies to develop packages of livestock insurance for farmers and SMEs in livestock production.
- Establish a regulatory framework for credit unions to operate in order to encourage savings among small farmers.

Institutions

- SLIEPA, MAFFS and MTI should collaborate to produce selected investment and export development packages to attract domestic and foreign investors to livestock.
- Encourage public-private partnerships in agricultural related infrastructure and research, through the use of fiscal and other instruments.
- Establish 'Producer Companies' through an amendment to the pending Companies Act.
- Review and amend the Cooperative Societies Act 1977.

Agricultural Land

- Establish central GPS based mapping of not only the Freetown Peninsula area but also the provinces, including crown land and government reservations, in order to determine the status of the available land for cultivation and development.
- Immediately establish an additional system of property ownership in land in Sierra Leone known as leasehold, and give it legal status through enactment of legislation.
- Repeal the law prohibiting ownership of land in Sierra Leone by foreigners subject to a residual oversight by government where large tracts of land are being bought by non-Sierra Leoneans.
- Establish a system of user rights over state lands. Establish a registration system for user rights which enables them to be tracked and monitored.

- Establish land regulations with clear rights and responsibilities of communities and traditional leaders regarding their role in the process or land acquisition, including zoning, community preservation areas for watersheds, spiritual or ecologically sensitive areas.
- Immediately implement a system of 'Title Registration' based on the GPS mapping for freehold and leasehold title to property in Sierra Leone.
- Establish a mechanism, such as a Lands Tribunal or Lands Arbitration Board that will adjudicate initially the claims of competing land ownership and enforce land agreements/contracts, subject to a right of appeal to the courts.

International and Regional Trade in Agricultural Products and Services

- Negotiate more flexible rules of origin under EBA and AGOA and in the future EPA.
- Make more use of the flexibilities in the Agreement on Agriculture to protect infant and other vulnerable agricultural industry
- Comply with SPS standards for important agricultural commodities
- Develop and enact comprehensive law and regulations on SPS, including systems and management

9. CONSTRAINTS AFFECTING MEAT AND MILK VALUE CHAINS AND PROPOSED SOLUTIONS

9.1 Livestock/meat and milk value chain SWOT analysis

Table 3: SWOT analysis of livestock/meat and milk

Strength	Weakness	Opportunities	Threats
Abundant natural resources in terms of abundant forest cover, grass fodder, rich soil, and abundant rainfall The tradition of keeping animals The indigenous livestock species are adaptable to local conditions	Small livestock population Low levels of productivity both in terms of meat and milk. Poor infrastructure in terms of road network, electricity and market facilities. Limited or no value addition Low technical and management skills Low level of investments Very limited veterinary infrastructure Limited networking between actors in the various value chains	large number of donor agencies Sierra Leone government's agenda for change has infrastructure as the top priority.	Unrestricted importation of livestock and livestock products Land grabbing by multinational companies Fights between the crops farmers and cattle farmers

9.2 Constraints

A few enterprises are engaged in the provision of inputs and services for the sector operating on a small-scale and focus largely on the provision of veterinary inputs and feeds. These enterprises are mainly located in Freetown with limited outreach into the rural areas where the majority of the livestock population is located. There are no well-established distributors of livestock production and processing equipment.

There are two private veterinary drug suppliers in the country – VetMan located at Ross Road Cline town and Sierra Leone Animal Welfare Society both located in Freetown. Most essential drugs are not easily accessible and affordable. Owing to the small level of livestock production drug suppliers have a limited market to sell their products. There are instances of huge losses incurred by drug suppliers due to expired drugs as buyers are not readily available. Suppliers therefore store only few basic drugs for fear of expiration. Most livestock producers rely on government for the supply of free drugs and vaccine.

