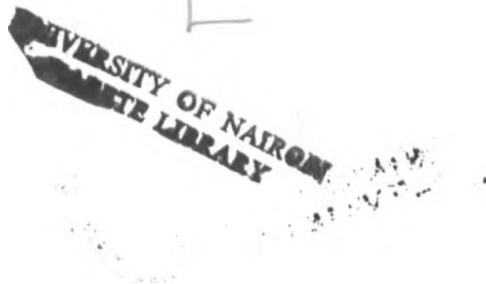


**The role of Veterinary Retail Drug Outlets in the Provision of
Primary Animal Health Care in Busia District, Kenya**

By:

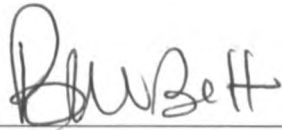
Bernard Bett (BVM, Nairobi)



A thesis submitted in partial fulfilment of the requirement for an award of a degree in
Masters in Veterinary Epidemiology and Economics,
Department of Public Health, Pharmacology and Toxicology,
University of Nairobi

DECLARATION

This thesis is my original work and has not been presented for award of a degree in any other university

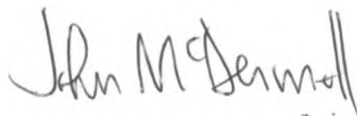


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DEDICATION

To my loving parents,
Mr and Mrs Ezekiel Kibet Kirui.

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ABSTRACT

The Government privatised animal health services in 1991 in a bid to improve the efficiency of delivery of veterinary services. Privatisation was however effected before the establishment of alternative suppliers outside the private sector and enactment of policies and standards that could assure the quality of animal health services provided. Since the public sector withdrew from providing animal health service, there has been an explosive development of retail drug outlets in most parts of the country offering drugs, insecticides and other veterinary inputs. Little is known about their numbers and capacities for effective delivery of these services.

This study assessed the role of these outlets in the provision of veterinary drugs and advice on their use in Busia District. The main objective was to identify and characterise retail outlets for veterinary drugs in Busia District, Western Province and determine their role in the dissemination of veterinary knowledge and information on drug use following seller/buyer interactions.

The study was carried out in three phases. In Phase 1, retail outlets for veterinary drugs were identified and their locations determined using Global Positioning Systems that recorded altitude, latitude and longitude. Their spatial distribution was analysed in Geographical Information Systems. Phase 2 involved shopkeeper interviews using a questionnaire structured to collect information on the owners' details, manager/salespersons' details, shop and business details and clientele details. In the last Phase, questionnaires were administered to the clients who sought services from the outlets on client details, their livestock inventory, drugs purchased, reasons for purchase and choice of the shop and the common animal health problems

encountered in their farms. Statistical analyses were done in Statistical Analysis System (SAS) software.

Forty-one retail outlets were identified and classified into agro-veterinary (20) pharmacy (11) and general (10) shops. These outlets were found in towns and market centres. Seventy five percent of these outlets were owned by men, but sex was not associated ($p = 0.45$) with ownership of any type of outlet. The largest proportions of both agro-veterinary (37.5%, $n = 10$) and general shops (57%, $n = 4$) belonged to owners who had secondary education. In the majority of the shops, the owners preferred to employ shopkeepers who had either equivalent or lower levels of education. Therefore, 60% ($n = 12$), 55.5% ($n = 5$) and 62.5% ($n = 5$) of agro-veterinary, general and pharmacy shops had salespersons with secondary education. Their main sources of veterinary information came from veterinarians and animal health assistants (AHAs) (35.1%, $n = 13$) and drug leaflets (32.4%, $n = 12$).

A high proportion (74.4%, $n = 61$) of clients purchased drugs for their own livestock. Out of 102 drug purchases made, diminzene aceturate was the most frequently purchased individual drug type and it represented 17.6% ($n = 18$) of the total. The reasons for the drug purchases were classified into preventive versus both preventive curative purposes. The purchase of a preventive drug was significantly associated with ownership of pigs ($p = 0.02$) or grade cattle ($p = 0.03$) and living at a distance of > 15 km from a retail outlet ($p = 0.05$). The odds of buying a curative drug by pig and grade cattle owners were 6.42 (95% CI: 1.42, 27.92) and 5.87 (95% CI: 1.13, 30.45) times higher than non-pig and non-grade cattle owners, respectively. Living within a distance of 15 km from the shop was also associated with reduced odds of buying a

preventive drug.

Seventy-four percent (n = 61) of clients sought advice from the shop as they bought drugs. The odds of an AHA advice on drug use were low (OR = 0.15 [0.03, 0.78; 95% CI]) compared to a client who bought drugs for own use. There was a significant interaction between age and cattle keeping experience to predict whether a client sought advice or not. Age was negatively associated with the ability to seek advice from the shop.

It was concluded from the study that private animal health providers stationed in the livestock drug stores in the District lacked technical skills needed for the provision of animal health services and consumer protection. Clients of the retail outlets in the District, more often than not, went for curative than preventive services. The Veterinary Department had a big role in advising the private health providers and farmers on the judicious use of veterinary drugs. Their offices could therefore act as drug information centres. Clear policies on delivery of clinical veterinary services were necessary to control the establishment of drug outlets and set standards for animal health providers stationed here.

CHAPTER ONE

1.0 INTRODUCTION

Many countries in Africa depend on livestock as a vital source of income and food. In Kenya, the livestock sector contributes approximately 30% of agricultural and 10% of overall GDP (Omoro et al., 1999). The production of meat and milk accounts for a significant proportion of the total agricultural production. No census has been conducted to establish actual livestock numbers and their growth rates and the number of households keeping them. It is, however, estimated that there are 10 million indigenous cattle and 3 million exotic dairy breeds, 10 million goats and 7 million sheep (Omoro et al., 1999).

The productivity of these livestock species continues to be constrained by diseases and the unavailability of modern veterinary inputs and health services despite the remarkable technical advances in disease diagnosis, prevention and control. The major diseases that are commonly reported and could be responsible for a large proportion of these losses include helminthosis, tick borne diseases such as anaplasmosis and East Coast fever and trypanosomosis (Grandin et al., 1991). A conservative estimate of losses resulting from these diseases places the figure at about US\$43 million per annum (Grandin et al., 1991). Some of these losses could be avoided with better animal health services.

The effective delivery of animal health services, particularly to small holder livestock production systems has declined in recent years. The provision of public clinical and preventive health services has been virtually discontinued as a result of government budgetary constraints. The transition to provision of services by private suppliers has

been uneven, better in more densely populated and highly developed areas and worse in the remote areas. Present evidence shows low extension staff to farmer ratios. This continues to decline as a result of stoppage of further staff recruitment by the government. The extension staff to farmer ratio ranges from 1:500 in Central Province to about 1:1,230 in Western Kenya (Omore et al., 1999).

The structural reforms in most sectors of the economy during the 1990s allowed the Veterinary Department to divest some of its services to the private sector. This followed a realisation that this would improve service delivery and provide an opportunity for the government to make some considerable savings (KVAPS, 1999). The Ministry of Agriculture hence defined veterinary services whose delivery it considered public, private or shared. In most settings, a 'public' health service refers to a service that belongs to the state. The term 'private' is used when health care is delivered by individuals and/or institutions not administered by the state (MoA, 1996 cited by Omore et al., 1999).

Privatisation of veterinary services has taken place where and when the demand for these services has been adequate. Increased intensification and market orientation of traditional livestock systems also helped in boosting the demand. The types of private service providers that have emerged include private vets (especially in high potential areas like Kiambu District), animal health assistants (AHAs), auxiliaries and retail outlets for veterinary drugs. Apart from reducing government expenditures (Leonard, 2000), privatisation of veterinary services ensures effective and efficient service delivery (Holden, 1999). In drug sales for instance, privatisation has reduced transaction costs in trying to reduce corruption, encourage competition and assure that

wholesaler discounts are passed onto consumers not retained by purchasing agents (Leonard, 2000). However, complete privatisation could lead to neglect of certain functions that have great social importance, for example, food inspection and disease quarantines (Leonard, 2000). Hasty or wholesale privatisation, involving the creation of a cadre of self employed veterinarians, in the face of market failure, has also resulted in a reduction in the services available to low input/low output production systems (Mlangwa and Kisauzi, 1994).

Livestock ownership became more diversified. Crop farmers, government officials and traders all saw livestock as one of the more profitable investment opportunities. These new livestock owners recognised the importance of disease control in reducing the risk to their livestock investment (De Haan and Bekure, 1991).

The privatisation of the services (considered private) was, however, effected quite slowly despite the dramatic reduction in public budgetary allocation to the state department. This pace was not adequate to fill the gap created by the divestiture of government services (Omoro et al., 1999). Privatisation also proceeded before a comprehensive policy framework that could check the entry into the sector by unqualified people was put in place. Currently, there is little evidence to indicate that the delivery of veterinary services has improved despite the evolution that the sector has undergone over the last 10 years (Holden and Chema, 1996 cited by Holden, 1999).

Retail outlets for veterinary drugs have emerged as key players in animal health service provision. A large proportion of farmers obtains information on veterinary

care from private animal health providers stationed in these outlets. It is not clear whether these providers have adequate technical and administrative infrastructures to carry out tasks and duties necessary for the efficient management of animal diseases and for consumer protection. This study was therefore designed to assess the role of these outlets in the provision of veterinary services in Busia District, Western Province of Kenya. The study focussed on trypanosomosis control since the disease was endemic in the study region and had slackened the development of the livestock industry in the district (GOK., 1997). The study was carried out in collaboration with Farming In Tsetse Control Area (FITCA) project working in three districts of Western Province namely Busia, Teso and Bungoma and two in Nyanza Province namely Siaya and Bondo. It was under two DFID Animal Health Programme Projects, R7360 and R7598 concerned with animal health service delivery in Kenya.

The overall objective of the study was to identify and characterise retail outlets for veterinary drugs in Busia District and determine their role in the dissemination of veterinary knowledge and information on drug use following seller/buyer interactions.

The specific objectives included:

- To identify and analyse the geographical distribution of formal and informal retail outlets for veterinary drugs in Busia District, Western Province of Kenya.
- To characterise a representative sample of these retail outlets in terms of:
 - (i) Level of training of personnel
 - (ii) Nature of business

(iii) Nature of client base

- To characterise the clients who visit these retail outlets and determine their requirements in terms of drugs, advice or both.

Findings from this study are intended to provide information to farmers, private animal health service providers and public health sector technical staff and policy makers that could support improvements to the delivery of animal health services in Busia District.

CHAPTER TWO

2.0 REVIEW OF LITERATURE

2.1 Evolution of animal health service delivery in the tropics

The evolution of institutions that deliver animal health services in the tropics appear to have passed through four recognisable phases (Table 1). These follow the pattern of veterinary epidemiological revolutions proposed by Schwabe (1993).

The pre-institutional era, which was the earliest, was characterised by the absence of organised veterinary institutions while the indigenous animal health service that was available was provided and procured by private arrangement between clients.

Orthodox veterinary medicine was introduced by the colonial administrators following the arrival of veterinarians at the turn of the 20th century. The Veterinary Department provided clinical and diagnostic services, research and training, policy formulations and advisory services, often, free of charge. At independence, therefore, African countries subsequently inherited without change the veterinary institutions and policies of the colonial administrators (Odeyemi, 1995).

From independence until the 1990s, Kenya had successful government-based animal health care systems. This public veterinary service was established to control exotic or epidemic diseases but in addition, other health care services were delivered, for example, the control of endemic diseases (Leonard, 2000). Unfortunately, the government was not able to continue funding these services. Ambitious staff development and expansion programmes resulting in over-staffing, global economic

recession and administrative inefficiencies made the government unable to adequately fund the delivery of animal health services resulting in the deterioration and subsequent restructuring and privatisation of some services (Odeyemi, 1995).

A move towards privatisation in the early 1990s resulted partly from a global re-evaluation of the role of the state in the provision of veterinary and other services by international donors and partly from budgetary pressures. The budgetary pressures resulted from high staff levels that saw a rapid increase in personnel costs at the expense of non-salary recurrent funding. The salary/non-salary ratio, one of the indicators of the efficiency of livestock service dropped from an excellent 40/60 in 1974 to a poor 70/30 in 1981 (De Haan and Bekure, 1991). This trend has probably continued to the present day.

The Kenya Veterinary Association sponsored by the European Union has implemented a privatisation scheme through the provision of credit facilities to veterinary doctors. This is done in collaboration with Pharmaceutical firms and Non Government Organisations (NGOs) like the American Breeder Society (ABS) and the Food and Agriculture Research Management (FARM) Africa project. By 1991, the scheme had supported 42 veterinarians to start up private practices (KVAPS, 1991).

The process of training individual farmers to manage simple clinical cases at farm level has been undertaken by programs like Intermediate Technology Development Group (ITDG) (Grandin et al., 1991), Farm Africa and other organisations.

Privatisation is taking place when micro-loans have become a popular vehicle for small business start-ups. Spontaneous private veterinary practices also evolved

following the stoppage by the government of automatic employment of newly graduating veterinarians since 1988 (Wamukoya et al., 1995). Currently, there are many service providers on foot, bicycles and motor cycles distributing drugs and other products like feeds, semen etc. Village drug stores have come up as well as auxiliary staff with some experience on animal health care. Ethno-veterinary research and development has also identified the local knowledge and its associated skills, practices, beliefs and social structures pertaining to health care (McCorkle et al., 1996).

Table 1. Evolutionary phases of animal health services in the tropics and their characteristics, organisational dynamics and predominant influences

Phases	Characteristics	Organisational Dynamics	Predominant influences
Pre institutional era (Before the 1880s)	Absence of orthodox veterinary medicine Ethno-veterinary practises Poor knowledge of diseases Frequent disease outbreaks	Private delivery	Private agenda
Era of colonial veterinary institutions (1880s-1960s)	Introduction of orthodox veterinary medicine Development of veterinary departments Formal and informal veterinary training Improvement of livestock breeding	Public delivery	Colonial agenda
Post independence era (1960s-early 1980s)	Inherited colonial departments and policies Staff development programs Expansion of veterinary infrastructure Nationalisation of livestock industry	Public delivery	Political agenda
Privatisation era (1980s-Upwards)	Public sector reforms Cost recovery and privatisation Liberalisation of drug/input distribution International agencies/NGO participation	Private delivery re-emerging	International agenda

Source: Odeyemi (1995).

2.2 Objectives and functions of animal health services

FAO (1991) identified three major functions of animal health services. These are:

(i) Development of animal health and production through:

Disease investigation and surveillance, disease prevention, control and eradication, quarantine, emergency response, clinical services, control of animal drugs and biological products, veterinary inspection, research, training, wildlife disease monitoring and veterinary aspects of aquaculture.

(ii) Protection of human health through:

Control of zoonoses, food hygiene, meat inspection, residue testing and training.

(iii) Protection of animal welfare by:

Ensuring humane treatment of animals in general, enforcing welfare standards in markets, during transport and slaughter and control of laboratory animals.

