

## A CASE STUDY OF THE EFFECTS OF TRADITIONAL SYSTEM OF SMALL RUMINANT MANAGEMENT IN KOMBO SOUTH, KOMBO EAST AND FONI BEREFET DISTRICTS IN THE WEST COAST REGION

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<sup>1</sup>Karamo Jatta, <sup>2</sup>Lamin K.M. Fatty, <sup>3</sup>Idu Ogbe Ode, <sup>4</sup>Sidat Yaffa

<sup>2</sup> & <sup>3</sup>Department of Sociology, Centre of Food Technology and Research Benue State University, Makurdi, Nigeria.

<sup>1,2&4</sup> School of Agriculture and Environmental Sciences, University of The Gambia, Brikama Campus, Banjul, Gambia.

Email: [lkmfatty@utg.edu.gm](mailto:lkmfatty@utg.edu.gm), [laminkmf@gmail.com](mailto:laminkmf@gmail.com), [idoode@gmail.com](mailto:idoode@gmail.com), [ksidat@netscape.net](mailto:ksidat@netscape.net) and [sidat@utg.edu.gm](mailto:sidat@utg.edu.gm)

### ABSTRACT

This research project is designed to investigate the effects of traditional system of small ruminant management in Kombo South and East, and Foni Berefet Districts in the West Coast Region. A total of 100 respondents (90 farmers and 10 livestock officers) were randomly selected to examine the effects of traditional system of small ruminant management in three districts of the West Coast Region. The study revealed that 98.9% of farmers in the area practiced traditional management system which according to farmers requires less capital, labour and management skills. Tethering is mainly practiced in the rainy season while animals are allowed to roam about freely in search of feed during the dry season. It demonstrated the relative importance to the farmers of tangible benefits of keeping sheep and goats such as regular cash income, meat and manure and intangible benefits. However, frequent outbreak of diseases, theft and feed shortage are the major constraints of small ruminant management in the area. Sometimes farmers are provided with medical, technical and economic support by the department and donor agencies to improve their managerial skills and raise their level of production and standard of living through extension services, still not much progress has been made due to resource constraints, weak policies and conservativeness of farmers. There is need for the effective implementation of policies and improve extension services to enhance the production of small ruminants in the region.

**Keywords:** Effects, Traditional System, Small Ruminant, Management System, West Coast Region

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## INTRODUCTION

Small ruminants (sheep and goats) management is a major agricultural activity practiced by most farmers in The Gambia and other countries in the Sub-Saharan Africa. The traditional system of small ruminant husbandry is mainly practiced in The Gambia. This system is extensive in nature and management of animals differs for the rainy and dry season. Under this system, small numbers of animals are reared by households or individual farmers mainly for the production of meat, milk, skin and wool. This system of small ruminant management plays an important role in the livelihood of many Gambians especially the rural population. It contributes to the socio-economic well-being of many Gambian farmers in terms of nutrition, income and intangible benefits (i.e. savings, an insurance against emergencies cultural and ceremonial purposes) and improve standard of living. Protein from these animals is needed for physical and intellectual development as well as for developing immunity against disease (Atinmo and Akinyele, 1983).

The traditional system practiced by farmers in The Gambia is a small holder production system in which goats and sheep are important because they require low initial capital investment and maintenance costs, are able to use marginal land and crop residues, produce meat and milk in readily usable quantities and are easily cared for by most family members. Small ruminants are prolific and need only short periods to increase flock sizes after catastrophes or in periods of high prices and thus off take rate can respond to price increases (Winrock International, 1983). Therefore, given the prolific nature and short generation interval for small ruminants, they contribute significantly to enhance food security and poverty alleviation in the villages. For these reasons the ownership of sheep and goats is wide spread in all the regions of the country. Of particular significance is the fact that sheep and goat numbers are increasing much more rapidly in the developing countries including The Gambia than in the more developed regions. This may well

reflect the particular ability of small ruminants to survive and produce on low cost feed, their adaptability to difficult and in particular arid environment, but perhaps more than anything else it reflects their suitability to the small low capital family farms in the developing countries that so badly need extra food and additional income. A recent survey conducted in CRR and LRR (PROGEBE, 2010) revealed that more than eighty percent (80%) of the households owned sheep and goats. Most of the sheep and goats are owned and managed by women. According to the data from Department of Planning (DOP report, the population of small ruminants has increased significantly across the entire country over the past ten years. Sheep population has increased from 106,000 in 2000 to 195,000 in 2010. The same source revealed that the number of goats has increased from 146,000 in 2000 to 375,000 in 2010 (WAAPP Baseline Survey report Dec 2012). However, despite the significant increase in the population of small ruminants and the socio-economic benefits farmers derived from the traditional system of small ruminant production, productivity of the animals and the living standard of the farmers across the entire country remain very low. Despite the support from the government and other donor agencies the productivity level for these livestock continues to remain low.

Generally production is constrained by a number of factors which include frequent disease outbreak, poor management practices, lack of access to good breeding stock, access to credit facilities and veterinary health care services etc. poor marketing infrastructure including roads, holding grounds, slaughter slabs and cold storage facilities affects the supply of meat for the local market. Lack of credit for livestock dealers in the country and the absence of reliable market information system also affect the development of marketing of small ruminant products. Currently the demand for sheep and goat meat has greatly outpaced the supply due to the poor marketing system and other related constraints (WAAPP, 2012). The Gambia Livestock Sector review (2010) estimated sheep and goat meat production at 550 and 1,028 tones respectively which represent 0.3 and 0.6 kg per inhabitant. Considering this low output and the level of demand there is a need for significant change and improvement in the sector. Improvement programmes on the system are necessary to increase and sustain the productivity of small ruminants so as to meet the demands of the population on them. Development of genetic improvement programmes for sheep and

goats for the purpose of addressing several constraints e.g. feeding, health control, management and cost, and availability of credit and marketing infrastructure are required to raise production (Baker and Gray, 2003). Many small ruminant genetic improvement programmes have not been very successful in developing countries in the tropics including The Gambia (Wolling *et al.*, 2002). An important reason is that genetic improvement programmes have mostly been implemented without taking in to consideration all the needs of the local farmers.

### PROBLEM STATEMENT

Small ruminant production and management plays an important role in the livelihood of many Gambians particularly the rural populations. Productivity of small ruminants under the traditional system is considered low owing to the insufficient feed, poor management practices and high mortality rate at 31% for sheep and 33% for goats which are mainly due to disease outbreak (WAAPP, 2012). Unimproved pastures and crop residues constitute the main sources of feed for sheep and goats in the country. Availability of feed varies considerably between the rainy and dry season. During the rainy season, grasses are available on the rangelands and around the villages and the feed requirements of sheep and goats are easily met. In the dry season however, the quality of grasses on the rangelands deteriorates and becomes nutritionally poor. Added to this problem, most of the biomass is destroyed by bushfires. With the progression of the dry season, scarcity of feed becomes more pronounced and, sheep and goats depend on crop residues and browsing. Apart of the occurrence of bush fires, significant proportions of the crop residues are sold or wasted through poor conservation and trampling by animals.

