

**MANAGEMENT OF MALIGNANT CATARRHAL FEVER AMONG
THE PASTORAL MAASAI OF KAJIADO DISTRICT, KENYA**

**BY
GATARWA ANTHONY KARIUKI**

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DECLARATION

**This thesis is my original work and has not been submitted
to any other University for a degree award.**


Gatarwa Anthony Kariuki (Candidate)

03.04.01
Date

This thesis has been examined with my approval and passed


Dr. Leunita Auko Muruli (Supervisor)

3.04.01
Date

**INSTITUTE OF AFRICAN STUDIES
UNIVERSITY OF NAIROBI**

DEDICATION

**In Memory of My Late Father, William Kariuki Kagoiya, and to
My Mother, Flora Wanjiru Kariuki**

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ABBREVIATIONS

CBS	Central Bureau of Statistics (Kenya)
DfID	Department for International Development (UK)
ECF	East Coast Fever
FMD	Foot and Mouth Disease
FRG	Federal Republic of Germany
IIED	International Institute for Economics and Development
ITDG	Intermediate Technology Development Group
KARI	Kenya Agricultural Research Institute
KWS	Kenya Wildlife Service
LADP	Loitokitok Area Development Programme
MAB	Man and Biosphere
MCF	Malignant Catarrhal Fever
NARP	National Agricultural Research Project
WVI	World Vision International

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ABSTRACT

The major purpose of this study was to investigate Maasai knowledge in the conceptualization, diagnosis, treatment and control of Malignant Catarrhal Fever (MCF). Specifically, the study focused on the description of Maasai knowledge and perceptions of MCF, gender and age roles in livestock production and management of MCF, and the influence of environmental factors on incidence and persistence of MCF. In addition, the extent to which traditional knowledge is applied for management of MCF was examined.

Data for the study were collected from single-subject interviews using a semi-structured questionnaire, group discussion, in-depth interviews of key informants and direct observation. Cultural ecology was used as the theoretical framework of analysis.

Findings suggest that the Maasai have extensive knowledge of MCF as they have had to cope with it for as long as they could remember. They also adhere to a cultural code of conduct that defines, explains and upholds the roles and power relations between men and women on the one hand and the young and old on the other. Knowledge about the disease does not differ by gender, but age is an important factor in understanding the cause and describing the symptoms of the disease. Women shoulder the bigger responsibility in nurturing sick animals, which suggests an enhanced status in responsibility bearing.

The study suggests the need for research to integrate indigenous knowledge with conventional knowledge for identifying and formulating interventions that are locally sustainable. There is also need to assess existing and emerging ethnoveterinary practices for their efficacy, effectiveness and efficiency.

CHAPTER 1

BACKGROUND AND PROBLEM STATEMENT

1.0 Introduction

The focus of this study is on Malignant Catarrhal Fever (MCF). This is an infectious fever of cattle in which there are acute inflammatory changes in the mucous membranes, particularly those of the respiratory system (West, 1988). It is most common in Africa. Infection is said to occur when an animal feeds on grass where a wildebeest has calved. Aberrant hosts inhale infected aerosol droplets generated by young wildebeest calves directly or by sniffing contaminated pastures. Although no case of cross-infection has been reported between cattle, the Maasai believe this does occur. MCF has no known cure and no technological package has been developed to combat this disease. It is highly fatal with one out of every two animals attacked dying in 3-12 days.

In this chapter the organization and problems afflicting the pastoral economy in general are reviewed, the problem is stated and a justification for the study given. This background review helps to position livestock health care in general and MCF in particular to the wider context of the characteristics of a pastoral livestock production system.

1.1 The Pastoral Economy

Pastoralism is the dominant way of life in fourteen districts falling under the arid and semi-arid lands (ASALs) of Kenya. These districts account for about 8% of the country's population and occupy roughly 63% of the total land area (Narman, 1990; CBS, 1994). Pastoralism is a system of production and a socio-cultural system of interaction between herders, animals and a given mode of resource management.

The pastoral production system is one that essentially derives from the exploitation of forage and water to maintain and increase livestock inventory. It excludes intensive dairy farming and is traditionally practiced in areas either too cold or too dry to permit the cultivation of crops (Gefu and Gilles, 1990). The system is primarily geared towards meeting the subsistence needs of the pastoralists by providing the major ingredients of their diets, which traditionally consist of milk, meat and blood.¹

However the people will often convert stock which is surplus to their subsistence needs into social relationships through acquisition of affines or by tying clients to them with gifts and loans, thereby increasing their range of social involvement (Asad, 1964; Bekure *et al*, 1991). Kinship institutions provide the means by which new families are equipped with a viable herd for independent pastoral production.

Baxter (1975) identifies three categories of stock-keeping peoples. The first category consists of pure pastoralists whose livelihood is entirely dependent upon livestock and are not involved in any form of cultivation. Second are those pastoralists who cannot

¹ The Maasai do not bleed cattle for subsistence unless under conditions of prolonged droughts or when maize meal is scarce. They will however bleed them during circumcision and childbirth (Talle, 1987).

subsist by their stock only and who practice a transhumant mode of pastoralism by oscillating between ephemeral sedentary agriculture and pastoral nomadism. The third category includes those who are primarily agriculturists but who continue to maintain strong pastoral values. For example, in the early 1950's among the Borana of Isiolo District, wealthy men who had settled near Garbatula cultivated the land and used dependent kin to tend to their flocks with the aim of maintaining connections, both in town and in camps.

1.1.1 Constraints to Production

The pastoral peoples of Kenya seem to have subsisted almost entirely from their herds or flocks even in the harshest years and there is little evidence that non-pastoral products formed an important part of their diet until recently and then in conditions of almost total famine (Baxter, 1975). The cardinal priority of meeting the immediate requirements for food was achieved by utilizing animal products. Poor families with no herds or few animals that could not sustain their minimum requirements would depend on the goodwill of kin, friends, neighbors or on relief agencies for handouts of food or they would sell part of their labor to richer herd owners in exchange of food. Such dependency only exacerbated self-aggravating poverty rather than encouraging self-reliance. Self-esteem and freedom of choice for such people was highly eroded.

By and large the pastoralist was isolated from the main arena of the national economy. But extreme conditions such as severe droughts and disease epidemics precipitated the turning points in the pastoralists' way of life in the sixties and early seventies (O'Leary, 1985). They recognized that absolute reliance on pastoralism was not sufficient to provide the economic base necessary to improve on their standards of living neither was it adequate to cushion them against the undesirable effects of environmental hazards. A scenario emerged whereby the range and texture of social relationships started changing and the nexus of mutual dependence started to fade slowly. Today there is an increasing linkage to the national and international trading chains and participation in the exchange market for labor and for output is becoming increasingly significant.

The relationship between nomadic populations and their natural environment depends upon the size of the human and herd populations and the capacity of the environment to provide feed and water for domestic animals. The pastoralists' environment is uncertain as it is characterized by poor soils, high temperatures, low and erratic rainfall and high rates of evapotranspiration. The uncertainty in the physical, biological and social environments is important to pastoralists in deciding how to manage their herds. Pastures and water are the two most important natural resources that support the livestock based production and the way they are managed has important ramifications on the pastoralists' welfare.

Since disease and drought often decimate large herds, their regularity and severity are the most important determinants of the social and economic welfare of the herders and their families. The strategies to cope with the pernicious effects of these afflictions are, therefore, of critical concern to those who are directly affected and should attract the attention of those responsible for formulating policies aimed at improving the economic base and minimizing risk in a pastoral livestock production system.

1.1.2 Coping Strategies

Among most pastoralists, the maximum herd that a family can manage is often greater or equal to the minimum herd required for subsistence (Horowitz, 1979). The rationale behind large numbers is predicated upon the notion that post-drought survival is dependent upon the absolute numbers of livestock possessed. Thus, the larger the number of livestock, the more likely that a larger number will survive drought. Therefore, it is assumed that a herder who owns a hundred heads will be better off than one with twenty should they each lose fifty percent of their herds.

For the pastoral family, it becomes necessary to keep a sufficient number of animals to provide security against drought and disease. It also ensures that the family will be able to weather those years when animal offtake rates must be increased as a result of unfavorable shifts in terms of trade viz. a viz. other purchased goods and services comprising the consumption basket (Sutter, 1982). This is because during

drought, prices of livestock fall while those of cereal grain rise, thereby making supplementary subsistence relatively more expensive.

The diversity, mobility and movement of herds, as practiced by pastoral nomads, is a primary tool of herd management which provides an opportunity for animals to do better than under sedentary conditions. Fratkin and Roth (1990) have identified three alternative economic strategies that are now available to ensure self-sufficiency for stockowners falling below the minimum level of *per capita* livestock units. One is herding for other more affluent herd owners in return for the loan of milk animals to feed their families. The second is reliance on the cash economy through the sale of the remaining livestock, while the third is to abandon the pastoral economy and seek for wage employment outside the pastoral sector. These strategies have led to a decrease in the ability to be self-sufficient in the pastoral economy and an increased level of dependency. Today many families survive only marginally as pastoralists and a differentiation of *bomas* into wealthy and unpropertied categories is being generated (Talle, 1987; Fratkin and Roth, 1990; Fratkin, 1991; Little, 1983, 1987).

When times are hard many pastoralists are forced to flock to towns where they can obtain provisions for food, water, clinics and schools from the state, churches and relief organizations. In the process, some of them become sedentary nomads around these permanent settlements and only move their animals to graze in the fields rather than shift with them when circumstances demand. This shift from a

mode of living characterized by nomadic pastoralism towards sedentarization has implications on the demand for economic activities and social amenities. This exerts pressure on the pastoralists to adjust their mode of "traditional" living to conform to the exigencies of "modern" living. Strategies have to be adopted in order to cope with the changing circumstances. Among these is sending children to school in the hope that they would secure paid jobs after school and thereby supplement for family needs. Thus the status of children is changing from being merely a source and reserve for family labor and are increasingly being seen as a source of gainful investment for the future.

Some pastoralists migrate to sell their labor in other parts of the country from where they may remit part of their earnings back home. Their low educational status, however, limits them to job markets with poor pay. A few engage in crop cultivation where feasible while others engage in petty trade. However, not all pastoralists who move out turn to non-pastoral activities as a number of them are assisted by development organizations with gifts of animals to enable them resume their pastoral way of life. While providing new opportunities to earn a livelihood, these activities by government, NGOs, churches and affiliated bodies, do change the style of living and many traditional strategies and practices are abandoned or eventually become obsolete.

1.2 Statement of the Problem

Disease and drought are the two most devastating phenomena afflicting the Maasai and their herds in Kajiado District. The incidence of disease, lack of water and pastures adversely affect livestock productivity. The three most important diseases are Malignant Catarrhal Fever (MCF), East Coast Fever (ECF) and Food and Mouth Disease (FMD). Others include anthrax, rinderpest, anaplasmosis, brucellosis and leptospirosis.

A disease outbreak requires a change in the management strategies that call for thorough knowledge of the disease with respect to its cause, symptoms, consequences and control. Any external influence, which alters the size and structure of the herd, will obviously have an impact on allocation of labor, availability and access to food for the affected family. It also means that decisions have to be made at the family level to cope with the new circumstances. The study focused on how these options impact on overall household² dynamics considering that a household is a functional whole made up of inter-related parts that respond to both internal and external perturbations.

² In the Maasai context there is no single word that corresponds precisely to "household" (Bekure *et al*, 1991). A household is commonly referred to as "boma" (*enkang*) which is a joint unit for livestock activities. It is headed by the man and includes his wife/wives, all their children (married/unmarried) and dependant kin. The house (*enkaji*) is constructed and owned by the woman.

1.3 Objectives of the Study

The study derives from a set of objectives aimed at answering questions relating to perceptions and management of MCF among Maasai herders. The broad objective of the study was to investigate Maasai knowledge in the conceptualization, diagnosis, treatment and control of MCF. Specifically the study sought to:

1. Describe knowledge and perceptions of MCF by Maasai men and women.
2. Describe gender and age perspectives in the division of labor and decision-making in the management of MCF.
3. Identify environmental and human factors that influence incidence and management of MCF.
4. Examine the extent of use of traditional knowledge in the management of MCF.

