ECONOMICS OF SMALL RUMINANT MARKETING IN COASTAL KENYA

BY

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A THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE DEGREE
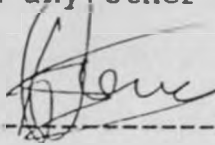
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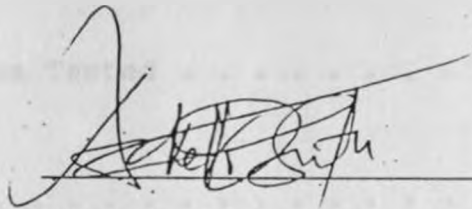COLLEGE OF AGRICULTURE AND VETERINARY SCIENCES,

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DECLARATION

This thesis is my original work and has not been presented for examination in any other university.

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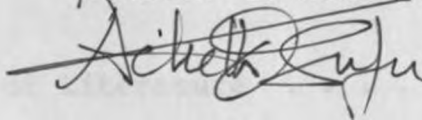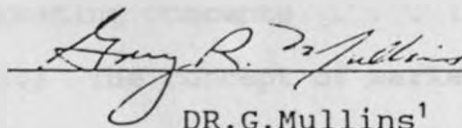
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This thesis has been submitted for examination with our approval as university supervisors.

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Acknowledgment

Dedication

This thesis is dedicated to my parents, Oruko and Anyango, for the firm foundation they gave me during my childhood .

Abstract

The study was set to evaluate the marketing system of small ruminants in coastal Kenya with the following objectives: i) Identify factors related to commercial offtake in the study area, ii) estimate the marketing costs and margins accruing to various marketing agents in the small ruminant marketing chain, iii) test for existence of spatial integration between different channel levels in the small ruminant marketing chain.

A farm household survey of 76 households in Kaloleni division of Kilifi District found farmers to own small ruminants for sale to meet household subsistence requirements. Seasonal cash need was identified as the main factor related to sale of small ruminant in the household. In addition, a survey of rural distributive markets and abattoirs serving the study area identified five channel levels namely;(i) producers (ii) assemblers (iii) itinerant traders (iv) retailers, and (v) consumers in the marketing chain.

The analysis of marketing costs and margins indicated rates of return on capital investment of about 15 percent per head of small ruminant for assemblers. All itinerant traders recorded less than 10 percent return per head save for Bamba-Kasemeni channel that recorded about 20 percent. The marketing cost varied between 9 and 15 percent of the total cost per head in all the channels for itinerant traders.

Price correlation analysis showed the distributive

markets Bamba and Mariakani, Kinango and Mariakani, and Bamba and Kinango to be integrated. All the abattoirs were integrated in prices with respect to each other.

Bivariate regression results showed lack of integration between Bamba distributive market and Mariakani abattoir. Arbitrage cost was suggested between Bamba and Kasemeni abattoir, Tsangatsini and Mariakani abattoir, as well as Mariakani and Mariakani abattoir. All the abattoirs showed integration with respect to each other.

In conclusion, the marketing system was both technically and price efficient as shown by marketing margins and cost analysis as well market integration evaluation. However, further research on the marketing system of hides and skins needs to be conducted. Bivariate regression analysis provided results consistent with traders observations regarding integration of distributive markets and the abattoirs. For future studies, regression models such as the Ravallion model that incorporates a vector of other significant market determinants is suggested for more conclusive results.

CHAPTER ONE

1. Background Information

It is estimated that Small ruminant meat and beef contribute about 80 percent of the total meat supply in tropical Africa with the former contributing about 45 percent of the total. A deficit of 2.8 million tonnes in meat supply is expected by the year 2000 in this region (ILCA 1986), arising largely from increases in population as well as affluence which are the two main structural variables determining demand for meat. (Speeding and Solinam, 1986).

In Sub-Saharan Africa, East and West Africa are the main producing and consuming areas. In 1986-1988, the two regions had 90 percent of the small ruminant stocks and accounted for 92 percent of small ruminant meat consumption (Table 1.1).

Table 1.1 Distribution of sheep and goat populations in Sub-Saharan Africa 1988

Region	Sheep 10^3	Goats 10^3
West Africa	42,604	58,488
Central Africa	5,020	10,279
East Africa	69,140	68,900
Southern Africa	3,305	7,020
TOTAL	120,069	144,687

Source: ILCA 1991

Although rangelands are the major source of small ruminant meat (Table 1.2) high rainfall areas also have small ruminants as integral part of their farming systems. In sub-humid West

Africa, for example, dwarf sheep and goats are kept as supplementary enterprise for financial gain (Upton 1985).

Table 1.2   Small ruminant population in Africa by Agro-ecological zone

Agro-ecological zone	Sheep 10^6	Goats 10^6
Arid	37.1	48.3
Semi-arid	23.1	33.2
Humid	14.2	20.3
Highland	8.2	11.6
Sub-humid	24.1	11.9
TOTAL	106.7	125.3

Source: ILCA 1986

From Table 1.2 above,it can be seen that the high rainfall areas have 40 percent of the total sheep population and 32 percent of the total goat population in Africa. One explanation for this is because small ruminants' production systems are characterized by low input levels and they often fit in the needs of resource limited producers better than large ruminants. (Fitzhugh, 1985).

The current estimated demand for meat in Kenya is 300,000 tonnes per annum, while the supply is estimated at 172,000 tonnes(GoK 1990). By the year 2000 this demand is expected to rise to 500,000 tonnes per annum. The beef herd in Kenya is currently decreasing and since small ruminant meat is the main substitute for beef, its demand is also expected to increase (Chabari, 1986).

Table 1.3 below shows a steadily increasing slaughter figures of small ruminants nationally since 1986.

Table 1.3 Numbers of livestock slaughtered in licensed abattoirs in Kenya (1986-1990)

	1986	87	88	89	90[1]
	(Numbers x 10^3)				
Cattle+Calves	427	524	701	752	828
Sheep+goats	818	875	942	998	1206
Pigs	77	60	63	73	84

[1] 1990 figures provisional.
The figures exclude stock slaughtered at Kenya Meat Commission Abattoir.
Source: Economic Survey, Republic of Kenya 1991.

The increasing offtake rates over the period 1986-90 from a decreasing national beef herd and unknown population of small ruminants calls for higher offtake rates from the non-traditional beef producing areas. With improved management and a liberalized meat market, producers from high potential areas could increase the share of their total household income from sale of small ruminants as well as meeting the increasing demand for meat in Kenya.

2. Problem Statement and Justification

In 1990, there was a significant decline of the production of maize, beans and coffee in Kenya. This led to sluggish growth in GDP contributed by the agricultural sector. However, the value of output of livestock and dairy produce increased. Livestock sales rose by 13 percent in nominal terms above the 1989 value (GOK 1991). The same source also reported an increase of 184 tonnes above the 1989 volume in the export of meat and meat products. This demonstrates

the ability of the livestock sub-sector to offset sagging
agricultural sectoral growth due to failure of traditional
crops in Kenya.

Traditionally, the majority of beef and small ruminant
meat was produced in the rangelands. Past studies on patterns
of offtake and the live animal marketing therefore have been
concentrated on the rangeland population. Yet even for the
rangelands, there is general lack of useful time series data
for analysis of the existing marketing systems (Bekure et al,
1982). The problem is even more acute for areas like sub-humid
Kenya and its environs where stock rearing is not the main
enterprise. Yet sub-humid Kenya contains the country's second
largest population centre, Mombasa, and is a major source of
demand for the country's meat producers. Other urban and peri-
urban centres such as Malindi, Kilifi, Mtwapa and Ukunda/Diani
also contribute substantially to this demand. These towns
receive a high percentage of their supply from the dry
hinterland (Table 1.5).

Tana River, Garissa and Kajiado Districts are some of the
major "exporters" of small ruminant meat to Mombasa urban
market (GoK 1989, Chabari 1986).

The distances involved in movement of the animals by road
suggest sufficiently high returns to capital, labour and time
investment to offset the relatively high transfer cost
incurred. This could be reflected in the price per head at
the terminal markets.

Table 1.4 Number of small ruminants slaughtered in four main slaughterhouses supplying Mombasa market (1989)

Slaughterhouse	District	Goats	Sheep
Uwanja wa Ndege	Kilifi	1437	444
Miritini	Kilifi	568	571
Kasemeni	Kwale	40338	16428
Mariakani	Kwale	14612	6447
TOTAL		56955	23890

Source: Ministry of Livestock Development:Coast Province Annual Report (1989).

Table 1.5 Movement of goats from other districts to Kwale for slaughter 1989

District	No. of goats
Garissa	17630
Machakos	8453
Kilifi	3310
Kajiado	2055
Nairobi	800
Tana River	570
Taita Taveta	167
TOTAL	32925

Source: Ministry of Livestock Development:Coast Province Annual Report (1989).

These major movements of stock into Mombasa from outside the Province demonstrate clearly that the Coastal sub-humid zone and its environs is either unable to meet the current demand or compete with other districts in supply of small ruminant meat.

A farm household survey carried out in Kilifi District's Kaloleni Division showed 60 percent of the households (N=1800) as owning small ruminants and 65 percent of the farm households (N=1009) with cattle also kept small ruminants

(ILCA 1991). There were 18330 goats and 4593 sheep; a total of 22923 small ruminants (Table 1.6). Mature males appeared to comprise over 10 percent of the flocks and their ratio to mature females was 1:4.5 for goats and 1:3.5 for sheep.