2.3 Classification of animal health services

The economic characteristics of animal health services allow for their classification into private goods, public goods or services that confer externalities. Externalities are costs or benefits that are not borne by the purchaser of a good (Otieno, 1999). Others have used the concepts of excludability and rivalry to identify those services that can be financed by private sector and those that require public funding (Table 2) (Holden, 1999; Otieno, 1999). Excludability considers whether the provider or consumer of a service can prevent (or exclude) others from simultaneously benefiting from the service. Rivalry (or subtractability) concerns the extent to which the use of or consumption of a good or service by one individual reduces the availability of the good or service to other people (Holden, 1999).

The economic characteristics of a service are not static. The rivalry and excludability attributes can change over time with the development of new disease management technology, or with changes to the regulatory and information environment within which services are delivered (Holden, 1999). The principle criterion used to define public versus private sector financing in disease control is the degree of externality associated with the disease and where that externality occurs. Where high externalities are associated with disease control, it becomes a public good, as the costs of control to the individual outweigh the benefits that can be captured by the individual. There are therefore no incentives for the individual to control the disease (Holden, 1999) but there are considerable benefits to society as a whole.

Collective and public goods can be provided by the private sector if the private sector can deliver them more efficiently. One complication in the delivery of public goods is that beneficiaries do not necessarily pay the true costs and may over apply (i.e. use more than is economically optimal) an input from a marginal revenue perspective. When services are provided at their market derived costs, the beneficiaries would only pay for a service where benefits are perceived to exceed the cost of service resulting in optimum allocation of resources (Otieno, 1999). The pricing of public goods is more complicated, as important externalities may also occur.

Input delivery of private goods through the private sector is argued to be more efficient and sustainable (Otieno, 1999). The services with strong private good characteristics include clinical services, drug sales and vaccinations against endemic diseases. These services have high excludability (non-fee payers can be denied access

to most of the benefits of the service) hence their delivery via the private sector would result in an economically optimal provision (Leonard et al., 1999). Under these circumstances, the public sector would remain purely regulatory (Otieno, 1999).

Table 2. Classification of veterinary services based on the economic characteristics:

Excludability and Rivalry

		Excludability	
		Low	High
Rivalry	Low	Public goods - Epidemic or zoonotic disease control (including surveillance, movement control, quarantine services) - Some extension - Some research - Control of food borne diseases - Drug quality control	Toll goods - Vaccine production - Diagnostic services - Veterinary clinics - Dips
	High	Common pool goods - Tsetse control on communal land using traps, targets or aerial spraying	Private goods - Endemic disease prevention and control - Sales of drugs and vaccines - Some extension - Some research

Source: Holden (1999).

Leonard (1987) classifies veterinary services into preventive, curative and promotive.

Preventive services exclude the occurrence of disease through administration of drugs, sera, vaccines and control of transmitting vectors. Curative services involve treatment of diseased animals while promotive services inhibit the occurrence of diseases and improve productivity.

The majority of veterinary departments in Africa were and still remain focussed on preventive services. Leonard (1987) notes that this orientation is justified on the basis of high benefit/cost ratios reported from most veterinary preventive work. With regard to curative services, there is a poor level of service provision to traditional livestock producers.

2.4 Constraints to the delivery animal health services

2.4.1 High transaction costs

Veterinary medicine in Africa continues to have high transaction costs associated with distance despite the great improvements in transportation that have taken place.

Transaction costs refer to all costs that occur between the provider and the consumer of animal health services (Leonard, 2000). These include obvious costs associated with transportation and less evident costs such as losses associated with misdiagnosis and poor treatment when farmers lack information. Transportation is particularly important in pastoral systems of livestock production because of the movement of people and animals to exploit available food and water (McDermott et al., 1999).

High transaction costs therefore limit the delivery of a number of animal health services as shown in Table 3. Local monopoly remains a distinguishing characteristic of most areas. However, for animal health products that are easily transported, regional price differentials usually disappear (Leonard et al., 1999).

The professional level of animal health providers is another component on the cost of service delivery. The more highly trained the provider, the larger the income he/she

will demand and the greater the cost of transport is going to be, for increased professionalization tends to carry with it reduced numbers, urban residence and greater comfort in travel (Leonard et al., 1999). Animal Health Assistants more often than not use cheaper means of transport like bicycles and motor cycles. It is also generally accepted that veterinary services will be ineffective if staff salaries represent more than 60 percent of the total budget leaving less than 40 percent for veterinary supplies and transport (Leonard et al., 1999). From an economic point of view, the appropriate training for providers would be determined by making the following calculation for the alternative levels and choosing the result with the highest total:

The average value of animals served (including externalities)
[Multiplied by] The reduction in the probability of death resulting from
service at a particular level of training [less] The average unit cost of
providing that service (Leonard, 2000).

Making services available on market days, at gazetted dipping times and along pre-set routes which animal health providers travel at regular established intervals are all ways of reducing time and costs involved in travel and therefore the unit cost of service. Another option would be to mix community and primary veterinary health services particularly in pastoralist areas where veterinary services are often more readily available and in greater demand than medical services (McDermott et al., 1999).

2.4.2 Poor administrative infrastructures

In many developing countries, veterinary departments are not given the appropriate legal power in the administrative system (FAO, 1991). Considerable deficits in the areas of government control and standardisation regarding animal production and health services have often been realised. This encourages among other vices the

importation of subsidised products. It is therefore not possible to design effective disease control programs. Veterinary policies, legislation and information services as well as transport, communication, veterinary products and equipment are in most instances outdated. Some of these problems result from the shortage of funds needed to sustain the activities of veterinary staff (Kleemann, 1995).

2.4.3 Difficulties facing veterinarians in private practice

Turkson and Brownie (1999) have reported the constraints encountered in the process of privatisation of veterinary services in Ghana. Questionnaires were administered to veterinarians to elicit their responses on various issues concerning privatisation. A significant proportion (61%) of government veterinarians, who formed 94% of the respondents were unwilling to go into private practice. Among the reasons given were that private practice was too risky, that farmers were unwilling or unable to pay for services, that capital to start practices was lacking and that the societal value for animals was low. Also, low livestock densities in many areas and the absence of commercial livestock farming were perceived as deterrents to the sustainability of private practice. Furthermore, the poor macroeconomic environment of high inflation, high interest rates and unstable currency discouraged investment.

Table 3. Constrains and options for the delivery of animal health and production

services in pastoral production systems

Animal health good/service	Class of economic good	Beneficiary (who can or should pay)	Delivery constraints	Options to improve delivery
Clinical service curative drugs	Private	Herder	High transaction costs Public education Trained personnel Poor markets	Trained para-veterinarians Combined veterinary and medical treatment Community education and participation
Parasite/vector control	Private with externalities	Herder	High transaction costs Public education Trained personnel Poor markets	Trained para-veterinarians Community education and participation Adaptive research
Vaccination (compulsory or voluntary)	Private with externalities	Herder Government Other beneficiaries	High transaction costs Public education	Community education and participation Subsidies from beneficiaries
Quality control (drugs/vaccines)	Public	Herder Government	Trained personnel Infrastructure Public awareness of benefits	Community education and participation
Surveillance/movement control	Public	Government Identified beneficiaries	Understanding of collective benefits	Community education and participation
Public health	Public	Government Community NGOs	Public education Infrastructure Trained personnel	Community education and participation Adaptive research
Adaptive research	Public	Government Community NGOs	Trained personnel Public education	Community participation
Policy	Public	Community NGOs	Weak public institutions Low political importance of pastoralism	Political activism Community education and participation

NGO: non governmental organisation

Source: McDermott et al. (1999).

2.5 The structure of clinical animal health service delivery in Kenya

2.5.1 Animal Health Service Providers

A mixed system of government and private operations in the delivery of veterinary services is common in most parts of Kenya especially in the high and medium potential farming areas. The government supports a centralised organisation that operates vertically under the Director of Veterinary Services. Under this system, better conditions for national disease prevention, control and eradication programs and for protection of the livestock populations are provided. The private establishment is a decentralised organisation and has direct contact with animal owners in the treatment of sick animals. This allows for better identification of the local problems and the treatment of diseased animals thereby increasing animal productivity (FAO, 1991).

2.5.1.1 Centralised organisation

The Kenyan government Animal Health service classifies practitioners according to level of formal training. Professional veterinarians usually trained to degree level are called Veterinary Officers. Graduates of diploma awarding colleges specialised in animal health hold the title of Livestock Officers. The most predominant practitioners in the government service are the Animal Health Assistants who are trained to certificate level from animal health training institutes. The lowest cadres of technical staff are the Junior Animal Health assistants. These are the staff of the veterinary department trained on the job and through experience, and are able to deliver basic animal health services (Otieno, 1999).

The role of the state in the provision of veterinary services has decreased over time.

This is because of the agricultural sector reform programmes that encourages private sector partnership in delivery of inputs and services (Otieno, 1999). The state would then intervene only under the following circumstances:

- a). Incomplete markets that require some insurance and credit intervention to cushion farmers,
- b). The existence of public goods that are unlikely to be provided by the private sector,
- c). The adoption of new technologies that require extension services to provide or to redress imperfect information constraints,
- d). The existence of externalities arising from the use of new technology by one farmer which conveys information to other farmers,
- e). The role of the state in correcting inequities between the small and large-scale farmers and enhancement of regional development therefore controlling monopolists (Stiglitz, 1987).

2.5.1.2 Decentralised operation

Unlike the traditional livestock production systems for which most public sector service provision was designed, the intensive production systems especially those of small holders with crossbred dairy cattle, pigs and hybrid poultry require more focussed individual animal health care (Otieno, 1999). De Haan (1995) observes that whereas traditional cattle keeper had considerable indigenous knowledge about health and production, the new livestock keepers are traditionally crop farmers. These less experienced farmers require more frequent and sophisticated services for which the

public sector services are ill prepared (Otieno, 1999). This is in line with the changing emphasis from increased output per se to increased efficiency per unit land and other inputs. Sustainable use of resources and the need for increased utilisation of renewable resources call for different sets of services that the private sector can easily adapt to under certain circumstances.

The service providers in this sector include farmers, Community Animal Health Workers (auxiliary staff), paraprofessional and veterinary doctors.

2.5.1.2.1 Farmers (livestock owners)

The decline in the efficiency of the public veterinary services and the high transaction costs attendant to private veterinary services have forced farmers into treating their animals. They often treat animal diseases with locally available modern drugs with which they are not familiar and which may be inappropriate, ineffective or even dangerous (FAO, 1991). This tends to increase the risk of drug misuse and may subsequently lead to the development of drug resistance to a variety of diseases.

Studies conducted by Van den Bossche et al. (2000) on trypanocide usage by farmers in Eastern Province of Zambia indicated that young stocks received an overdose of trypanocidal drugs. The majority of trypanocidal treatments were given to clinically sick animals that may not have been necessarily infected with trypanosomes. Farmers also preferred to treat the productive animals in the herd. This could be the reason why most treatments were given during the dry season when the body condition and tolerance of infection was lowest (Van den Bossche et al., 2000).

Since the diagnostic facilities are not available to such farmers, it could be difficult for them to distinguish between clinically sick animals infected with trypanosomes from those infected with other disease agents.

Through ethno-veterinary research and development, local knowledge pertaining to healthcare has been emphasized. Some farmers are known to use the smell of urine to diagnose trypanosomosis (McCorkle et al., 1996). The mode of treatment for the disease varies with the community with some opting to seek the help from traditional healers. Traditional veterinary knowledge and practises are very widespread especially in pastoral societies and most community elders and experienced farmers are very knowledgeable about ethno-veterinary remedies (FAO, 1991).

The scarcity of veterinary staff (especially in pastoral areas), the vastness of the area involved, the scattering of people and their livestock and the poor roads and communication all hinder the efficient supervision of these farmers and the surveillance and treatment of livestock diseases (Grandin et al., 1991).

2.5.1.2.2 Community-based Animal Health Workers

These are livestock owners who are trained and equipped as primary health care and husbandry specialists. As herders themselves, they share the same social, cultural and linguistic background and they are easily accessible by fellow producers because they generally live and work in the same vicinity. They are more likely to reach poorer stock raisers in addition to rich or middle income groups (McCorkle et al., 1996).

The choice of a Community-based Animal Health Worker is dependent on social, cultural and economic inclinations. Veterinary auxiliaries are able to provide a reliable information on the animal disease situation in areas that the government livestock service cannot otherwise reach (McCorkle et al., 1996).

2.5.1.2.3 Paraprofessionals (Animal Health Assistants)

Paraprofessionals are veterinary subordinate staff who are expected to work under veterinarians since their training is limited to managing simple conditions. In marginal areas of Kenya, paraprofessionals have been allowed to operate as private or independent animal health service providers. Although paraprofessionals cannot substitute for veterinarians, these personnel are able to provide cheap, locally available basic healthcare service that can lead to improvements in herd health. In a study conducted in Meru, it was found that the paraprofessionals treated on average 17 animals per month (Grandin et al., 1991). In Tsavo region, the mortality rate of cattle reared in villages with community based animal health worker was on average 40 percent lower than those in neighbouring villages without this service (Holden, 1999).

Farmers value the services of AHAs highly as they are more readily available and considerably cheaper than those of state veterinarians (Holden, 1999). Indications from a survey done in Meru were that farmers were pleased with the service of paraprofessionals, even the simple drugs provided had been well accepted by the community (Grandin et al., 1991). They are hence envisioned as an alternative that is hopefully cheaper yet more available and accountable to clients. However, like the auxiliaries, paraprofessionals act as complements to more professional services

without whose support through retraining, recognition, mutual referrals and often various kinds of logistic assistance they may not be able to function effectively (McCorkle and Mathias, 1995).

Paraprofessional programs seek to complement and extend conventional delivery systems by giving short term training in basic veterinary techniques to traditional healers, groups or individual stock raisers and others (McCorkle and Mathias, 1995). Veterinarians also benefit from association with these paraprofessionals since in addition to treating animals, paraprofessionals sell drugs from the veterinarians to farmers whom they cannot visit, direct sales accounting for about 20 percent of farmers' contacts (Grandin et al., 1991).

Official certification of paraprofessionals has been rare. This likely reflects tensions that can arise over paraprofessional roles in relation to both public and private sector veterinary services. The personnel in these services may consider paraprofessionals as a threat to their authority and earnings. Alternatively, they may see them as valuable frontline practitioners for funnelling first hand epidemiological intelligence to public sector agencies; extending information from such agencies to stock raisers and referring cases that are beyond paraprofessional powers to professional practitioners in either the public or private sector (McCorkle and Mathias, 1995).

2.5.1.2.4 Veterinarians

There are about 200 veterinarians in formal private practice in Kenya and many more practice informally since the stoppage of automatic government employment of veterinary graduates in 1990 (Omore et al., 1999). Most clients of private

veterinarians are better resource-endowed farmers who can afford their services (Wamukoya et al., 1995). The European Union supported Kenya Veterinary Association Privatisation Scheme has further boosted the number of formally registered private veterinarians.

Reasons cited for poor performance of private veterinary practises in sub-Saharan Africa include:

- i) unfair competition from public services which dispense subsidised treatments and often use para-veterinary staff to compete with would be professional private veterinarians
- ii) a preference for and sometimes an obligation to employ new graduates in the civil service
- iii) uncertain availability of drugs and equipment
- iv) Perceived poor financial perspectives especially in the pastoral and small holder areas (De Haan and Bekure, 1991).