1.4 Rationale of the Study

In line with the objectives of the National Development Policy, the Kenya Government lays considerable emphasis on the need to bring development and change in the arid and semi-arid lands. Majority of the people living in the ASALs are pastoralists but semi-pastoral and farming communities have increased due to immigration and sub-division of land. Apart from the provision of adequate supplies of water, the key to dryland livestock production is the use of low cost and appropriate technical packages to deal with drought and disease. The control of livestock disease, an important constraint in the improvement of food production in

Africa, is expected to play a key role in resolving what Huss-Ashmore refers to as the "complex crisis in African food systems" (Huss-Ashmore, 1996:162). The Maasai of Kajiado District are part of this heritage and this study addressed their concerns with respect to livestock health care.

This study sought the Maasai knowledge about the etiology and endemiology of MCF. Although the Maasai are said to have developed a remarkable knowledge of pharmacopoeia to deal with illnesses, diseases, or the pain of both humans and animals (Lehman and Mihalyi, 1982), documentation of how they perceive MCF in relation to their traditional context and to modern science is missing. No social studies have been done on MCF among the Maasai and this study is a pioneering step in that direction.

This kind of study is necessary if one acknowledges that traditional knowledge is important as a tool in development and combined with modern knowledge they can achieve what each cannot possibly achieve in isolation. It is hoped that information obtained from the people on their knowledge will complement the efforts of modern science in the search of control measures for MCF. This conforms with the view that research should take existing indigenous practice as its starting point, seeking to refine this in various ways and then to feed results into the system (Howes and Chambers, 1979).

Finally, this study was part of a larger MCF research project planned under the aegis of the KARI/DfID/NARP II Project. It provides socio-cultural and economic information that the veterinary and other scientists could use to fine-tune their technological interventions so that they are compatible with the social, economic, technical and cultural practices of the Maasai.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

This chapter focuses on review of literature that provides background information on several aspects of the Maasai. The focus is on contributions by various authors on some important facets of Maasai life: their history, economy, resource sharing, social organization and how all these integrate into their culture. In addition a theoretical orientation, which forms the framework for analysis, is presented and its relevance to this study explained. Cultural ecology theory is adopted to investigate the interaction of culture and nature in explaining allocation of labor and responsibilities, attitudes and behavior toward changes in the production environment. Hypotheses are formulated and an operational definition of variables given.

2.1 Recent History of the Maasai

The Maasai proper occupy land in the part of the East African plateau which generally varies between 600 and 2000m above sea level--the forested region on the western escarpment of the Rift Valley averages between 2440 to 3960m while the eastern Maasai tribes occupy land only 600 - 1100m above sea level (Jacobs, 1975).

The western lands are generally better watered and provide better grazing than the eastern lands which are hot, dry and windy receiving a maximum of only 350mm of

rain per year. Bernsten argues that the degree of choice of the Maasai to live in this region is limited by environmental conditions and cultural values while other authorities are said to emphasize that it is on personal choice that they lead a pastoral life (Bernsten, 1977).

It is here argued that Bernsten's view appears to be a more logical deduction as this is a region which offers little else in terms of economic opportunity. The situation is exacerbated by limited natural resources to be exploited particularly due to erratic and unreliable rainfall, poor soils, recurrent scourges of drought, and disease. Combined, these take a heavy toll on both human and animal life. Surface water of the lakes to be found in the Rift Valley and seasonal pools in the rainy seasons form the centers of Maasai social and political life and from which they exploit the surrounding pastures. This makes them lead a transhumant mode of pastoralism rather than a true nomadic life as they move annually between dry and wet season grazing areas.

The Maasai were composed of two groups, the *Iloikop* and the *Ilmaasai* (Were and Wanjala, 1986). The former were oriented to agriculture while the latter were pastoralists and are the second largest pastoral group after the Somali. They are said to have migrated from the Southern Sudan and the adjacent areas of Ethiopia to East Africa during the 15th and 16th centuries as a result of prolonged drought, disease epidemics and increased population pressure. In the 19th century, wars

between the two groups weakened Maasai power. These wars played an important part in determining the pre-colonial distribution of the Maasai. It is argued that it is a result of the maneuvers of the colonial government that they were restricted to the "Maasai Reserve" which was in an environment largely marginal and which conditioned them to practice a pastoral subsistence economy (Bernsten, 1977; Were and Wanjala, 1986; Campbell, 1991).

While the treaty of 1902 recognized the social and cultural identity of the Maasai and hence allocation of land to them as reserves, the 1911 treaty led to appropriation and alienation of their most fertile land on the Rift Valley floor and the adjacent highlands. The "Maasai Reserve" was highly infested with tsetse fly and East Coast Fever pathogens. Competition from wildlife and cultivation by other ethnic groups such as the *Agikuyu* and *Abagusii* further reduced the availability of grazing land and water. The Maasai may have lost well over 1,000 square miles of grazing over the past century as the Laikipia plateau, the Ngong hills, the Mara plains, the Amboseli swamp and the Mau forest area were removed from their control by these other interests (Little, 1987) as quoted in Scoones (1994). One consequence of this was the movement to Kajiado and Narok Districts. The Group Ranch Scheme implemented by the Kenya Government in the 1970s also precipitated internal movement in modern Maasailand. This pattern continues today in Maasailand and is further accelerated by the sub-division of land into individual holdings under freehold entitlement.

The Maasai of Kajiado District are generally composed of large sub-communities known as sections (*iloshon*). There are presently eight sections; *Ilkekonyoikie*, *Ilodokilani*, *Ilkaputiei*, *Ildamat*, *Ildala le kut*, *Ilpurko*, *Ilmatapato* and *Ilkisonko*. The ninth has been absorbed among the eight as it is said they could not stick together because of witchcraft among its members. This section is known as *Iloonkidong'i* and it has been described as "a dynasty of diviners and prophets who mostly lived on the boundaries between the major tribal sections" (Spencer, 1988:4).

Kajiado is regarded as one of the most important traditional habitats of the Maasai and an important spot for tourists particularly to the Amboseli National Park. But an increase in human and animal population coupled with contact with "outsiders" (meaning people of other ethnic origin) is said to cause an acceleration in the rate of desertification and a weakening of adherence to customary norms of marriage, kinship and animal husbandry.

2.2 The Economy

The production system of the Maasai is based upon the acquisition of land, livestock and labor by the production groups. Subsistence production has been and remains the dominant sector of the economy. Livestock is not only the major cog that drives the economic wheel but it also serves to cement, legalize, validate and enhance social relationships through exchange or transfer of animals as outright gifts or as loans on a short or long-term basis (Talle, 1987; Bekure *et al*, 1991; Ndagala, 1992).

Animals kept (cattle, sheep, goats and donkeys) are owned by individual families (*ilmare*) and are herded and watered by the cattle camp which consists of the co-residential unit. These animals have different nutritional needs, water requirements and susceptibility to disease thus allowing for the exploitation of different ecological niches.

The *boma* is not only a collection of physical structures sheltering people and young animals but it is also a property-holding unit of central importance and is the focus of crucial productive and reproductive activities (Talle, 1987). A unit consists of several independent, polygynous families, the size of which is determined by the labor needed to manage the herds and flocks that support the family (Dahl and Hjort, 1976). But as the Maasai have become increasingly more sedentary and moved toward individualization of production, the single-family *boma* is becoming increasingly common.

Cattle are most prized as a source of food (read milk) and may be sold to meet major cash obligations while small stock may be slaughtered at home, for ceremonies or sold to meet immediate household exigencies. Hides and skins, which were used mainly for making bedding and clothing, are now gaining importance as a source of income as they enter the sphere of monetary exchange in the market. Sedentary agriculture is possible where rainfall exceeds 600mm, along river valleys and on mountain slopes.

According to Bernstein (1977), relations between the Maasai pastoralists and the agricultural peoples around them show a greater variation due to the wide range of environments occupied by various groups of agriculturists, but more importantly due to the different cultural backgrounds of the various groups. For instance their relations with the more agricultural people such as the *Agikuyu* with whom they formed symbiotic relationships by exchanging grain for livestock was relatively more peaceful than those others who practiced pastoralism such as the *Akamba*. Other factors that facilitated interaction between the Maasai and their neighbors include whether the two peoples shared common cultural phenomena such as language, age-set structure or a rite such as clitoridectomy.

2.3 Gender and Social Organisation

The Maasai society is recognized as patriarchal in structure and male dominated in ideology (Galaty, 1979). The patrilineal clan organization and the male age-set system are crucial organizing principles, which mediate the control of means of production and labor into the hands of married men, providing for gender inequality in social relations of production and reproduction. Men have rights of control while women have usufruct rights to livestock. Women, and to some extent unmarried youths, are regarded as minors. The products of their labor, and of their procreative resources, are largely appropriated by the men occupying the elder status in the age-set system.

The bond between husbands and wives seems to center on livestock and children (Almagor, 1978) with women providing fertility to reproduce children and men providing livestock for maintaining their families. Within the traditional economy, women are still tied down to the domestic sphere and the village in a way that men are not; collecting firewood, fetching water and milking the cattle (Spencer, 1988). In effect they take immediate responsibility for the herds at night, while males retain overall responsibility and especially when the herds are grazing away from the village in daytime. This gives the women a subordinate role within the husbandry sector of the economy.

However, there is also belief that it would be unpropitious for men to undertake the women's tasks, and in the extreme circumstances this can provide a weapon for women to defend their basic rights. They can threaten to humiliate the elders by withdrawing their labor. To this extent at least, the women's sphere has "a certain autonomy, and forms a separate economic sector in its own right, subordinate and yet not wholly subdued" (Spencer, 1988:21). Evidence gathered in the present study and presented later in the discussion suggests that the gap in power relations may be diminishing in favor of women.

The animals, which are allocated to a woman and her children at culturally prescribed occasions, constitute the sustenance base of the members of the house, and the animals cannot be transacted or converted easily. Final say in matters relating to

livestock is more often a result of negotiations and consultations with other members of the domestic group.

2.4 The Age-Set System

The Maasai age-set system (*Ilporon*) has been a central feature and continues to be an important principle of Maasai social and economic organization (Almagor, 1978; Were and Wanjala, 1986) and in many cases it was more important than clanship in determining one's friends and close associates (Bernsten, 1977). Age is important in ordering the productive and reproductive capacities of the society. The age-set organization, which provides the framework for allocating tasks and resources, is based upon a division of the male population into age-grades which are arranged hierarchically within a framework of authority positions and rules of appropriate behavior (Were and Wanjala, 1986). It is formally ritualized among males but not women. Through an elaborate combination of rights, obligations and prohibitions, age regulates human fertility, sexuality, division of labor, access to and control of pastoral resources.

In essence age-sets function to support the creation of social order. They help to hold societies together by ordering relations among those of different ages by creating links that cut across the boundaries of kin groups, providing the individual with an even greater range of people to call on for assistance. The structure and significance of age-sets vary considerably from one society to another (Ndagala,

1992). Some follow a linear progression, in which those born during a specific period belong to a single set that moves through a series of grades as the members grow older. Others adhere to a cyclic pattern, whereby sets accept new members on a periodic basis. While age-sets may perform limited functions in some societies they may have tremendous importance in others such as the Maasai.

In some pastoral societies such as the Nandi, power, (the ability to exert control over the behavior of others) is laid with the elders due to their control of the means of production (Oboler, 1985). Seniority in age, however, does not automatically translate to dominance in resource control. There also exist culturally defined factors, which may intervene on behalf of or against a member of a given age-grade in respect of the resource control principles. For instance in case of death, a circumcised boy may inherit his father's herds earlier than otherwise expected (Almagor, 1978).

2.5 Distribution and Control of Resources

Traditionally, the resources of pasture and water have been owned on a communal basis at the clan level. The Maasai adopted traditional management techniques to conserve and improve their pastures (Jacobs, 1975) as cited in Bernsten (1977). The system consisted of elaborate grazing sequences involving systematic reconnaissance of movement to wet season reserves. There was regular use of donkeys to carry water both to expand the grazing area and to permit camps to stay away from their

dry season reserves as long as possible. But where this study was conducted, the provision of watering points along the Loitokitok to Emali pipeline has greatly reduced the need for this laborious task.

There was also a careful management of sheep and goats to avoid damage to grass at critical growth periods and to extend grassland by regular browsing of bush. During good years of rainfall, moderate burning of grassland would be adopted either to kill ticks and other disease carriers or to promote growth of more nutritious grass species and to check bush encroachment. There existed a social penalizing system whereby families or camps that failed to adhere to these management practices were rebuked, avoided or excluded from local social and economic networks and from the ritual community. A council of elders, formed on the basis of the localized age-set organization, constituted the decision-making body and resolved matters involving pasture management and disputes arising from controversies related to the exploitation of common resources. But with changes in land tenure that encourage private ownership of property either by individuals or groups, these and many other facets of Maasai life are fast disappearing.