Other constraints to economic livestock production are:

- Delivery of services and execution of livestock development initiatives hampered by inaccessibility to target groups.
- Difficult access to market due to long distances from farms

- Low, variable and therefore unattractive prices for livestock and livestock products resulting in low private sector investments
- Low producer prices, weak market organization, and rudimentary physical market infrastructure
- Insufficient attention to effective farmer's organization and the limited means and capacity of small scale producers to adopt improved production technologies
- Insufficient consideration of interaction between disease, nutrition and management in livestock development projects.

Before the war, production and training in the public sector was centred on the government livestock stations of Newton, Teko, Musaia and Malal Marah. Most of these facilities were destroyed during the war and those that survived are in dire need of rehabilitation. Research effort since then has been patchy and has not focused on the needs of the agro-processing firms, including adaptive research on enhancing variety and ensuring the availability of livestock and livestock products. There are no obvious policies on technology dissemination and technological upgrading for improved agricultural productivity. Science and technology infrastructure targeted at the agricultural sector over the years has degraded. Public funding for research institutes, universities and technology policy coordination bodies has traditionally been low or non-existent. The disconnection between public research and development institutes and productive sectors is a constraint on learning and technological adaptation at the enterprise level.

Most worrehs whether in the Koinadugu district or anywhere else in the country are located far from urban centres and are inaccessible by vehicle. The roads leading to Gbindi cattle market centre the largest in the country is inaccessible during the rainy season making it difficult to rapidly and safely transport animals.

Vehicle transport facilities are inadequate and most times not appropriate for transporting live animals. Transporters also face the difficulty of harassment by police officers demanding money. Generally, marketing facilities are very limited and the market is little more than a convenient meeting place for the exchange of livestock. The animals are tethered to poles and posts imbedded into the ground and buyers and sellers mingle amongst the cattle. Goats and sheep are traded in an adjoining area. There are no pens, weighbridges, water troughs, loading ramps or shade trees.
In Freetown, the central slaughter house located at Dovecot (Guard Street) is about 70 years old and in a state of deterioration with an inadequate water supply and open drains leading directly into the sea. Six separate stalls are provided for slaughtering cattle, each with a hand operated hoist. Smaller towns have an official slaughter site which is generally very rudimentary and usually consists of an open concrete pad with inadequate and easily contaminated water supply and no drainage facilities.

There are no meat vans for distribution of meat to meat markets. Meat retailers rely on service boys to transport meat on their heads from the slaughter house at Dove cot to meat markets. Meat retail stalls lack cold rooms, running water with an erratic electricity supply. Meat retailers are quite fearful of meat spoilage which is quite common as they lack facilities for meat preservation. Meat retailers forecast trends in sales which in turn determine the quantity of animals slaughtered as any excess is prone to spoilage.

On government policy, organization, finance and credit

- A lack of priority and clear cut policies for livestock development and support to value chain actors.
- Many of the actors lack experience and knowledge of livestock development as well as economic aspects of their operations and incentives for improvement.
- A lack of credit facilities for small scale farmers and also for working capital in livestock development.
- Heavy dependency on foreign exchange inputs and foreign aid for livestock development
- Excessive involvement of and dependency on government for providing financing for services and field based interventions.

9.3 Proposed solutions

Policies

- Farmers should pay for inputs and services (veterinary services) and subsidies should only go to development cost.
- A reliable market outlet with adequate producer prices which should be based on cost price and clear cut long term policies
- Policies should be specific for livestock development and target well identified groups.
- Imports that compete with local products should be heavily taxed to stimulate local production.
- Better donor coordination and inter-institutional linkages need to be established.

Investment, credit, marketing and services

Credit systems for livestock should be more comprehensive. For example, loans should be accompanied with insurance schemes, subsidies complimented with loans and/or reduced rate of interest for the poorer section of society. The credit system for small livestock farmers should be directed at farmers' societies or organizations with established markets.

Investment in collection system, small scale processing and transport should receive due attention to provide better perspective for decentralized marketing e.g. meat. Commitment and dedication of extension personnel is very essential for effective service delivery for the adoption of improvement. Training and motivation of such personnel requires more time and funds.