Table 1.6 Number of goats and sheep by age/sex classes kept on farms with cattle in Kaloleni Division

Age/sex class	Goats No.	%	Sheep No.	%	Total No.	%
Mature males	2089	11	675	15	2764	12
Mature females	9358	51	2425	53	11783	51
Immature females	3964	22	829	18	4793	21
Immature males	2672	15	617	13	3287	14
Castrates	247	1	47	1	294	1
TOTAL	18330	100	4593	100	22923	100

Source: Small Ruminants in Farming Systems of Coastal Kenya (ILCA 1990).

The producers in this region do not seem to be responding to the demand that apparently exists in the nearby markets. A number of reasons could explain this phenomenon:

(i) farmers have a strong non-commercial production objective

(ii) small ruminants traditionally act as a store of wealth and are therefore retained

(iii) animals are needed to meet social obligations. Indeed, in Lamu District, the main reasons for keeping small ruminant are; for sale when cash is needed, slaughter for meat and payment of bridewealth. In Kwale District, farmers were reported to be reluctant to sell in the harvest season choosing to keep their animals until cash is needed (GoK 1991). The same source reports lack of an adequate marketing

system as a major constraint to production in Kwale District and suggests research on improved marketing system in the District as well as methods of changing socio-cultural attitudes as ways of overcoming these constraints. Further contributing to the marketing problem, there appears to be lack of communication with regard to prices paid to producers at primary markets in Coast Province. Reynolds (1991) observes the apparent uniform and high price across all Districts of Coast Province. Yet prices would be expected to rise as the market location changes from rural net production areas to urban net consumption areas like Mombasa.

The Kenya Agricultural Research Institute (KARI)and the International Livestock Centre for Africa (ILCA) are currently conducting collaborative research on breeding and management as well as nutrition and health aspects of small ruminant production in Coastal Kenya. The long term aim is to improve the productivity of small ruminants in the region. However, as noted by Kebede (1990), "If investment and improvements in the marketing system lag behind, then inadequate marketing arrangements become a serious constraint on the development of production and consumption." The above mentioned deficiencies and lack of research on the small ruminant marketing system in the coastal region can become a major constraint to the adoption of recommended technology.

3. Objectives of The Study

The broad objective of this study was to assess the marketing of small ruminants in coastal Kenya. This was done by identifying the farmers production objectives, describing the existing marketing channels and evaluating their performance.

Specific objectives were:

(a) identify factors related to commercial offtake in the study area

(b) estimate the marketing costs and margins accruing to various marketing agents in the small ruminant marketing chain

(c) test for existence of spatial integration between different channel levels in the small ruminant marketing chain.

4. Hypotheses Tested

The following hypotheses were put forth regarding small ruminant production and marketing.

1. That the sale of small ruminants from the households is not correlated to cash needs.

2. That the returns to capital investment of traders in the small ruminant marketing chain at different channel levels are greater than the prevailing interest rates.

3. That there is no spatial integration between the markets serving the study area.

CHAPTER TWO

2. Review of Literature

2.1 Production objective and marketing strategy

Different small ruminant production systems have different producer objectives. In industrial countries, it is a specialized undertaking where large flocks are kept in commercial ranching conditions. In Africa, the holdings are mainly geared towards subsistence food production with milk and meat as the main products. For small scale farmers, cattle usually act as equity investment whereas small ruminants act as a form of current account or working capital. In general, stock is kept as security or store of wealth (Anteneh 1982, Low et al, 1980).

On commercial farms, stock owners act as portfolio managers whose decisions to slaughter their beef animals are based on the prevailing price of beef, relative to the cost of production inputs , and the opportunity cost of capital. Capital value depends on the expected future price rather than the prevailing market price. An increase in price normally results in stock owners delaying their marketing since the capital value of an animal in production is equated to their market value at an older age. A negative price response is therefore observed in the short run in such a production system. In the long run, however, a positive price response

is observed (Jarvis 1986).

Jarvis' concept of cattle as purely productive assets whose value is determined in the market place was shown not to be applicable in African production systems. Doran et al (1979) came up with the store of wealth concept as the main production motive for cattle owners in Swaziland. In their study they define wealth as "accumulation of assets which confer among other things, security, prestige and status" while income is defined as "means of attaining wealth and supporting current consumption". They therefore argue that whereas the cash value of the animals is important in supporting current consumption, their numbers are more important in terms of security, prestige and status. To demonstrate the concept further, they use a linear multiple regression model with yearly offtake as the dependent variable while real cattle prices and annual summer rainfall act as the independent variables. A negative relationship is observed between the dependent variable and both the independent variables.

In their recommendations, they discourage the use of productivity improvement based options and market incentives as solutions to overgrazing problems in Swaziland as these would not result in reduction of herd sizes. Instead, they prescribe measures that make cattle less attractive as a store of wealth while simultaneously instituting measures that force cattle owners to sell more of their stock. They also

recommend a legislative measure restricting stock sizes in Swaziland communal grazing areas.

Jarvis (1980) disagreed with these conclusions. In a rejoinder to their paper, he puts forth the following four main arguments challenging the findings of their study:

(a) beef production in Swaziland is reduced more by technical inefficiency in the communal grazing system than by store of wealth motive

(b) the negative price response is consistent with commercial attitudes

(c) the Swazi producers' decision to sell are based on profit-maximizing motive rather than sale for specific cash needs

(d) productivity-increase based technical packages and market incentives will actually have a positive effect on technical efficiency and help alleviate overgrazing problem in the long run.

Jarvis cites lack of precise theoretical definition of the term store of wealth and the lack of framework within which its impact on resource allocation can be rigorously analyzed. The wide perception of cattle as productive assets whose exchange value is determined mainly by their use as a source of milk, beef, hides and draught power underlies the store of wealth concept. This exchange value is established in orderly markets. Security and prestige are therefore derived from the exchange value of the animals as this is a

sign of economic wealth. Apart from the above, cattle have the ability to convert forage into useful products. Wealth can therefore be invested in cattle with the likelihood of increase and not just preservation. Jarvis concludes his store of wealth analysis by stating that producers will find it profitable to prolong the life of an individual animal as long as its daily production, including future beef production capacity, exceeds its current value which is beef and hide. The store of wealth benefits suggested by Doran et al are therefore joint products with beef. Since producers have to substitute one benefit for another, the net result is zero welfare loss.

The negative price response explanation is criticized by Jarvis on the basis of changing annual aggregate cattle receipts from one year to another. The price variation used by Doran et al has the long term price trend removed even though it is over a 27 year period. The changes observed in their study are cyclical and cannot be used for long term analysis of price on offtake. Jarvis' overall conclusion is that store of wealth effect is consistent with market orientation.

The debate on store of wealth concept does not, however, end there. Low, Doran and Kemp (1980) reply to Jarvis using price response of Swazi producers. In their reply, they argue that price response provides weak support for the store of wealth motivation.

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"First, negative price response has been observed in western societies where cattle producers, acting as portfolio managers, delay their marketing in the face of a cattle price increase because capital value of cattle in production then equates their market value at an older age. Secondly, it is not always easy to differentiate between the cause and the effect of price and supply movements. It is possible that an observed negative price supply relationship is as much the other wayabout." (Low et al 1980)."

To avoid problems in the previous analysis, a cash-need supply model is developed by Low et al (1980). Total slaughter from the Swaziherd is the dependent variable while basic cash needs, seasonal cash needs, and earnings from the other sources are the independent variables. The model is based on the assumption that "Cattle are a store of wealth or savings account from which withdrawals are made only for a special social or ceremonial occasions or for emergency needs such as payments for education etc." (de Hilde, 1967, Vol.1, p.55-56 in Low et al 1980). The results show a positive relationship between offtake and basic as well as seasonal, cash needs. There was, however, a negative relationship between offtake and incomes from other sources. Using the same results in their reply to Jarvis, they show that receipts to cattle sales are not equivalent to annual consumption

expenditures but rather represent the balance of consumption expenditures which cannot be met from alternative sources such as wages or own food production. A cross-sectional marketing survey further supports the sale for-specific-cash-need contention.

They also show that over the period of analysis, 70 percent of variation in the extraction rate is explained by calving and overall death rates which contributed to a downward trend in extraction rates. They therefore conclude:(i) cattle development programs be considered alongside other income generating activities in the household and (ii) production-oriented development programs will not have a positive impact on technical efficiency and output. They do, however, agree with Jarvis' assertion that advanced slaughter age and constant herd composition do not provide convincing evidence that Swazis keep cattle as a store of wealth.

The debate between Doran, Low and Kemp on one hand and Jarvis on the other brings out the conflicts that existed between those who perceived producers as rational price responsive economic men and those who regard traditional livestock producers as investors in cattle as assets to be liquidated only during periods of dire need. Two points of argument emerge from the debate:

analysis responsproducemay bprodauffable fobjebtives;

cross-sectional survey designed to elicit specific

production goals may be more suitable.

(ii) presence of store of wealth motive does not

necessarily imply lack of commercial orientation.

In subsistence economies,producers only sell "forced marketable surplus."(see concept of marketing pp 21) In an attempt to achieve long term household survival, they balance between animals that command premium price in the market and those unlikely to survive drought. Market forces will only have a partial influence in their decision to sell. The value of an animal in such a case includes the cultural attachment which is not directly determined in the market place. In this study, producer goals are investigated using cross-sectional data from producers themselves. Although a sale-for-cash-need model is used, an attempt is made to link the production goals with the performance of the marketing system serving the producing area.