Agriculture and trade are increasingly becoming part of the production economy, mainly as a result of the immigration into Maasailand of people who are oriented to farming. Alienation of tracts of land for wildlife conservation further limits access to the resources of pasture and water. The Maasai, like other pastoralists, have to

adjust in line with these new developments. Evidence from the Maasai (Bekure *et al*, 1991) show that poor households with high labor-to-animal ratios basically consume or sell everything the animals produce. Productivity per animal quickly declines as household labor to animal ratios decline, indicating that the per-animal labor demands for very high productivity are hard to sustain at larger herd sizes.

With regard to the access to and utilization of resources, Ndagala (1992) makes a distinction between control and ownership of resources in the following manner:

Control refers to the power to direct or determine the disposal, allocation and utilization of the resources in question while ownership has to do with the rights of use in respect of the resources *and their output* (Ndagala, 1992:15, emphasis mine).

For example, title to (say) land may not be granted but a group may enjoy usufruct rights on the land and ownership rights of its produce. This distinction may appear subtle but it has important gender and age implications on decision-making that involves pastoral resources. Many contributors in this area have held to the notion that pastoral societies are equal and egalitarian (Asad, 1979; Dahl, 1979; Talle, 1988). But new evidence has emerged to demonstrate inequality and inegalitarianism (Fratkin and Roth, 1990; Fratkin, 1991). According to Caulfield (1981), equality cannot be sufficiently assessed on the basis of what people believe in, or are free to do, but also on what they actually do.

Almagor (1978) adds that the elders' sacred prerogative to bless or withhold blessing may in itself suggest inequality between men and women, on the one hand, and young men and elders, on the other. The polarization in this equality versus inequality debate is further enriched by Talle (1988) who gives what she calls a cultural explanation of equality as follows:

The conceptualization of "equality" (*ensioroto* : "balance") in Maasai society does not primarily refer to absolute equality in terms of livestock wealth but rather to equal opportunities for social mobility and random misfortune and stress. The social commitments of the blessed ones to help others and disperse their surpluses through institutionalized rituals of sharing and exchange of animals are a part of this perception of equality (Talle, 1988: 244).

Generally, Maasai equality exists at the level of consumption. Due to the fact that the rich pastoralists retain their surplus on hoof, both rich and poor domestic groups maintain similar levels of consumption and thereby prevent the emergence of differences in lifestyles characteristic of agricultural societies (Ndagala, 1992).

But as modernization permeates the sphere of Maasai life, one needs to adopt a broader perspective in examining the impact of these changes and how the Maasai are adjusting to cope with the changing circumstances. For instance, how have linkages to markets and interaction with people of other ethnic groups influenced the Maasai economy and social organization? As Ingold (1980) contends, the decreasing

territory due to increased competition from agricultural activities and wildlife, the installation of technical inputs such as water supplies and dips and government policies have made the Maasai more sedentary, thus curtailing the freedom of movement and flexibility of the *boma* as a residential unit.

2.6 Indigenous Knowledge and Livestock Health

Indigenous people often live in and manage complex and fragile ecosystems. This implies that they have a repository of traditional knowledge which is a useful tool for development, and the wider society can learn from their pool of experience and skills. Studies on indigenous knowledge are aimed at identifying problems, potentials and constraints in the traditional base and seeking for solutions. Since the base is often not perfect, the idea should be to bring the people and knowledge into focus of development and change and consider the role of culture in this process.

The study of indigenous knowledge systems considers the role of culture in the adoption of technology to manage the ecosystem (Scoones, 1991). It takes cognizance of the fact that people are likely to adopt those technologies that are compatible with their culture. Thus the concept of indigenous knowledge has been expanded and is now considered as *cultural* knowledge. According to Wirtu *et al* (1998), ethnoveterinary research, development and extension work could have a significant impact on development if the knowledge, attitudes and practices of livestock owners are properly investigated and considered. Then action could be

taken to avoid or modify harmful practices and utilize the beneficial ones. A society such as the Maasai should be seen in the context of the co-existence of traditional livestock herding systems and a more recent market-oriented livestock management system.

The importance of ethnoveterinary surveys and gender-disaggregation in livestock health studies is well documented by Curry *et al* (1992) and Curry *et al* (1996). Others, (Narayana, 1998; Sindhu *et al*, 1998), have focused on a wide range of constraints experienced in the use of ethnoveterinary medicine. Such studies provide insight to the kind of conceptual framework within which ethnoveterinary medicine should be considered by scientific research.

2.7 Theoretical Framework: Cultural Ecology Theory

Cultural ecology theory derives from cultural materialism which is associated with White (1959), his students and followers. White is responsible for re-awakening of interest in the explicit formulations of cultural evolutionary theory. The theory is given further impetus by Harris (1979).

Cultural materialism is based on the argument that culture and its evolution can be understood through the study of technology and economics. White (1959) sees technology as the determinant of all cultural systems and that the concept is as applicable to cultural systems as it is to biological ones. It gives rise to behavioral

categories within which culture is manifest. Technology is seen as the mode of production and reproduction or the part of culture by means of which people exploit the environment while economy considers the output of the system, its consumption and exchange within and outside the domestic sphere (Grapo, 1990). With respect to the Maasai, this may be perceived in relation to the mix of livestock species and the adoption of nomadic pastoralism to utilize natural resources which vary in quantity and quality over time and space. The outputs of the system are used for life sustenance (milk, meat and blood) and to cement social relationships by way of outright gifts or loans of animals to kin and clanmates. The basic assumption of cultural materialism is that cultures follow a single line of development giving rise to the theory of "unilinear evolution" as espoused by White and his colleagues.

The cultural ecology school was founded by and is therefore associated with Julian Steward (Swartz and Jordan, 1980; Oke, 1984). According to Keesing and Keesing (1971), ecology is seen as the science of the interrelation between living organisms and their environment, including both the physical and biotic environments, and emphasizing species as well as intraspecies relations. In this context the Maasai may be perceived in the way they use their traditional knowledge to cater for the nutrition and health of their livestock. This is by way of their pedestrian use of the resources of water, pastures, and saltlicks and the utilization of herbal mixtures to treat various conditions in their herds and flocks.

Other scholars in the cultural ecology school include Andrew Vayda and Roy Rappaport. The major point of divergence from cultural materialism is the relaxing of the unilinear assumption. Steward aimed at relating patterns between cultures and the way they developed. The thrust of his theory was the discerning of similar cultural patterns of getting food, shelter and defense among groups inhabiting similar environments. He was concerned with *explanation* rather than *correlation*, with an *active* rather than a *passive* causal role for the environment and hence with *process* rather than *classification* for its own sake (Ellen, 1982). The emphasis was on *local* rather than *regional* environment, incorporating the spatial and temporal dimensions in the interdependence of culture and environment. The major issues centered on the behavioral patterns involved in appropriation through a specific technology in a particular environment and the extent to which behavioral patterns influence other aspects of culture. The theory came to be known as "multilinear evolution".

Though recognizing the role of technology and economics, Steward believed that they were a *sine qua non* but not sufficient condition for cultural evolution. To him environment was an important variable in this process. Cultural ecology therefore focuses on the study of the adjustments of ways of life in different habitats as illustrated by various authors (Kaplan and Manners, 1977; Howard, 1989; Campbell, 1991; O'Leary, 1985; Fratkin, 1991; Roy, 1982).

According to Kaplan and Manners (1977), cultural ecology is characterized by a concern with adaptation at two levels. First with regard to the way cultural systems adapt to their total environment and second as a consequence of this systemic adaptation with regard to the way institutions of a given culture adjust to one another.

Economic activity is so basic to human life that all other cultural elements have to adapt to it. Some of the most important changes involve the ways in which society earns its living and exploits the environment. A people's cultural practices are necessarily linked to the pressures and opportunities of the environment in which they live. How individuals interact with the environment is conditioned by their society's beliefs concerning the nature of the universe. Through myth and ritual, cultural beliefs link humans with the natural environment, space people across landscapes and promote the well being of both plant and animal resources (Howard, 1989). The movement of animals in response to variation in pastures, water or incidence of disease is the major manifestation of how the Maasai fit into this pattern.

In general, cultural ecologists have tended to emphasize technology and economics in their analysis of cultural adaptations. They are concerned with the way in which man, through the instrumentality of culture, manipulates and shapes the ecosystem itself and how societies adapt themselves and their physical environment to attain

the material and spiritual needs of the community (Campbell, 1991). They add that what constitutes an environmental opportunity or limitation can never be stated in absolute terms but is always relative to the cultural means available for exploiting the possibilities of the environment. The way labor is divided is an important social dimension of an adaptive strategy as it reflects the nature of its adaptive strategy as well as environmental conditions, particularly the resources available.

The concept of adaptation therefore underlies the theory of cultural evolution. In this study, "Cultural Darwinism" is contextualized by assuming that culture is an adaptive mechanism and that survival of customs is subject to natural selection in the same way that survival of biological traits is in organic species. According to Pelto and Pelto (1979), those societies, past and present, that have specialized in making their living from nomadic animal husbandry have had to locate in areas with sufficient space to meet the feed needs of their herds. The Maasai are an example of this form of adaptation. Reliance on agricultural people for plant foods is occasioned by shortfalls in areas with inadequate rainfall. Under such circumstances it may be necessary to establish symbiotic relationships which may be invisible to outsiders during normal seasons.

2.8 Relevance of the Theory to the Study

The rationale of cultural ecology theory is that nature (biotic and abiotic environments) and culture (social environment) are not independent entities and

their interaction gives rise to the emergence of specific cultural types over time and space. For the Maasai, the abiotic and biotic environments include water, salticks, livestock, trees, pastures, bush, predators, pests and diseases while the social environment relates to livestock, rituals, beliefs and the mode of interaction between people, whether positive or negative. Thus livestock become the embodiment of the interaction between their culture and nature. They are the medium of social and economic exchange giving rise to diverse webs of relationships among different members and groups in the community. The major concern of the people is on the ability and capacity of nature to provide for the needs of livestock from which they derive their livelihood. The importance of the balance between livestock and human welfare is demonstrated by the compromised sharing of milk between calves and children.

The quantity, quality, allocation, appropriation, sharing and spread of labor are all important in determining how families meet the demand for competing needs. This becomes more crucial in the event that environmental conditions are changing thereby placing new demand patterns for the different range of activities. A disease outbreak is one perturbation that requires such adaptation. Decisions are made regarding what coping activities are to be adopted and whom among family members is to participate and how.

Rationalization on the basis of biological differences alone does not provide a wholly convincing case for differentiation of responsibility and labor allocation along sex and age lines. The “culture side of the coin” of cultural ecology theory provides a useful framework for the analysis of gender and age roles in the management of production, consumption and exchange practices. Broader issues of adjustment processes that are initiated and adopted to cope with environment-driven scenarios are also taken into consideration. Therefore, cultural ecology is relevant in describing Maasai pastoral life in relation to ecological factors, examining and explaining the interaction of culture, nature, technology and MCF.

The analytical approach draws partly from the framework on gender analysis and disease control as conceptualized by Feldstein and Poats (1989) and adopted by, among others, Curry *et al* (1996). There are three premises that underlie this framework. The first is that members of a family belong to a category of individuals defined by gender, age, position or seniority and that these categories frequently carry with them rights of access and control over family resources. The second one is that there may be different kinds of family structures within a community which emerge as responses to different stages in the domestic life cycle. And the third is that individuals or families belong to other corporate groups within and beyond the community.

Four principal areas of analysis are then identified on the basis of the above premises. These are categorized as labor or activities, resources, benefits and incentives, and inclusion. These categories attempt to answer questions relating to who does what, who controls what, who has access to and control over production resources and who is included in various steps of the project process respectively. Answers to these questions help to identify who to consult for interventions and how to conduct the process so as to harmonize technosolutions with cultural considerations and increase chances of adoption.

2.9 Research Questions

To help focus on the objectives of the study, the following research questions were considered:

1. How do Maasai men and women perceive MCF?
2. Is there gender and age differentiation in the allocation of labor and responsibility in the management of MCF?
3. What factors influence the incidence and management of MCF?
4. What is the role of traditional knowledge in the management of MCF?