Other proposed solutions include

Animal rearing practices that include cattle, small ruminants and pigs need to be significantly revamped in line with the animal husbandry best practices. This is extremely important to not only increase milk yield but also live weights of the animals.

Facilitated farmers access credit from local financial institutions for livestock housing, fencing and veterinary drugs.

More land earmarked for the establishment of cattle settlement schemes in order to minimize conflicts between crop and livestock farmers.

While improving farming practices will provide quick benefits in the short term, it will be important to tackle bred improvement for the longer benefits.

Increase cattle population by encouraging the crop farmers to engage in livestock production.

Increased the supply of good quality livestock by increasing livestock ownership and intensification of production system

Increase profits to cattle producers through a taxation scheme that makes the cattle from across the border from Guinea expensive to sell in Sierra Leone.

Enhance commercial orientation of traders by organizing them into trade bodies through which capital can be provided to widen their procurement network.
Improve transportation facilities to facilitate cattle trading at the local level.
Improve market infrastructure by providing sheds and watering facilities in order to improve the physical conditions of the traded animals.

Construct more improved local markets in order to create more outlet opportunities for producers selling livestock to traders.

Build value adding infrastructure by taking the following measures:
Improve the road networks in areas or regions with high concentration of livestock as this will add tremendous value to the meat value chain since the animals can be transported rapidly, thus avoiding animal fatigue and weight losses which affect sale price as well as injuries and risk of loss/theft.
Ensure a supply of stable electricity in the medium to long term for improved preservation of meat and dairy products which can then be prepared locally and supplied to local markets in and around major towns.

Train and recruit paravets to effectively respond to the animal health needs of the farmers. Later on when the animal stock increases, small veterinary clinics may be established that are manned by these paravets. These may be established in central points in each district.
Improve common infrastructure at markets by providing sheds, water and dipping facilities with a minimum fee charged for use and their upkeep

Set up a modern abattoir and meat processing plants in areas with high potential for livestock production so that instead of transporting live animals, processed meat could be transported to Freetown and other major towns.

9.4 Prioritized areas of interventions

- Rehabilitate the training and breeding/multiplication centres
- Prepare a short 'Best Practices in Animal Husbandry' training curriculum for farmers
- Encourage crop farmers to start raising cattle through a series of meetings and workshops with community representatives
- Training of cattle and small ruminant farmers (including the crop farmers) based on a curriculum that includes: cattle housing, stall feeding, balanced feeds, general health and hygiene, and fodder cultivation
- Provide improved breeding stock to farmers through crossbreeding
- Organize periodic cattle fairs and provide incentives for best kept farm, best cattle, highest milking cow etc.
- Engage research institutions to generate appropriate feeding and other related technologies
- Prepare a 3 to 4 month veterinary curriculum
- Select potential youths for para-vet training and provide rigorous field based training

- Provide for sheds and water facilities in paddocks
- Establish small veterinary clinics in each district
- Set up modern abattoirs and meat processing plants in strategic areas
- Train entrepreneurs in milk processing to make products like butter and cheese
- Set up milk cooling units and milk pasteurising/packing plants in high potential milk producing areas.
- Road construction and electricity supply in line with the 'Agenda for Prosperity' programme

10. SUGGESTED PROJECTS AND PROGRAMMES

Project title: Livestock improvement project

Duration: 5 years

A five year project and investment plan is proposed with the overall objective of transforming and adding economic value to the sector in order to provide sustainable food security, reduce poverty and provide decent income for those working in the sector while preserving the natural resources. The immediate outputs are: a sustained livelihood through improved livestock production, productivity and profitability; structured and enhanced capacity of livestock value chain actors (producers, processors and marketers and service providers), and effective project management /implementation

Activities that will lead to these outputs include: (i) enhancing the productivity of livestock production systems, (ii) Structuring and building the capacity of the various stakeholders, for community driven livestock development and (iii) support for project implementation and management. Other outputs linked project activities are further elaborated below and presented in the project investment plan (table 4).