Treatment for the same clinical condition, species and type of animal under identical circumstances may differ considerably among veterinary staff, even if they were trained in the same institution (FAO, 1991). Good effective examples of refresher courses or other formal and informal training activities on appropriate veterinary drug use are limited in quality and quantity. Sometimes even undergraduate training courses on pharmacotherapy are not completely satisfactory. They do not adequately prepare students for their future work and they are often based on the trade name of the products and not on the International Non-proprietary Name (INN)(FAO, 1991).

2.5.2 Availability and use of veterinary drugs

Drugs and vaccines as well as other biological products and disinfectants, if properly used are major tools in the prevention and control of livestock production losses and in dealing with veterinary public health problems. The provision of effective veterinary care and the treatment of the most important diseases of animals are based on their rational use (Ghirotti et al., 1994)

The budgetary pressures weakening the provision of livestock services by the state has led to the removal of government service staff and drug distribution from the field. The private drug stores and distribution points that have replaced this service are in many cases not only widely spaced but also located in high and medium potential agricultural areas. This has given rise to flourishing black markets in areas that do not have reliable drug stores. With the aid of external support, many countries have introduced more liberal distribution that includes several channels. In the Central African Republic where drugs have become more available through official channels, the share of drugs purchased by herders on black market fell from 67 percent in 1982 to 18 percent in 1985 and was down to only 7 percent in 1988 (De Haan and Bekure, 1991).

Drug availability seems to have improved where drug imports and distribution have been privatised. Pharmaceutical supply when done by the private market reduces transaction costs enhancing the incentives to provide the service at a marginal cost price. A comparison of drug consumption per veterinary livestock unit (VLU) under different distribution regimes, although confounded by climate and price differences and illegal trade between countries shows that between 1985 and 1988 the average

consumption of drugs in countries with a government monopoly was US\$ 0.14 per VLU per year. The consumption in countries that had adopted a freer trade policy was US\$ 0.46 per VLU (De Haan and Bekure, 1991).

Given that unskilled persons are allowed to administer drugs, undoubtedly many errors occur in calculating the correct doses. Cases have been reported related to fraudulent or even malicious misuses of trypanocidal drugs. As the drugs are relatively expensive, there is a temptation to over dilute them leading to under strength preparations (Geerts and Holmes, 1997). Errors may also occur during the administration of the drug due to consistency of the preparation: too thick or the viscous preparation may block the bore of the needle. The drug may also escape along the needle track after an intramuscular injection (Lewis and Thompson, 1974).

Under strength preparations particularly with deeply coloured drugs are alleged to have been used to extend the numbers of animals treated with a given quantity of a drug. Water coloured with plant or chemical dyes to simulate trypanocidal drugs is said to have been marketed by unscrupulous dealers (Stephen, 1986). Sometimes generic products are used which have a reduced efficacy (Geerts and Holmes, 1997).

Heffernan and Misturelli (2000) evaluated access to veterinary pharmaceuticals by herders and farmers in Baringo, Garissa, Kajiado, Machakos, Nairobi and Samburu. A high proportion (71%) of households purchased livestock pharmaceuticals from a livestock drugstore or Agrovet. The rest 29% obtained drugs from other outlets. The stores were found mostly in urban centres and markets.

Residents from Baringo District and Samburu benefited from NGO and donor efforts to improve drug supplies by supporting livestock drugstores. Study findings from their study indicated that given a choice, herders and farmers would choose a Community-based Animal Health Worker over a duka (drug outlet) (Heffernan and Misturelli, 2000). They attribute this to increased training and knowledge of the individual involved as compared to untrained shopkeeper. However, consumer behaviour regarding the purchase of livestock drugs is complex and the type and quantity of drug available is often a primary motivating factor in the purchasing behaviour of the poor. Community-based Animal Health Workers will sell drugs in pre-filled syringes often in less than optimal dosages to those who cannot afford the appropriate level of treatment compared to shopkeepers who often only sell drugs in bottles.

2.6 Ways of improving the delivery of animal health services

2.6.1 Creating an enabling environment for the private sector to deliver private goods in high potential areas

Privatisation could lead to an improvement of some sectors of animal health and hence a better way of responding to the needs of animal owners (FAO, 1991).

Establishing that particular inputs and services should be candidates for full privatisation and others for public sector contracting under certain conditions is only the first step in specifying the appropriate shape of service provision (Leonard, 2000).

This is in line with the economic theory that suggests that the private sector should play a major role in the financing and supply of private veterinary services. However, in many countries the transfer of responsibilities from the public to private sector is

inhibited by - among other things – a weak and poorly developed private sector (Holden, 1999). This was realised in Kenya with collapse of over half of the dips in the country following their privatisation.

For the private sector to perform effectively, conditions of free entry and exit into the market place must exist. The price of clinical services for example rises beyond the purchasing power of small-scale farmers when the rights to treat animals are limited to veterinarians. If this is the case, legislation should be considered to allow for official and regulated role for para-professionals and community based animal health workers. By legitimising the activities of these service providers the state will be better able to monitor the performance and control malpractice. The formation of a para-veterinarian association could also enhance training and standards, and encourage the formation of links with veterinarians (Holden, 1999).

Other ways of encouraging the efficiency of private services include withdrawal of government subsidies, contracting out certain services, availing credit facilities, creating farmer co-operatives and producer associations, recovering government costs more efficiently and using the revenue generated for selective subsidies (FAO, 1991).

2.6.2 Review of Animal health service and Drug policies

The current animal health service policy in Kenya is outdated as it was drafted before the liberalisation of the economy. However, the process of reviewing it is ongoing. It is hoped that a policy that will particularly aim at providing practical ways of reducing food losses from animal morbidity and mortality will be put in place. It should also spell ways of increasing productivity in animal populations/herds and

draught power, protecting human health against diseases transmissible from animals and ensuring humane treatment of animals. In order to obtain the necessary political, economic and public support, animal health service policy should attempt to contribute effectively to the overall development of the country.

A national veterinary drug policy (NVDP) is fundamental to the delivery of animal health services and can have a positive impact on public health, the environment and the economy of the country (Ghirotti et al., 1994). This entails an establishment of Essential Veterinary Drug Lists- this being a list which contains those drugs that have been shown to be more efficacious, cost effective and safe for the prevention and control of the socially and economically most important diseases in animal populations (Ghirotti et al., 1994). A matrix system can be used for the listing of essential drugs. The matrix could have the following columns:

- a) Animal species
- b) Disease condition
- c) Usage- Treatment or prophylaxis
- d) Classification (category of professional permitted to administer the drug, i.e
 - i) qualified veterinarian only
 - ii) para-professional
 - iii) farmer

The advantages of establishing veterinary drug policy include:

- a. It provides a rationale for cost effective veterinary drugs policy embracing different components of animal health delivery systems

- b. It encourages conformity between operational strategies implemented in the same or neighbouring areas by different organisations or donors
- c. It allows for concentration on a limited number of basic active products in efforts to improve their procurement, supply, quality control, storage, distribution, pricing, training of personnel and education of animal owners
- d. It encourages the stimulation of pharmaceutical industries, including local ones, which can ensure quality control and regular supply.

The list will however require frequent up dating to incorporate any advances in scientific knowledge in order to serve best the needs of animal health delivery service (Ghirotti et al., 1994).

2.6.3 Continued training of service providers and farmers

Service providers should be continually trained in line with the changing needs of the farmers and production systems. Private and publicly provided formal training for the agricultural sector is available at several levels from farmers training centres to certificate, diploma and degree colleges. Certificate level training in animal husbandry takes place at several Animal Health and Industry Training Institutes situated at Kabete, Ndongba, Bukura and Nyahururu. Certificate and diploma level training in dairy technology is provided at the Dairy Training Institute in Naivasha, meat inspection training at MTI, Athi River and degree level training is provided at universities Egerton, Nairobi, Moi and Baraton (Omore et al., 1999).

Farmer training schemes should also be supported. Geerts and Holmes (1997) indicated that farmers had the tendency of underestimating the weight of the animals

when they had to treat them. Van den Bossche (2000) on the other hand reported that farmers in Zambia over dosed their young stock with trypanocidal drugs. These findings call for periodical training of farmers on the management of simple clinical conditions.

2.6.4 Promotion of institutional linkages

Good linkages, co-ordination and sharing of information among national and international institutions engaged in veterinary research exist. However, the implementation of their research findings has not been harmonised. To improve the efficient delivery of livestock services these linkages should be broadened to include farmer groups, NGOs, private sector and donor agencies. This will strengthen the capacity to undertake more integrated research on animal health and veterinary services by better utilising the available knowledge, institutional and human resource capacities. Universities (Nairobi and Egerton) for instance have well-established agricultural faculties. They also possess a large pool of trained manpower whose skills can be tapped to contribute to research in this sector (Omoro et al., 1999).

2.7 Conclusion

This chapter described the types of private animal health service providers that have emerged following the privatisation of veterinary services in Kenya. While the importance of the private sector in providing veterinary services is now widely acknowledged, the paucity of data on their numbers and capacities to offer quality services prevents the quantification of their contribution to the economy. Retail outlets for veterinary drugs, one of the key private service providers studied in this

survey, are highly heterogeneous and this has raised deep concerns on the quality of services that they provide. The chapters that follow endeavour to address these fears as they report the findings of veterinary drug and service provision by retail outlets as per the objectives listed in Chapter 1.

CHAPTER THREE

3.0 BUSIA DISTRICT: The study area

Busia is one of the six districts of Western Province of Kenya. Its location is shown in Figure 1 below.

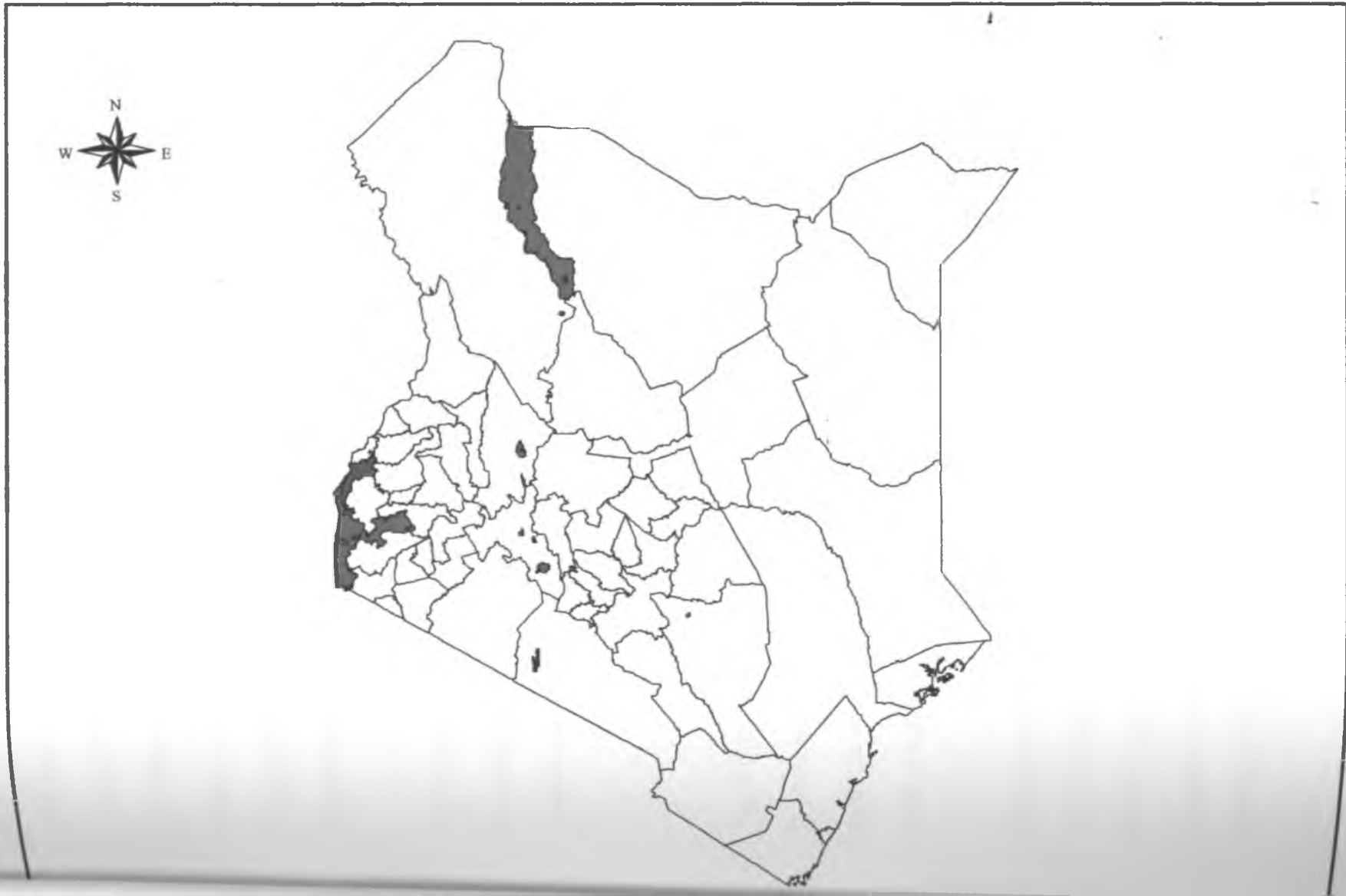
3.1 Location and size

The district is found between latitude 0.03° South and 0.62° North and longitude 33.91° and 34.42° East. It covers an area of 1262 km^2 including 137 km^2 that is under permanent water surface. It is sub divided into six administrative divisions namely Nambale (228 km^2), Butula (265 km^2), Funyula (273 km^2), Budalangi (312 km^2), Busia Municipality (19 km^2) and Matayos (165 km^2) (Anon., 1997).

3.2 Climate

The annual mean minimum and maximum temperatures range from 14° and 18° C to 26° C and 30° C, respectively. There are two rainy seasons in the district, the long rains and the short rains. The long rains start in March and continue into May, while the short rains start in August and continue into October. The dry spells are from November through February and June to August. The mean annual rainfall is 1500 mm with most parts of the District receiving rainfall between 1270 mm and 1790 mm. The evaporation ranges between 1800 mm. and 2000 mm. per year (Anon., 1997).

Figure 1. The map of Kenya showing the location of Busia District



3.3 Topography

The district falls within the Lake Victoria Basin. Its altitude varies from 1130 m on the shores of the lake to 1375 m in the Central and Northern regions. The central parts especially Butula and Nambale divisions are characterised by a plain capped by a shallow incised drainage patterns. The Southern part is covered by the Samia and Funyula hills that terminate in Port Victoria. The lower parts of the district covering Funyula and Budalangi have fairly flat terrain (Anon., 1997).

The numerous streams and undulating terrain has benefit for agriculture but constrains the development of roads due to large number of bridges and culverts required for construction (Anon., 1997).

3.4 Resource potential and agro-ecological zones

The resources that are available in Busia District include land and soils, water, forests, fisheries and minerals (GOK., 1997). The district has 924 200 hectares (924 sq. km.) of agricultural land. Twenty three percent of land is under crop production while 44 % is grazing land. Bushes or swamps cover the remainder.