2.10 Hypotheses to be Tested

The following were the hypotheses of the study:

1. Maasai men and women perceive MCF as a normal condition in their herds.

2. There are gender and age differences in the allocation of labor and responsibility in the management of MCF.
3. Management of MCF is influenced by environmental and human factors.
4. Traditional knowledge and practices play an important role in the management of MCF.

2.11 Operational Definition of Variables

Perception: what people think and feel about a certain phenomenon.

Normal condition: a phenomenon that is persistent and considered to be part of the production process in a way that it does not require intervention.

Control of MCF: handling of infected animals and actions or activities that are designed to prevent or reduce infection.

Livestock health care: the range of attitudes, behavior and practices associated with nurturing of sick animals.

Herd size: the number of cattle under the ownership of one family.

Incidence: the frequency and number of animals succumbing to MCF infection in a herd.

Traditional knowledge: means of controlling disease that are outside the domain of modern veterinary medicine.

CHAPTER 3

THE STUDY AREA AND METHODOLOGY

3.0 Introduction

This chapter covers information on the research area, sample population and sampling procedure, instruments of data collection and data collection methods. In addition, problems encountered during the study are highlighted.

3.1 The Research Area

Kajiado District lies within the Rift Valley and covers an area of 19,605 km² (Central Bureau of Statistics, 1981; Were and Wanjala, 1986). This is 11% of Rift Valley Province and 3.4% of Kenya. It lies between Longitudes 36° 25' and 37° 55' East, Latitudes 1°25' and 3°1' South. It is bordered by Tanzania to the South, Taita-Taveta to the South-East, Narok to the West and Nakuru, Kiambu and Nairobi to the North. Only 8% of the land has potential for rainfed agriculture, the rest being classified as rangeland as it is characterized by low rainfall.

3.1.1 Rainfall

Kajiado experiences a high degree of erratic rainfall, which fluctuates from an average of 750mm in the Athi Plains to about 300mm on the Amboseli Plains.

Rainfall can be classified into three patterns:

1. To the North, in the Ngong hills region, there are two distinct peaks (March - May and November - December), with a few relatively dry months between July and October.
2. The Chyulu hills and slopes of Mt. Kilimanjaro with more rainfall in November to December.
3. The rest of the district, with a peak between March and May and almost all the rainfall falling in April.

Variability in total rainfall is the major limitation to crop cultivation. There are also high rates of evapotranspiration due to strong winds and high temperatures.

3.1.2 Population

The population of Kajiado was estimated at 258,659 in 1989 with Maasai making more than 60% of the population (CBS, 1994). Other significant ethnic groups include the *Agikuyu*, *Akamba*, *Luo*, and *Abaluyia* in that descending order. The population growth rate was then estimated at 5.00% which was mainly contributed by the increasing number of immigrants especially the *Agikuyu*. The 1989 projections showed that children made up more than 44% of the population indicating a high dependency ratio. The population was also predominantly male.

Kajiado District is a rather expansive area and is divided into four administrative divisions. According to the 1989 Kenya population census (CBS, 1994), Central

Division had a total of 18,723 households, Ngong had, 19,619 Magadi 14,528 and Loitokitok 15,506, making a total of 56,977 households.

3.1.3 Economic Activities

The local economy is dominated by the Maasai. The pastoral production system is largely subsistence-oriented but does respond to market demand for live animals, meat, milk, hides and skins. There is a large livestock cattle market at Emali on the main Mombasa highway which operates once every week. Transport of animals is on-hoof.

With movement of animals in response to rainfall seasons, estimates of livestock numbers are often inaccurate. An aerial survey count of all stock in December 1982 (King *et al*, 1985) gave a total of 53,270 cattle and 28,940 smallstock. In addition wild herbivores add roughly 25-30% to the livestock biomass with grazers (e.g. wildebeest and zebra) accounting for some 40% of the wild herbivore biomass, or some 10% of total livestock biomass (de Leeuw, 1991; de Leeuw *et al*, 1991). It is difficult to obtain a consistent figure for the rate of growth of livestock mainly due to the wide fluctuations resulting from recurring drought and disease epidemics and difficulty in tracking movement. Due to an increase in the range and occurrence of diseases, livestock production has created increased demand for veterinary drugs, services and information.

Rainfed crop production, mainly by non-Maasai, is practiced in the higher rainfall areas particularly the slopes of Mt. Kilimanjaro while irrigated agriculture is common along swamps and riverbeds. The main rainfed crops are maize, beans and bananas while onions, tomatoes and cabbages are grown under irrigation. Forests on the slopes of Mt. Kilimanjaro are exploited for fuel and building materials. Through the Kenya Wildlife Service, the local communities receive some funds from the lodges in the Amboseli National Park. These are channeled through group ranches and are meant to assist in community development initiatives.

The local Maasai have also formed groups (referred to as "cultural *manyatta*") which are meant to cater for the leisure demands of the tourist clientele visiting the Park. These groups offer entertainment in the form of Maasai song, dance and folktales; narratives on rituals, beliefs and ceremonies. This has become an important source of income, sometimes in foreign exchange. Alongside this, trade in Maasai crafts and other wares is also thriving. This new institution is symptomatic of the commoditization of Maasai culture which is packaged and exported for consumption by the tourism sector both locally and in the international market.

3.1.4 The Field Study Site

This study was carried out within Loitokitok which has since been elevated to the status of a sub-district within Kajiado. Preliminary inquiries with the District Veterinary Office at Kajiado confirmed that this is where the incidence of MCF is

highest due to the presence of the Amboseli National Park and hence the migratory corridor of the wildebeests and the many grazing ranches, both individual and group, located in the area. The area is on the tourist circuit and is served by trunk road that branches off the main Nairobi-Mombasa highway at Emali. The major development in infrastructure is a water pipeline that runs for about 150 km from the Nolturesh river near Loitokitok town to Athi River town near Nairobi, providing several watering points for the Maasai, their livestock and wildlife too along its path. Other social infrastructure including schools, a health center and water supply have been supported partially by the Kenya Wildlife Service and World Vision International on a community-based-project rationale.

The field data were collected among the *Ilkisonko* Maasai who constitute about 36% of the total population (CBS, 1994). The community selected for study is to be found at Namelok, an expanse of grazing located between Amboseli National Park to the West, the cropping lands on the slopes of Mt. Kilimanjaro to the South and Mbirikani plains to the Northeast (within shaded part of figure 1 below). It is classified under agroclimatic zone vi (Sombroek *et al*, 1982). Open grasslands predominate many parts with bush and woodland characterizing the western part of the Amboseli ecozone (de Leeuw *et al*, 1991).

The adjacent areas are well watered by streams and springs and are ideal for irrigated farming in addition to being important watering points for livestock. The

area forms an important corridor for the migration of wildlife (particularly wildebeest, zebra and gazelle) from the park in the south to the plains in the north, a movement which is occasioned by changes in rainfall and hence the availability of pastures.

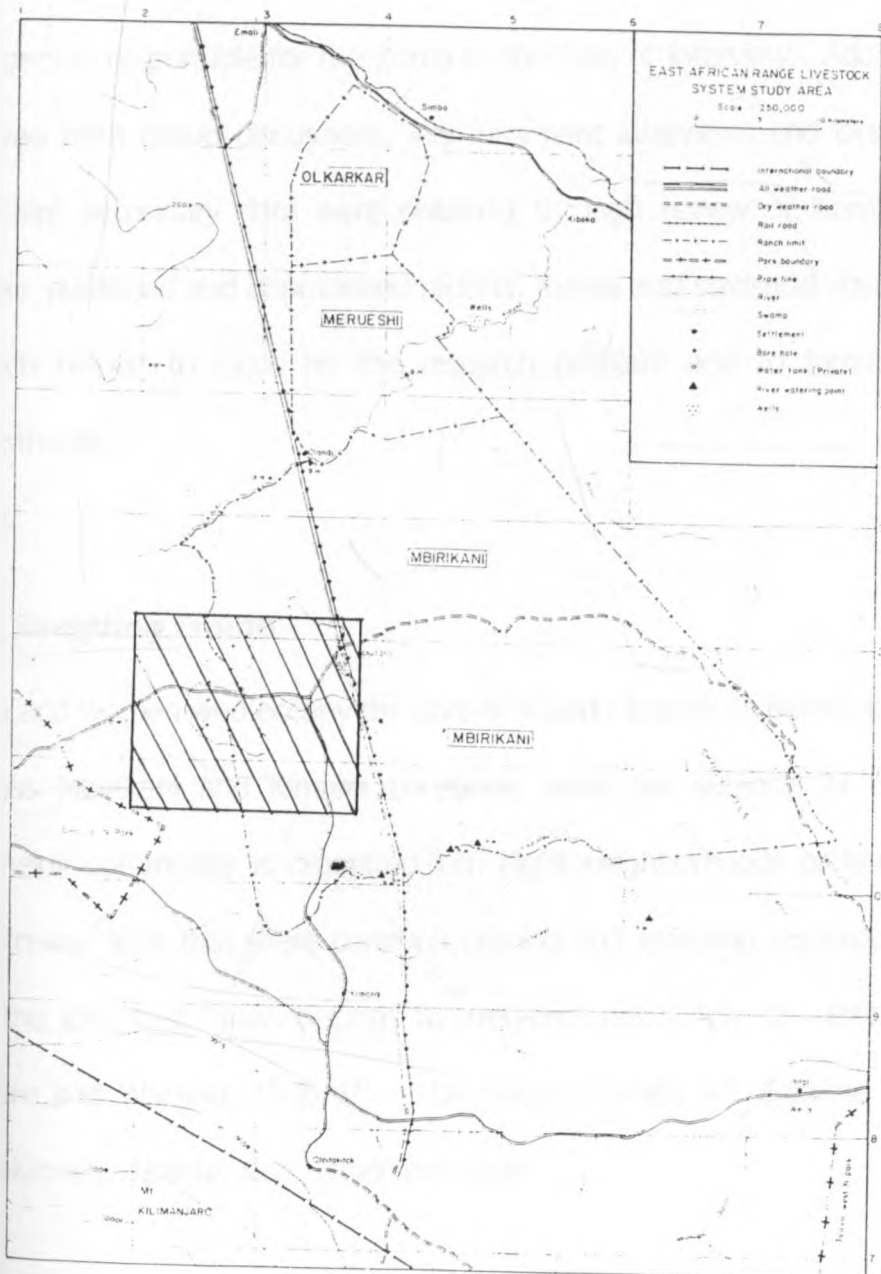


Figure 1: Location of the field study site

3.2 Types of Data and Their Sources

The *olmarei* (family) formed the unit of analysis. This is the smallest unit which is the locus of cattle ownership and is autonomous in decision-making (Bekure *et al*, 1991). Both primary and secondary data were used in the analysis. Primary cross-sectional data were generated from a field survey by interviewing the family head or the person responsible for the *boma* at the time of interview. Additional data were derived from group discussions, key informant interviews and direct observation. Relevant secondary data were obtained through review of literature in journals, books, published and unpublished reports, theses and statistical abstracts. Literature search helped to focus on the research problem and to formulate appropriate hypotheses.

3.3 Sampling Frame

Men and women who occupy the part of Kajiado known as Namelok, which straddles across Mbirikani and Kimana Locations, were the subjects of this study. The Namelok community is organized into eight neighborhoods or kraal camps (*ilatia*) which are units that share common grazing and watering resources. This is based on the idea that "grass belongs to everyone, not simply to members of one clan" (Were and Wanjala, 1986:92). The neighborhoods are *Enkumi*, *Sumneria*, *Elerai*, *Ilkelunyieti*, *Alpagai*, *Risa*, *Isinet* and *Osoit*.

The neighborhoods were identified with the help of the management committee that oversees their interests in the affairs of the adjacent group ranches (Kimana and Mbirikani) who keep a list of the registered members. Due to constraints mainly associated with difficult access due to the spatial distribution of *manyattas*, three out of the eight neighborhoods were selected for study. There were a total of 243 men who owned livestock in the three neighborhoods. These were identified with the help of councils of elders (*inkiguana ilosho*) which make decisions relating to utilization of the common resources within each neighborhood. Therefore, men who owned livestock in three neighborhoods of the Namelok community (*Enkumi, Osoit* and *Isinet*) formed the sampling frame for this study.