In Kenya, studies on producer production goals have mainly concentrated on the rangelands. Evangelou (1984) established a missing link between production and marketing as the main reason for sub-optimal offtake from the Maasai pastoral system. Producers, livestock traders and butchers were sampled in Kajiado and Narok districts. A non-commercially oriented production objective was found amongst the Maasai producers. Immediate cash need for household consumption was found to be the main factor influencing rate and age of offtake. The Maasai rarely engaged

in the marketing of small ruminants, preferring cattle marketing instead. Evangelou did not find evidence of barriers to entry and exit . He also observed that the price discovery method was one-to-one bargaining. Keen eye and bargaining acumen were principal contributors to traders profit. Credit was readily extended to fellow Maasai cattle traders reflecting the personal friendship which permeate the trade. Evangelou interpreted this credit system as meaning that default was not common.

In his analysis of market performance, Evangelou examined pricing and technical efficiency. Although he found room for improvement in market performance by increasing the volume of animals transported from the villages thereby reducing unit transfer cost and improving the flow of information about market prices. The effect of these improvements would be weakened, however, by producers' lack of commercial orientation. A possibility of expanded production in the Maasai system could not be expected as long as the store of wealth motive amongst Maasai producers persisted. Evangelou's recommendation could be effective only when production and marketing were linked by prices that accurately reflect demand and producers respond to price changes.

Chabari (1986) extended Evangelou's analysis of sub-optimal offtake from the Maasai production system. Using a comparative study between Kajiado and Baringo districts, the Baringo auction system was found to be relatively competitive

in structure with low seller and moderate buyer concentration. There was lack of free flow of market information in Kajiado due to the one-to-one bargaining method and domination of small ruminants trade by non- Maasai traders. The Kajiado marketing system was, however, more technically efficient than the Baringo system based on marketing margins and costs analysis. The study concluded that low offtake rates in Kajiado were caused by preference of relatively rich households to sell cattle instead of small ruminants when they needed cash for household consumption. The poorer households were therefore the main source of small ruminants from the Kajiado production system.

In contrast to the present study, Chabari's work differs in its classification of all livestock sellers as producers. The present study adopts a different approach as it was found that it is primarily assemblers rather than producers who actually sell small ruminants at the distributive markets. This raises the possibility that the information collected by Chabari on flock size and structure might not have been accurate. In both Evangelou and Chabari's studies, store of wealth motive is found to still exist in Kenya's rangelands. The main factor influencing commercial offtake is cash-need for household consumption. Chabari also supports Evangelou's view that technical inefficiency in marketing is not the main constraint to increased offtake rates from the Kajiado system, rather it is still the store of wealth motive.

Evangelou's study resembles the present study in that it covers both producers and the middlemen of marketing. The only difference is that it was done in an extensive production area where livestock play a dominant role in household income.

In contrast to the foregoing studies, the present research is conducted in a zone where the land holdings are on average less than 2 hectares. Crops still play an important role in the farming system and off-farm activities are a major source of income for many households (ILCA unpublished). In such a system most small holders tend to regard sheep and goat production as secondary to crop production and as a means of meeting immediate family requirements (Anteneh, 1982). Producers will therefore not keep large flocks of small ruminants for prestige. Rather, they store their surplus incomes from other sources in small ruminants for security and ease of liquidation when cash need arises. As cited by Jarvis (1980), it is their exchange value that provides the security, whereas their ease of liquidation and relatively low input demand make them excellent stores of wealth.

Both Jarvis (1980) and Low et al.(1980) agree that the store of wealth concept does not necessarily imply lack of market orientation in production. To ascertain whether or not this is the case, a study of the marketing system in the area is conducted as well.

2.2 Marketing concepts

Undeniably, the scope and diversity of marketing functions have greatly expanded over time, thus resulting in a multitude of different definitions of marketing. This study adopts a broader definition of marketing as put forth by Purcell (1979). Marketing encompasses "the set of economic and behavioral activities that are involved in co-ordinating various stages of economic activity from production to consumption." This definition embraces both the activities involved in the flow of goods and services from producer and creation of form, time, place and possession utility (Chaturvedi, 1959). Chaturvedi (1959), however, differentiates the concept of marketable surplus in developed and underdeveloped economies. He defines marketable surplus in poor agricultural economies as "forced" since what is marketed is not over and above the producer's personal needs but that created compulsorily out of the given produce in order to meet more pressing needs. This concept rationalizes farmers decision to sell only when they need cash for immediate use in the household and strengthens the store of wealth hypothesis.

Small ruminant producers in the study area could be classified as those selling forced surplus as they belong to the underdeveloped economies. A marketing system should, however, be able to stimulate production. Since the market place serves as an area for price formation, efficient

transmission of price signals not only helps producers to allocate their resources more optimally amongst competing enterprises but also to meet consumer needs in terms of type, quality and quantity supplied (Kebede, 1990). It is possible that the marketing system in the study area is unable to stimulate production. Consumer needs in terms of quality and quantity are possibly not being met as well.

Structure-conduct-performance

Structure and conduct are the characteristics used to appraise the internal and external conditions in which a firm operates as well as a firm's behavior in the market place respectively. Bain (quoted by Kebede,1990) defines structural variables as "those characteristics of the organization of the market which seem to influence strategically the nature of competition and pricing within the market." Conditions to entry into the market, degree of the product differentiation and degree of seller and buyer concentration are some of the variables used in market structure analysis.

Producer goals and marketing objectives, however, influence greatly the structure of a marketing system as well as the market participants. In a predominantly secondarily market oriented economy, production is guided mainly by immediate and long term subsistence requirements. This in turn can influence the number of animals on offer for sale. In the theory of industrial organization, market performance is attributed to the conduct of sellers in their degree of

collusion as well as pricing. Conduct is in turn related to structure in terms of number, size and spatial distribution of buyers and sellers.

"Recognition of the underlying influence upon both market structure and participant conduct of various basic conditions affecting supply, from the availability of substitute products to laws, regulations and dominant socio-economic values completes the structure, conduct performance theoretical construct." Evangelou (1984). Many studies in marketing deal with performance problem descriptively (see Staatz 1979, Evangelou 1984, and Chabari 1986).

In order to understand the behavior of producers in a given production system, the economic influences under which they operate need to be studied. As pointed out earlier, economic constraints to expanded production may stem from producer production goals. Given that producers do not offer their total production for sale, irrespective of the prevailing market prices, the determinants of the market forces amongst buyers and sellers are often more difficult to separate. Under such circumstances, price increases could be due to reduced supply from the producers or increased demand from the sellers.

Moreover, influences external to producer's immediate environment often evoke different responses from buyers and sellers. The state of the national economy as well as

deliberate government intervention, such as decontrol of meat prices, usually have an indirect effect on producers and similar, if not direct, effect on buyers.

2.2.1 The concept of marketing efficiency

The concept of efficiency is a complex one. French (1967) noted that "economists have yet to develop an integrated set of theories, concepts, methods and data that are necessary and sufficient for the construction of workable frameworks for quantitative evaluation of the efficiency of marketing systems." The absence of such a framework has led to different approaches to the study of marketing efficiency.

Although markets perform pricing and exchange functions, physical and facilitating functions performed between the points of production and final consumption are equally important. An efficient marketing system should therefore provide physical and facilitating services at the minimum cost per unit compatible with the kinds and qualities of service required among others (ILCA 1991). "The performance of a marketing system usually has two aspects, commonly classified as technical efficiency and pricing efficiency" (Purcell 1979 quoted by Evangelou 1984). Technical efficiency is therefore attained when least-cost-combination of inputs in marketing activities are employed. Price efficiency on the other hand refers to the capacity of a marketing system to adjust to changing supply and demand conditions. A smooth

flow of information along the marketing channels as well as the ability of market participants to readily modify their allocation of resources in response to price signals is a sign of a relatively price efficient marketing system.

The degree of price fluctuations is an important indicator of marketing risks faced by the producer. "With a good methodology, the degree of market integration can be used as a proxy for market efficiency measurement" (Dittoh 1992). Past studies (Monke and Petzel 1984; Kebede 1990) have used market integration as an indicator of marketing efficiency since it is a performance variable. The justification for this approach is that on the basis of structure and performance, efficiency can be improved by manipulating the structural variables of the market. Moreover, efficient market will establish prices that are interrelated through space by transportation costs and through time by storage costs as well as market information (Bressler and King, 1970 pp.413).

Kebede (1990) studied the traditional sheep marketing systems in the Ethiopian highlands. He based his study on lack of research on market performance of livestock marketing system in the area and on the importance of sheep and goats in the livelihood of large portion of Ethiopian people. His objectives were (a) to describe the traditional sheep trading system for some key central highland markets (b) analyze factors affecting intra-annual price variations (c) diagnose

efficiency of the traditional marketing system and (d) make recommendations on the basis of the findings. He identified four marketing channel levels:

(i)   Producer

(ii)   farmer trader,itinerant trader,rural consumer

(iii)   resident urban trader

(iv)   urban consumer

Price discovery was again by the one-to-one bargaining method. The main factors influencing intra-annual price were found to be: market composition of male, females, and castrates; seasonal factors such as religious festivals; animal characteristics such as body condition score; and, purpose of purchase.

Market performance analysis indicated low seller concentration ratios. Market integration analysis revealed no clear indication of market segmentation. However,there was evidence of unfair trading practice resulting from the lack of free flow of information inhibited by one-to-one bargaining method.