Provision of adequate nutrition and water for sheep and goats during the dry season remains a major challenge for flock owners. Poor marketing infrastructure including roads, holding grounds, loading ramps, slaughter slabs, and cold storage facilities is affecting the supply of meat for the local markets. Lack of/low credit for the livestock dealers and the absence of reliable market information system are also affecting the development of marketing of livestock and livestock products. The demand for meat and other livestock products has greatly outpaced the supply due to the poor marketing system. The countries therefore rely on imports to meet the

requirements of local consumers, restaurants and hotel industry. Unlike cattle more sheep and goats are sold annually as evidenced by higher off-rate of 23.6 % and 25% respectively. The production of sheep and goat meat was estimated at 550 and 1,028 tones , representing 0.3 and 0.6 kg per inhabitant respectively (livestock sector review, 2010). These figures are far below the national meat demand which stands at 23,630 Metric tones against the national meat production which stands at 7841 Metric Tonne. Imports of meat and other livestock products have increased considerably over the past decades. Thus between 1985 and 1990, 39.6 million dalasi was spent on imports of meat and other livestock products. Similarly a total of 1.3 thousand metric tonnes of meat and other livestock products were imported from 1992 to 1993 and of this amount 40% was fresh, chilled or frozen. In 1994, 1.8 million kg of frozen meat valued at 14.9 million dalasi was imported (WAAPP, 2012).

A significant increase was observed in the importation of mutton, goat meat, poultry meat and eggs from 2002 to 2011. Fifty six metric tons of mutton and goat meat were imported in 2002 while in 2007, 174 metric tons of the same products were imported. In 2010 and 2011, 1170 and 301 metric tonnes of mutton and goats meats were imported. Furthermore, management of small ruminants in the country is predominantly traditional and extensive in nature. Production under the system is characterized by minimal inputs, with greater emphasis on head count than individual productivity. Flock sizes are usually small and are not properly looked after mainly during the dry season, many animals are lost through theft, accident and attack by predators such as dogs, hyenas.

Poor housing condition for small ruminants often give rise to a series of disease problem such as respiratory diseases, helminthes infestation etc. all of which are of major economic significance. Disease outbreak mostly lead to high mortality rate, loss of weight, infertility, longer lambing kidding, and huge monies spent on treatments and impact on human health. The effects of poor housing increase the risk of predation, traumatic injuries, stress due to rain, wind, temperature and sunlight. Other factors such as weak livestock extension services, low agricultural education for farmers, low level of animal recording, high human and livestock population pressures, increase competition between crops and livestock among others pose a great

challenge to small ruminant management and production. The government of the Gambia in collaboration with the livestock sub-sector, stake holders and donor agencies has launched numerous projects (PROGEBE, WAAP, 2012.) across the country to promote and improve the managerial and production skills of small ruminant farmers by providing financial and technical training and support to the farmers. According to the research conducted by (WAAPP, 2012) on small ruminants the production of animals in term of head count has increased significantly over the past years but the productivity of each animal in term of meat and other products remain low and this is currently the main challenge facing the sector.

## JUSTIFICATION

Small ruminants are mainly reared for the purpose of income generation, employment creation, food supply, manure production, prestige and other socio-cultural and religious benefits. Despite the numerous challenges facing small ruminant management and production throughout the country there are still much opportunities and prospects in the future. Research is required to turn the currently unexploited livestock sector in to a strong and vibrant industry supplying standardized products to meet the demand of the 21<sup>st</sup> century. According to the livestock sub sector report 2011, the current stock of small ruminants shows that the rate of exploitation could be increased by more than 10% without harming the reproductive potential of the production system. The continuous high demand for meat, milk and milk products and the introduction of improved breeds of sheep and goats and the genetic improvement programmes for small ruminants is a way forward for increase productivity in terms of quality and quantity. Small ruminant production has significantly improved the income level of many livestock farmers and all other sectors of the society that are directly or indirectly involved in the production and distribution of animals and their products. The activities of middlemen, butchers, village buyers, herders and other stakeholders including the government obtain income from small ruminant management, production and distribution.

The cross border trade which involves the movement of animals and peoples from neighboring countries like Senegal, Mauritania etc. to the country provide a very good source of income and foreign exchange for the government. According to the Gambia livestock sub sector report livestock

sector contributes 8.6 % to National GDP and 29.6 % to Agricultural GDP with a low off-take (cattle 11% small ruminants 23%). Small ruminant production has complimented government's effort by creating employment for most livestock farmers, middlemen, butchers and even truck drivers responsible for transporting live animals from one center to another across the country; and is mainly used during religious ceremonies such as feast of Idul adha, naming ceremonies and socio-cultural events such as wedding and initiation ceremonies. Small ruminant farmers in the country have realized that unlike cattle small ruminants are easier to sell and they therefore serve as ready sources of income for the purchase of food and other household needs during the lean periods. The income obtained from the sale of these animals is used by farmers to provide basic household needs such as food, health care services, shelter and provision of children school expenses. This research project is designed to investigate the effects of traditional system of small ruminant management in Kombo South, Kombo East and Foni Berefet Districts in the West Coast Region.

## LITERATURE REVIEW

### **Small Ruminant Production and Management in Africa**

Small ruminant management is widely practiced by most farmers in Africa. The sector contributes significantly to the national and agricultural GDP and to the economy of countries in the Sahel and Sub-Saharan Africa. The sector contributes to job creation, national and personal income, food security and nutrition and it is the driving force for crop agriculture. It represents more than half of the capital held by rural inhabitants in sub Saharan Africa. Sheep and goats are important because they require low initial capital and maintenance costs, are able to use marginal land and crop residues, produce milk and meat in readily usable quantities, and are easily cared for by most family members. Small ruminants are prolific and need only short periods to increase flock sizes after catastrophes or in periods of high prices and thus off-take rate can respond to price increases (Winrock International, 1983).