3.4 Sampling Procedure

Simple random and systematic sampling procedures were applied to generate the sample population. At the initial stage, three out of the eight neighborhoods were selected at random for study. This was done by writing down the name of each neighborhood on a different piece of paper. The eight pieces were then folded, mixed in a calabash and one elder was asked to pick three pieces at random. At the second stage all men who owned livestock in the three neighborhoods were recorded. The researcher opted to pick 75 respondents for the study.

Systematic random sampling was applied to generate the sample population using the rule of proportions in each neighborhood. The sample consisted of every third

respondent in the list (243/75=3.24). Two declined to be interviewed bringing the final sample down to 73. This sample may appear small but it was based on the resource and ecological constraints in the field at that time. The infrastructure was difficult and was compounded by the then prevailing *El Nino* rains. The sample was however adequate for the purpose of the study.

3.5 Methods and Instruments of Data Collection

This study adopted a participatory ethnoveterinary approach to obtain data on knowledge, skills and beliefs of the Maasai in order to understand their perception of Malignant Catarrhal Fever and how to cope with it. This is based on what Chambers (1985) refers to as "cost-effective ways to learn about the local situation". A combination of different sets of instruments was used to capture data.

3.5.1 Single-Subject Interviews

A semi-structured questionnaire was administered to capture background information on the respondents, ownership of various classes of livestock, frequency and levels of MCF infection in the herds, options and limitations in the control of MCF. The questions administered to all the respondents appeared in the same order and in the same wording. The interviews were conducted in *Maa* language and recorded in English with the aid of a field assistant who translated and explained the responses.

The field assistant, who was introduced to the researcher by a group ranch committee member was born and brought up in the Namelok community. He had gone through secondary school education and had prior experience in data collection having been engaged in a similar exercise by researchers from the National Veterinary Center at Muguga. Being exposed to both traditional and contemporary Maasai lifestyles and having established rapport with the community enhanced the process of interview and discussion. Training of the field assistant involved discussing the questionnaire and interview guides with the researcher to ensure that the questions made sense in English and also when translated to the *Maa* language.

3.5.2 Group Discussions

Group discussions were used to obtain in-depth information on various aspects of MCF: what causes the disease, factors favoring its occurrence and persistence, and the role of gender and age groups in its management. The group discussions were defocused (through translation) to facilitate communication between the researcher and participants.

For discussion, men and women were categorized by age. The number of participants varied between a minimum of seven to a maximum of ten. Those to be included in these categories were identified with the help of elders. Since it was difficult to ascertain their ages, a method relating to the Maasai gender and social organization was improvised as the indicator for estimation. Men's ages were

categorized on the basis of their age status into 15-34, 35-55 and 55+ year groups. These roughly coincided with the following age status respectively: the *ilmurran* who are in the junior warriorhood stage, those who have gone through the *eunoto* rite to senior warriorhood and are ready to marry or are married and those who have gone through the *olngesherr* rite to total elderhood. Women were categorized on the basis of their marital groupings: the newly married (*ensiakiki*), the middle group (*entasaŋ*) and those considered to be elders (*ilmoruak*). Since girls marry earlier than men, women's ages were lagged by 10 years in each group but the minimum remained at 15 years.

In total, six groups provided data through discussion. The researcher provided a discussion guide with questions relating to the themes of the study. The themes revolved around the role of a certain age or gender group in the care of livestock with special emphasis on diagnosis, treatment and control measures for MCF. These were translated through to the discussants who were then asked to make their responses. Some of the responses were recorded in *Maa* by an interpreter who then translated them into English at the end of the day. The researcher sought clarification on issues arising from the discussion. Local terminology and phrases were later counterchecked and verified with key informants.

3.5.3 Key Informants Interviews

This group of respondents was used to verify responses recorded in the initial stages and also to check for correctness and consistency of descriptors used. They provided in-depth data on the cause and mode of transmission of MCF, a description of its symptoms, the length of the incubation period and the role of traditional knowledge in its management.

The key informants included two elders who were members of a group ranch, a retired teacher who is a church elder, a councilor, and a community worker with World Vision International. Others were an animal health assistant with the Department of Livestock Production, a warden with Kenya Wildlife Service and a project manager with the Maasai Preservation Trust.

The elders were selected on the basis of their experience and responsibilities in the community. They were members of the council that oversees the management of common grazing resources. They are regarded to be knowledgeable and are seen as pillars of the communities' interests in matters of livestock care. One of them had extensive knowledge of trees used to treat various diseases and performing surgical operations such as castration and removal of fetuses that may die before or at parturition. The retired teacher/church elder was regarded as an important link between tradition and contemporary lifestyles and a custodian of the community's moral fabric. He could articulate the cultural code of the Maasai within the context of

changing socio-cultural and economic circumstances. The councilor is entrusted with advocating for and defending the rights of the community in light of competing and sometimes conflicting interests arising from diverse political and economic orientations.

World Vision International is involved in supporting community development programmes through the Loitokitok Area Development Program, part of which is aimed at improving livestock productivity. They are therefore working with veterinary personnel and local community leaders in addressing issues of animal health care among other activities. As for involving Kenya Wildlife Service, this is because the community regards the institution as the custodian of the wildlife which competes with their livestock for resources (grazing, water, saltlicks), predate on their livestock or in the case of wildebeests, transmit diseases. The Maasai Preservation Trust is involved in environmental rehabilitation efforts through the distribution of tree seedlings for planting within settlements. The project manager assisted in identifying some of the tree species described by the Maasai as containing possible cures for MCF.

3.5.4 Direct Observation

A diary of field notes was used to record data from informal interviews and direct observation relating to activities, behavior and attitudes considered relevant to the objectives of the study. During the pilot survey it had been observed that men were

usually away from the *boma* during the day and it was women and the very young children who were left behind. Men were normally available in the morning (before 9 a.m.) and from early evening (6-7 p.m.). These were the times when they inspected animals just before and after grazing.

When the head of the *boma* was absent and only women were present, a member of the husband's peer group would be informed of the presence of guests in the compound and they would come over and be present during the interview. The interview sessions were held outside the house usually under the shade of a tree in the compound. Calves, kids and weak animals could be observed grazing not far from the *boma*. Some of these animals were infected with MCF and a case was observed where one animal was moving in circles, which is one of the symptoms that the Maasai use to identify the disease. In some cases young women could be seen bringing grass to feed these animals.

Another observation was that a number of Maasai families incorporate maize, beans and maize flour into their diets. This is a trend that has taken place over time as a way of supplementing for inadequate milk or due to the "demonstration effect" of consumption practices from non-Maasai. A good number of Maasai now grow these crops in small plots adjacent to the *boma* during the rains while others regularly purchase them from the market place. The plots are fertilized with *boma* manure accumulated in the night enclosures for livestock.

With respect to housing, the Maasai are replacing their traditional "loaf-like" dung-plastered huts with mud-walled and grass-thatched roofs which are now common in many of the homesteads. A few timber-walled and iron-roofed houses surrounded by live fences instead of harvested thorny twigs are also evident. These homesteads are characteristic of the upcoming, educated Maasai, often in the employment of government or non-government organizations who may also be identified by their modern mode of dressing. Otherwise the garish mode of dressing by the *ilmurran* with its attendant aesthetics and paraphernalia remains perhaps the most potent feature of Maasai material culture.

For livestock health care, the possession of a syringe and the presence of a bottle of *terramycin* (a broad-spectrum antibiotic) in many homesteads, the knowledge and frequency of their use, are the most telling manifestation of Maasai concern for the health of their livestock. To them *terramycin* reads like the universal solution to their disease problems. The faith in the therapeutic power of this drug is manifested in their readiness to spend substantial amounts of money on it, sometimes selling goats to finance its purchase. It is often the first and only drug administered to a sick animal regardless of the disease.

3.6 Piloting

A pilot survey was carried out for two weeks in the month of February with the aim of identifying the site where the study was to be conducted. Some time was spent

in building rapport and identifying avenues for entry into the community. Discussions were held with officials from the Veterinary Department, Kenya Wildlife Service, Intermediate Technology Development Group, Loitokitok Area Development Project and Group Ranch committee members.

The information obtained helped in the construction of the sampling frame and selection of the sample size. Administering the instruments to a sample of fifteen respondents in one of the neighborhoods not selected for study assessed the relevance and reliability of the instruments of data collection. The instruments were checked for logic and consistency and the appropriate adjustments were made.

3.7 Problems Encountered during the Study

A number of problems were experienced during the course of the study. The implementation of the fieldwork, which was initially meant to start in November, 1997 could not proceed as planned. It was a period of anxiety as the residents were involved in election campaigns for the national general elections which took place in the following month of December. In addition the *El Nino* rains continued unabated, destroying road networks and cutting off access to many parts of the country. This situation persisted well into the early parts of 1998, and it was not until February that the researcher managed to get out into the field for the pilot survey. The data collection exercise started in March. The fieldwork schedule was interrupted many

times by the unusually heavy rains and it was not until the end of June when conditions had significantly improved that it was finally concluded.

The classical problems encountered by anthropologists studying societies other than their own were part of the limitations. The researcher is from a non-Maasai cultural background. This made it necessary to spend time making some inquiries regarding some basic socio-cultural considerations that would facilitate easier contact with the respondents. The use of a field assistant from the local area facilitated communication through translation. It was also observed that some cultural considerations limit women's liberty to divulge certain information without the knowledge of their husbands or senior kinsmen. Group discussions were used to alleviate this constraint.

CHAPTER 4

FINDINGS OF THE STUDY AND DISCUSSION

4.0 Introduction

The results of the study are presented and discussed in this chapter. The methods of data analysis and characteristics of the sample population are described. Maasai knowledge of MCF, gender and age roles in management, factors influencing the incidence and management of MCF and the role of traditional knowledge in this process are then discussed as guided by research questions and hypotheses.

4.1 Data Processing and Analysis

Much of the data collected during the survey were qualitative and descriptive in nature and responses were tallied to generate frequencies. Descriptive statistics were used to analyze and characterize responses. Gender analysis was used to characterize division of labor and responsibilities. Correlation coefficient was calculated using *excel* package in windows.

Descriptive statistics using frequency distribution of observations is useful in data checking and validation while values outside the feasible range are readily detected. They also help in examining the form of distribution and spread. They are easy to construct and interpret and are free of the rigors involved in the use of esoteric

statistical models. Quotations in verbatim helped to capture perceptions, attitudes, beliefs and explanations for observed behavior relating to livestock care.

4.2 Characteristics of the Sample Population

Out of the total 73 respondents, 62 (84.9%) were men while 11 (15.1%) were women. Their ages ranged from 23 to 79 years with the mean being 38.6 years. The married ones constituted 94.5% of the sample. Polygyny was recorded for 52% of the respondents. The mean number of children per household was 5.7 with 28.8% of the families taking care of children of relatives. Adoption is mainly due to loss of parents or their inability to feed the children due to poverty. School enrolment for children was 31.4% at all levels of education but for 20% of these, attendance was irregular due to lack of money. Evidence from literature, confirmed by field data, suggests that poor parents invest in children by sending them to school as they have a low opportunity cost in production while the rich invest their children's labor in herding.

The Maasai contend that as long as they can support their families from their herds then they do not need alternative means of livelihood. A case was narrated to the researcher about a case where one elder, reputed to be the richest man in Mbirikani, had withdrawn all his children from school. The researcher had the opportunity to

meet him and sought to verify his reasons for the action. Without much ado he responded:

Many of my animals died during the last drought so I had to send some of the children to school where they could get some milk. But now I have enough cows to cater for the needs of my twelve wives and well over fifty children so why should they go to school any more? In any case I am the ultimate authority in deciding what is good and not good for my family.

This statement has relevance to O'Leary's (1985) study of Rendille and Gabra pastoralists of northern Kenya who send their children to school when there is insufficient milk to meet family needs as one way to cope with the stress of drought. It is also symptomatic of the erosion of Maasai cultural construction of male responsibility in taking care of the family and that of mutual dependency among kin, friends and/or clansmen in times of need.

The Maasai are also said to exhibit a pattern that relates "love" and education (personal communication). Those who command more affection from their parents are retained for herding (if they are boys) or engaged for future marriage (if they are girls), thereby bringing honor and respect to the family head. This manifestation of culture is however succumbing to the pressures of present day living that recognizes education as an important investment for the future.