Kebede recommended;

(a) preparation of sheep to meet buyer requirements, seasonal demand variations and animal characteristics such as good finishing during sales by producers

(b) further study on the effect of brokers (delalas) in market performance

(c) provision of market information and infrastructure by

government

(d) provision of weighing facilities.

The livestock markets surveyed in the present study operate on a one-to-one bargaining system like those in Kebede's study. The present study does not, however, measure live weights of animals in the markets and is limited to a three month period in all markets.

Ackello-Ogutu (1976) while studying marketing of poultry meat in Nairobi found five channel levels in the marketing chain. These were producers, assemblers both at rural and urban centres, distributors, retailers and final consumers. Oligopolistic tendencies was found to exist at retail and wholesale level but was counterbalanced by lack of clear product differentiation and demand for lower quality backyard poultry meat. The wholesale price of poultry meat depended on production costs. The wholesale price of poultry meat was therefore based on production level rather than retail level price expectations. This gave the highly concentrated middlemen at wholesale level latitude to dictate farmgate prices since they were responsible for transportation to urban centers. At all channel levels, price setting mechanism was by one-to-one bargaining.

The foregoing review focused on farmer production objective and the linkage of this objective to the marketing systems. The main factors that influence offtake from the different production systems vary from lack of essential link

between production and marketing, household cash needs to
wealth status of different households.

CHAPTER THREE

3. Methodology and Description of Study Area

3.1 The study area

Kaloleni Division of Kilifi district was chosen as the study area for household survey. This was because Kaloleni covers three of the four major agro-ecological zones of the coastal lowlands and the existence of a sampling frame created during a cattle census conducted by ILCA in 1989. Jaetzold (1983) defines an agro-ecological zone as "a zone defined by its relevant agro-climatic factors mainly moisture supply in case of the tropics."   The agro-ecological zones are:

(a) Coastal lowland 2 (CL2)

This is the lowland sugarcane zone found mainly in Kwale district.   This zone has long to medium cropping season with an annual rainfall up to 1400mm per annum.   The altitude ranges from 1-60 metres above sea level and main crops grown are maize, sweet potatoes, sunflower variety 252, cassava, bananas and coconut.

(b) Coastal lowland 3 (CL3)

This is the coconut-cassava zone with an annual rainfall up to 1200mm and an altitude ranging from 1-450 metres above sea level.   This zone is found both in Kwale and

Kilifi Districts. The main crops grown are coconut, maize, cowpea and cassava.

(c) Coastal lowland 4 (CL4)

This refers to the cashewnut cassava zones also found in Kwale and Kilifi Districts. This zone has an altitude of 1-250 metres above sea level and annual rainfall of up to 1000mm. Main crops grown here are maize, cassava, cashewnut and cowpea.

(d) Livestock Millet Zone (CL5)

This is a semi-arid zone with livestock rearing as the dominant activity.

The mean annual rainfall is upto 900mm. Millet and maize are the main crops grown(Jaetzold 1983).

The Coastal semi-humid zone comprises CL3 and CL4. Figures 3.1 and 3.2 show the agro-ecological zones of Kilifi and Kwale Districts as well as Kaloleni Division respectively.

The region is mainly occupied by the Mijikenda Community with the Giriama being the majority to the North Coast and the Digo predominating the south.

FIG. 3.1

THE AGRO-ECOLOGICAL ZONES OF
KILIFI AND KWALE DISTRICTS

AGRO-ECOLOGICAL ZONES

CL 3 - Coconut/Cassava
CL 4 - Cashew/Cassava
CL 5 - Livestock/Millet
CL 6 - Ranching
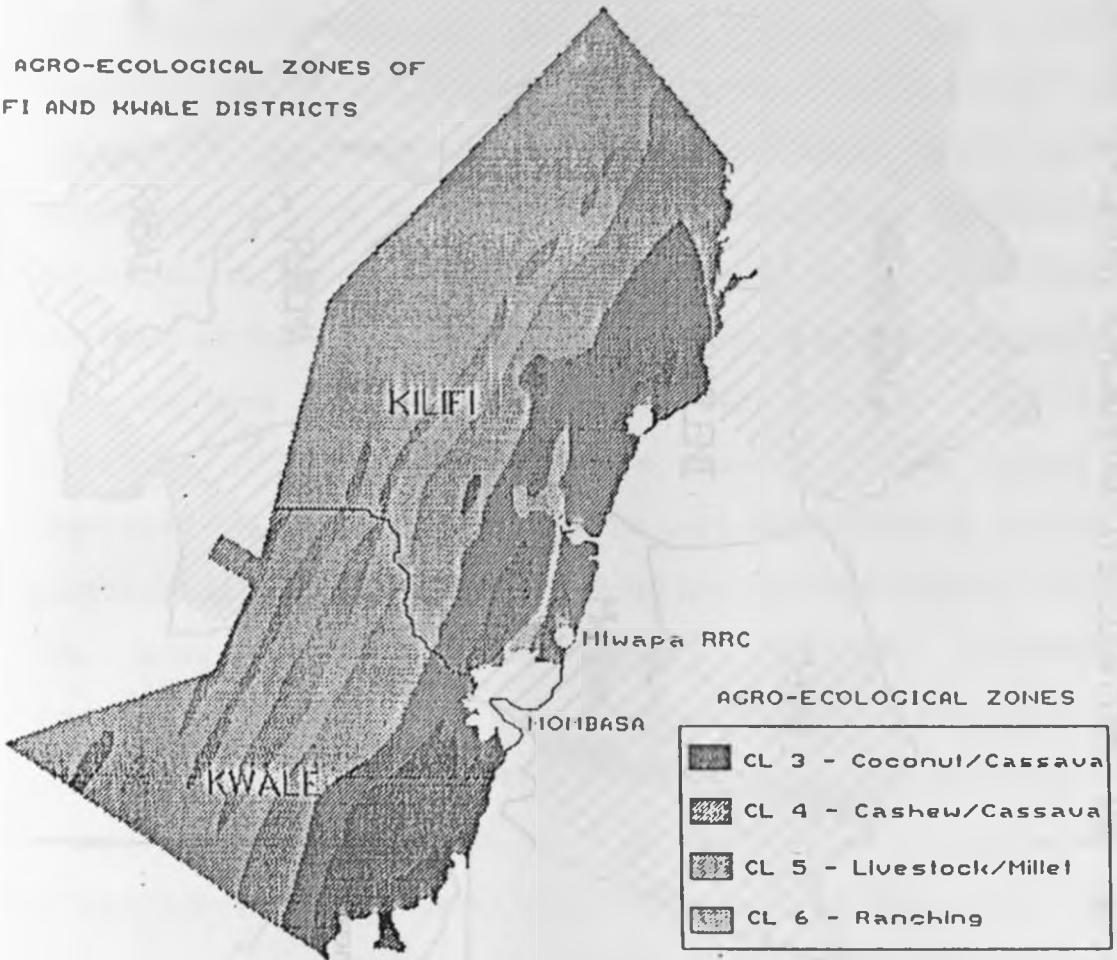
FIG. 3.2 KALOLENI DIVISION, ADMINISTRATIVE LOCATIONS AND AGRO-ECOLOGICAL ZONES
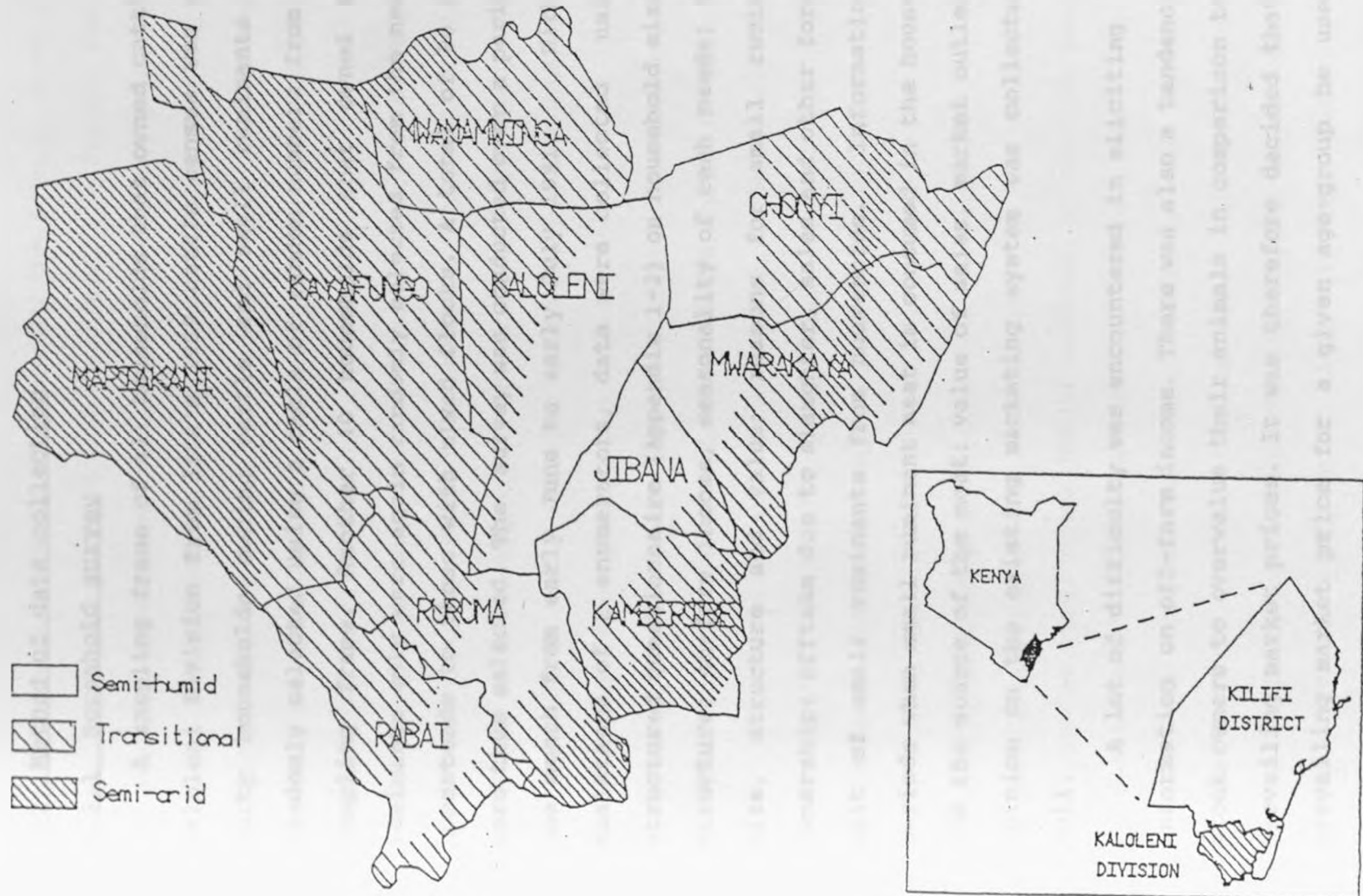
3.2 Method of data collection