### **Distribution and Ownership**

Sheep and goats are widely distributed in Africa, and though there are conflicting figures as to the numbers available, their importance especially to resource poor farmers have been well documented (Devendra, 1985; Nuru 1987; Itty, 1997; Peacock, 1995). It has been estimated that 171 million sheep

and 144.7 million goats are in Africa, representing 28.7% and 20.2% respectively of the total population of ruminant livestock in the tropics and subtropics (Nuru, 1987). The distribution of sheep and goats in Africa is not even and numbers tend to be higher in the drier areas. The population of sheep in Sub-Saharan Africa is estimated at 127 million head, while that of goats is estimated at 147 million (Winrock International, 1992). The Arid and Semi-arid zones together hold the majority of sheep 36% and 64% populations of sub-Saharan Africa. However, the Arid holds 11% more sheep and more goats than the semi-arid which contains 23 and 26% of the sheep and goats, respectively. Consequently, flock sizes are larger in the drier areas than in the humid areas. Some areas, (West Africa) flock sizes decrease from north to south (ILCA, 1979; and Otechere *et al.*, 1985). In East Africa (e.g. Ethiopia and Kenya) flocks are smaller in the highlands compared with the lowlands (Wilson, 1982) Flock sizes are generally larger in the pastoral and smaller in the humid agricultural regions (ILCA, 1979; Bayer' 1984). The data on small ruminant study in Africa show that the pattern of ownership of small stock in Africa is rather varied and extremely complex. The majority of small ruminants are owned by individuals or families in rural areas and the number per group is small. Small stock nevertheless forms an integral part of the farming system.

### **Small Ruminants Production and Management in the Gambia**

Small ruminants are widely distributed across all the regions in the country. According to the National Livestock Census 1993/94 report, about 1,579 and 2,151 goats and sheep were found in KMC region, 41,931 and 12,132 in Western Region, 22,978 and 9,185 in Lower River Region, 43,763 and 20,643 in North Bank Region, 30,583 and 22,053 in Central River Region south, 29,153 and 20,957 in Central River Region north, 43,745 and 28,468 goats and sheep found in Upper River Region respectively. In the Gambia, ownership is widespread among the rural populace with little variation between ethnic groups or geographical areas (Greenwood and Milineaux, 1989). There is an increasingly renewed interest in the Gambia, as in other countries in the sub Saharan region; in smallholder sheep and goat production (Itty *et al.*, 1997). This has been attributed to a strong consumer preference as shown by the increase in small ruminant slaughter and consumption over the past two decades (Seyoum, 1992), and an increasing total and urban population with an annual growth rate of 3.7% and 6%



respectively (World Bank, 1995). Ownership of sheep and goats is wide spread in all the regions. A recent survey conducted in CRR and LRR (PROGEBE/ilri 2010) revealed that more than eighty percent of the household owns sheep or goats. The livestock census (1994) indicated that there were 32385 owners of sheep and goats distributed in 1713 villages most of sheep and goats are owned and manage by women. According to 1994 census report, 37% of sheep and 51% of goats are owned by women. This ownership trend is further confirmed by the 2002 agricultural census which revealed that 74% of the goats and 47% of the sheep are managed by women. The agriculture census of 2001/2002 in the Gambia shows an estimated total of 357,000 small ruminants made up of 129000 sheep and 228000goats; a decrease from the 1993 livestock figures (DOP/DOSA, 2002). Small ruminants have a great potential to affect the socio-economic development of the majority of African rural communities. Sheep and goats are kept as an insurance or emergency cash resource (McDermot *et al.*, 2010). Key opportunities for smallholder small ruminant producers to not only engage in income generating activities enabling them to escape the poverty trap but also to consume animal source food they could not afford to buy.

### **Management System**

Small ruminant management system in The Gambia is predominantly traditional. Sheep and goats are raised to generate income and to meet the nutritional requirement of the population. The traditional small ruminant production system practiced by farmers in the Gambia is extensive in nature and management of animals differs for the rainy and dry seasons. During the rainy season flocks are housed during the night whilst during the day all the sheep and goats in the villages are pooled to form big flocks that are herded by contract Shepherd to keep them away from the crop fields. In some places sheep and goats are tethered near the villages so they can feed on grasses around the villages. In the dry season however, the animals are left to roam around the villages scavenging on domestic waste or grazing on crop residues in the harvested fields. The productivity of ruminants managed under such condition is considered low due to inadequate nutrition and high mortality rate (Yemi Akinbamijo, *et al.*, 1999).

### Feed resources for Small Ruminants

Nutrition is identified as one of the most serious factor limiting small ruminant productivity in the Gambia. Unimproved pastures and crop residues constitute the main sources of feed for sheep and goats in the country. Availability of feed varies considerably between the rainy and dry season. During the rainy season, grasses are available on the rangelands and around the villages and the feed requirements of sheep and goats are easily met. In the dry season however, the quality of grasses on the rangelands deteriorates and becomes nutritionally poor. Added to this problem, most of the biomass is destroyed by bushfires. With the progression of the dry season, scarcity of feed becomes more pronounced and, sheep and goats depend on crop residues and browsing. Apart of the occurrence of bush fires, significant proportions of the crop residues are sold or wasted through poor conservation and trampling by animals. Provision of adequate nutrition and water for sheep and goats during the dry season remains a major challenge for flock owners.

### Diseases Management

Diseases of small ruminants seriously limited their productivity in the country. High disease incidence cause loss of weight, infertility, high mortality rate, longer lambing or kidding interval and huge monies spent on treatments. The effects of disease interact with malnutrition in that an under nourished animal is less resistant to disease, yet disease control is more justifiable in economic terms when animals are well- nourished. The seriousness of diseases can be measured according to the loss in production they cause, the cost of their control or the effect they will have if no preventive measures were taken. Internal parasites such as viruses, bacteria and protozoa are a major cost of low productivity of small ruminants in the Gambia. Helminths (*Haemonchus*, *Fasciola hepatica*, *Damalinia* spp, etc) can cause clinical symptoms such as diarrhea, but more importantly lead to reduce growth rate and fertility. The effects of helminthes are most serious towards the end of the wet season. Fascioliasis occurs throughout the country as is seen from slaughter house records of live infections. Its life cycle depends on a snail and the disease is probably picked up by animals at watering places or in marshy areas. Peste des petits ruminants (PPR) are endemic in the Gambia and other parts of West Africa. It is a disease which mimics rinderpest (to which small ruminants are not susceptible) causing

fever, mucosal erosion, diarrhea and often death. Ticks because serious economic loss by skin damage resulting in poor hide quality. Other diseases constraining the productivity of village flocks are pasteurellosis causing pneumonia, contagious caprine pleuropneumonia (CCPP), sarcoptic mange, hydatid cysts on lungs, anthrax, brucellosis, foot and mouth disease, rift valley fever, trypanosomiasis, sheep and goat pox and clostridial diseases.

### **Veterinary drugs, vaccines and feed supplements**

Availability of veterinary products including drugs and vaccine and feed supplements is one of the key factors for improving livestock production in the country. In the past all the drugs and vaccines were provided by the Government and they were administered free of charge. With the advent of the Economic Recovery Programme (ERP), the Government could no longer afford to provide the products free of charge. This led to the initiation of cost recovery programme for certain products such as Antibiotics, Acaricides, Anthelmintics and certain categories of vaccines. One such initiative was the Animal Health care Programme that was implemented (through Dutch Government donor Support) to enhance availability of drugs and vaccines to livestock owners at village level. Currently importation, distribution and retail of veterinary products in the country are carried out by private veterinary supply outlets such as VETSAN and AGROVET.