Other aspects investigated included the level of formal schooling and religious orientation of the respondents. Out of the total sample, 75.4% had no formal schooling, 12.3% and 8.2% had gone through primary and secondary school respectively while only 4.1% had acquired post-secondary level of education. A majority 72.6% were Christians, 26% professed to be traditionalists while there was only one Muslim. Education is an important variable as it enhances the producer's ability to plan and control their production activities and increases opportunities to gain employment outside the traditional sector. The belief systems of a people influence the way they view the universe and how they explain phenomena that affect their day to day mode of living. For many societies, illness and disease are explained within the realm of belief systems.

The main activities, which the local people are involved in are, presented in table 4.1 below.

Table 4.1: Sources of Livelihood for Sample Population

Activity	N	%
Livestock keeping	73	100.0
Farming	16	21.9
Perm. Employment	9	12.3
Trade / Business ¹	11	15.1
Other ²	6	8.2

¹Includes trade in livestock, running of tea hotels and retail shops.

²Includes recruitment to herd livestock, dig and maintain wells.

Information in table 4.1 above was solicited from a question that allowed respondents to specify their primary and secondary sources of livelihood. Livestock herding is the main pre-occupation of the Namelok Maasai community with a small proportion taking up farming as a secondary activity. The cultivation sector is dominated by people from non-Maasai communities mainly the *Agikuyu*, *Akamba* and *Ameru*. Less than 25% of the respondents were engaged either in employment or petty trade.

Another 32.8% were involved in a wide range of community activities. Such responsibilities though not necessarily remunerated in monetary terms, attract social rewards such as status, prestige and power, factors that can be used to manipulate resource control and acquisition. Farming is being adopted as a survival option by those who have lost livestock through drought and disease and as a result of the "demonstration effect" from farming communities. It is also a way of diversifying the economic base thereby spreading risk and increasing food security in the event of inimical externalities that affect livestock production. All these are part of the process of accommodating new opportunities into the Maasai traditional system of production as well as symptoms of its gradual demise.

4.3 Livestock Ownership

Livestock belong to men and are inherited along patrilineal lines. However cattle "change ownership" within a twenty four-hour period. After the morning milking,

women hand over the cattle to men for the day's grazing. A visual inspection is conducted to assess their condition and note if any are missing. The men then escort the animals which remain under the care of boys and girls as they graze. In the evening, the animals are received back by the men who repeat the ritual of inspection before handing the animals to women for the evening milking. After they are done with this, the animals are then handed back to men who ensure their safety for the night. The men also spend time reviewing the grazing pattern and discussing opportunities for pastures with better grass and safer from diseases and predators. It is for these reasons that men go to sleep long after women and children have retired for the night.

In the traditional subsistence economy, women could exercise extensive control of livestock through the institution of the house (Talle, 1987). But commercialization of the pastoral economy is likely to favor and strengthen male control over the means of production. A woman in a polygynous homestead may be allocated milk animals, the number depending on the herd size, her seniority in marriage and the number of children. The partial control of livestock by women is explained and legitimized by a number of legends and cultural premises. One such theme, (Talle, 1987), concerns women's procreative resources and close affiliation to children. It is presumed that a woman will try to exploit a cow to feed her children thereby threatening the well being and survival of the animal. These gender-differentiated attitudes towards livestock are complementary rather than conflicting. Productive animals enhance the

nutritional status of children by providing more milk while nourished children have more energy to take care of the animals.

The types and numbers of livestock owned are presented in the table below:

Table 4.2: Distribution of Livestock Ownership

Category	Number of Families	%	Mean animals
Cattle	71	97.1	15.6 (16.1)
Sheep	58	79.5	11.1 (15.7)
Goats	67	91.7	15.8 (20.1)
Donkeys	29	39.7	2.9 (5.7)
Chicken	14	19.1	1.3 (3.2)

Source: Author survey, 1998 [Figures in parentheses are the standard deviations]

The table shows that the distribution of livestock is highly skewed. But as the argument goes, this does not present a problem as cultural construction provides for sharing with the less disadvantaged in resource endowment. Livestock is a proxy for wealth and a symbol of social status among the Maasai. One key informant put it as follows:

Wealth starts with cattle. A successful man is like a tree in a hot sunny day, he shelters many people under his shade.

Wealth translates to economic power while status translates to social power and prestige. The less endowed are able to live on the goodwill of the wealthy. Any externalities that are seen to diminish these perceptions are regarded as transgressions against the society. However, this traditional context of wealth is now being challenged by the more educated, elitist Maasai who perceive wealth in terms of material comfort such as having a permanent house, good clothing and a diversified diet among others (personal communication). They further lament the dependency syndrome among the Maasai which, they argue, is a setback to development initiatives.

4.4 Testing of Research Hypotheses

This section focuses on analysis of data that were relevant in testing the hypotheses of the study as guided by the main research questions.

4.4.1 Hypothesis 1: Maasai Men and Women Perceive MCF as a Normal Condition in their Herds

It was hypothesized that Maasai men and women perceive MCF as a normal condition in their herds. This hypothesis was based on the assumption that if MCF was not a constraint then the Maasai would consider it as part of their life and would therefore not bother to treat it. However, study findings suggest that MCF is one among a number of diseases considered by the Maasai to be important constraints to

production. Data generated from a group of elders in the 55⁺ age group indicates ECF (*oltikana*), FMD (*oleirobi*), anthrax (*enkeanairogua*) and Brucellosis (*olokibirito*) as the other important diseases. The Maasai assert that many of these diseases were brought by outsiders. For instance one key informant said that ECF is also referred to as *lipis* in the believe that it was contracted from cattle belonging to a white colonial settler called "Lipps". He further added:

Although the Maasai were dirty and unhygienic they never used to suffer from the many diseases now afflicting them. They could for instance use the cow tail switch to clean themselves after defecating and use the same to clean the milk gourd. I think this is because they used to depend on only one type of diet i.e. meat, milk and blood. These days we are touching and breathing a lot of poisons as we try to control the many insects that bring disease to our animals and plants. As a result we are now catching a lot of diseases that we cannot identify. We are seeing a lot of strange things that never happened before.

To the Maasai, the difference between these diseases and MCF is that it has been with them from as far back as they can remember. It is therefore regarded as an important constraint to livestock production. Data collected clearly indicates that MCF is the top priority disease with 85% of the respondents ranking it as the most serious disease. The disease was recorded in 47% of the cases with 7.2% of the herds being infected in the season just preceding the study. Regression analysis of herd size against infection rates gave a positive and significant correlation ($r=0.42$).

The seriousness with which the disease is regarded primarily stems from the fact that it is endemic and has no cure.

The incidence of MCF has important implications to the family and by extension the community. Loss of milk offtake, future calves and reduction in value due to loss of condition are part of the problem. There is an opportunity cost of replacing the animal or having to feed orphaned calves by a foster mother or through supplementation. All these threaten food security at the family level. There is also a loss associated with the sentimental attachment Maasai have for cattle. The loss of an animal implies loss of part of the primary means of Maasai livelihood. This translates to social poverty, loss of power, prestige, self-esteem and status in society. If support from kin, neighbors or friends is not forthcoming one has to look for other means of survival and may be consigned to a life of destitution.

Awareness regarding MCF among the Maasai is very high and this knowledge is widely shared among age and gender categories. Only one newly married woman reported not having seen a case of the disease and children as young as six years could comfortably describe the symptoms. The most frequently mentioned symptoms included watery eyes, salivation, mucous discharge, blindness, shaking of the head and moving round in circles.

Wealth and education were important variables in explaining attitudes and behavior towards disease. Those with more livestock could afford to take chances while trying out different drugs while those with education considered it a waste of time as there was no cure. With respect to identity of the disease, three descriptor phrases were provided by discussants in the 35-55-age category:

- (i) *Enool enkatin* (that which is brought by the wildebeest).
- (ii) *Eenkeya oo elokunya enkatin* (disease/death of the head of the wildebeest).
- (iii) *Inkutukie oo inkpa enkatin* (that which comes from the amniotic fluid of the wildebeest).

The first two descriptor phrases were mainly used by women and younger men while the third came from a few of the older men. Knowledge about how the disease is transmitted and a description of its symptoms did not appear to differ by gender. The Maasai know that wildebeests transmit the disease but they cannot tell what the causative agent is. To them cattle are infected when they ingest grass or water that has been contaminated by the amniotic fluid.

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One key informant suggested that the disease could be a punishment from God but declined to speculate on why it should be meted and for such a long time. The wildebeest was described as "a bad animal and a mental case" while it is believed that the disease is caused by the "bitterness" of its amniotic fluid. This belief is enacted in the form of a Maasai curse:

Thus MCF has been culturalized to symbolize death. The curse is meant to bring a permanent incurable condition to the subject and is invoked by elders under conditions of extreme rebellion against tradition. This conforms to Almagor's (1978) and Oboler's (1985) studies. They observe that power is vested with elders due to their control of the means of production or their sacred prerogative to bless or withhold blessing which allows them to lord over women and the younger men.

The structural organization into male age-sets provides a channel of passing knowledge through the different levels of hierarchy which favors men more than women. While women perceive MCF in terms of losing subsistence, men are more concerned with the loss in status and weakened social ties that are maintained and enhanced through philanthropic exchange of livestock. It is also seen to stimulate dependency on unconventional sources of income such as brewing, subservient employment or prostitution to meet individual and family needs. One who relies on such means is regarded to be an unwholesome Maasai.

4.4.2 Hypothesis 2: There are Gender and Age Differences in the Allocation of Labour and Responsibility in the Management of MCF

It was hypothesized that the management of MCF is achieved by division of labor by gender and age. The hypothesis was based on the assumption that the care of

livestock is a collective responsibility which entails specific duties for specific groups in the family for ease of management. Data generated from the group discussions for both gender and age categories confirm this hypothesis. It has been the responsibility of older men to diagnose and treat diseases, perform surgical operations such as castration and removal of dead fetuses and make decisions regarding disposal of animals through slaughter or sale. They also pass on these skills to the younger men and as they grow older they become more of supervisors than performers.

Girls (*entito*) and newly married women (*esiankiki*) assist their mothers and senior wives respectively in the daily household chores. They may also assist in herding if there are insufficient boys. In addition to their daily domestic chores women are responsible for milking, processing milk products and animal skins and tend the calves, kids and lambs. Sick animals are usually separated from the healthy herds and grazed within the *olopololi*, a common grazing area reserved for young and weak animals. Animals that exhibit aggressive behavior due to illness may need to be tethered. Feeding and watering of the sick animals is primarily the responsibility of women. According to one elderly woman this is because:

Women are the ones who remain in the *boma* as men go to clan meetings, *barazas* or attend to their affairs while children are away herding.

A scenario is emerging whereby some herd owners need to be away for some time for reasons of employment, engaging in business or attending to community affairs that demand their attention outside the *boma*. Often it is women who are left behind as children are away either herding or in school. Due to these emerging circumstances, some herd owners, notably those in employment or community service, have seen the need to train their wives on simple techniques of drug administration (Councilor Permuat, personal communication). On the other hand there are some women who have taken personal initiative to learn such techniques so that they could take necessary action when a situation so demands. Says one middle-aged woman during a group discussion:

My husband is a busy man and sometimes he spends days away while attending meetings in Kajiado and Nairobi. I asked him to teach me how to do these things. Initially he refused saying that it was not a woman's job. But I insisted, telling him that the animals did not know when he was away so that they would not fall ill (laughing). After much persuasion he agreed and he would place me under the supervision of his brother when he was away. Now I have perfected the skill and he lets me do it on my own.

This statement is relevant to Galaty's (1979) study on the Maasai society, which has a patrilineal clan organization, patriarchal structure, and is male dominated in ideology. The gender imbalance in power relations and the relegation of women to subordinate status is demonstrated. These observations, however, suggest that the

scope of women's tasks and responsibilities is becoming wider as they get involved in activities that were hitherto considered the domain of men. Such data confirm the hypothesis that the workload on women increases when there is occurrence of disease in family herds.

Women's roles and responsibilities change as men migrate to non-pastoral sectors. To some informants, the increased participation of women is seen to exacerbate their disadvantaged position against that of men as the latter are not seen to participate in spheres that are culturally prescribed to women. On a positive note however, it is seen as an achievement for women with respect to their social and cultural status, the argument being that they are getting more involved in shouldering responsibilities and decisions that are for the good of the family. This implies a change in power relations that enhances the position of women without necessarily diminishing that of men.