The district is divided into four agro-ecological zones: Lower Midland (LM) 1, LM 2, LM 3 and LM 4. LM 1 and LM 2 are higher in agricultural potential whereas LM 3 and LM 4 are lower. In Table 4, the area (in Ha) of each division under the listed agro-ecological zones has been shown. LM 1 covers Nambale, Matayos, Butula and Municipality divisions. LM 2 covers parts of Nambale, Butula and Township divisions,

while LM 3 covers Budalangi and Funyula divisions. LM4 covers parts of Funyula and Budalangi divisions.

Table 4. Area (in Ha.) of each division of Busia District falling in the four agro-ecological zones

Division	LM 1	LM 2	LM 3	LM 4	Total
Nambale/Matayos	18240	4560	-	-	22800
Butula	25175	1325	-	-	26500
Funyula	-	2560	20480	2460	25600
Budalangi	-	-	7680	11520	19200
Township	1900	-	-	-	1900
Matayos	9900	6600	-	-	16500

Source: Anon. 1997

The high potential parts of the District are found in Nambale, Matayos and Butula

Divisions while the medium potential zones include those parts adjoining Lake Victoria

and covers entire parts of Budalangi and parts of Funyula Divisions. The crops grown

in each season in these zones are shown in Table 5 below.

Table 5. Crops grown in the four agro-ecological zones of Busia District during the long and short rainy seasons and whole season

Zone	Long rains	Short rains	Whole season
LM1 (sugar cane zone)	Sorghum, Sunflower, Soya beans, Sweet potatoes, Maize	Maize, Sorghum, Cow peas, Sweet potatoes	Sugar cane, Bananas, Robusta coffee, Avocadoes, Cassava
LM2 (Marginal zone)	Sorghum, Sunflower, Soya beans, Sweet potatoes, Onions	Bulrush millet, Sorghum, Beans, Green grams, Onions, Kale	Sugar cane, Robusta coffee, Mangoes, Citrus
LM3 (Cotton zone)	Maize, Katumani, Sorghum, Millet, Beans, Cow peas	Simsim, Green grams	Cassava, Sisal, Rice, Bananas, Vegetables
LM4 (Marginal cotton zone)	Sorghum, Millet, Green grams, Cow peas		Cassava, Sisal, Rice, Bananas, Vegetables

Source: Anon. 1997

3.5 Human population structure

According to the 1999 census (Table 6), the District's human population was 369 230 with 81932 households (Anon., 2001). The District's Statistics Office had predicted that the district was to have a human population of 391 913 by the year 2001 and a density of 347 persons per square kilometre (Anon., 1997).

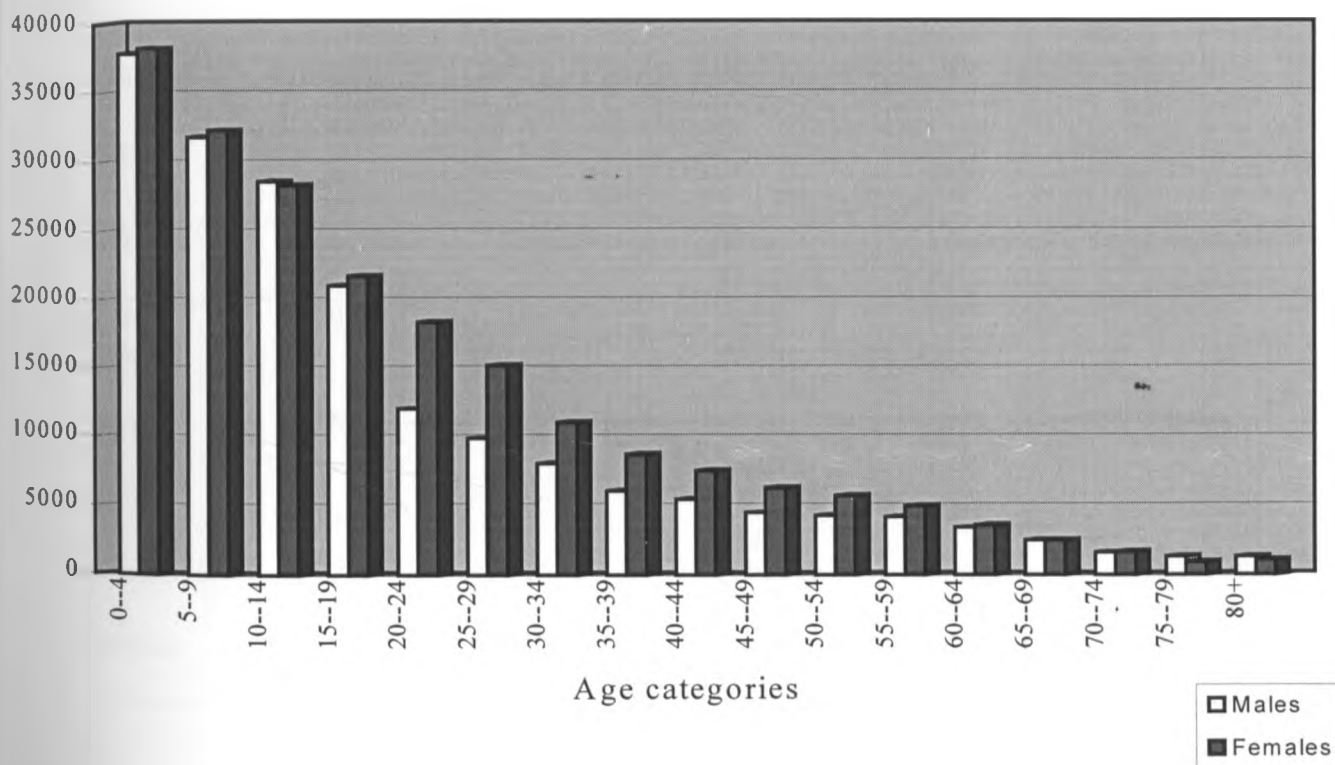
Table 6. Human population and the number of households in the six division of Busia

District as per the 1999 population census

Division	Number of people	Households
Nambale	66 666	13 862
Butula	96 720	21 732
Funyula	73 835	15 748
Budalangi	52 488	12 785
Busia Township	24 421	6 054
Matayos	55 100	11 751
Total	369 230	81 932

Source: Anon. 2001

Figure 2. Human population structure in age and sex of Busia District in 2001



Source: Anon. 1997

Save for the older generation (>60 years), females comprised the majority in most of the age brackets (Figure 2). The overall sex ratio of males to females was about 0.88:1. The proportion of young people in the population was high.

3.6 Livestock production

The district has a number of livestock activities. These include dairy and beef farming, poultry keeping, sheep and goat rearing, bee keeping and pig rearing (Anon., 1997).

Almost all divisions practice dairy farming, poultry keeping and both sheep and goat rearing. However, in Budalangi and parts of Funyula division, tsetse fly infestation has constrained the development of the dairy industry. Consequently, sheep and goats rearing tend to be practised on a more extensive scale. The main livestock products in every division are illustrated in the table below.

Table 7. Main livestock and livestock products obtainable from the divisions of Busia

District

Division	Area (sq. km.)	H.H (No.)	Main livestock	Livestock products	Livestock population
Nambale/ Matayos	42.9	12964	Dairy, poultry, Sheep & Goats	Milk, Meat, eggs	3000
Butula	24.6	8780	Dairy, Poultry, Sheep & Goats	Milk, Meat, eggs	3569
Budalangi	18.2	4713	Sheep & Goats	Hides and Skins	261.8
Funyula	24.8	7397	Sheep & Goats, Dairy	Milk, Skins and Hides	2932

Source: Anon. 1997

The population of dairy cows rose steadily from 1991 following the implementation of Livestock Development Program (LDP) sponsored by Finland. The increase partly resulted from direct importation of dairy cows from Trans Nzoia District and cross breeding. The population of zebu however decreased between 1992 and 1995 because of increased prevalence of trypanosomosis (Anon., 1997). This led to a rise in small ruminant production. Pig farming also became popular in the district over this period because of the willingness of the local community to raise pigs and consume pork. Livestock population estimates by the Ministry of Agriculture and Rural Development for the year 2001 are presented in Table 8.

Table 8. Estimates of livestock numbers from the divisions of Busia District in 1999

Division	Grade cattle	Zebu	Grade poultry	Local poultry	Goats	Sheep	Pigs	Donkeys	Rabbits	Hives
Township	401	1220	2050	9392	513	801	336	0	206	51
Matayos	737	8678	3442	26616	2044	2401	1055	0	757	427
Nambale	674	18810	1480	27054	1740	1900	0	0	320	0
Butula	2245	26354	121	162524	4216	4492	1631	24	11570	367
Budalangi	270	32000	640	64000	8900	6100	6410	30	540	0
Funyula	380	25000	1000	47000	7500	4200	4000	0	0	0
Total	4707	112062	8733	336586	24913	19894	13432	54	13393	845

Source: Anon.2000

3.7 Retail business

The type of business activities range from wholesale to retail trade. Retail trade comprises small outlets scattered all over the district with high concentration in the market and urban centres. Most of the small businesses in the district are found within the small market centres. The enterprises are small both in number of employees and the start up capital. These enterprises employ school leavers. Wholesale outlets and other large businesses employ at least five people while small business units are operated using family labour or at most employing one or two people (Anon., 1997).

Retail business commands a large share of market. This is because they are geographically spread all over the district including small villages. It is expected that more retail outlets will be set up in these towns to tap the market from Uganda and central African states following the revival of East African Co-operation (Anon., 1997).

CHAPTER FOUR

4.0 LOCATION AND CHARACTERISATION OF THE RETAIL OUTLETS FOR VETERINARY DRUGS

4.1 Introduction

This chapter reports the results of the identification, distribution and characterisation of the retail outlets for veterinary drugs in the study area. Forty-one outlets were identified throughout Busia District.

4.2 Methodology

4.2.1 Identification and mapping of the retail outlets

A map was obtained from the GIS laboratory at ILRI containing divisional boundaries and feeder roads that were used to access market centres. In all the divisions, Divisional Veterinary Offices were visited and personnel requested to provide a list of retail outlets that traded in veterinary drugs within their areas of jurisdiction. Trade names of the retail outlets commonly used by these personnel were obtained. These outlets were visited and their managers/salespersons again requested to give trade names of other shops that traded in veterinary drugs within their market/town centres.

Interviews of the managers/salespersons were done in all the outlets identified. The basic information collected from them at this phase of shop identification included: owners' name, managers' name, trading name, classification (into agroveterinary, pharmacy and general shops), address, division, location, approximate number of

clients per day and the approximate number of clients that bought veterinary drugs only (see Appendix I). Geo-referencing was done at a point approximately 4 m outside the shop with Global Positioning Systems (GPS 12, Garmin). The readings (latitude, longitude and altitude) were recorded in decimal degrees that allowed five places of decimals using the ARC 1960 datum. Geographical Information Systems (GIS) software (Arcview, ESRI) was thereafter used to generate maps illustrating the location and distribution of the outlets.

4.2.2 Phase II: Managers'/salespersons' interview

The questionnaires administered in the second phase were designed to collect information of every outlet on owner, salesperson, shop, business and clientele characteristics (see Appendix II).

Common to both owner and sales persons' details was information on name, sex, age, main activity or occupation, education level, qualification and experience (in number of years). Occupation was classified into two classes that differed according to the owner or the salesperson. Owner occupation was classified into business or formal employment, whereas, salespersons' was classified into business or full time retailing. Qualification was classified as animal health, none or other professions that comprised, among others, teachers, nurse aids and business administration. Information on the livestock ownership for both the owner and salesperson and relationship between them was also elicited.

A brief and general history of each outlet was captured in the shop details section of questionnaire (Appendix II). This section sought information on when the shop was

established, nature of ownership, whether the owner had other businesses, number of people employed in the shop and the requirements for employment. Under the business details, a list of items that each shop stocked was compiled and the drugs that were regularly stocked were identified. The shopkeepers were also requested to indicate the supplier of their items and whether these suppliers gave advice on drug use before or after being questioned. They were further asked to rank the sources of information in order of the most frequently used, from a list that comprised AHAs/veterinarians, drug suppliers, posters, drug leaflets and other sources such as seminars, mass media, etc.

Under the clientele details, the managers were asked to identify their clients and to state their needs from the shop in terms of drugs, advice or both. They were also asked to identify the diseases their clients commonly reported. The shopkeepers were later asked to rate the importance of trypanosomosis from their clients' perspective. The three possible outcomes were very important, moderately important and not important.

4.2.3 Data management and analysis

The data generated from the study were entered in a relational database designed using Microsoft Access software. Descriptive analyses involved the characterisation of the retail outlets as agrovets, pharmacies and general outlets based on owner, salesperson, business and clientele details. Both descriptive and statistical analyses were carried out using the FREQ procedure in Statistical Analysis Systems (SAS, Version 6.2) software. Statistical analyses were performed using Fisher's exact tests.

These tests were used to determine simple associations between variables with significant differences determined at a 90% confidence level.

4.2.4 Constraints

Some of the shop managers were reluctant to participate in the exercise since they mistook the interviewer for an agent from Income Tax department. Some also needed the permission of the shop owners to participate in the interview. To overcome these constraints, the interviewer provided identification documents, and in some cases deferred the interview to a time when the respondents felt they were confident enough to participate.

4.3 Results

4.3.1 Classification of retail outlets

A total of 41 retail outlets classified into 20 agrovets, 11 pharmacies and 10 general shops were identified throughout the district (Table 9). The classification of the outlets was based on the types of products stocked in the shop. Agrovets specialised in agricultural inputs like veterinary drugs, farm implements, seeds and chemicals. Pharmacies traded in human and veterinary drugs; whereas, general shops, in addition to veterinary drugs, dealt with a variety of items ranging from hardware, bicycle spares and clothes to domestic items.