### **Productivity of Small Ruminants**

According to the (FAO, 1982) tropical Africa has about one –sixth and about a third of the total world flock of sheep and goats respectively. Total meat produced from small ruminants in Africa was 1.3 million metric tonnes (about 16% of the world total from sheep and goats). Within Africa, sheep and goats contributed 10.9% and 8.4%, respectively, of our total. Total meat from African sheep and goats contributed 12.0%, respectively, of the world total meat production from these two species. Sheep and goats in Africa produced 8.6% and 18.2% respectively, of the world total amount of milk produced from these two species and the production from these two species and the production from both accounted for 13.6% of milk collected from small ruminants in the world.

## **Production and Consumption of mutton and goat meat**

The Gambia Livestock sector review (2010) estimated sheep and goat meat production at 550 and 1,028 tones representing 0.3 and 0.6kg per inhabitant respectively. The Household Economic survey estimated the total annual meat consumption for the greater Banjul Area at 2343 metric tones of beef, 350 tones of mutton and goat meat and 664 tones of chicken and other poultry meat. The reports also revealed that meat consumption per capita was 16 kilogrammes.

## **Slaughtering of Sheep and Goats**

Slaughtering of livestock for the greater Banjul Area is carried out at the Central Abattoir in Abuko that was constructed in 1979 at the total cost of 1.5 million dalasi a large proportion of which came as financial assistance from the UK Government. The abattoir commenced operations in September 1979 and it had a throughput of 60 head of Cattle and 60 Small Ruminants. The services provided by the abattoir included slaughtering, dressing and inspection. Slaughtering and dressing of the carcasses is carried out on the floor due to lack of equipment. The smooth operation of the abattoir has been constrained by lack of trained personnel and effluent disposal system that makes it difficult to maintain proper hygienic standards. Slaughtering of sheep and goats is also carried out in the Abattoir in Banjul. Slaughter of sheep and goats and is carried out at slaughter slabs in regional centers whilst in the villages most of the meat is produced through the slaughter of animals in the backyard of the owners and hanged in the open air stalls and sold to consumers. The slaughter slabs in the towns and big villages are constructed by the Area councils.

During the past years a number of projects have provided support to construct slaughter houses in the regions. The required standard of hygiene is not maintained at the slabs because the carcasses are often smeared with blood and the gut contents are dumped around the slab and this practice creates an ideal environment for vultures, dogs and other scavengers. Funds were provided by some projects to rehabilitate some of the slabs in the provinces but a lot of improvement is required for the other structures. There are no processing facilities at the Abattoirs and as a result meat is not transformed in to other products. Apart from processing problems, the traditional butchers who are involved in the meat trade do not have the skills

in preservation, processing and provisions of appropriate meat portions and cuts. For these reason the variety and self-life of meat products is limited (WAAPP, 2012).

### **Importance of Small Ruminant Production and Management**

The importance of small ruminants in Africa in general is well organized (Williamson and Payne, 1978). Small ruminants are reared mainly for many functions, namely meat, milk, manure, wool, religious and other socio-cultural purposes. It is difficult to determine accurately the contribution of small ruminants to human food supply and general welfare. Available statistics are misleading because much of the production from these species does not enter formal trade channels and is therefore not reported. Estimates indicate that ruminants contribute 80% of the total food production from livestock in tropical Africa (Janhke, 1982). Of this, small ruminants account for about 22%. It is estimated that ruminants supply over 3.2 million tones of meat per year, representing over 72% of total meat production. Small ruminant meat accounts for about 30% of the total red meat production and over 20% of the total meat output of Sub-Saharan Africa. Small ruminants account for about 21% of the total milk produced in SSA. According to Wilson, (1982), sheep and goats accounted for 17% of the total ruminant biomass in Africa.

Africa has a greater meat/milk consumption ratio than any other continent and 27% of this meat comes from sheep and goats. However meat is still a luxury for the majority of the population and is eaten only on special occasions. In a continent with primitive storage facilities the small individual size of sheep and goat is an advantage because meat from them comes in family- size packs. Any animal can be eaten for meat. In a system designed to produce meat as the main product most meat is produced from young males and culled females. However, other classes of animal are eaten if the need arises, and sick animals may be slaughter at point of death. Milk for human consumption is a relatively minor product from small ruminants in most of Africa. Goats are more frequently used for milk production than sheep which are milked in parts of Somalia Sudan and the arid regions of West Africa. There is little literature on quantitative aspects of milk production but yields are probably less than 1 kg/day.

Goat milk is said to be more easily digestible than cow milk, and sheep milk has much higher content of total solids than cow milk – a factor which gives it a premium price. Most communities boil milk before use thus minimizing the risk of diseases such as brucellosis. Controlled fermentation produces yoghurt which may be dried and stored in oil. Cheese too keeps for several months and ghee which contains little or no water may be stored for years in sealed containers. Few farmers have access to commercial fertilizers. Manure and urine from domestic animals are therefore essential components for maintaining agricultural production. However, only limited quantitative data are available on the contribution of manure in traditional production systems. One of the reasons usually given for low live animal off take from traditional herds is the holding of livestock as a status symbol or sign of wealth. Livestock owners in rural areas do not usually have access to banking facilities and have come to rely on investment in their stock. While investment in livestock does carry its own risks, it provides security against crop failure and currency fluctuations.

### **Constraints to Sheep and Goats Production**

Of paramount importance to economic productivity and reproductive efficiency in small ruminants is mortality. Both pre-weaning and post weaning mortality of small ruminants in tropical Africa is very high. Several factors have been reported to affect mortality in small stock in various areas in tropical Africa. Among these are season and type of birth (Peacock, 1982), length of the previous parturition interval (Wilson, 1981), parturition number (Fall *et al*; 1982) and disease (Mack, 1982). All of these effects are clearly related to nutrition, health and management. Van Vaenderen, (1985) described sheep and goat husbandry in Africa as generally being casual rather than an organized activity for the following reasons: Animals have no benefit of prophylactic or curative medicinal treatment, little or no supplementary feed is offered, no good flock management is practiced, poor housing, tethering of animals during the planting season so as to avoid crop damage. The above criticism will seem to apply to small ruminant production in traditional systems throughout tropical Africa. According to Wilson (1982), however, Africans who keep small stock rarely do so for irrational reasons and that such reasons are perfectly in keeping with the problems encountered and the specific objectives of the owners. However, an accepted

fact that for a greater part of the year, grasslands in the tropics does not supply sufficient nutrients to stock for greater productivity.