The Project will contribute to sustainable livelihoods through improved cash incomes, increasing food security among households facing food shortages and malnutrition, which include some of the poorest segments of the population. It will achieve this by providing access to appropriate livestock production and management technologies, improved management practices, and marketing systems, rationalizing household labour requirements, and improving returns to labour, particularly women's labour.

It will contribute to gender equity by providing rural women with increased opportunities and support, to participate in the selection and implementation of community and household investments, for improved income generation and asset creation. It will support the formation of farmer and trader based organizations and their technical training in livestock rearing and marketing, as well as in savings and credit management. Women will be enabled to participate equitably in all training, group formation, and activities aimed at improved extension, production, and marketing.

Table 4: Project investment plan

Activity	**Budget (US$ Millions)**
Output 1: Enhanced productivity of Livestock Production systems Activity Promote production of large ruminants through introduction of cattle settlements and improved pastures and forage trees (initially 2-5 ha per pilot district)	10.0
Improve livestock survival through enhancing the capacity of the Livestock/Veterinary services Division, support for vaccination campaigns and training and put into operation of Community animal Health workers. Purchase of veterinary drugs, vaccines and equipment Purchase of Vehicles and motorbikes	10.0

Activity	Budget (US$ Millions)
Refresher training for Livestock Extension Staff and training of new recruits Training of Community Paravets	
Improve livestock productivity through information dissemination to livestock farmers, improved performance of local breed, and demonstrations Training of Project beneficiaries Establishment of demonstration sites Support to Teko Livestock Research Station and Njala University Improve the access of livestock producers and traders particularly women, to better smallholder cattle, small ruminant and piggery production and management techniques Cattle value chain support Small ruminant value chain support Piggery value chain support Community Revolving Fund	6.0 12.0
Output 2: Structuring and capacity building of producers and traders based organizations for community driven livestock development Activity Formation of livestock farmers based organizations with common interests in Agricultural Business Centres Training in decision making and management	8.0
Output 3: Implementation Management - Appointment of Project Implementation Team - Preparation of work plans and training curricula - Monitoring and Evaluation Preparation and submission of reports	4.0
Total	**50.0**

The vision for the National Sustainable Agriculture Development Plan (NSADP) and the Smallholder Commercialization Programme (SCP) for commercializing agriculture emphasizes the critical role agricultural research and extension is expected to play in the development of the agricultural sector. In this regard, this project is expected to play a major role in addressing the many challenges facing the livestock sector which must be incorporated into a National Livestock Development Plan (NLDP) linked to the recently launched Sierra Leone's "Agenda for Prosperity" that was developed to deliver the economic growth envisioned in the Vision 2025.

From the regional and global perspective, the project is in line with the Comprehensive African Agricultural Development Programme (CAADP); ECOWAP; West and Central African Council for Agricultural Research and Development (WECARD); and the Millennium Development Goals (MDGs) in extending the area under sustainable land management; improving rural infrastructure and trade-related capacities for market access; increasing food supply and reducing hunger; and agricultural research, technology dissemination and adoption.

11. CONCLUSIONS

From this review it is evident that livestock meat and milk value chain is essential for the livelihood of the people of Sierra Leone. Potentials for increasing production of livestock and livestock products exist. Increased investment in livestock will have a profound effect on the development of the agricultural sector and the economy as whole.

Livestock directly or indirectly contributes to the livelihoods of over 70 percent of Sierra Leoneans and accounts for 1.6 percent of total GDP. Livestock is one of few livelihood options for pastoralists, and is the one that enables their way of life and sustains their social structures. Realizing the full potential of livestock as a component of Sierra Leone's long-term food security and growth requires clear direction from GoSL and a number of stakeholders.