4.3.2 Number of service outlets by Divisions

Table 9. The location and number of the retail outlets for veterinary drugs in Busia District in every division and market centre

Division	Market Centre	Agrovets	Pharmacies	G. Shops	Total
Busia Township	Busia Town	8	-	1	9
Matayos	Mundika	-	-	1	1
	Matayos	-	-	3	3
Butula	Buhuyi	1	2	-	3
	Butula	1	-	-	1
	Bukhalalire	-	1	-	1
	Lugulu	1	-	-	1
	Bumala	2	-	2	4
Nambale	Nambale	3	2	1	6
Funyula	Funyula	3	1	-	4
	Mulukhoni	-	-	1	1
	Mulwanda	1	-	-	1
	Sio Port	-	2	1	3
Budalangi	Port Victoria	-	3	-	3
Total		20	11	10	41

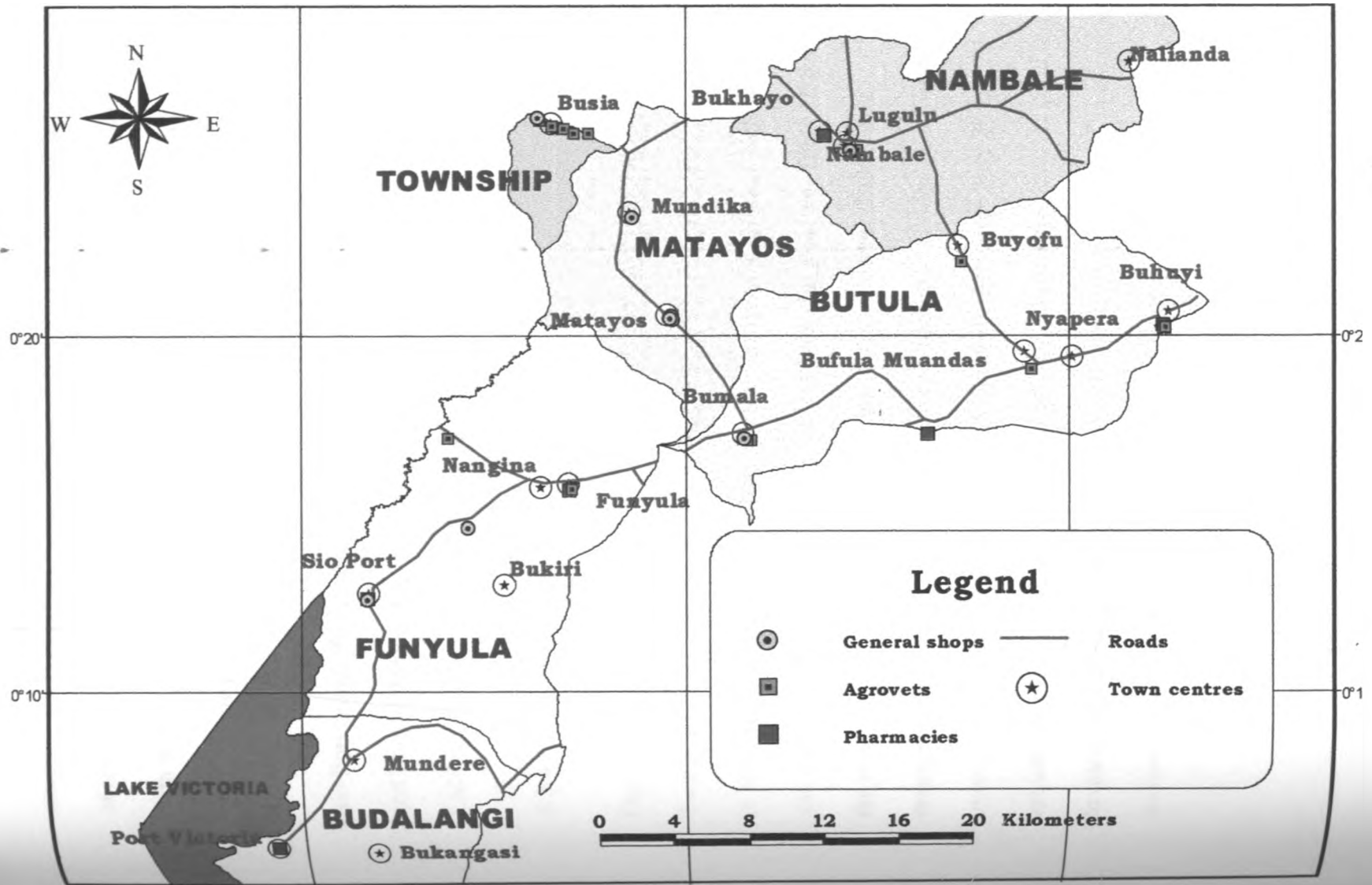
It was realised that many outlets were located in major towns like Busia (9) and Nambale (6). Other busy centres like Bumala and Funyula had four outlets each whereas Buhuyi, Port Victoria and Sio Port markets had only three outlets each since

the main economic concerns revolved around other agricultural activities like sugar farming and fishing.

4.3.3 Geographical location and distribution of the retail outlets

Figure 3 illustrates the geographical distribution of the shops in the District.

Figure 3. Geographical distribution of retail outlets for veterinary drugs in Busia District



The map indicates that most of the outlets were aggregated in towns and market centres. The road network also influenced their distribution, especially in the location of some Agrovets in Mulwanda and Lugulu. The distribution of agrovets contrasted with that of pharmacies and general shops, as they were mainly concentrated in high potential areas of the district; whereas, pharmacies and general shops could be found in all agro-ecological zones. For instance, there were no Agrovets in Port Victoria and Sio Port though there were five Pharmacies in total and one General shop. Sio Port and Port Victoria fall in low potential agro-ecological zones LM3 (cotton zone) and LM4 (marginal cotton zone) respectively.

4.3.4 Shop ownership

Out of the 41 retail outlets identified in Phase 1, 37 participated in the second phase. Two pharmacies, Port Victoria Chemists in Port Victoria and New Oruma Chemists in Nambale declined to participate; whereas, an agroveter, Borders Vets in Busia town and a general shop in Mulukhoni centre had been closed down. Table 10 summarises the results of the characterisation of outlets based on owner details. The managers/salespersons of these outlets were reluctant to divulge information on the owners' education and qualification and therefore, there were only 28 and 29 respondents to these characteristics respectively. There were however good responses to questions on occupation (n = 35) and cattle ownership (n = 32). The sex of the owners could be determined readily from their names.

Table 10. Characterisation of the 37 retail outlets for veterinary drugs in Busia District

based on owners' characteristics

Owner characteristics		Types of retail outlets				
		Agrovets	Pharmacies	General shops	Total	Exact p
Sex	Male	15	8	5	28	0.45
	Female	5	1	3	9	
Education	Primary	1	0	2	3	0.19
	Secondary	6	2	4	12	
	Tertiary	4	3	0	7	
	University	5	0	1	6	
Qualification	Animal health	4	0	0	4	0.20
	None	8	1	5	14	
	Other	5	4	2	11	
Occupation	Business	14	4	6	24	0.78
	Formal employment	6	3	2	11	
Experience in years	0 – 5	6	3	2	11	0.88
	6 – 10	4	0	2	6	
	11 – 15	0	0	0	0	
	16 – 20	3	0	1	4	
	> 20	1	0	0	1	
Cattle ownership	Yes	14	0	2	16	0.006
	No	6	4	6	16	

Men represented a high proportion of owners across all the three types of retail outlets for veterinary drugs in Busia District. Sex was however not significantly ($p = 0.45$) associated with ownership of any type of outlet. In total, (43%, $n = 12$) of the outlets were owned by proprietors who had a secondary education. Fifty percent ($n = 6$) of them were agro-veterinary shops. The largest proportions of both agro-veterinary (37.5%, $n = 10$) and general shops (57%, $n = 4$) belonged to owners who had secondary school education, though these observations were not significant ($p = 0.19$) at a 90% confidence level. Three out of five respondents from pharmacy shops indicated that the owners of these outlets had tertiary (middle level college) education.

Very few outlets (13.8%, n = 4) were owned by proprietors who had qualification in animal health. Proprietors that had animal health training owned agro-veterinary shops (p = 0.20). The largest proportion of owners of agro-veterinary (47.1%, n = 8) and general shops (71.4%, n = 5) had no qualifications at all; whereas, the majority (80%, n = 5) of the owners of pharmacy shops had other qualifications not related to animal health (i.e. teachers, nurse aids, technologists and etc.). In all the outlets, the proprietors had less than 10 years experience in veterinary drug retailing.

Seventy percent (n = 14) of agro-veterinary shops' proprietors owned cattle. Only 16.7% (n = 2) of general shops were owned by proprietors who had cattle whereas all the owners of the pharmacy shops did not own cattle. These observations indicate that cattle and agro-veterinary shop ownership were significantly (P = 0.006) associated.

4.3.5 Managers'/Salespersons' details

There was a good response to all the questions on salespersons' details. Apart from experience on veterinary drug retailing where 34 responses were recorded, all other questions had 37 responses.

Table 11. Characterisation of the 37 retail outlets for veterinary drugs in Busia District based on the salespersons' characteristics

Salesperson characteristics Types of retail outlets

		Agrovets	Pharmacies	General shops	Total	Exact p
Sex	Male	11	5	5	21	1.00
	Female	9	4	3	16	
Education	Primary	1	0	3	4	0.09
	Secondary	12	5	5	22	
	Tertiary	6	4	0	10	
	University	1	0	0	1	
Qualification	Animal health	2	0	0	2	0.16
	None	12	5	8	25	
	Other	5	4	0	9	
Occupation	Business	12	2	5	19	0.14
	Full time retailer	8	7	3	18	
Experience in years	0 – 5	16	7	4	28	0.42
	6 – 10	3	0	1	4	
	11 – 15	0	0	1	1	
	16 – 20	0	0	0	0	
	> 20	1	0	0	1	
Relationship to owner	Employee	5	7	4	16	0.08
	Self	6	1	3	10	
	Family member	9	1	1	11	

The number of male and female salespersons did not vary significantly ($p = 1.00$) with the type of outlet. However, the education level was significantly ($p = 0.09$) associated with the management of all the outlets. The majority of salespersons in all the outlets had secondary school education. Their proportions were 60% ($n= 12$), 55.5% ($n= 5$) and 62.5% ($n= 5$) for agro-veterinary, general and pharmacy shops, respectively. The education levels for salespersons for agro-veterinary shops varied widely compared to those of pharmacies that had either secondary or tertiary (middle level college) education and general shops that had primary or secondary school salespersons.

The owners preferred to employ managers who had either equivalent or lower levels of education. Respondents in 58.3% outlets pointed out that the minimum qualification required for employment was a secondary school certificate. The influence of owner education on the manager's is illustrated in Table 12.

Table 12. The influence of owner education on the employment of shop manager/salesperson of the 37 retail outlets for veterinary drugs in Busia District

Owner's Education	Salesperson's Education	No.	Percentage
Not indicated	Secondary	6	16.2
Not indicated	College	3	8.1
Primary	Primary	3	8.1
Secondary	Primary	1	2.7
Secondary	Secondary	11	29.7
College	Secondary	2	5.4
College	College	5	13.5
University	Secondary	3	8.1
University	College	2	5.4
University	University	1	2.7

More than two thirds (67.6%, n = 25) of the the salespersons in all the outlets had no qualifications. Forty eight percent (n = 12) of them worked in agrovets and 20% (n = 5) were in pharmacy shops and 32% (n = 8) worked in general shops. There was no association between education level of salesperson and type of retail outlet (exact probability 0.16).

Three forms of owner/manager relationships were identified. They were employer/employee, family member and self (where the owner managed his/her business). Family members managed 45% (n = 9) of agro-veterinary shops while 77.8% (n = 7) of pharmacies and 50% (n = 4) of general shops were managed by employed personnel (p = 0.08). In all the shops, most managers had less than 5 years experience in veterinary drug retailing.

4.3.6 Shop and Business details

Retail outlets for veterinary drugs in Busia District had similar business characteristics but differed only in the products stocked and whether or not they gave advice on drugs with sales. As expected, only pharmacists stocked human pharmaceuticals in addition to veterinary drugs, but not animal feeds. General shops stocked other items like hardware and clothes. These results are shown in Table 13.

A significantly ($p = 0.03$) greater number of agro-veterinary shops gave advice on drug use with drug sales. Only two out of nine pharmacies gave this advice while general shops were almost equally distributed between the ones that gave and those that did not give advice.

Table 13. Characterisation of retail outlets for veterinary drugs in Busia based on the shop and business characteristics

Shop/business characteristics		Types of retail outlets						Exact p	
		Agrovets		Pharmacies		General shops			Total
Shop ownership	Sole traders	13		9		7		29	0.38
	Partnerships	3		0		0		3	
	NGOs	4		0		1		5	
Products stocked		No.	%	No.	%	No.	%		
	Veterinary drugs	20	100	9	100	8	100	37	
	Human drugs	0	0	9	100	0	0	9	
	Animal feeds	15	75	0	0	4	50	19	
	Fertilisers	20	100	0	0	8	100	28	
	Seeds	16	80	3	33	4	50	23	
	Hardware	0	0	0	0	3	36	3	
Clothes	0	0	0	0	1	13	1		
Drugs stocked		No.	%	No.	%	No.	%		
	Trypanocides	19	95	5	63	4	50	28	
	Anthelmintics	20	100	9	100	4	50	33	
	Antitheilerials	10	50	0	0	0	0	10	
	Antibiotics	20	100	9	100	6	75	35	
	Acaricides/Pour-ons	20	100	5	25	8	100	33	
Vaccines	3	15	1	5	0	0	4		
Drug sources	Wholesalers	15		9		8		32	0.14
	Manufactures	5		0		1		6	
Advice from drug Suppliers	Availed	18		9		6		33	0.31
	Not availed	2		0		2		4	
Frequently used Information source	AHAs/Vets	7		4		2		13	0.84
	Drug suppliers	4		3		1		8	
	Posters	1		0		1		2	
	Drug leaflets	6		2		4		12	
	Others (radio etc.)	2		0		0		2	
Decision maker in The running of the Shop	Owner	11		5		3		19	0.90
	Salesperson	4		3		2		9	
	Both the above	3		1		2		6	
	Stock controller	2				1		3	
Fastest selling drug	Trypanocides	7		2		1		10	0.18
	Anthelmintics	8		4		2		14	
	Antibiotics	3		1		0		4	
	Acaricides	2		1		5		8	
Advice given in Addition to drugs	Yes	15		2		5		22	0.03
	No	5		7		3		15	

Business characteristics that were similar to all the shops were drug sources, advice from suppliers, frequently used information source and the decision-maker in the running of the shop.

All the pharmacies and general shops and 75% of the agro-veterinary got their stock from the wholesalers. Only 25% of the agro-veterinary shops got their drugs from the manufacturers. Drugs commonly stocked by agro-veterinary shops included trypanocides, anthelmintics, antibiotics and acaricides. Pharmacies commonly stocked anthelmintics and antibiotics and general shops commonly stocked antibiotics and acaricides. Antibiotics were therefore common to all the three shop types. In total, only four shops had vaccines. They were three agro-veterinary shops and a pharmacy. The fastest selling drug for agro-veterinary shops and pharmacies was anthelmintics and was followed by trypanocides. General shops had acaricides as the fastest selling drug followed by anthelmintics.

All the pharmacies and the majority of agro-veterinary and general shops pointed out that drug suppliers gave advice whenever they delivered their orders. The ranking of the frequently used information source to salespersons slightly differed as shown in the Table 13. AHA/vets and drug leaflets emerged as the two commonest sources of information.

The decision-maker in all the shops was the owner.

4.3.7 Clientele details

Farmers and veterinary personnel were the main clients that bought veterinary drugs from the outlets. The approximate number of clients (seeking veterinary services) served by Agrovets, Pharmacies and General shops on daily basis were 272/20, 65/9 and 83/8.

The salespersons were asked to identify animal health problem(s) that clients complained commonly about. Table 14 below shows a summary of the findings.