Otchere *et al.*, (1977) reported that West African Dwarf sheep, usually received no supplementary feed during the dry season (December to February) lost about 15% of their body weight. Many crop residues like rice and cocoa husks and corn cobs have not found their way in to stock feeding even though they have been shown to be potentially useful (Adeyanju *et al.*, 1975; Otchere *et al.*, 1983). Many of these crop discards are not used because production is by small scale farmers scattered over a wide area thereby making collection impracticable. It must be mentioned however that there are several large plantation and or farms now in Africa on which such crop discards are allowed to rot. Such large scale farms could include fattening of small stock in their operations so as to utilize these discards. Efficient use of such by-products for stock feeding under present conditions would call for the stratification of the system of small ruminant production. Estimates by ILCA (1979) showed that Africa potentially had agro-industrial by-products that could be used for fattening about one million small ruminants for a 90 day period each year during the 1980s. Several factors make it difficult for Africa's agro-industrial by-products to be harnessed.

In the meantime, wholesale rangeland improvement is not practicable because grazing land is communal. The majority of stock owners do not own land and for those who have, the farm sizes are small and grossly subsistence crop-based. An integration of forage legumes in to the cropping system of small stock owners would go a long way to improve the productivity of their animals. Research along these lines has been initiated by ILCA (International Livestock Center for Africa) in Nigeria and Mali (ILCA, 1982). Initial indicators appear very favorable, and it is therefore suggested that such experiments need to be conducted in other zones in other countries. National Research Institutes (for both crops and livestock) should cooperate and find feasible avenues for integrating livestock and crop production. A systems approach would appear to yield relevant results and research efforts should emphasize the identification of factors which, when modified or eliminated, will enable small ruminant producers in tropical Africa to have control over the productivity of their animals and not under the control of ecology as is the case at the present.

## Marketing of Small Ruminants in the Gambia

The trade in sheep and goats in the Gambia is currently controlled by traditional livestock dealers as opposed to the situation that prevailed in the past when Livestock Marketing Board controlled the largest in the livestock trade. Livestock Marketing Board (LMB) that controlled livestock trade in the past was established by an act of parliament in 1975 to develop export trade in livestock, ensure adequate and regular supply of Cattle and meat for the local market and to control importation and export of livestock and livestock products. In pursuance of this mandate, the Board purchased animals directly from livestock owners/ through agents licensed by the board. Animals destined for sale and slaughter were assembled at specific buying points that were equipped with weighing scales and located in the divisions. Livestock marketing Board over the years faced financial and managerial problems that affected its operations and it was privatized in 1990. With the collapse of Livestock marketing Board and Yams Agricultural Enterprise, the trade in livestock is totally controlled by traditional livestock dealers who lack the capacity and resources to improve livestock marketing in the country. The livestock traders buy sheep and goats directly from village flocks or from the weekly markets in the provinces and transport those to the holding ground at Abuko, Banjul or Brikama in hired private trucks. The prices paid for sheep and goats are negotiated on the basis of visual estimate of the weight of the animals and the body condition.

## METHODOLOGY

### Study Site

The specific area targeted for this research is West Coast Region. This region is large and has high concentration of small ruminant farmers across it from east to west. However, according to reports much research has not been conducted in the area to assess the level of progress and constraints affecting small ruminant management and production in the area. West Coast Region consists of nine districts in which three districts have been chosen at random for this research. These were Kombo South, Kombo East and Foni Berefet. Three villages have been identified from each of the selected districts namely; Sanyang, Gunjur and Sifoe villages in Kombo South, Pirang, Faraba and Kafuta in Kombo East and Bullock, Ndemban and Somita in Foni Berefet district. The indigenous people of these areas rely mainly on subsistence farming as a means of survival.



### **Sampling Method**

The target sample size for this research is one hundred respondents of Livestock farmers and Officers. Ninety questionnaires were administered to farmers and ten to the agricultural extension personnel working with farmers in the area. Out of the three villages identified in each district, ten farmers were interviewed in each village. Since the researcher did not know all the potential respondents in the research area, the first point of entry was the Alkalo who identified the names of some of the small ruminant farmers in his village at random. The researcher went round the village to meet them one after the other.

### **Data Collection and Analysis**

The data in this research work have been collected from both primary and secondary sources and other materials relevant to the research. The data collection method was based on personal interview using structured questionnaires for farmers and some questionnaires were distributed to agricultural extension experts in the area to fill and submit them back to the researcher. Face to face communication between the researcher and the respondents was conducted and the responses of the respondents were noted. However, since majority of the respondents could not speak English, the medium of communication was mainly local language which both the researcher and the respondent could speak. After the data have been collected successfully, the SPSS statistical software designed for statistical data analysis was used to analyze the data. The results of the analysis have been presented in the form of frequency counts, percentages and cumulative percentages in frequency distribution tables. Based on the results the data have been discussed for each of the frequency tables presented.

## **RESULTS AND DISCUSSION**

### **Results of Data Collected From Farmers**

The results presented and discussed below have been collected from farmers in West Coast Region. All the ninety farmers targeted have been successfully interviewed and their comments have been recorded, analyzed and presented in frequency distributions tables.

**Table 1 Frequency Distribution of Respondents Based on Gender**

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	67	74.4	74.4	74.4
Female	23	25.6	25.6	100.0
Total	90	100.0	100.0	

The data presented in the table 1 above indicated that out of the total number of farmers interviewed 74.4% were male and 25.6% were female respectively. These results portrayed that more male are engaged in small ruminant management in west coast region than female.

**Table 2 Frequency Distribution of Respondents Based on Age**

	Frequency	Percent	Valid Percent	Cumulative Percent
21 to 35	6	6.7	6.7	6.7
36 to 50	7	7.8	7.8	14.4
51 to 65	16	17.8	17.8	32.2
66 and above	61	67.8	67.8	100.0
Total	90	100.0	100.0	

The data shown in the above table 2 indicated that 6.7% of the farmers interviewed were between the ages of 21 to 35 years, 7.8% were between the ages of 36 to 50 years, 17.8% were between the ages of 51 to 65 years and 67.8% were at the age of 66 years and above. These results have proved that majority of small ruminant farmers in west coast region are elderly farmers that are above the age of 65 years.

**Table 3 Frequency Distribution of Respondents Based on Ethnicity**

	Frequency	Percent	Valid Percent	Cumulative Percent
Mandinka	41	45.6	45.6	45.6
Fula	11	12.2	12.2	57.8
Jola	32	35.6	35.6	93.3
Wollof	1	1.1	1.1	94.4
Manjago	2	2.2	2.2	96.7
Serere	3	3.3	3.3	100.0
Total	90	100.0	100.0	

The result shown in the above table 3 indicated that out of the total number of farmers interviewed 45.6% were mandinkas, 12.2% were fulas, 35.6% were jolas, 1.1% were wollof, 2.2% were manjagos, and 3.3% were serere respectively. The results have shown that majority of small ruminant farmers in the area are mandinkas followed by Jolas, Fulas, sereres, manjagos and wollof respectively. There is variation in settlement pattern of these ethnic groups across the region. Majority of the population in the eastern part of

the region are jolas and Fulas while the western part which has the highest population density constitute of mainly mandinkas.