3.2.1 Household survey

A sampling frame of all households that owned cattle in Kaloleni Division from ILCA's 1989 cattle census was used. Forty households owning cattle and small ruminants were randomly selected using a table of random numbers from this sampling frame. Another 40 households that owned small ruminants only were again randomly selected from the nearest homesteads to those with mixed flocks. A total of 80 farms were thus selected. The survey was conducted over a period of one month from early June to early July 1991.   With the assistance of 2 enumerators, data were collected using a structured questionnaire (Appendix 1-2) on household size and structure; on-farm income, seasonality of cash needs; flock size, structure and value; reasons for small ruminants ownership; offtake due to slaughter, sales and other forms of exit of small ruminants from households.   Information on periods when small ruminant meat is consumed in the household and the source of the meat; value of sales, market outlet and opinion on the existing marketing system was collected as well.

A lot of difficulty was encountered in eliciting information on off-farm income. There was also a tendency for stock owners to overvalue their animals in comparison to the prevailing market prices. It was therefore decided that the prevailing market price for a given age-group be used in

valuation rather than that quoted by the farmer. Seasonality of cash needs was divided into two broad categories: the pre-harvest period between January to July and the post harvest period between August and December. These periods also coincided with the school fees periods in a year as well as periods of food deficit and surplus in the households, respectively.

Reasons for small ruminant ownership which were taken as the production objectives were ranked in order of importance. Slaughter periods, especially festivities, were also recorded for each household. The sex and species slaughtered were specified in each case.

Stock sales in the previous 12 month period were also recorded by value, age, sex, species and period of sale. The place of sale, price setting mechanism, market visits before sales or when not selling were all recorded in order to determine the nature of market information system.

3.2.2 Marketing Survey
Distributive Markets

In the rural distributive markets, it was not possible to statistically pre-determine the sample size. This was because the population size, variance and hence the probability of selection was unknown. All small ruminant traders willing to be interviewed on any market day were sampled. In the study area, there are four markets, each

operating once a week, Mariakani on Mondays, Bamba on Wednesdays, Kinango on Thursdays and Tsangatsini on Fridays. It was not possible to collect data on individual animal characteristics since most traders bought animals in batches rather than singly.

Data collection at each of the four primary markets commenced in mid-March 1991. In order to gain confidence of sellers and buyers in each of the markets, the initial 3 weeks were spent pre-testing the questionnaire. The number of discarded questionnaires were high due to obvious inconsistencies in answers. The greatest number of disqualified data were from sellers who frequently gave negative margins incurred per head of small ruminant sold.

Information was collected on business experience, other occupations and whether the business was jointly owned or not. Fluctuations in business cycle was determined by the gross sales per trader. A high gross sales would thus indicate good trading period or high business activity while low gross sales would indicate low business activity.

Information on other markets visited and whether the trader engaged in cattle trade was also sought. Source and purchase price of animals, destination of animals in case of buyers, form of resale, losses and costs incurred were all recorded. Apart from Kinango auction market which was closed in the month of April due to foot and mouth disease outbreak in Kwale District, the rural distributive market survey

ended by July 30th 1991.

Slaughterhouses

At the slaughterhouses, daily recordings were taken on the dressed weight of small ruminants slaughtered. Information was gathered on total number of animals slaughtered, the price per kilogram of each batch of animals, the price of goat and sheep skin and the prices of tripe, trotters and head. This was done in Mariakani from March to the first week of August and from June to August for the other slaughterhouses. Total slaughter figures and mean daily prices were available throughout the period. Figure 3.3 shows the location of rural distributive markets and the abattoirs. Two enumerators assisted with collection of data at the rural distributive markets and the abattoirs.

Fig 3.3

SMALL RUMINANT MARKETS
AND ABATTOIRS IN
KILIFI AND KWALE DISTRICTS

Bamba

Tsangatsini

Mariakani   Vipingo

Kasemeni

Mombasa

Kinango

Mwangalu

CL2 - Sugarcane
CL3 - Coconut/Cassava
CL4 - Cashew/Cassava
CL5 - Livestock/Millet
CL6 - Ranching
Abattoir
SR Market
All Weather Road
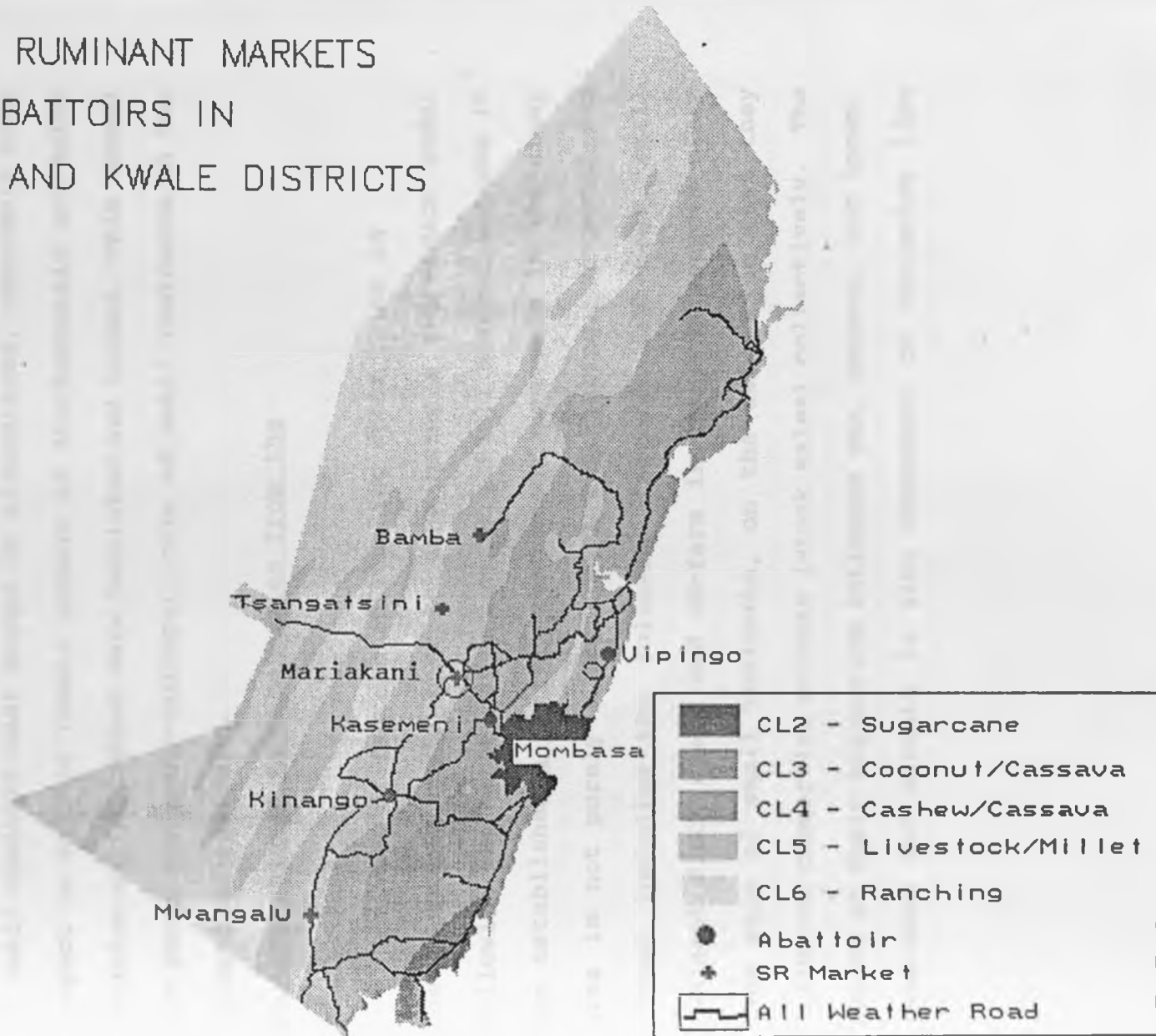
3.3 Analysis of data

3.3.1 Producer production objective

General descriptive statistics like frequency
distributions and percentages were calculated for the
variables used in analyzing producer production goals. They
were then ranked in order of importance to the farmers.
Frequency distribution of all major festivities observed in
the household when small ruminant meat was consumed, species
of small ruminant meat bought or slaughtered, ownership with
respect to male or female members of the household and sales
decision making method were tabulated and ranked. This formed
the basis for socio-cultural role of small ruminants in the
households analysis.