Performance of sub sector remains poor, as the agricultural sector continues to be faced with challenges. The best option is the transformation from subsistence into commercial orientation. Addressing important issues along the livestock commodities value chain will help to stimulate increased growth. The government has been taking positive measure to create an enabling environment to attract investment. It is high time that the other stakeholders particularly the private sector took up the challenge and played a leading role in commercializing the sector for increased development of sub sector and the economy as a whole.

The scheduled five-year investment plan offers a window to address critical bottlenecks and lay the foundation for the accelerated development of the livestock meat and milk value chain as an integral part of Sierra Leone's livestock sector. The five-year investment plan is based on a set of factors including a robust system of agricultural extension and animal health, and access by small-scale producers and other chain actors to resources such as capital, land, skills development and other related inputs. With dedicated focus on these issues, livelihoods of livestock farmers and other stakeholders could be set on a path towards increased income and more stable earning while the economy as a whole would benefit from improved products and some competitiveness by the end of the project period. This can increase smallholder incomes, as well as benefit value chain actors and their employees and service providers. With a strong and functional value chain covering production, processing and marketing, retail and consumption, GoSL and its development partners, along with the private sector will be in a position to place Sierra Leone on a strong trajectory towards the development of a highly performing livestock sector.

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13. ANNEX

Annex 1: Persons interviewed including group discussions (GD)

Name	**Designation/Organisation**
Mr. Sorie M. Kamara	Acting Director, Agriculture
Mr. Mohamed Boie Jalloh	Cattle farmer
Alhaji Abdul Barrie	Cattle farmer
Mr. David Sellu	Koinadugu Livestock Officer
Mr. Sarjoh Bah	Cattle farmer Chairman,
Mr. Sallieu Tellah Jalloh	Cattle farmer
Mr. John S. Kamara	Beef retailer
Dr Abdul Gudush Jalloh	Director SLAWS, Vet Officer
Mr. Arthur Scotland Nicol	Pig farmer, PPFASL
Mr. Malik Barrie	Cowboy, Gbindi (GD)
Mr. Haddi Barrie	Middleman, Gbindi (GD)
Group Discussion	
Joni Joni Cattle Farmers Association	
Wallidra Cattle Farmers Association	
Walliderien Cattle/Crop Farmers Association	
Jogodirein Farmers Association	
National federation of Butchers	

Annex 2. Livestock stakeholders associations

Name	Contact information
Producer Organizations	
National Federation of Farmers of Sierra Leone	Mr. Jesse Olu John President. 33A Hill Street, Off Wesley Street, Freetown. Mobile phone: +232-76-605-894; Email: naffsl2009@yahoo.com
The Pig and Poultry Farmers Association	Mr. Emile S. Kargbo President
Joni Joni Cattle Farmers Association	Mr. Mohamed Boie Jalloh. Phone: + 232-78-385-815
Wallidra Cattle Farmers Association	Alhaji Abdul Barrie. T:+232-76-967-319
Walliderien Cattle/Crop Farmers Association	- Mr. Sarjoh Bah. T:+232-76 – 795-906
Jogodirien Cattle Farmers Association	Mr. Atigu Jalloh. T:+232-76-588-217
United Federation of Butchers	Mr. Saidu O Jalloh. Dove Court market; T: 232-76-762273.
Jogodirien Cattle Farmers Association	Mr. Atigu Jalloh; T:+232-76-588-217
Non-Governmental Organizations	
Heifer International	Contact details: Rashid Sesay – Regional Director, West Africa; Email: Rashid.Sesay@heifer.org; T: 23276- 671-303; 98b Off Wilkinson Road, Freetown, Sierra Leone.
GIZ	GIZ, Regional Office Sierra Leone – Liberia; Country Director - Marina Mdaihli; email: marina.mdaihli@giz.de
BRAC	23 Old Lumley Road, Off Spur Road, Wilberforce, Freetown, Western Area, Sierra Leone.

I5273E/1/04.16