**Table 4 Frequency Distribution of Respondents Based on Educational Background**

	Frequency	Percent	Valid Percent	Cumulative Percent
Formal	40	44.4	44.4	44.4
Informal	50	55.6	55.6	100.0
Total	90	100.0	100.0	

According to the results in the above table 4 about 44.4% of respondents interviewed had formal education while 55.6% had informal education. Majority of those with formal education had primary school educational background and the rest had either secondary or tertiary educational qualifications. Most of the farmers with informal education had local Arabic "Dara educational" background at childhood while the rest had attended adult literacy programme.

**Table 5 Frequency Distribution of Respondents on the Type of Animals Reared**

	Frequency	Percent	Valid Percent	Cumulative Percent
Sheep	34	37.8	37.8	37.8
Goats	51	56.7	56.7	94.4
Both	5	5.6	5.6	100.0
Total	90	100.0	100.0	

The results in the table 5 above have shown that 37.8% of farmers interviewed rear sheep, 56.7% rear goats and 5.6% rear both sheep and goats. Based on these results, most farmers keep goats than sheep in the area. Most of the farmers mentioned that goat management under the traditional system is easier and more advantageous than sheep.

Goats are highly prolific, fast breeders, mature early and can thrive well on locally available resources.

**Table 6 Frequency Distribution of Respondents on Flock Size**

	Frequency	Percent	Valid Percent	Cumulative Percent
1 to 10	79	87.8	87.8	87.8
11 to 20	7	7.8	7.8	95.6
21 to 30	3	3.3	3.3	98.9
31 and above	1	1.1	1.1	100.0
Total	90	100.0	100.0	

The results in the above table 6 have shown that 87.8% of farmers owned between 1 to 10 animals, 7.8% owned between 11 to 20 animals 3.3% of farmers have between 21 to 30 animals and only 1.1% of farmers owned more than 30 animals. These results have shown that most farmers in the area have few numbers of animals in their flock.

**Table 7 Frequency Distribution of Respondents on Management System**

	Frequency	Percent	Valid Percent	Cumulative Percent
Intensive	1	1.1	1.1	1.1
Traditional	89	98.9	98.9	100.0
Total	90	100.0	100.0	

According to the results in the above table 7 98.9% of farmers practiced traditional management system while 1.1% practiced intensive system. According to farmers, traditional management system is mostly practiced because it is a cheap system of management which involves low capital and labour investment, use of local available resources and easy to adopt by a poor farmer. The management under the traditional system differs from wet to dry season. In the wet season, animals are tethered in the grassland around the village where they feed on green grasses and are taken back to the houses in the evening mainly by children. In the dry season, animals are allowed to roam about freely in search of feed and water. They feed on dry grasses, crop residues and household leftovers.

**Table 8 Frequency Distribution of Respondents on Housing of Small Ruminants**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	74	82.2	82.2	82.2
No	16	17.8	17.8	100.0
Total	90	100.0	100.0	

The results in the table 8 above have shown that 82.2% of farmers provided house for their animals while 17.8% did not construct house for their animals. Lack of house; expose animals to many hazards and constraints such as diseases, theft, bad weather which consequently reduces flock size.

**Table 9 Frequency Distribution of Respondents Based on Feeds and Feeding**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	14	15.6	15.6	15.6
No	76	84.4	84.4	100.0
Total	90	100.0	100.0	

According to the results in the above table 9 15.6% of farmers provide supplementary feed for their animals while 84.4% do not provide supplementary feed. Farmers expressed that they allow their animals to scavenge around because the cost of supplementary feed is high and therefore they can't afford it. Few farmers provide supplementary feed such as mineral licks, groundnut cake, rice and millet bran, groundnut hay, maize Stover, moringa leaves, malina leaves, rose wood leaves etc.

**Table 10 Frequency Distribution of Respondents Based on Diseases**

	Frequency	Percent	Valid Percent	Cumulative Percent
PPR( pest des petit ruminants)	62	68.9	81.6	81.6
Pasteurellosis	12	13.3	15.8	97.4
Ectoparasites	1	1.1	1.3	98.7
Nutritional diseases	1	1.1	1.3	100.0
Total	76	84.4	100.0	
Missing System	14	15.6		
Total	90	100.0		

According to the above table 10 results 81.6% of farmers interviewed said that PPR (Pest des Petit Ruminant) is the most common disease of small ruminants in the area, 15.8% said pasteurellosis, 1.3% said ecto and endoparasites and 1.3% said nutritional diseases. Therefore, the results of this research have shown that PPR and Pasteurellosis are the most common diseases of small ruminants in west coast region.

**Table 11 Frequency Distribution of Respondents Based on Treatment**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	67	74.4	74.4	74.4
No	23	25.6	25.6	100.0
Total	90	100.0	100.0	

According to the above table 11 results, 74.4% of farmers said their animals receive treatment from veterinary officers while 25.6% said that their animals have never been treated. According to most farmers veterinary officers provide treatment for their animals and these have significantly improved the health condition of their animals. However, some farmers complained that

access to treatment for their animals by vet officers is very rear. They expressed that cost of treatment is very high and difficult to sustain by a poor farmer. Some farmers do not trust vet officers because they accused them of administering expired or wrong drugs which cause their animals to die shortly after treatment. This is a main concern for both vet officers and farmers in the area.

**Table 12 Distribution of Respondents on Marketing of Small Ruminants in the Area**

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	36	40.0	40.0	40.0
No	54	60.0	60.0	100.0
Total	90	100.0	100.0	

The results in the above table indicated that 40% of farmers interviewed said that they rear animals purposely for sale while 60% said they rear animals for food and to provide basic household needs. The results have shown that most farmers in the area do not sale their animals. Some farmers exchange small ruminants to large ruminants based on mutual agreement between the two parties. According to most farmers there are no marketing facilities available in the area and demand for small ruminants fluctuates from one period to another and is high during occasions and religious festivals. Marketing of small ruminants either takes place at the village level between the owner and the village buyer or the owner obtain permit from the Alkalo and transport the animal to the market in Brikama or to the Abattoire at Abuko. Price is determined by negotiation between the buyer and the seller. Sometimes middlemen meet farmers in the villages buy animals from them and transport the animals to urban centers and resale them.