Factors related to stock sales from the
household

Analysis of factors influencing stock sales in
the household could best be done using a regression model
following the method of Low et al (1980). However,because it
was established a priori that stock ownership in the study
area is not purely a commercial undertaking, a model was
fitted including the following factors: cash-need, small
ruminant flock size and on-farm income from sources other
than sale of small ruminants, on the assumption that they
influence commercial offtake (stock sales) collectively. The
nature of their collective influence was, however, not known.
Cash-need for example is also dependent on variables like

level of off-farm income, crop yield in the preceding year, number of children attending school as well as total household size as was observed by Low (1980).

In circumstances where the nature of cause and effect relationships is strictly not known, a correlation analysis may be used instead of a regression analysis. On the basis of the above, a correlation analysis was applied.

Correlation analysis

Correlation analysis only shows the degree to which variables are linearly related. A near zero correlation value does not necessarily mean lack of relationship since there could be a high non-linear relationship between the variables (Spiegel 1981).

Simple correlation analysis assumes a bivariate normal distribution of the underlying population variables. The coefficient of correlation r is defined as:

$$r = \pm\sqrt{\frac{explained\ variation}{total\ variation}}$$

Inferences about the population correlation coefficient P can be made from a sample correlation coefficient r by setting confidence intervals using student (t) distribution. Hypotheses can be tested about the nature of linear relationship between any two variables at a specific level of confidence . One important assumption about the population from where the two variables are selected is that they must be bivariate normally distributed. For a null hypothesis of P =

0 (correlation coefficient=0) for any two variables, the distribution is symmetric and statistics involving t distribution can be used. (Spiegel 1981 pp246).

The following equation can be used to calculate t statistic for a null hypothesis P = 0

$$t - r\frac{\sqrt{N-2}}{\sqrt{1-r^2}} \, .$$

Where r = sample correlation coefficient

N = sample size

t = student t distribution at N - 2 degrees of freedom

A high correlation coefficient, however, does not necessarily indicate a direct dependence of the variables. There are times when cases of spurious correlations may occur and a strong theoretical basis should be the guiding principle.

3.3.1 The structure conduct and performance of the marketing system

The description of the existing marketing channels serving the producers in the study area was done using absolute frequencies and percentages. The market features analyzed in relation to buyers were their trading experiences, purpose and destination of animals purchased, processing of the purchased products before resale and buyer mobility across

the markets. Time spent on tasks related to livestock trade and degree of specialization on particular type of livestock was also investigated. Price setting mechanism at all channel levels was also investigated. The above formed the basis of structure and conduct descriptive analysis.

Market performance evaluation

Two analytical methods have been used in the analysis of market performance, namely,

(i) marketing costs and marketing margins analysis and

(ii) market integration between distributive markets and the abattoirs, using price analysis.

(i) Marketing costs and marketing margins analysis

"Results of analysis of marketing costs and margins are used to determine whether there are excess profits and serious inefficiencies or whether wide margins were due to high real costs"(Kebede 1990). There are different methods of determining marketing costs and margins. Abbott (1961) gives three methods:

(a) tracing the product as it moves through the marketing system

(b) computing the volume handled and gross value of purchases of each type of marketing agency. The average gross margin is then obtained by dividing the difference between the value of purchases and sales

by the volume handled

(c) comparing prices at different levels of marketing. The prices used should cover products of comparable description and quality and allowance be made for physical loss, quality deterioration and time lag between successive market operations.

Since price analysis is also used in market performance evaluation, the last method was adopted in this study with slight variations. Analysis of marketing costs and margins was therefore done per head of small ruminant in each marketing channel. The different marketing channels were then compared in terms of returns to traders as well as the marketing costs as a percentage of total cost. As Chabari (1986) noted, "from the welfare point of view, the most desirable level of performance should be that which offers the lowest possible average marketing costs per head of small ruminant sold because this would enable small ruminant buyers and sellers to offer lower prices to the consumer."

The following were identified as marketing costs for traders in the study (Cost of licensing is actually omitted here because traders were unwilling to divulge information on it):

(a) transport of self to market (1 return trip)

(b) transport of assistants to market (1 return trip)

(c) food and drink expenses (1 return trip)

(d) lodging expenses (1 return trip)

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(e) taxes (cess) paid per head

(f) dipping fees

(g) meat inspection fees

(h) slaughter fees

(i) transportation cost of the animal to its final destination

(j) herding fees at the slaughter house before the animals are slaughtered.

There was lack of data on losses resulting from death or disappearance from the trader or his agents during the trading operation. This aspect was therefore omitted. Lag due to successive market operations was also omitted. The assumption is that this storage cost is covered in the returns to capital investment, apart from the difficulty in assigning a value to it. Calculation of margins accruing to middlemen was done according to the following formula:

Marketing margin per head = Total value of animal at sale - buying price.

(ii) Price analysis and market integration

In an integrated marketing system, price formation in an individual market is influenced by prices in other markets. The degree of spatial market integration is usually determined by the variation in prices between places. Correlation of prices between these markets is taken as an

indication of the extent to which two markets are integrated (Kebede 1990). On the other hand, Monke and Petzel (1984) define integrated markets as those in which prices of differentiated products do not behave independently and can therefore be analyzed in an aggregate manner.

Ruttan (1969) designed a linear regression model to test empirically for efficiency of transmission of information amongst different market participants. He assumed a highly elastic supply function, a highly inelastic demand for marketing services and a shift to the right of both curves with long term growth in marketable surplus. In Ruttan's model, if the slope coefficient of the linear regression model relating price at farm gate to price at retail level is not significantly different from one, then the marketing margin is independent of price, hence supply of marketing services approaches perfect elasticity.

Price correlation coefficients have also been used to test for market integration by Francis and Ingawa (1988). The degree of price correlation is taken as an indication of market integration. Jones (1968,1972) attempted to measure marketing efficiencies in Nigeria and other African countries using (i) the bivariate coefficient of correlation of prices in different markets;(ii)price difference between markets in relation to costs and (iii) seasonal price differences relative to storage costs. Although the markets were weakly integrated, they were quite efficient given the poor

infrastructure and lack of market information characterizing the system.

There are, however, weaknesses in the use of price correlation as a diagnostic method for integration. Harris (1979) cites monopoly procurement at fixed prices, similar price response to temporarily synchronous local forces of supply and demand as yielding high correlation coefficient. She also noted the difficulty in identifying the causation effect amongst markets in the price formation process as well as difficulties in making a structural analysis given the potential autocorrelation in time and space. Timmer et. al. (1983 quoted in Kebede, 1990) also note the existence of monopoly as well as effective government policy and little price movement as possible causes of a high correlation coefficients which could be mistaken for market integration. He maintains, however, that high correlation coefficients could indicate perfect competition and efficient arbitrage as long as corroborative evidence exists to help understand the actual price formation between markets (See Holtzman,1986).

Hays and McCoy (1978 quoted in Dittoh 1992) analyzed inter-market price differentials in relation to transport and transfer costs and intertemporal price differentials in relation to storage costs in order to assess the degree of market integration in Northern Nigeria. The spatial price differences as well as seasonal price increases were found to exceed the transfer cost and the cost of storing grain,

respectively. This lack of integration provided opportunity for those who stored grain to make more than normal profits. Information on crop prospects, market supplies and prices in order to improve the performance of grain marketing system was therefore necessary. Other studies (see Delgaldo 1986) avoided correlation coefficient method and used a variance component approach to measure grain market integration in Northern Nigeria because of the observed weaknesses in price correlation analysis.

Recent studies (Monke and petzel 1984, Ravallion 1985, Hayten 1986, Kebede 1990 and Benson 1990) have used various regression models to test for market integration.

Bivariate (simple) regression model

Bivariate regression models have been used by Monke et al 1984 and Kebede 1990 to test for market integration. This model is formally stated as:

$$P_1 = F(P_2)$$

This can be specified to:

$$P_1 = \alpha + \beta P_2 + e.$$

where: P_1= price per unit in market 1

P_2= price per unit in market 2

α= constant

β= coefficient of p_2

(a) If coefficient β is not significantly different from zero, the two markets are independent (not integrated)

(b) If coefficient ß is significantly different from zero, the two markets are dependent (integrated)

(c) If coefficient ß is not significantly different from 1 and zero and coefficient α is not significantly different from zero, the two prices are statistically identical

(d) If coefficient ß is significantly different from 1 and zero and the coefficient α is not significantly different from zero, arbitrage is suggested

(e) When coefficient ß is not significantly different from 1 and coefficient α is significantly different from zero, this suggests absolute arbitrage cost reflecting a fixed price differential between the two markets. Both percentage and absolute elements would be indicated if ß is significantly different from zero and 1 and α is also different from zero.