Table 14. Classification of the 37 retail outlets for veterinary drugs in Busia District based on the clientele characteristics

Clientele details		Types of retail outlets				Total	Exact p
		Agrovets	Pharmacies	General shops			
Most common Disease asked about	Trypanosomosis	9	1	1	11	0.06	
	Helminthosis	0	1	1	2		
	Anaplasmosis	1	0	0	1		
	ECF	4	0	0	4		
	FMD	2	1	1	4		
	Other	2	5	2	9		
Trypanosomosis Importance	Very important	14	4	3	21	0.25	
	Moderately important	4	3	4	11		
	Not important	2	2	0	4		

A significantly ($p = 0.06$) greater number of agro-veterinary shops pointed out that trypanosomosis was an important animal health problem to the majority of clients.

East Coast fever was also identified by four agrovets. A high proportion of pharmacies (62.5%, $n = 5$) and general shops (40%, $n = 2$) pointed out that other diseases like skin conditions, mastitis, etc. were important. When the salespersons were asked to rank the importance of trypanosomosis to their clients, those in agro-veterinary shops and pharmacies ranked it as very important. Four out of seven general shops ranked it as moderately important.

4.4 Discussion

4.4.1 Distribution of the outlets

The results indicate that retail outlets for veterinary drugs in Busia District aggregated in town and market centres. This ensured a crucial avenue to an economic mainstream comprising a majority of businesses. This distribution pattern allowed them to be easily accessed by farmers who went for other business in towns/markets. It has also been reported that the majority (92%) of private veterinary practices in Nigeria, for example, operate in urban and peri-urban areas (Odeyemi, 1994). The economies of concentration that favour the establishment of specialised firms offering banking, communication, security and other services could have also played a role in influencing their location in towns/market centres in Busia District.

Busia Township Division had the highest number of the outlets compared to other divisions. It also had the largest number of other commercial enterprises. This could be attributed to a high human population and livestock density in the division and the fact that it was also an important transit border town to Uganda (Anonymous, 1997).

The distribution of the different types of outlets differed. Whereas, pharmacies and general shops were more evenly distributed throughout the district, agro-veterinary shops were only found in high potential areas. There were no agro-veterinary shops in the Budalangi Division despite their high numbers and good distribution in other divisions of the district. The livestock and human population densities of Budalangi Division by 1997 were relatively low at 261.8 livestock numbers and 282 persons per

km² respectively (Anon., 1997). The main livestock species kept in the division were small ruminants that could do well in this marginal zone (LM4). The soils were also poor to support cash crop farming. These ecological and demographic factors indicate that the division had low potential for intensive livestock and crop farming. The demand for agricultural inputs was probably low for a profitable operation of an agro-veterinary shop.

4.4.2 Ownership and management of the outlets

Although the population of women that could own property (between the ages 25 and 70 years) was higher than that of men by 18, 280 according to the District Statistics Office projections (Anon., 1997), most of the retail outlets for veterinary drugs in Busia District were registered to men. It has been observed that women are differentially drawn into pharmacies run by corporations rather than the independently operated businesses (Muzzin et al., 1994). However, different factors could be responsible for the observed trend in Busia District. In most African societies, family capital assets are registered under a husband's names even in cases where the wife solely operates the business.

The ownership of agro-veterinary and general shops had two main things in common: the majority of owners had secondary education with no qualifications. The majority of the owners of pharmacy shops on the other hand had middle level college training and other qualifications not related to animal health. Though the owners were not in constant touch with the clients like the managers/salespersons, their education and qualifications had an indirect influence on the quality of animal health service provided from the retail outlets. This is because they always employed salespersons

that had lower level of education/qualification than they had. The association of the agro-veterinary shop ownership and cattle husbandry was also observed but its influence on the running of the shops was not analysed.

It was observed that the majority of salespersons in each shop type had secondary education with no relevant qualifications in animal health. The number of salespersons with only secondary education in agro-veterinary shops was significantly ($p = 0.09$) higher than those in either pharmacies or general shops yet agro-veterinary shops gave advice on drug use more often ($p = 0.03$) compared to pharmacies and general shops. The quality of the advice given, therefore, might be unreliable given the salespersons' qualifications. Even in cases where the providers have undergone training, the quality of advice availed from the shop is always suspect (Heffernan and Misurelli, 2000).

Kafle et al. (1992) has observed that the sale of modern drugs by untrained personnel, general traders and other drug sellers is common throughout the developing world.

Chuc and Tomson (1999) have reported an increase in antibiotic resistance associated with weaknesses in drug regulation in Hanoi, Vietnam. In Kenya, the liberalisation of drug distribution systems and weak drug regulation may have led to an explosive establishment by unqualified staff of retail outlets that trade with prescription drugs among others. In Busia District, the majority of owners and managers lacked proper qualifications to operate the drug outlets. Veterinarians, who would be expected to be judicious in their operations have been noted to employ untrained and unsupervised sale clerks in their pharmacies in Kenya and Senegal (Leonard, 2000).

Business concerns seemed to overshadow veterinary service delivery in the operation of these outlets.

Regulatory approaches to controlling drug selling in the informal sector require a cadre of professional regulatory staff and enforcement mechanisms which are always beyond the economic and political reach of developing countries (Kafle et al., 1992).

4.4.3 Shop and business

Sole traders owned the majority of the outlets in Busia District. Agro-veterinary shops differed from the other types of outlets in that they commonly stocked trypanocides. Vaccines were also only found in agro-veterinary and pharmacy shops.

With regard to the use of over the counter drugs, the importance of drug information to clients of the pharmacies is becoming recognised (Blom and Rens, 1989). The main sources of information to veterinary drug retailers in Busia were veterinarians/AHAs and drug leaflets. The source of this information to the retailer is of paramount importance since they are expected to advise their clients on drug use. A study done in Hong Kong indicated that the main sources of information to Pharmacies were pharmacists' own knowledge and work place reference texts (Chan et al., 1996). This differs from what was realised from this study in that salespersons for veterinary drug retail outlets in Busia District were not qualified and therefore had no 'own knowledge'. Drug companies and state veterinary departments therefore had a duty of reaching out to retail outlets with information on drug use.

General shops in Busia District stocked prescription drugs like antibiotics with other domestic and hardware items. The poor drug control system reported in this study was also observed by Sri Ngernyuang (1996) in Thailand. He pointed out that attempts to rationalise drug use by consumers were hampered by the haphazard retailing.

Prescription drugs were available in various sources including grocery stores.

4.4.4 Clientele

Agro-veterinary shops had the highest average number of clients compared to the other types of outlets. These shops also were able to identify trypanosomosis and East Coast fever as important diseases farmers commonly complained about. Pharmacies and general shops identified other diseases like mastitis and skin conditions. Agro-veterinary shops could therefore be used for information dissemination in this trypanosomosis endemic area.

CHAPTER FIVE

5.0 CHARACTERISATION OF CLIENTS

5.1 Introduction

This chapter presents the results of a questionnaire survey that involved 82 clients in 14 selected retail outlets in the District. Only clients who bought veterinary drugs were interviewed.

5.2 Methodology

5.2.1 Selection of retail outlets

The number of clients for veterinary drugs at agro-veterinary, pharmacy and general shops varied widely. Very few clients go to pharmacies or general shops to purchase veterinary drugs. Therefore, the client survey focussed on agro-veterinary shops, except in Port Victoria and Mundika where pharmacy and general shops were chosen because there were no agrovets in these markets.

Fourteen out of 37 outlets were selected for this phase of the study. The seven regions considered were Busia and Nambale Towns, Matayos, Bumala, Funyula and Port Victoria Markets and Butula centre. In each of these centres, outlets that had the highest average number of clients per day were chosen. The selected outlets were:

Busia Town:	Multivet Agro-suppliers, Giathi and Busia Agrovets
Nambale Town:	Sinani Agrovets and Nambale Agrovets
Matayos Market:	Mundika shop and Selco Enterprises
Bumala Market:	Mareba Multipurpose and Wakulima Agrovets
Funyula Market:	Mkulima Shop and Rab Agrovets

Butula Centre: Butula Agrovet

Port Victoria Market: Lubanga Chemists and Port Victoria Chemists

In areas where the outlets were closely located, the managers of the non-selected outlets were asked to refer their clients, after being served, to where the interviewer was stationed for inclusion in the survey.

5.2.2 Client interviews

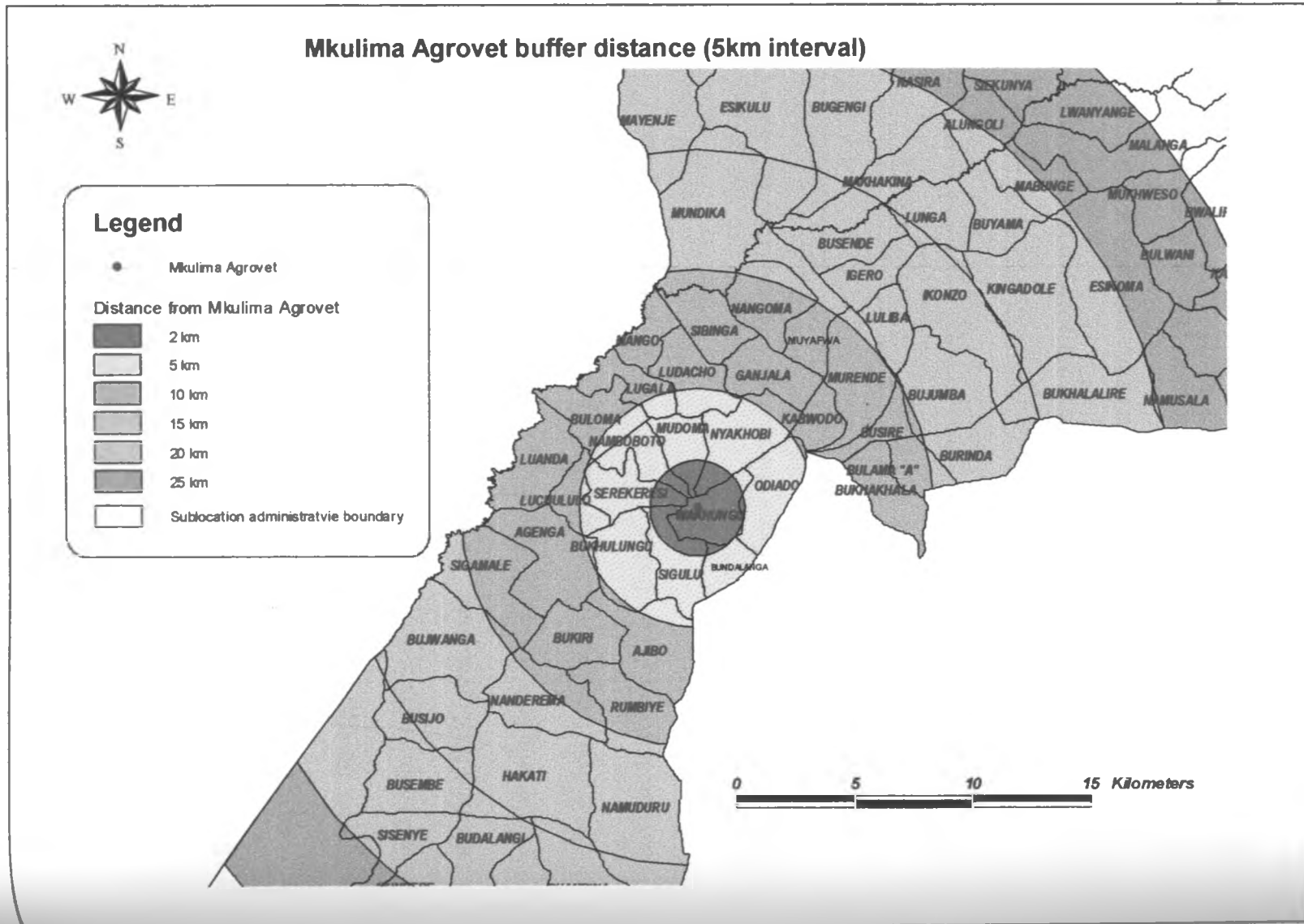
Client interviews at every selected shop were carried out for two consecutive days. All the clients who purchased veterinary drugs in these outlets in the two days were interviewed. The salespersons were requested to introduce the clients to the interviewer after they had made their purchases. The purposes of the study were explained to the clients and thereafter requested to participate in the survey. Their responses were always positive.

The questionnaire had seven sections (questionnaire III in the Appendix). In Section One, the location and date of the interview and name of the interviewer were recorded. Section Two sought information on client's name, sex, address, occupation, education, source of income and cattle keeping experience. In Section Three, the details of the end user of the drugs bought were recorded. Livestock inventory, types of drugs purchased and reasons for the choice of the shop were covered by sections four, five and six in that order. The last section recorded animal health problems encountered by clients in their respective farms.

5.2.3 Estimation of distances covered by clients to the outlets

The estimation of distances travelled by clients to reach a retail outlet were calculated using GIS software (Arcview, ESRI) at ILRI's GIS Lab by the creation of buffer zones graduated at an interval of 5 km up to 25 km from every outlet selected above. Sub-locations represented the clients' origin or home. Distances were then classified into two class intervals. These were 0 – 15 and over 15 Km. Figure 4 shows how the estimation of the distances was done.

Figure 4. Method used to estimate distances from clients' homes to retail outlets using Mkulima Agrovet as reference



5.2.4 Data management and analysis

Data were managed and stored using Microsoft® Access program. Descriptive analyses were conducted using database queries that gave counts and percentages.

Statistical analyses were carried out in Statistical Analysis Systems (SAS Inst., Version 6.12) software. Two models were generated. In the first logistic regression model, the type of product purchased - preventive drugs only versus both Preventive and Curative drugs – was the dependent variable. This analysis was performed using the GENMOD procedure. The independent variables were sex, age in years, relationship between client and end user of drugs (AHA, messenger or self), occupation, livestock ownership, distance, education, income source and experience in cattle husbandry classified as < 10, 10 – 19, 20 – 29 and > 30 years.

The factors determining whether a client sought advice on drug use or not (Yes or No) were also analysed using the GENMOD procedure. Explanatory variables included client characteristics: age, sex, livestock inventory, relationship between client and end user of drugs, experience in livestock husbandry and education level.

Lack of fit (clustering or missing independent variables) in these models were corrected for using DSCALE for both regression analyses above. In both models, explanatory variables were considered as determinants for their respective outcomes at $p < 0.05$.

5.2.5 Constraints

Some clients refused to be interviewed due to various reasons that included lack of time and mistrust of the interviewer's objectives. Others complained that similar interviews had been done in the past yet they did not get any tangible benefits from them. In such cases, the interviewer was forced to fully explain the purposes of the study and how the clients were to benefit upon implementation of intervention measures.

5.3 Results

5.3.1 Number and distribution of clients by division

Eighty-two clients were interviewed in 13 shops, with no clients visiting Mundika general shop (for veterinary products) in the two days the interview was to be conducted there. Fifty percent of these clients were served in Busia Township Division. Table 15 shows the number of clients interviewed in every Division.

Table 15. The number of clients of retail outlets for veterinary drugs interviewed at each division in Busia District

Division	No. of clients	Percentage
Busia Township	41	50.0
Butula	12	14.6
Funyula	13	15.9
Nambale	9	11.0
Matayos	6	7.3
Budalangi	1	1.2

Apparently, the distribution of clients interviewed in each division seemed to mirror the population densities in the respective division. However, this correlation could not be determined because some clients traversed divisional boundaries to reach some outlets. For example, only 24% (n = 10) of the 41 clients served at Busia Township lived within the Division. The rest came from Chakol Division in Teso District, Matayos, Nambale, Funyula and Budalangi divisions and Uganda.