The division of labor and responsibilities is culturally prescribed along gender and age lines. Herding, defined as a male activity, is the most demanding task and is undertaken by uncircumcised boys between 6 and 15 years. Cattle are only grazed during the day and are separated from the sheep and goats. By splitting a herd into mobile units which would use the scattered available water and pasture, labor can be used more efficiently (Bekure *et al*, 1991).

During prolonged drought the Maasai pastoralists utilize the mountain slopes where pastures can be found throughout the year. This vertical or transhumant mode of pastoralism is the tradition of moving animals between the lowlands during the wet season and the highlands during the dry season and compares with that of the Samburu of Marsabit District. Younger boys are inculcated into the art by taking care of calves, kids and lambs within the *boma*. The *ilmurran* and young married men assist in the more arduous tasks of digging wells, watering, moving camp and erecting night enclosures for the temporary camp (*ormuate*) where they may also milk. They are also responsible for protecting animals against predators and scouting for new pastures.

Theories that subscribe to the cultural school of thought have been used to explain the roles and power relations between men and women (Njiru, 1990), and as discussed in anthropology divide into two broad types. On the one hand are those that trace inequality in the division of labor along gender lines to fundamental biological differences between sexes and on the other those that subscribe to the cultural school of thought. In the first type, the physical features and characteristics of men and women are said to be the basis for their social power differentiation and that men with their large physique are said to coerce women physically and subordinate them in this manner.

Njiro (1990) quotes Tiger and Fox (1971) who have theorized on what they refer to as human biogrammers. These are defined as genetically based programmes, which predispose humankind in certain ways and are responsible for allocation of male and female roles. It is argued that men's aggressive and dominant characteristics may have been genetically inherited from their hunting way of life. That women, by comparison, are programmed to be docile and passive, a predisposition that suits their roles in reproduction and care of children, and that these qualities have continued to modern times as genetic changes are slower than cultural ones. But this author would argue that the *per capita* energy input into various tasks and responsibilities would be a more rational basis for comparing the contribution of men and women to both the productive and reproductive sectors of the household economy. In addition, these inputs need to be identified, and where possible, quantified and given a monetary value using appropriate indices.

Along the same line of argument, Murdock (1949) argues that biological determinants of sex roles arise out of sheer practicality. He adds that inequalities in the division of labor between men and women are brought about by complementarity rather than one being superior to the other and that this is essential as an efficient way of organizing a society. According to Parsons (1975), the male is seen as the breadwinner who spends his working day competing in an achievement oriented society, an instrumental role which is accompanied by stress and anxiety. The expressive role of the female is to relieve the tension by providing warmth,

security and emotional support to the family members. He adds that efficiency in a social system is when there is a clear-cut division of labor along gender lines in which instrumental and expressive roles complement each other to promote family solidarity.

On dividing labor and rewards, Howard (1989) points out that there is little that is natural about the ways in which societies assign tasks to particular types of people or about the values placed on particular types of work. He adds that both the division of labor and its rewards are essentially products of a particular socio-cultural setting and that the maintenance of a system of production requires that people accept or at least acquiesce in these practices. Changes in the system of production are then seen to occur due to alterations in the environment (such as the outbreak of MCF) or the interplay between problems within the system such as class conflict and changes in climate.

While these observations may be valid, one needs to go a step further and examine the scenario where gender roles are changing due to the exigencies of present day living. Decision-making through consultation may be a more viable option to improve efficiency in the allocation of tasks and responsibilities given the ever-changing interests among different individuals and groups within a family. There is also need to address the role played by the process of present day socialization and

the conflict engendered by cultural prescriptions that demand individuals or groups of people to conform to certain expectations of the wider society.

4.4.3 Hypothesis 3: Incidence and Management of MCF are Influenced by Environmental and Human Factors

This hypothesis was based on the assumption that pastoralism is characterized by a fluid interaction between the social and physical environments. Several factors are considered to favor the persistence of MCF in Maasai herds. First is the proximity of the Amboseli National Park and the presence of wildebeests in the grazing lands adjacent to it. The animals do not like bushy areas (where the threat of predation is greater and there is less grass) preferring to graze in the open plains. Second, the availability of permanent water and similarity in grazing behavior with cattle has intertwined wildebeests with the pastoral production system. The prolonged rains had ensured plenty of grass and the wildebeests had not migrated over the past year as they usually do. "They are even preferring to sleep around the *bomas* close to our cattle as maybe they know they are safer here from the lions and hyenas", muses one respondent.

Movement in search of pastures also increases the chances of transmission. As one key informant pointed out:

Some of us may be settled yes, but we have to move our animals to where there is enough grass and this makes it difficult to avoid the disease. All we need to do is

send our *ilmurran* to scout for suitable pastures and once they find them we send the animals there. We have no prior knowledge whether the grass or water is already contaminated and in any case our priority at that moment is to find enough grass for our animals.

This statement is relevant to Howard's (1989) observation that an adaptive strategy links man and the environment in a way that spaces people across the landscape, and is driven by the need to promote the well-being of plant and animal resources. Cooperative herding and watering is a social strategy to provide common security for livestock, compensate those without adequate labor and to manage utilization of common pastures, salticks and watering points. In case of contamination therefore, more animals are exposed to risk of infection. The Maasai also acknowledge that the wildebeest population is so high and increasing at such a rate which makes it practically impossible to keep them off their cattle. The only time that this happens is at the peak of the dry season when livestock are moved to the Chyulu hills for pasture while the wildebeests move back to the park. Even then some contact is inevitable as cattle have to be watered along the water pipeline every 2-3 days.

The Maasai also believe that due to the tears and mucus discharged by a sick animal, infection between cattle may occur through breathing, licking or during mating. If this is possible, then disease could spread through the cultural exchange of animals as loans or outright gifts as practiced by the Maasai. They can predict a disease outbreak which is said to occur about a month after the wildebeests start calving.

The infected animal dies within a month. Scientific literature gives the incubation period as three weeks but may sometimes take longer.

Weak animals and those suffering from whatever diseases are isolated from healthy ones and herded together in the *olopololi*, a factor that predisposes them to cross-transmission. The trend towards sedentarization or using the same transhumant route season after season is likely to favor the persistence of the disease. There is an increased dependency on hired labor mainly recruited by absentee herd owners. This is likely to compromise on certain management aspects which may militate against disease control. Competition for family labor among several activities also reduces the input that is available for disease management. The Maasai have to live with the wildebeests as they do not just kill wildlife except those animals preying on their animals; they neither hunt nor eat game meat.

4.4.4 Hypothesis 4: Traditional Knowledge and Practices Play an Important Role in the Management of MCF

This hypothesis was based on the assumption that if there was a cure for MCF based on modern veterinary medicine, the Maasai would not resort to traditional knowledge to cope with the problem. Data on the role of traditional knowledge were obtained from key informants. The Maasai consider MCF as the most mysterious disease they have had to contend with given its failure to respond to many treatment trials that they have tried. Among the many herbal mixtures used include those extracted from

Solanum incanum (entulelei), *Acacia mellifera* (oiti), *Withnamia soma* (olesayiet), *Acacia nilotica* (olkilonti), *Salvadora persica* (oremit), *Oloe africana* (oloirien), *Sesbania sesban* (olonyiakalani) and *Warbugia ugandanensis* (osokonoi). These are some of the plants which have been used to treat other conditions and illnesses in both humans and animals.

The leaves, bark, roots or a combination of all are boiled in water, mixed with either animal fat or ghee and administered through the mouth. For *osokonoi* the mixture is administered through the nostrils so that the animal may sneeze and be able to breathe by ejecting the mucous discharge. They have tried rumen contents of goats mixed with water in the hope that they contain possible remedial properties due to the nature and wide variety of plants that goats feed on. Salty soils found in some parts of Amboseli are believed to have some therapeutic effect as the animals grazed there are said not to succumb easily to the disease compared to those grazing elsewhere. These have been tried too but no positive results have been achieved so far. Administration of herbal mixtures continues as some of the older men still believe that curative ingredients are to be found in trees.

Generally, elders were found to have a more detailed knowledge on the use and preparation of traditional treatments. Younger generations emphasized greater reliance on drugs, possessed a more limited knowledge of the herbal treatments, and were also more skeptical of their likely efficacy than the elders.

Movement of herds to avoid contaminated pastures is feasible for large scale private ranchers who can afford to fence their land but not the small scale producers who have to rely on patchy distribution of resources which militates against use of enclosed grazing systems. The economics of fencing is way beyond many of them. In any case it contradicts the traditional mode of pedestrian resource utilization and limits access to dry-season and drought-retreat resources. Fencing also needs backing by legislation in land tenure changes that legitimize ownership of land under freehold title. This is an issue that is bound to generate heat beyond the local community institutions currently managing the resources. Domination by powerful individuals and groups operating as political and economic front runners in Maasailand is a real possibility. Resource poor pastoralists may be bought out and further impoverished.

Those whose animals are infected with MCF have no other option but to dispose the infected animals through sale or home slaughter. The former is the more common mode of disposal and the animal is walked to the market as soon as the disease is diagnosed. Money accruing to such sale is versatile but is rarely used to purchase a replacement animal as it is believed that it will also succumb to the disease. This is the first evidence that invokes myth and beliefs to explain the persistence of the disease in Maasai cattle. If an animal is slaughtered at home, such meat is shared with neighbors and friends and is not for sale. There are no cultural taboos inhibiting

the handling and consumption of the meat. The disease is believed to affect only the head, which is therefore thrown away after scooping out the tongue.

4.5 The Livestock Health Crisis

Drought and disease continue to occupy center stage in addressing problems of pastoral production systems. While little could be done in manipulating the environment to cope with drought, much leeway exists to deal with the threat of disease. Many cases of disease go unreported either because information and services are inadequate, inaccessible or both, or simply because infected animals would be condemned.

Data from the survey suggest that the study population hardly receives veterinary services except when there are widespread vaccination campaigns targeting specific diseases such as rinderpest. Otherwise, they argue, they have to rely on their traditional knowledge and skills to deal with exigencies of disease. It is difficult on the part of veterinary personnel to ensure that regulations relating to disease control are adhered to. The major constraints include lack of sufficient personnel, equipment and resources needed to cover extensive and difficult territory.

With respect to livestock health care, the major priority for the Maasai is to get a solution for MCF. Their hopelessness, concern and anger are echoed by the

sentiments of one Leposo who says he has lost more animals than he cares to remember:

Tell your people that what we want is a cure for the disease. If it were not for these *inkati* I would be having a big *boma* by now. For the KWS let them confine their *inkati* in their park the way we keep our animals within our land. If they cannot do that why not just kill all the wildebeests? And if they don't want to kill them let them *ntamelono inkati!* (make the wildebeests sweet).

Ticks, which are vectors of a wide range of diseases, are a threat to livestock, and their removal by hand is not uncommon. This is done to reduce tickload on animals as acaricides are either not available or are too expensive to be economical.

Apart from disease there is also threat posed by predators such as hyenas and lions with the former being considered more ominous as they can kill many animals at the same time without necessarily feeding on the carcasses. They also maim or cause injury to animals. Of late there has been increased encroachment of grasslands by bush particularly *Sastrapomea hyoscyamoides*, a prolific weed which continues to colonize vast parts of better grazing lands. It causes diarrhea in goats, which is attributed to its high alkaloid contents. Being alien, there is no local name for the plant and it is dubbed as *olmintilo*, which means anything found in abundance but is useless. It is estimated to have colonized over 10,000 hectares of grazing pasture, killing grass and all vegetation that is suitable for their livestock (Daily Nation, 1998).

These are important factors that further limit animal movement and the resources available for grazing. As a result the risks of drought and disease are compounded.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this last chapter findings of the study are summarized, drawing conclusions and making recommendations on how to deal with livestock disease at the local and national level.

The relationship between nomadic populations such as the Maasai and their natural habitat depends upon the size of the human populations and the capacity of the environment to provide feed and water for domestic animals. Pastures and water are the two most important natural resources that support the livestock based production while drought and disease are the two most important factors that afflict Maasai and their herds. The mobility and movement of animals, as practiced by pastoral Maasai, is a primary tool of herd management which provides an opportunity for animals to do better than under sedentary conditions.