In this study, both price correlation coefficients and bivariate regression analysis were used. Average weekly price per head in each distributive market were used. In case of prices between distributive markets and abattoirs, the final value of the animal was used as price per head in the abattoir. This was the sum of carcass, skin, head and trotters, and tripe values. Among the abattoirs, per kilo wholesale price was used for analysis.

CHAPTER FOUR

4. Results and Discussion

4.1 The socio-economic role of small ruminants in the households

4.1.1 Size and structure of flocks

Table 4.1   Distribution of small ruminants in the sample households

No. owned	Respondents Number	Respondents percentage
1-5	18	23
6-10	21	28
11-15	25	33
Over 15	12	16
Total	76	100

Table 4.2   Distribution of small ruminants in households with and those without cattle

No. owned	Respondents with cattle		Respondents without cattle	
	No.	Percentage	No.	Percentage
1-5	8	25	10	23
6-10	7	22	14	32
11-15	13	40	12	27
over 15	4	13	8	18
TOTAL	32	100	44	100

Table 4.3   Mean flock sizes of goats by sex and age
categories

	No.	percentage
Immature males	2	20
Immature females	3	30
Mature males	1	10
Mature females	4	40
Total	10	100

Stock were physically counted and classified by age and
sex categories for each household sampled. The results are
summarized in Tables 4.1 and 4.2. The results indicate that
51 per cent of the households owned flocks of 10 animals or
less with only 16 per cent owning more than 15 animals. The
results did not vary much even when the household were
classified into those with cattle and those without cattle.
Table 4.3 indicates the mean flock size of goats as 10 animals
with the mature females comprising 40 per cent of the flock
and the immatures comprising 50 per cent.

4.1.2 Reasons for ownership and mode of acquisition

Table 4.4 Farmers reasons for owning small ruminants by rank

Reason	No. of respondents	Rank
For sale for cash when		
needed in the household	76	1
Slaughter during festivities	56	2
Dowry payment	10	3
Other reasons like prestige	3	4

Producers were asked to state explicitly and in order of

importance their reasons for owning small ruminants. The results are shown in table 4.4. Sale for cash need is the main reason for keeping small ruminants.

Table 4.5 Producers source of ruminants (Mode of acquisition of initial stock)

Source	No. of respondents	Percentage
Bought	47	61.8
Some bought some inherited	8	10.5
Some bought some from dispersion	5	6.6
Paid as dowry only	5	6.6
Some bought some paid as dowry	4	5.3
Dispersed only	4	5.3
Got from other sources	3	3.9
TOTAL	76	100

The main method of acquiring original stock was through purchase from fellow farmers. This suggests that the decision to sell or not lies within the household. The household head made the decision on small ruminant sale in 52 out of 76 households that actually sold their stock. Notably, bridewealth payment is listed as one of the reasons for keeping small ruminants yet it does not contribute much to entries or exits from the farm.

4.1.3 Consumption of small ruminants in the households

Table 4.6 Small ruminant consumption in the household during festivities

Festivity	Number of respondents
Christmas	22
Christmas and end of the mijikenda year	8
End of the mijikenda year	7
Christmas and Idd-ul-Fitr	7
Idd-ul-hajj	6
Christmas and Easter	5

In the survey, producers were asked to state how often they purchase small ruminant meat. Forty out of seventy-six indicated that they purchase small ruminant meat no more than twice a year from the meat retailers.

Table 4.4 indicates slaughter for festivities as ranking second to sale for cash need in producer production goals. Survey results also showed 60 out of 76 households as having slaughtered goats during the previous 12 months while only 2 out of 76 households slaughtered sheep. Goat meat therefore preferred to sheep meat for household consumption by the sample farmers.

Table 4.6 shows the consumption of small ruminant meat during festivities from the household's stock. Christmas appears to be the religious festivity during which most small ruminant meat was consumed by households. The end of the Mijikenda year, referred to as "vuri" in Kigiriama or 'vuli'

in Kiswahili is another important festivity. There is also a
clear preference for goats rather than sheep because sheep are
regarded as a "cleansing" animal slaughtered only for
performance of specific cleansing rituals. Consumption of
small ruminant meat would appear therefore to generally be
limited to festivities.

From an economic point of view, slaughter during
festivity can also be viewed as income in that it is what the
family saves by not buying an animal from the market for
slaughter. There is therefore an economic rationale for
owning small ruminants for slaughter during festivities.

4.1.4 Stock sales in the household

Table 4.7 Small Ruminant sales by households in the 12 months
preceding the survey period

Number of Animals sold	Number of households	Percentage of households
1	8	15
2	15	29
3	9	17
4	8	15
5	4	15
Over 5	8	8
TOTAL	52	100

Table 4.8 Stock sales by sex-age categories and value from the households.

Sex-age category	Number of respondents	Number of animals	Value of animals sold KSH
Immature males	7	7	1310 (187)
Immature females	9	15	3442 (229)
Mature males	41	59	20280 (343)
Mature females	31	65	19530 (300)

Note: values in brackets are average price per head.

Only 52 out of 76 households actually sold small ruminants during the 12 months preceding the survey period. The actual numbers of animals sold were few, with 61 per cent of households selling between 1 and 3 animals (Table 4.9). More households sold mature males than mature females although in terms of actual numbers sold, mature females were more (Table 4.10). From the same table commercial offtake rates were calculated to be 28.1 per cent per annum given an average flock size of 10 animals per household (Table 4.3).

 Seventy-two per cent of the surveyed households sold mature animals whose market values were higher than immatures. The choice of mature males for sale possibly indicates the farmers response to market signals in addition to ability to differentiate between the current value and the future discounted value. This would appear to concur with the concept propounded by Jarvis (chap 3 pp 10,12). The female goat is a productive asset whose value in production is above the prevailing market value. The male animal however has attained its highest possible value. Table 4.10 therefore

suggests   rational economic decision making in the selection
of marketable stock by producers.

The sale of females could be an example of sale of
"forced marketable surplus."   Market prices may not have a
bearing on the farmers' decision to hold onto the female or
sell it.   The household's immediate and long term cash needs
would appear to be the main determinants.

<u>Factors related to sale of small ruminants from the household</u>
A sale-for-cash-need model based on correlation analysis was
used to analyse factors related to commercial offtake (chap3
pp37).
The following factors were hypothesized to influence the
number of small ruminants sold from the household (Q).

     X1 = seasonal cash needs

     X2 = annual on-farm income from sources other than
       those from small ruminants

     X3 = flock size

Result of the correlation matrix

	Q	X1	X2	X3
Q	1.000	0.6134*	-0.1108	0.0459
X1		1.000	-0.0718	0.0501
X2			1.000	-0.0136
X3				1.000

* significant at α =0.01
N = 52
correlation constant Y = 0.74

The 95% confidence interval for the underlying population correlation coefficient is given as:

$$0.5 < p < 0.89$$

Only cash need factor lies within this range and is also highly significant. The hypothesis that cash need is not related to number of small ruminants sold is rejected at $\alpha=.01$. Notably, on-farm income from other sources as well as flock size have a positive but non-significant linear relationship with stock sales as they both fall on the lower tail of the interval. There is evidence to show that off-farm income contributes a large proportion of household income in Kaloleni Division (ILCA unpublished 1990). The sale of stock is therefore limited to periods of seasonal cash need for household consumption possibly, because the small ruminants are more easily liquidated as compared to cattle.

4.3 Classification and operation of small ruminant markets

In this study, homesteads served as primary markets for the producers since 96 percent of the respondents who actually sold their stock did so at the homesteads. The main buyer purpose at this level was production (breeding) and resale.

4.3.1 Distributive markets

The major rural buying centres, Bamba, Mariakani, Tsangatsini and Kinango are distributive markets as the main buyer purpose at them was for resale. In the festive seasons like Idd-Ul-Fitr and Christmas, they serve the nearby urban centres as terminal markets since many urban dwellers prefer to purchase live animals for consumption. Apart from Tsangatsini, the distributive markets are government established auction rings for cattle.

Tsangatsini, however, is not an auction ring and the only activity that legitimizes it is collection of cess by County Council staff. Another market that operates in the same manner is at Samburu in the dry ranching zone. Collection of cess has however benefitted mainly cattle traders especially in markets where there are auction rings. The rings have sheds both for cattle and the market participants. Cattle can therefore be kept in the sheds overnight just before the auction day. The rings are also properly enclosed with roofing both for the traders and for

the buyers. The slaughterhouses also served as distributive markets. One important marketing serving occurring at the abattoirs however was processing which added to the final value. All the carcasses from the abattoirs ended up in various retail outlets in Kilifi town, Mombasa town, Mariakani urban centre and other nearby retail outlets.

4.3.2 Mode of transport to and from the distributive markets

Out of 109 cattle and small ruminant traders interviewed in the study, 96 percent trek their animals both to and from the market. Apart from 4 regular traders whose business are vertically integrated, all the buyers from Bamba auction ring trekked their animals to the respective destinations. The truckers own retail outlets both in Kilifi and Mombasa town and slaughter the animals both at Vipingo and Kasemeni abattoirs. They also own the trucks which they use for transporting the animals. Transportation costs however varied with flock size and destination in case of trekking by hired assistants. Pooling of animals destined for same destination was frequent among the traders. This helped them reduce the costs. Buyers from Bamba transported their animals using trucks as well as trekking. The truckers own retail outlets both in Kilifi and Mombasa town and slaughter the animals both at Vipingo and Kasemeni abattoirs. They also own the trucks which they use for transporting the animals. Transportation costs however varied with flock size and destination in case

of trekking by hired assistants.