5.3.2 Client characteristics

Descriptive statistics of the clients are shown in Table 16.

Table 16. The characteristics of clients that purchased veterinary drugs from the retail outlets for veterinary drugs in Busia District

Characteristics	Categories	Total	Advice sought with drug purchases			
			Yes	%	No	%
Sex	Males	74	56	75.7	18	24.3
	Females	8	5	62.5	3	37.5
Age	13 – 22 years	8	4	50.0	4	50.0
	23 – 32 years	14	10	71.4	4	28.6
	33 – 42 years	23	19	82.6	4	17.4
	43 – 52 years	16	13	81.3	3	18.7
	53 – 62 years	14	11	78.6	3	21.4
	> 62 years	3	2	66.7	1	33.3
Occupation	AHA	10	5	50.0	5	50.0
	Formal employment	16	11	68.8	5	31.2
	Informal employment	56	45	80.4	11	19.6
Education	None	4	3	75.0	1	25.0
	Primary	24	21	87.5	3	12.5
	Secondary	29	20	69.0	9	31.0
	College	25	17	68.0	8	32.0
Income	Livestock	24	21	87.5	3	12.5
	Crops	16	13	81.3	3	18.7
	Both crops and livestock	3	2	66.7	1	33.3
	Other sources	36	24	66.7	12	33.3
Cattle keeping Experience	< 10 years	49	40	81.6	9	18.4
	10 – 19 years	11	7	63.6	4	36.4
	20 – 29 years	9	7	77.8	2	22.2
	> 30 years	6	4	66.7	2	33.3
Relationship with end user Of drugs	AHA	10	5	50.0	5	50.0
	Messenger	11	3	27.3	8	72.7
	Self	61	53	86.9	8	13.1
Distance from home to shop	< 15 Km	61	46	75.4	15	24.6
	> 15 Km	10	7	70.0	3	30.0

The table shows that the majority (90.2%, n = 74) of the clients were males. There was a very slight variation in the proportions of males and females who sought advice from the shop on drug use.

A large proportion of clients (28%, n = 23) fell in the age bracket 33 – 42 years. Most of them were in informal occupations like masonry, business, farming and etc. Their education levels varied widely. The majority had secondary school education, followed by those who had college and primary education in that order. Slightly more than half of the clients (n = 59, 59.8%) had less than 10 years experience in cattle husbandry. A high proportion of them sought advice on drug use compared to any other group of clients.

Seventy four percent (n = 61) of the clients were the end users of the drugs (farmers). The remaining proportion comprised AHAs (12.2%) and messengers (13.4%). Messengers included friends, neighbours or children of the end users of the drugs. Many (86.9%) end users (self - clients) sought advice from the shop on drug use but the majority of messengers (72.7%) did not. Fifty percent of the AHAs sought advice.

Most of the clients (n = 61, 74%) lived within a distance of 15 Km from the shop where they were interviewed. Distance did not seem to influence advice-seeking ability of the clients.

5.3.3 Drug purchases

A total of 102 drug purchases were made. Some clients especially AHAs made multiple purchases. The majority of these purchases (88.7%, n = 86) were made for cattle. The choice of the shop for these purchases was influenced by price (19.5%, n = 16), availability of drugs (18.3%, n = 15) and recommendations by friends (17.1%, n = 14).

Two modes of classification of the drugs purchased were:

- i) classification according to drug type - antibiotics, trypanocides, anthelmintics, acaricides and antitheilerials; and,
- (ii). classification according to the reasons for the purchase - curative or preventive purposes.

Table 17. Cross - classification of the drugs purchased by clients of the retail outlets for veterinary drugs in Busia District according to type of drugs and reasons for purchase

Drugs purchased	Reasons for purchase		
	Preventive	Curative	Total
Acaricides/pour-ons	20	-	20
Antibiotics	-	30	30
Anthelmintics	10	12	22
Trypanocides	4	21	25
Antitheilerials	-	1	1
Multivitamins	-	4	4
Total	34	68	102

The purchases made, in decreasing order, were antibiotics, trypanocides, anthelmintics and acaricides/pour-ons. Others included multivitamins and antitheilerials (specifically Butalex®). Two-thirds of these drugs were purchased for curative purposes (especially antibiotics, multivitamins, antitheilerials and the majority of trypanocides). As expected all the acaricides/pour-ons were purchased for preventive purposes. Anthelmintics were somewhat evenly distributed between the two groups, though curative purchases formed a slight majority.

Table 18. Classification of type of drugs bought based on the breed and species of livestock kept by clients of veterinary drug outlets in Busia District

Drugs purchased	Livestock type for which the drugs were purchased				Total
	Zebu	Mixed	Grade	Other animal spp.	
Acaricides/pour-ons	11	2	7	0	20
Antibiotics	16	5	6	3	30
Anthelmintics	14	1	3	4	22
Trypanocides	15	6	3	1	25
Antitheilerials	0	0	1	0	1
Multivitamins	2	1	1	0	4
Total	58	15	21	8	102

The majority (56.9%, n = 58) of the drug purchases were made for zebu cattle since 48% (n = 40) of the clients owned zebu cattle only. Sixty nine percent (n = 40) of drug purchases made for zebu cattle were for curative purposes. A lesser proportion (50%, n = 10) of curative purchases were made for grade cattle.

Table 19. The classification of the type of drugs bought in retail outlets for veterinary drugs in Busia District according to the relationship between the client and end user of drugs

Drugs purchased	Relationship between the end user and the client			
	AHA	Messenger	Farmer (self)	Total
Acaricides/pour-ons	0	3	17	20
Antibiotics	5	4	21	30
Anthelmintics	3	2	17	22
Trypanocides	4	4	17	25
Antitheilerials	1	0	0	1
Multivitamins	1		3	4
Total	14	13	75	102

Farmers (end users of drugs) made seventy-five (73.5%) drug purchases. They also represented the majority (74.4%, n = 61) of the clients interviewed at the outlets. Only 14.8% (n = 9) of these clients had prescriptions for their purchases from a veterinary service provider.

5.3.4 Animal health problems

Fifty seven percent of the clients identified trypanosomosis as very important disease in their farms. Other diseases mentioned included East Coast fever and helminthoses.

5.3.5 Regression analyses

(a) The type of drugs bought

The factors that could determine the type of drugs purchased were analysed in the logistic regression model 1. Clients were grouped into two depending on the type of drugs they purchased. These groups were preventive purchases only and both curative and preventive drug purchases. Backward-stepwise variable selection process was adopted to identify significant determinants of the reasons for the purchases at 95% confidence level. The results are shown below.

Table 20. Model information for logistic regression model 1: The factors that determine the type of drugs (preventive or both preventive and curative) purchased by clients of retail outlets for veterinary drugs in Busia District

Description	Value
Distribution	Binomial
Link Function	Logit
Dependent variable	Type of drug(s) purchased
Observations used	63
Number of events	27 (preventive drugs =1)
Number of trials	63
Missing values	19

Table 21. Criteria for analysing the goodness of fit for logistic regression model 1:

The factors that determine the type of drugs (preventive or both preventive and curative) purchased by clients of retail outlets for veterinary drugs in Busia District

Criterion	DF	Value	Value/DF
Deviance	59	72.4138	1.2274
Scaled deviance	59	59.0000	1.0000
Pearson Chi-square	59	61.9863	1.0506
Scaled Pearson X2	59	50.5040	0.8560
Log likelihood	-	- 28.5000	-

Table 22. Results from the logistic regression analysis of the association between the purchase of preventive drug (=outcome) and characteristics of clients of retail outlets for veterinary drugs in Busia District, Kenya

Factor	Estimate	Std Error	Pr > Chi	Odds Ratio
Intercept	4.02	1.48	0.0067	
Pigs				
Present Vs None	1.84	0.76	0.0155	6.42 (95% CI: 1.42, 27.92)
Distance				
>15 Vs <15 Km	1.82	0.94	0.0524	6.17 (95% CI: 1.00, 38.95)
Grade cattle				
Present Vs None	1.77	0.84	0.0357	5.87 (95% CI: 1.13, 30.45)

The scale parameter was estimated by the square root of DEVIANCE/DOF.

The independent variables that were significantly ($p < 0.05$) associated with the purchase of drugs for preventive purposes were ownership of pigs or grade cattle and distance of > 15 Km. between home and retail outlet of choice. The occupation of the client was, however, not significant at this level even though the AHAs bought more curative than preventive drugs. Education was also not statistically significant yet the majority of the 'self' (61.5%, $n = 8$) clients who had college education bought more preventive than curative drugs compared to clients who had primary (37.5%, $n = 9$) and secondary (45.8%, $n = 11$) education only.

The ownership of pigs or grade cattle was associated with increased odds of buying preventive drugs. The odds of buying preventive drugs by pig and grade cattle owners were 6.42 (95% CI: 1.42, 27.92) and 5.87 (95% CI: 1.13, 30.45) times higher than non-pig and non-grade cattle owners, respectively. Living within a distance of 15 km from the shop was associated with buying a curative drug. The odds of buying a

preventive drug by a client living more than 15 km from a drug outlet were 6.17 (95% CI: 1.00, 38.95) higher than those of clients living <15 km.

In reference to informally employed clients, AHAs purchased a higher number of curative than preventive drugs ($p = 0.08$). There was no significant ($p = 0.45$) difference in the numbers of curative and preventive drugs bought by formally employed clients from those of informally employed clients. This variable, however, could not be retained in the model because the change in model scaled deviance when removed was 2 with 2 degrees of freedom.

(b) Advice sought from the shop

In Logistic regression model 2, three variables that could predict whether a client sought advice or not from the shop were identified. These were the age of the client, relationship between client and end user of the drugs, cattle experience and the interaction between age and cattle experience. Age and cattle experience (years) were not significant before their interaction was factored in the model.

Logistic regression model 2

Table 23. Model Information for logistic regression model 2: The factors associated with seeking advice on drug use by the clients of retail outlets for veterinary drugs in Busia District

Description	Value
Distribution	Binomial
Link Function	Logit
Dependent variable	Advice sought (Yes or No)
Observations used	74
Number of events	57
Number of trials	74
Missing values	8

Table 24. Criteria for assessing goodness of fit for logistic regression model 2: The factors associated with seeking advice on drug use by the clients of retail outlets for veterinary drugs in Busia District

Criterion	DF	Value	Value/DF
Deviance	64	56.9035	0.8891
Scaled Deviance	64	64.0000	1.0000
Pearson Chi-Square	64	96.7677	1.5120
Scaled Pearson X2	64	108.8358	1.7006
Log Likelihood		-32.0000	-

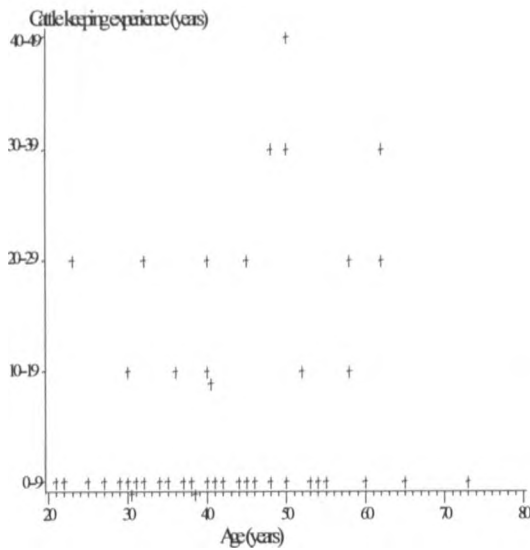
Table 25. Results from the logistic regression analysis of the association between seeking advice from the drug retailers (=outcome) and the characteristics of clients of retail outlets for veterinary drugs in Busia District

Factor	Estimate	Std Error	Pr > Chi	Odds Ratio
Intercept	126.13	2.72	0.0001	
Relation				
Self Vs AHA	1.88	0.83	0.0241	6.55 (95% CI: 1.29, 3.34)
Self Vs Messenger	3.25	0.94	0.0006	25.79 (95% CI: 4.04, 62.78)
Age	-2.03	0.04	0.0001	
Cattle husbandry				
< 10 Vs > 30 Years	-124.79	1.78	0.0001	
10 – 19 Vs > 30 Years	-124.56	3.96	0.0001	
20 – 29 Vs > 30 Years	-125.94	4.04	0.0001	
Age*cattle husbandry.				
< 10 Vs > 30 Years	2.07	0.00	-	
10 – 19 Vs > 30 Years	2.02	0.08	0.0001	
20 – 29 Vs > 30 Years	2.06	0.08	0.0001	

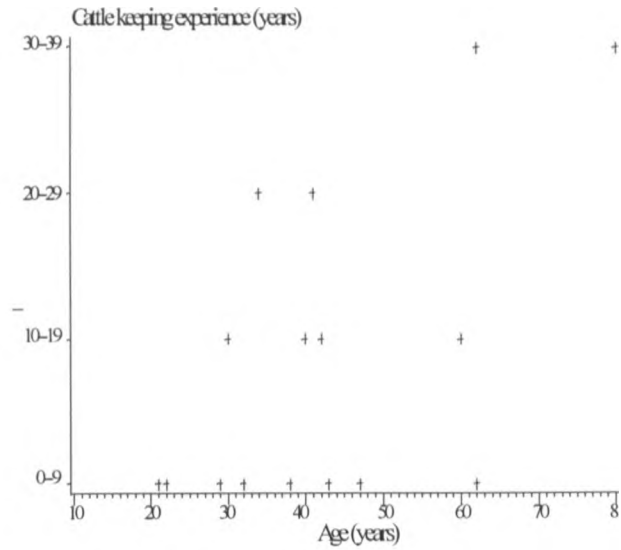
The scale parameter was estimated by the square root of DEVIANCE/DOF.

Figure 5. Graph of Cattle keeping experience by age of client outlining the interaction of these variables in the determination of the ability of a client to seek advice from a drug outlet

(a) Advice sought



(b) Advice not sought



The majority of clients who sought advice from the shop on drug use had minimal experience (0 – 9 years) of cattle husbandry.

The odds of an AHA seeking advice on drug use were low compared to a ‘self’ client (Table 25). The odds were even lower for a messenger to ask for advice when compared to ‘self’ clients.

There was a significant interaction between age and cattle experience to predict whether client sought advice or not. Age is negatively associated with the ability to

seek advice from the shop. When an 80-year-old client is compared to a 40 year one, while keeping cattle keeping experience constant at 10 – 19 years, an odds ratio of 0.54 is obtained. This indicates that the chances of an old client seeking advice from the shop was remote.

5.4 Discussion

5.4.1 Client type

The results indicate that many clients were males aged between 33 and 42 years and in most instances heads of households. Seventy-four percent of them purchased drugs for their animals and the remaining proportion were agents/middle men. Most of them had secondary education. This tied with the fact that many of these clients were engaged in informal income generating activities. Given that about three-quarters of the clients were end users of the drugs, retail outlets for veterinary drugs, and especially agro-veterinary shops, could be effective points for channelling extension messages to farmers.