Cultural ecology theory provides the framework of analysis. It is used to describe Maasai pastoral way of life and how it relates to ecological factors. The theory helps to explain the interaction of culture and the environment and how this relationship influences decision-making and allocation of labor in livestock production. It also shows how Maasai social and economic life derives from the capacity and ability of

the environment to provide for the needs of livestock in terms of grazing, water, salticks, security from predators and protection from disease.

5.1 Summary

This section presents a summary of the major findings of the study on the basis of research hypotheses formulated as guided by research questions.

5.1.1 Knowledge and Perceptions of MCF

The Maasai appear to have considerable knowledge regarding MCF and this seems to be shared widely across gender and age groups. The most significant manifestation of this knowledge is the ease with which the people can describe its symptoms. It is also evident that the medium of transmission is well understood. Thus phrases used to describe the disease are associated with the wildebeest (*enkatin*). Physical evidence in the form of disturbed grass and presence of hair, which falls off during the course of calving, is used to identify possible sites of contamination. If such a site is identified then cattle may be restricted from grazing around it. However this identification is rarely the result of deliberate searching but is often a happenstance.

What is more certain is the period that MCF is likely to occur. Outbreaks are seasonal being linked to the parturition seasons of wildebeests. Once the first batch of calves is observed, there is a high probability that an outbreak will occur in a month's time.

What makes MCF stand out first among other diseases is the fact that neither traditional nor conventional knowledge has provided a cure for it. This attribute makes some Maasai believe that the disease may be linked to some supernatural forces.

Malignant Catarrhal Fever almost certainly leads to death and few clinical cases survive. This has important implications to family welfare. It means not only the loss of milk and herd value but also diminished social and economic status so central in Maasai culture. Forced slaughter or sale of cattle is not taken kindly within the socio-cultural setting. It is for these reasons that the wildebeest is regarded as an enemy and agent of wealth deprivation. The enactment of a curse associated with this phenomenon is the ultimate symbolization of the ire and hatred that the Maasai have against the wildebeest.

5.1.2 Gender and Age in Management of MCF

Livestock health care is one among a range of activities undertaken in the process of livestock production. The Maasai have a strong cultural attachment to cattle and every effort is made to ensure that they are in good condition with respect to feeding, security and health. The allocation of roles in livestock care is explained and legitimized by cultural prescriptions based on a number of legends (Talle, 1987). Traditionally, animals are under the care of men and children during the day and are

handed over to women in the evening for milking. The ritualized inspection before and after grazing ensures that their condition is monitored closely.

While men are responsible for diagnosis and treatment of diseases, women feed and water sick animals. Children are taught to observe change in behavior that may indicate that an animal is sick as they herd livestock. When animals are moved to satellite camps this is the responsibility of *ilmurran* some of who may already have some basic knowledge in treating some conditions. Knowledge about disease management is passed from elders to younger men through the age-set structure. Today, simple procedures in drug administration may be done by young men, or even women who have been trained by their husbands.

5.1.3 Factors Influencing Endemiology of MCF

The persistence of MCF in Maasai cattle is favored by both environmental and human factors. During the wet season wildebeests move out of the Amboseli National Park into the adjacent lands where cattle are grazed. The risk of disease decreases as one moves away from the park. The outbreak of MCF occurs in regular patterns which correspond to the breeding cycle of wildebeests. The large population of these animals not only competes with cattle for grass but also increases the chances of disease spread. Other factors that favor persistence of MCF include sedentarization and the use of the same transhumant routes in consecutive seasons.

Cooperative herding is a social strategy adopted to provide security of livestock against predators, share labor and also to manage utilization of common resources. Therefore, herding large numbers together exposes more cattle to risk of infection. Although no evidence has been documented, there is a chance that MCF may be transmitted between cattle by contact through licking or mating. This would mean that the cultural practice of exchanging livestock could favor the spread of MCF.

Control of MCF and disease in general is constrained by lack of efficient animal health delivery systems, poor facilitation of disease control programmes, limited resources and poor infrastructure that makes access to many areas difficult. Institutional and legal back-up may also be weak or lacking.

5.1.4 Role of Traditional Knowledge

Traditional knowledge has been recognized as an important tool in livestock development. It complements the efforts of conventional knowledge in developing technological packages that are compatible with local circumstances. The Maasai have a repository of traditional knowledge which they have used to cope with livestock diseases and conditions (Were and Wanjala, 1986). There are a variety of tree species that are believed to have curative ingredients and their extracts have been used to prepare mixtures for disease therapy. Otherwise, isolation, home slaughter and sale are used to deal with MCF.

5.2 Conclusions

Pastoral societies have difficulty in accessing modern veterinary services and information on determinants and distribution of disease over time and space. This partly explains their continued reliance on traditional knowledge. Important issues for research to consider include the relationship that people have to their knowledge, how this knowledge is generated, shared and transmitted. Additional technical knowledge and inputs are likely to be required which are sensitive to local knowledge, but which introduce concepts and resources not locally available. Ethnoveterinary research, development and extension work could have a significant impact on development if the knowledge, attitudes and practices of livestock owners are properly investigated and considered. This would help in taking action or modifying harmful practices and utilizing beneficial ones.

It is important to consider how animals are conceived and perceived in order to comprehend how they are treated and placed in different societies. It is also useful to identify who is responsible for what task, responsibility or decision so as to adapt interventions to suit the local situation. Control and ownership of livestock and income accruing to sale of the same provides information on who is responsible for making decisions and financing expenditure on disease control. When these factors are considered it becomes possible to improve or blend indigenous knowledge with outside know-how and thus contribute to the development of efficacious locally-based solutions to disease problems.

5.3 Recommendations

In light of the findings of the study, the following recommendations are made:

1. As a control strategy, the Maasai should keep their cattle away from wildebeests during their calving period to avoid possible contact with pastures contaminated with their afterbirths and/or amniotic fluids. But it is also essential to recognize the importance of wildebeests to biodiversity and ecotourism hence an all-inclusive stakeholders' approach needs to be adopted in formulating mechanisms to cope with MCF. This should address issues of rights of access to resources viz-à-viz sustainability of the system.
2. There is need for research to address the pressing need of developing viable packages for the control of MCF. This effort, participatory and inclusive in approach, should take into consideration the social, cultural and economic organization of the Maasai and how this influences allocation of resources, responsibilities and decision-making at the family and community level.
3. The key players involved in the control of specific livestock diseases should be identified and efforts made to enlighten them about the utility of ethnoveterinary practices in livestock health care.
4. It is necessary to formulate procedures and develop skills for testing and evaluating the efficacy and efficiency of existing ethnoveterinary practices.
5. At the national level, resources need to be provided and mobilized for funding research efforts towards control of specific diseases taking into consideration their

socio-cultural and economic importance. There is need to put in place operational institutional mechanisms and policy frameworks to improve on animal health delivery systems.

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Appendices

Appendix A: Questionnaire

Greetings to you,

The purpose of our visit is to ask you to provide us with information about the MCF disease in this community. The information you provide is important because it guides us in making recommendations that could be used to improve the health of your animals.

This information is confidential and your name will not be quoted. Therefore you are requested to answer the questions to the best of your knowledge.

Thank you.

Respondent's background

- 1 Name _____
- 2 Location _____
- 3 Are you the head of the family boma? 1 Yes ____ 2. No _____
- 4 If No what is your relationship with the head of this boma? _____
- 5 Sex 1. Male _____ 2. Female _____
- 6 Age in years _____ or Age group _____
- 7 Marital status 1. Single _____ 2. Married _____ 3. Other _____
- 8 For men indicate number of: 1. Wives _____ 2. Children _____
- 9 For women indicate number of: 1. Cowives _____ 2. Children _____
- 10 Indicate total number of: 1. Boys _____ 2. Girls _____
- 11 How many children are in school? 1. Boys _____ 2. Girls _____
- 12 How many are helping with work at home? 1. Boys _____ 2. Girls _____
- 13 How many are employed for cash outside the home? _____
- 14 Are you living with other children who are not your own? 1. Yes _____ 2. No _____
- 15 If yes tell us why _____
- 16 What is your level of formal schooling? 1. None __ 2. Primary __ 3. Secondary _____
4. University _____ 5. Other _____
- 17 What is your religion? 1. Muslim __ 2. Christian __ 3. Traditionalist _____ 4. Other _____
- 18 What is your major source of income? _____
- 19 What are your other sources of income? _____

20 Indicate if you have other responsibility within the community

Questions on livestock

21 How many of the following animals do you own?

1. Cattle_____ 2. Sheep_____ 3. Goats_____ 4. Donkeys_____ 4. Other_____

22 Are there any in your herd that belong to relatives or friends? 1. Yes__ 2. No_____

23 If yes tell us why _____

24 Are any of your animals being looked after by someone else? 1.Yes____. No_____

25 If yes tell us why _____

26 Who is responsible for:

a) Grazing your animals_____

b) Watering them _____

c) Milking_____

d) Feeding the calves and kids_____

e) Feeding and watering sick animals_____

f) Treatment of sick animals_____

g) Slaughter and sale of animals _____

27 Tell us the three problems that you consider most important to your livestock.

a)_____

b)_____

c) _____

Questions on MCF

29 Have you heard about this disease? 1. Yes _____ 2. No _____

30 If Yes tell us from whom _____

31 Have you seen a case of the disease? 1. Yes _____ 2. No _____

32 Tell us which animals are infected by the disease _____

32 When did you last observe a case of the disease and where? 1. Year __ 2. Place __

33 What season of the year does the disease mostly occur? _____

34 Have any of your animals been infected by the disease? 1. Yes _____ 2. No _____

35 How do you tell that an animal is infected by this disease and not any other?

36 What do you do when you detect a case of the disease?

37 Is there a traditional treatment for the disease? 1. Yes _____ 2. No _____

38 If Yes describe it _____

39 Are there traditional healers who can cure the disease? 1. Yes __ 2. No __

40 Do you seek their help? _____ and why _____

41 Do you seek help from the veterinary people? _____ and why _____

42 Tell us the problems you experience when there is an outbreak of MCF:

43 Are there any legends or beliefs in this community that are used to explain the disease? 1. Yes _____ 2. No _____ If Yes please elaborate _____

44 How do you think these problems could be tackled? _____

Recorded by _____

Checked by _____ Date _____

Questions for the Veterinary Officer

1. Please give a brief account of the status of diseases and their prevalence in your area of jurisdiction.

2. How would you rate the incidence of MCF in this area?

1. High _____ 2. Medium _____ 3. Low _____

3. How many cases of MCF have you recorded during the year? ____

4. Can you estimate the %age of total cases that are reported to you? _____

5. Can you cite particular seasons of the year when the incidence of MCF is high. ____

6. How would you explain this? _____

7. If many cases are going unreported what would be the reasons?

8. What would you say is the level of knowledge of the local people regarding MCF?

1. High _____ 2. Moderate _____ 3. Low _____

9. What kind of cooperation do you receive from the people and local administration in controlling MCF? _____

10. What have been your major constraints in the control of MCF?

Appendix B: Group discussion guide

Greetings to all of you. We are here to discuss with you and learn about how you manage your livestock.

There are certain activities that are involved in the day to day care of animals.

Let us talk about the duties and responsibilities that you take care of.

Who assigns you these duties?

You may also mention those decisions that you can make independently and those you need to consult other members of the family or clan.

Let us specifically talk about animal health care.

We may start by drawing a list of the diseases affecting your cattle and how you perceive their seriousness. (Note local phrases or descriptors used).

What role do people in your age category play in disease control?

Let us talk about MCF.

How do you explain the occurrence of the disease?

Do you know what actually causes the disease?

How is MCF transmitted to cattle?

Can you describe the symptoms that differentiate MCF from other disease?

What options are available for handling cases of the disease?

In some societies the occurrence of a certain disease may be attributed to some myth or legend. Do such explanations exist in relation to MCF?

Let us talk about how the Maasai relate with wildebeests.

Appendix C: Key Informants Interview Guide

Informant's background e.g. age, marital status, responsibilities in community, numbers of livestock.

Who is responsible for the health of livestock?

What are the common diseases that affect cattle in this area?

What is Malignant Catarrhal Fever?

What causes this disease?

In which ways is the disease transmitted to cattle?

Describe how you are able to identify MCF.

What happens to an animal infected with MCF?

What times of the year is the disease most common?

Why is this so?

Are you or anyone else able to treat this disease?

If yes describe how you do it.

If no what do you do with the sick animal?

Why do you think MCF is persistent in your herds?

What possibilities are there of controlling MCF?