**Table 13 Distribution of Benefits of Traditional System of Small Ruminant Management**

	Frequency	Percent	Valid Percent	Cumulative Percent
Food	44	48.9	48.9	48.9
Income	21	23.3	23.3	72.2
Religious purposes	17	18.9	18.9	91.1
Social ceremonies	1	1.1	1.1	92.2
Emergency needs of the family	7	7.8	7.8	100.0
Total	90	100.0	100.0	

The results in the above table 13 have shown that 48.9% of farmers interviewed said that food is the most important benefit they derived from

traditional small ruminant management system, 23.3% said income, 18.9% said religious purposes, 1.1% said social. According to farmers small ruminants are easy to sell and the income obtained is used to purchase food for the family and to settle children school expenses and clothing. Small ruminants are slaughtered during religious festivals like Tobaski, Koriteh, naming ceremonies etc. Sometimes when the family is confronted with emergency problem small ruminants can be sold, mortgage or use as collateral to settle debts and fines.

**Table 14 Distribution of Constraints of Traditional Small Ruminant Management System**

	Frequency	Percent	Valid Percent	Cumulative Percent
Diseases	36	40.0	41.9	41.9
Theft	29	32.2	33.7	75.6
Accident	7	7.8	8.1	83.7
Feed	9	10.0	10.5	94.2
Disputes and complain from neighbors	5	5.6	5.8	100.0
Total	86	95.6	100.0	
Missing System	4	4.4		
Total	90	100.0		

According to the results in the table 14 above 41.9% of farmers interviewed said that the major constraint of traditional small ruminant management system in the area is diseases, 33.7% said theft, 8.1% said accident 10.5% said feed and 5.8% said disputes over ownership and complain from neighbors. According to farmers many of their animals die of diseases each year and many got stolen by thieves. Feed scarcity is another problem particularly in the western part of the region were population pressure on the land significantly reduced feed availability and grazing area. Feed shortage mostly in the dry season increase the risk of diseases, theft and accident. Disputes over ownership and damage caused by animals to crops are another critical problem facing small ruminant farmers in the area.

**Table 15 Frequency Distribution of Respondents on Mortality Rate**

	Frequency	Percent	Valid Percent	Cumulative Percent
1 to 5	54	60.0	94.7	94.7
6 to 10	3	3.3	5.3	100.0
Total	57	63.3	100.0	
Missing System	33	36.7		
Total	90	100.0		

The results of mortality rate of small ruminants shown in the above table 15 indicated that 94.7% of farmers said that about 1 to 5 animals in their flocks die each year while 5.3% said 6 to 10 animals die each year. These deaths according to farmers are mainly caused by diseases, accidents and sometimes poisoning. Diseases account for 90% of small ruminant death in the region. Mortality due to accident also contributes to high mortality but it mostly affects flocks in homes located along the highways

**Table 16 Distribution of Respondents Based on Plans to Improve Feed Supply for Animals**

	Frequency	Percent	Valid Percent	Cumulative Percent
To different feeds for animal feed.	57	63.3	93.4	93.4
Sites for animal feeding	4	4.4	6.6	100.0
Total	61	67.8	100.0	
Missing System	29	32.2		
Total	90	100.0		

The results in the above table 16 have shown that 93.4% of farmers interviewed said that their plan is to cultivate more crops, plant fodder trees, pastures and browse trees for animal feed while 6.6% said their plan is to allocate specific sites purposely for animal grazing throughout the whole year. According to them this will help to reduce feed shortage particularly in the dry season.

**Table 17 Frequency Distribution of Respondents on Disease Prevention**

	Frequency	Percent	Valid Percent	Cumulative Percent
Sanitary practices	68	75.6	76.4	76.4
Animals for vaccination during the campaign.	21	23.3	23.6	100.0
Total	89	98.9	100.0	
Missing System	1	1.1		
Total	90	100.0		

According to the results in the above table 17 76.4% of farmers said that they practice sanitary practices such as frequent washing of animals bodies (sheep) with salt water and soap, frequent removal of manure from the house etc. 23.6% said that they present their animals for vaccination during the campaign.



**Table 18 Distribution of Respondents on Local Treatment Administered by Farmers**

	Frequency	Percent	Valid Percent	Cumulative Percent
Solutions for animals feeds	57	63.3	100.0	100.0
Missing System	33	36.7		
Total	90	100.0		

According to the table 18 above almost all farmers practiced local treatment alongside treatments provided by veterinary officers. When farmers suspect disease they harvest either leaves, roots or bark of trees boil or dilute it in water and administer to animals as means of treatment or prevention. This according to most farmers is very effective in disease control and treatment.

**Table 19 Strategies used by Farmers to Improve on Marketing Constraints**

	Frequency	Percent	Valid Percent	Cumulative Percent
Funding to establish standard market for animals in the area	43	47.8	100.0	100.0
Missing System	47	52.2		
Total	90	100.0		

The tables 19 above have shown that 100% of farmers interviewed said that the only plan they have is to seek for fund from individuals, association, donor agencies and organizations in order to establish standard market with modern marketing facilities in the villages within the region.

**Table 20 Distribution of Respondents Based on Job Experience**

	Frequency	Percent	Valid Percent	Cumulative Percent
1 to 10	36	40.0	47.4	47.4
11 to 20	26	28.9	34.2	81.6
21 to 30	7	7.8	9.2	90.8
41 and above	7	7.8	9.2	100.0
Total	76	84.4	100.0	
Missing System	14	15.6		
Total	90	100.0		

The table 20 results of the research on age category of farmers in the table above have shown that 47.4% of farmers have 1 to 10 years' experience in small ruminant management, 34.2% have 11 to 20 years' experience, 9.2% have 21 to 30 years' experience and 9.2% have above 31 years' experience in small ruminant management. This statistics have shown that most farmers

have being involved in small ruminant management for many years but these haven't created any significant change in the living standard of farmers. Flock sizes and productivity of animals continue to remain low. Farmers are confronted with numerous challenges which they could not overcome.

## DISCUSSION

Ten livestock officers were targeted for this research but only five responded. Their comments have been noted analyzed and discussed. All the officers that responded were male and their ages ranges from 23 to 53 years. Three of them were livestock officers; one was a veterinary assistant and the other senior livestock officer. Their qualifications range from certificates in animal health and production to higher diploma in animal health (HND). According to the officers their role is to act as link between research subject matter specialist and farmers and to aid in the management, production and productivity of farmers. To educate farmers on good management practices, offer advisory services, introduce innovation, change farmers' outlook towards their problems and improve their standard of living.

### Feeds and Feeding

According to the officers, feed resources available for small ruminants in the area are herbage, grasses, groundnut hay, crop residues, brans, shrubs, moringa leaves, natural pastures, mineral licks, groundnut cake etc. Farmers were advised to maximize feed utilization by allowing animals have free access to pasture, roughage, concentrates and minerals depending on their body conditions. Practiced proper feed storage strategy, supply balanced ration with regular clean water supply.