The main reasons given for the choice of an outlet for drug purchase(s) by clients in this study were price, availability of drugs and the influence of friends who worked in the outlets. Similar reasons for the choice of drug outlets have been reported by McCurnin's (1996), Heller (1982) and Chernichovsky et al. (1986). McCurnin (1986) opined that consumers today are generally looking for choice of products, value, new facilities and items, long business hours, convenient location and friendly personal knowledgeable people to help in a clean bright environment. On the other hand, Heller (1982) and Chernichovsky et al. (1986) in Malaysia and Indonesia respectively identified price, income and distance as important determinants for the choice of health provider.

5.4.2 Clinical and preventive services

Up to 66.7% of the drugs bought were for curative purposes. Ownership of grade cattle and pigs and a distance of > 15 Km. were significant determinants for the purchase of drugs for preventive purposes. AHAs more often than not purchased curative drugs indicating that they mainly offered curative than preventive/herd health services.

Grade cattle and pig owners used prophylactic drugs more often than clients who did not own these animals. It has been recommended that animal health programs should be heavily oriented towards preventive medicine and production with little emphasis on the treatment of individual animals other than those of draft or multipurpose species (Schwabe, 1984).

Physical distance between home and retail drug outlet was also important. Living within a distance of 15 km from a retail outlet was associated with increased odds of purchasing a curative drug. It is therefore probable that farmers who travelled long distances to purchase other items in markets were more likely to buy preventive drugs like acaricides and pour-ons and when an animal got sick, farmers visited the nearest outlet for curative drugs.

Distance has been known to influence the efficiency of veterinary service delivery by increasing transaction costs (Woods, 2000). Differences in acceptable distances covered in the purchase of livestock drugs can be attributed to the types of livestock production systems in an area (Heffernan and Misturelli, 2000). Unlike in pastoralists systems where herders are both willing and accustomed to travelling long distances,

the majority of farmers in Busia District, given their small holder subsistence livestock production systems, travelled less than 15 km to drug stores. The total cost of obtaining animal healthcare at the household level includes the cost of transport, cost of drug and opportunity costs of labour (Heffernan and Misturelli, 2000).

The productivity and access to animal health centre was not studied in this case.

However, Woods (2000) has pointed out that there is a clear correlation between animal health centre location and the productivity of livestock herds.

Gender and education differences between the herders and service providers were not appreciable. The majority of clients, as indicated above, were males with secondary education. The majority of the retailers, on the other hand, had secondary education but there was no significant difference between the number of male and female (Chapter Four) managers. This therefore indicates that there was no big distance in education and gender between service providers in retail outlets for veterinary drugs and their clients in Busia District.

5.4.3 Advice

Retail outlets give a wider, quicker distribution of drugs but break the link between dispensation and advice on their use (Leonard, 2000). Many clients look up to the retail outlets as the most important sources of advice on pharmaceuticals (Goel et al., 1996; Heffernan and Misturelli, 2000). Given that the majority of retailers in Busia District were secondary school leavers (Chapter Four) their advice, when availed, might have been relatively poor. Heffernan and Misturelli (2000) have noted that even in cases where drug sellers have purportedly undergone training, the accuracy of

advice given is often unreliable. From their studies carried out in Baringo, an agro-pastoralist area, drug retailers knew no more or less than the herders themselves.

The factors that were associated with seeking advice from the shop on drug use included buying drugs for own use and the interaction of age and experience of cattle husbandry (in years). Clients who purchased drugs for their own use sought advice more than AHAs and messengers. AHAs believed that they had all the necessary information on drugs.

The age of the client and experience of keeping cattle had a significant interaction to determine advice-seeking ability of the client. The graphs of age and cattle keeping experience indicate that clients started raising cattle at different times, with some old clients having an experience of less than 10 years. However, the majority of clients who had minimal experience of cattle husbandry commonly sought advice on drug use. This demonstrates that the association of age with advice seeking ability depended on the level of cattle keeping experience.

5.4.4 Animal health problems

Previous studies have identified trypanosomosis as the most important animal health problem in the District and especially in Budalangi and Funyula areas (Anonymous, 1997). The response by the shop managers in Chapter Four and their clients (in this Chapter) that trypanosomosis was both the most important disease and the disease that extra advice was commonly sought on is in agreement with the above findings. It also explains why trypanocides, especially Veriben®, were the commonly stocked and bought drugs in the region.

CHAPTER SIX

6.0 Conclusions and Recommendations

6.1 Conclusions

The conclusions that could be drawn from this chapter include:

1. Retail outlets for veterinary drugs in Busia District were evenly distributed but lacked capacities to offer quality advice on drug use.
2. The Pesticide Control Board that licences veterinary drug outlets and the Kenya Veterinary Board that vets animal health providers have not done their best in controlling marketing of veterinary drugs and the provision of veterinary services.
3. Farmers were more often than not treating their animals without recourse to technical help from animal health specialists.
4. Trypanosomosis was of economic importance to the farmers in the District.

6.2 General Recommendations

1. The role played by the retail outlets in the provision of veterinary clinical services should be recognised to allow for the enactment of policy regulations governing their establishment, basic requirements for the employment of retailers and conduct in their operations.
2. The privatisation scheme currently targeting veterinarians only should be extended to animal health assistants so that more skilled animal health providers operated livestock drug stores. A short-term intervention measure that could be implemented before the above could be training of the retailers on safe dispensing of drugs and appropriate referral of cases that they cannot manage.

3. Farmers should be sensitised through these retail outlets on the need to judiciously use drugs to delay the onset resistance to the commonly used drugs and more importantly, to adopt integrated disease control measures.
4. The Kenya Veterinary Board should also organise for programs aimed at educating/sensitising farmers and veterinary service providers on the use of veterinary drugs.
5. The Pharmacy and Poisons Board should also enforce regulations on marketing of antibiotics to limit unscrupulous retailing of these products.
6. More studies should be done to determine the proportion of farmers that use licensed drug outlets as opposed to those who use freelance retailers and taking into consideration acceptability, accessibility and affordability of these services.

CHAPTER SEVEN

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CHAPTER EIGHT

8.0 APPENDICES

8.1 Appendix 1

DUKA IDENTIFICATION SURVEY FORM

Instructions for filling the form: (I) please take great care, (ii) complete all the questions, (iii) do NOT leave blank spaces, (iv) if the answer is don't know – enter DK

1. Enumerator's details

1.	Name of enumerator	
2.	Profession*	
3.	Date of interview	

*Vet./anthropologist

2. Shop details

1.	Ref. No	
2.	Owner's name	
3.	Manager's name	
4.	Trading name	
5.	License displayed Y/N	
6.	Classification	
7.	Tel No	
8.	Division	
9.	Location	
10.	Address from which service is provided	
11.	GPS Location (reading in decimal degrees with 5 decimal places, ARC 1960)	LATITUDE: LONGITUDE: ALTITUDE:

3. Local Landmark(s) _____ (eg Road name, Building, Sketch map etc.)

4. Is this operation part of another organization Y / N (circle the answer that applies)

If yes, what is its:

Name _____

Our Ref _____

Address _____

Tel. No. _____

Owners Name _____

Address (if different from the shop's) _____

Manager's name _____

Respondent _____

5 (a) When is the owner/manager available for interview?

5 (b) Where and How to contact?

6 (a) What is the total (approximate) number of farmers you see each day _____
(Sales record book?)

6 (b) How many of these farmers buy Animal Health Products _____
What is the main category of sales?

i) Animal Health _____

ii) Other (Specify) _____

7. Comments

8.2 Appendix II

SHOPKEEPER INTERVIEW ON VETERINARY DRUGS

Name of the enumerator	
Date of interview	

SECTION ONE: LOCATION DETAILS

1	Division			
2	Location of shop			
3	Name of shop			
4	GPS readings (readings in decimal degrees with 5 decimal places, ARC 1960)	NORTH (N) EAST (E) ALTITUDE		Format N00.01217 Format E35.22283 Format 2489

SECTION TWO: OWNER/RETAILER DETAILS

1	Name
2	Sex: Male Female Age
3	Main Activity or occupation
4	Education level
5	Qualification
6	Experience
7	Length of livestock keeping experience

SECTION THREE: SALES PERSON'S DETAILS

1	Name
2	Sex: Male Female Age
3	Main Activity or occupation
4	Education level
5	Qualification
6	Experience
7	Relationship to the owner

SECTION FOUR: DETAILS OF SHOP

1. What is the nature of shop ownership
 - a. Sole trader/family business
 - b. Partnership
 - c. Co-operative/self help group
 - d. NGO

2. When was business established?
3. Does the owner has other similar businesses elsewhere?
4. How many people are employed in the shop?
5. What training/experience does the owner require staff?

SECTION FIVE: BUSINESS DETAILS

1. What type of products/services do you supply
 - a. Animal health products
 - b. Animal feeds
 - c. Fertilisers
 - d. Seeds
 - e. AI
 - f. Human pharmaceuticals
 - g. Hardware
 - h. Groceries
2. Who supplies you with animal health products
 - a. Wholesalers
 - b. Manufacturers
 - c. Other (Specify)
3. Do the suppliers offer advice/information?
 - a. Without being asked
 - b. Only when asked
 - c. Not at all
4. What are your sources of animal health products information in order of most frequently used?
 - a. AHAs/Vets
 - b. Drug suppliers
 - c. Posters
 - d. Drug leaflets
 - e. Other
5. What animal health products do you stock?
 - a. Trypanocides
 - b. ECF drugs
 - c. Dewormers
 - d. Antibiotics
 - e. Acaricides/pour ons
 - f. Vaccines
 - g. Other

6. Which ones are regularly stocked?
7. What determines products to be stocked?
8. Who decides what to stock?
 - a. Owner
 - b. Sales person
 - c. Both
9. What drugs do you sell most often? (Rank from most sold to least sold)
 - a. Trypanocides
 - b. ECF drugs
 - c. Dewormers
 - d. Antibiotics
 - e. Acaricides/pour-ons
 - f. Vaccines
 - g. Other

SECTION SIX: CLIENTELE DETAILS

1. Who buys your drugs?
 - a. Farmers
 - b. Vendors
 - c. AHAs
2. How many clients do you get per day?
3. When clients come to your shop, do they:
 - a. Ask for medicines?
 - b. Ask for medicines and advice on using the drugs for particular diseases?
 - c. Ask for administration of drugs in their animals?
 - d. Ask for advice only?
4. Do clients know:
 - a. What drugs they want?
 - b. How to use them?
5. What disease do farmers complain about mostly in their animals?
6. What disease do they usually require advice on?
7. How important do you think trypanosomosis is to your clients?
 - a. Very important
 - b. Moderately important
 - c. Not important
8. How important do you think trypanosomosis is in this area?
 - a. Very important
 - b. Moderately important
 - c. Not important

8.3 Appendix III

CLIENT INTERVIEW ON USAGE OF VETERINARY DRUGS

Name of enumerator	
Date of interview	

SECTION ONE: LOCATION AND INTERVIEW DETAILS

1	Division	
2	Name & Number of shop	

SECTION TWO: CLIENT DETAILS

1	Name:		
2	Sex : Male	Female	3. Age:
4	Division:	5	Sublocation:
6	Village:		
7	Main activity or occupation ^a :		
8	Education level (circle one): (a) No formal ed ⁿ (b) 1 ^{ty} school (c) 2 ^{ty} school (d) Adult education (d) College (Agric, Teacher, etc.) (e) Other (specify)		
9	Main source of income (circle one): (a) livestock (b) crops (c) other (specify)		
10	Years of cattle keeping experience ^b :		

^aMain activity: Farm mgt; Formal employment; Businessman; Labourer; Retired with/without pension; Other (specify)

^bIndicate (0) if none

SECTION THREE: FARMER DETAILS (i.e. end-user of the drugs)

1.	Name of head of household:		
3.	Sex of head of household: Male Female		
4.	Age of head of household:		
5.	Relationship of household head to client (circle one): (a) Self (b) Son (c) Daughter (d) Other relative (e) Neighbour (f) Friend (g) Other (specify)		
6	Division:	7	Sublocation:
8.	Village:		
9.	Main activity or occupation:		
10	Education level (circle one): (a) No formal ed ⁿ (b) 1 ^{ry} school (c) 2 ^{ry} school (d) Adult education (d) College (Agric, Teacher, etc.) (e) Other (specify)		
11.	Years of cattle keeping experience ^b :		
12.	Main source of income (circle one): (a) livestock (b) crops (c) other (specify)		
13.	Who in household requested drugs (circle one): (a) Household head (b) Other (specify)		

^aMain activity: Farm mgt; Formal employment; Businessman; Labourer; Retired with/without pension; Other (specify)

^bIndicate (0) if none

SECTION FOUR: LIVESTOCK INVENTORY (END-USER)

Indicate (E) if number estimated by respondent who is not the farmer

Livestock species	Number kept	Livestock species	Number kept
Local cattle		Pigs	
Grade cattle		Poultry	
Goats		Sheep	
Other (Specify)			

SECTION FIVE: DRUG PURCHASES

1. (a) What drugs have you bought today? (Specify name of drug)
 (b) Why did you buy each of these drugs? (Ask for clinical signs or disease names or whether somebody advised them to buy the drugs)

	Drug name	Reason for purchase
a. Trypanocides		
b. ECF drugs		
c. Dewormers		
d. Antibiotics		
e. Acaricides/pour-ons		

1. How often do you buy drugs? (circle one)

- (a) Every week (b) Every month (c) Four times a year
 (d) Twice a year (e) Once a year (f) This the 1st Time

2. How often do you buy drugs for other people? (circle one)

- (a) Every week (b) Every month (c) Four times a year
 (d) Twice a year (e) Once a year (f) This the 1st Time (g) Never

3. How often have you bought each of these drugs over the last 12 months?

1. Trypanocides	
2. ECF drugs	
4. Dewormers	
5. Antibiotics	
6. Acaricides/Pour ons	

1. Why did you choose this shop? (Rank 1-6 according to importance)

- a. Price of goods _____ (1 = Most important)
- b. Distance _____
- c. Quality of Advice _____
- d. Credit _____
- e. Recommendation _____
- f. Range of products _____
- g. Other _____

4. Do you ask for advice on drugs and diseases from the shopkeeper? Yes No

5. Does the shopkeeper offer this advice without being asked? Yes No

6. Is the level of service provided by this Duka adequate?

(a) Very Good (b) Good (c) Not Good (d) Poor

7. How could the service be improved?

8. Where else do you obtain drugs?

(a) Veterinary (b) AHA (c) Duka (Specify)
(d) Other farmer (e) Traders (f) Other (Specify)

9. Where do you get information about animal diseases and how to treat them?

(a) Veterinary (b) AHA (c) Duka (Specify)
(d) Other farmer (e) Traders (f) Other (Specify)

SECTION SEVEN: GENERAL HEALTH PROBLEMS

1. What is the most important health problem that you encounter in your animals?

2. What animal health problem do you most often require advice on?

3. How important do you think trypanosomosis / tsetse fly (*Mabuko*, *Lutako*, *Mbungo*) is in your area? (circle one)

(a) Very important (b) Moderately important (c) Not Important

4. What medicines do you use for trypanosomosis? _____