### Housing

Livestock officers in the area expressed that the most common forms of houses constructed by farmers were ground level houses and raised platform types covered with corrugate or palm roofs. Farmers are advised that if they are to build on ground level house the floor should be concrete with clay soil provided on the floor. Raised platform type should be built on raised floor about 1 to 1.5 m above the ground. The house should be well ventilated and animals should be prevented from lying on the ground as this increases the risks of worm infestation and pneumonia. Good spacing about 1m square per animal is recommended because this will allow movement in the house.

### **Disease Prevention and Treatment**

The most common types of small ruminant diseases in the area according to the officers are PPR, Pasteurellosis, worm infestation, pneumonia, and mange and ectoparasites. Farmers are advised to turn out during nationwide campaign, isolate suspected animals, report signs of diseases to vet officers. Regular house cleaning, cleaning feeders and drinkers and disinfect the whole house. Vaccinate against PPR, pasteurellosis twice a year, deworm sheep and goats 3 times a year beginning, middle and end of rainy season. Report cases to the nearest livestock assistant and quarantine disease animals during disease outbreak.

### **Marketing**

Livestock officers in the area revealed that marketing of small ruminants takes place within the villages, Daral, livestock markets in Brikama and Abuko. The transaction involves the owner; village buyer or middlemen and prices are determined by negotiation until consensus is established either at the village or at the market centres. Farmers are advised that if they are to sell their animals they should sell female animals that have given birth at least 5 times, male animals and keep the best male for breeding purpose. They are encouraged to sell barren animals, those that easily catch diseases, sell old ones and buy from farms that keep records. Avoid selling of animals to middlemen and buying of sick animals is not recommended.

### **Benefits**

According to the livestock officers working with farmers in the area extension services have provided lots of benefits for small ruminant farmers. It has improved farmers skills and awareness in production and management, assist them in problem solving and decision making. They have been provided with incentives, funds, technical assistance and advice to boost their productivity and willingness to accept innovations. The livelihood of some farmers that have cooperated has improved immensely.

### **Constraints**

Almost all the officers in the area expressed that some of the main problems that hinder the progress of their job are inconsistent availability of vaccines, mobility, inadequate equipment, lack of adequate resources to health personnel and accessibility. High mortality rate for PPR in a year and theft

scare many farmers from rearing small ruminants. Vaccines sometimes kill animals if not properly stored and preserved. Some farmers are still reluctant to accept innovation because of their strict observance of customs and traditions. They keep saying that I have been working like this since you were a child or not yet born so you don't have anything new to tell me. Some farmers' believed that cleaning the house kills animals.

### **Opportunities**

Small ruminant management has lots of opportunities associated with it. It is a good source of employment for youth and this helps to reduce dependency and unemployment among youths. Small ruminant management serves as insurance against crop failure and huge profit is connected to the business because of the current high demand for meat. Small ruminant management cannot be ignored because of the economic, social, cultural and religious benefits associated with it.

## **CONCLUSION AND RECOMMENDATION**

### **Conclusion**

The data collected from this research findings have shown that traditional management system of small ruminants is practiced by almost all farmers in west coast region. This system is mainly practiced because it is a cheap system of production that requires less capital, labour and skills to manage. Majority of farmers involved in the management are elderly farmers that have informal educational background. Flock sizes are generally small and management system differs from wet season to dry season. Tethering is commonly practiced in the wet season while animals are allowed to roam about freely in the dry season feeding on feed resources they could find in the surrounding. Few farmers give supplementary feed in the dry season. Sale of animals is not very common because most farmers keep small ruminants purposely to provide basic household needs such as food, income, religious, social and emergency needs of the family. Small ruminant management is a very significant agricultural activity that contributes immensely to the socio-economic development of the area. The sector provides food in the form of meat, income, employment, manure, religious and social benefits. Despite the numerous benefits associated with the system there are major constraints which impede the progress of the system. The most common ones among them are diseases, theft, feed shortage and accident. Diseases and theft are the

most serious problems affecting farmers in the area. Flock sizes remain low due to high mortality caused by diseases and lost due to frequent theft. These factors discourage most farmers from small ruminant keeping. According to the livestock officers in the area majority of small ruminant mortality in the area were caused by PPR and Pasteurellosis. Efforts are being made by the department and donor agencies to help reduce mortality caused by these diseases by sponsoring periodic and nationwide vaccination campaign and sensitization programmes but still much progress has not been made to eradicate the diseases. Livestock personnel expressed that mobility constraint, inconsistent availability of vaccines; inadequate equipment and conservativeness of farmers hinder the efficiency of their service delivery to farmers. Farmers themselves practiced traditional methods of treatment by giving certain tree leaves, roots and barks which are diluted in water and provide to the animal. However, none of these efforts were able to change the situation. Inadequate markets, poor market infrastructures and inadequate market information are other constraints that affect small ruminant business in the region. Therefore, there is need to examine the system carefully and try to develop strategies that can serve as remedy to the major problems of the system.

## **RECOMMENDATIONS**

Small ruminant production and management plays an important role in the socio – economic development of the country and contributes significantly to the national economy and GDP. Considering the percentage of farmers involved in the management of small ruminants in the area and the country at large, the sector has the potential to contribute positively to food self-sufficiency and poverty alleviation if proper management and support is provided. Therefore, in consideration of the above findings, I deem it vital to recommend some strategies that could serve as solutions to some of the major constraints of the system. These recommendations are: Small ruminant farmers should be empowered by the government and donor agencies by providing them with financial and technical support to boost their production and raise their standards of living. This research has proved that majority of small ruminant farmers are elderly farmers above the age of 60 years with non-formal educational background. The current situation will continue if the trend remains the same. Therefore, young people should be encouraged, trained, educated and be provided with the necessary resources

to take up small ruminant management as an occupation and full time employment. Loans and credit facilities should be provided to the youth and anyone interested to take up the job as an occupation.. Strict laws and regulations should be formulated to govern the operations of the system. This will help to improve the situation and encourage others to take up the job. The Traditional management system could be reduced gradually by increasing farmers access to subsidy, grants, loans and credit facilities and train them on intensive management strategies. Sheep fattening programmes should be supported and decentralized across the whole region. This is a gradual move from traditional to intensive system which is the best system that can increase farmers' income and raise their living standards. High mortality rate caused by PPR and Pssteurellosis diseases could be reduced by conducting more intensive research to develop or acquire more effective drugs against the pathogens and to train vet officers to conduct the treatments across the area.

Theft could be reduced by constructing solid houses for animals and by practicing intensive system of management. Market and marketing facilities easily accessible by farmers should be provided by the state in various locations in the region. This will enable farmers have access to market and market information and be able to sell their animals and get good price. More veterinary officers should be trained and well equipped by the state to enable them carry out their activities effectively. They should be provided with adequate mobility, drugs and other equipment that facilitate their service delivery. This will enable them to reach farmers on time and frequently. Feed processing and storage facilities should be available for small ruminant farmers and they should be trained on how to preserve, store and prepare feed supplements. This will help to reduce feed scarcity particularly in the dry season.

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