4.3.3 Market participants and marketing channels

There are various participants in the marketing chain of small ruminant meat from producers to consumers. The participants involved in the exchange functions between the produce and the final consumer are called market intermediaries. Three main market intermediaries were identified in this study; collectors(assemblers), Itinerant traders and retailers.

Collectors (Assemblers)

These individuals normally reside in the rural areas and are often known to producers within a given area. They are usually not full-time traders and spend some time moving from village to village collecting animals for the distributive. They are the essential link between producers and the distributive markets. A few also do buy small ruminants for later re-sale after fattening. This was the group that was identified as sellers in the distributive markets.

Itinerant traders (Wholesalers)

These are the most versatile group in terms of their sources of stock. Apart from moving from market to market, they also buy animals from homesteads. They then slaughter the animals in slaughter houses and sell to retailers the carcasses. Skin is sold separately to skin dealers while head and trotters are sold separately to retailers.

The retailers

These are the owners of the main retail outlets in both urban and rural areas. They normally purchase whole carcasses on a dressed weight basis and truck them to their retail outlets using both hired and own vehicles from the abattoirs. Although there is preference for a given abattoir by the retailers, there is shuttling around to different abattoirs depending on the prevailing wholesale prices.

Figure 4.1. Small Ruminant Marketing Channels
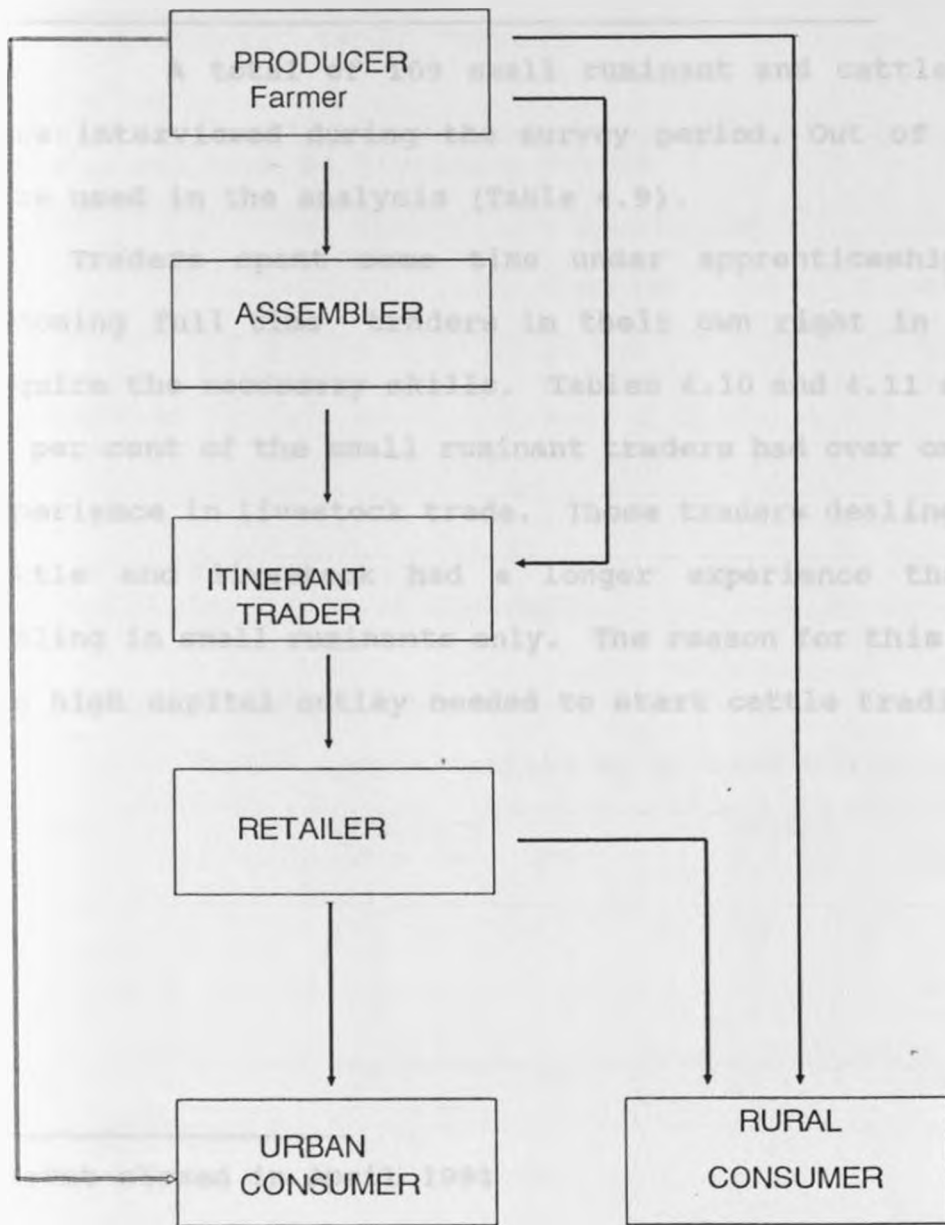
4.3.4 Characteristics of small ruminant buyers

Table 4.9 Distribution of small ruminant trader sample by markets

Market	Sellers		Buyers	
	No.	%	No.	%
Bamba	12	30	12	21
Mariakani	12	30	20	34
Tsangatsini	11	28	17	29
Kinango[1]	5	12	9	16
Total	40	100	58	100

A total of 109 small ruminant and cattle traders were interviewed during the survey period. Out of those 98 were used in the analysis (Table 4.9).

Traders spent some time under apprenticeship before becoming full time traders in their own right in order to acquire the necessary skills. Tables 4.10 and 4.11 show that 68 per cent of the small ruminant traders had over one year's experience in livestock trade. Those traders dealing in both cattle and livestock had a longer experience than those dealing in small ruminants only. The reason for this could be the high capital outlay needed to start cattle trading.

[1]market closed in April 1991

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Table 4.10 Trading experience of small ruminant buyers by markets and type of livestock traded

Market	less than 6 months		6 months to 1 year		over 1 year	
	C+SR	SR	C+SR	SR	C+SR	SR
Bamba	0	0	0	3	3	6
Mariakani	1	6	0	3	4	6
Tsangatsini	0	5	0	3	3	5
Kinango	1	1	0	1	5	2
Total	2	12	0	10	15	19

SR = Small Ruminant only
C + SR Cattle and Small ruminant

Table 4.11 Trading experience of small ruminant sellers by markets and type of livestock traded

Market	less than 6 months		6 months too 1 year		Over 1 year	
	C+SR	SR	C+SR	SR	C+SR	SR
Bamba	0	0	0	0	11	1
Mariakani	0	0	0	0	9	3
Tsangatsini	0	4	0	2	3	2
Kinango	0	0	1	0	4	0
Total	0	4	1	2	27	6

SR = Small Ruminant only
C + SR Cattle and Small ruminant

4.3.5 Trader specialization

Table 4.12 Trader specialization by markets and animal type

Market	Sellers		Buyers	
	C + SR	SR	C + SR	SR
Bamba	11	1	3	9
Mariakani	9	3	5	15
Tsangatsini	3	8	3	13
Kinango	5	0	6	2
Total	28	12	17	39

SR = Small Ruminant only
C + SR Cattle and Small ruminant

There was a high degree of diversification among the small ruminant traders in the study area. Sellers in the distributive markets who are actually assemblers collected both cattle and small ruminants as they moved from village to village (Table 4.12). They then trekked them to the distributive markets for resale. Bamba market is, however, unique. Although the auction ring exists, cattle sellers prefer the one-to-one transaction method. The sellers act as commission agents to the producers. They are paid a given amount of commission after the sale of the animals by the producers depending on the sale value of the animal. An open auction would make the market more transparent with a possibility of producers demanding more or even doing away with the assemblers all together. More traders may have ventured into cattle trading as a result since initial capital is not a constraint as such.

In Tsangatsini, however, the sellers possibly lacked initial capital to diversify hence the few number of traders(Table 4.12) The buyers showed a greater tendency towards specialization. These were mainly itinerant traders between the distributive markets and the abattoirs. The probable reason being a more developed marketing system at this channel level. There is also a possibility of market integration with the traders supplying particular retailers. Traders dealing in small ruminants only cited lack of capital as the main reason for trading in small ruminants only.

Those traders dealing in both cattle and small ruminants, however, cited response to market demand conditions as well as better returns as being the main reasons for diversification. It is possible that small ruminant trade at assemblers channel level is mainly undertaken by relatively resource poor traders. As the capital base of a trader increases, they diversify more into the more profitable but risky cattle trade.

4.4 Market performance

4.4.1 Analysis of marketing costs and marketing margins

Mean costs and returns per head of small ruminant were calculated for each of the channels. Losses due to theft or animals going astray were few.

Assemblers

Table 4.13 Analysis of marketing costs and marketing margins per head of small ruminant sold at Bamba market by assemblers

Cost	Amount Kshs	Revenue	Amount Kshs
Purchase price	197.00	Selling price	232.00
Taxes and cess	3.00		
Other costs	2.00		
Total costs	202.00	Total revenue	232.00

Profit= 30.00. Marketing margin = 35.00
Traders return to capital investment = 14.85%
Marketing cost = 5.00. N=144

In all the channels assemblers incurred the lowest marketing cost per head. This is because of the apparent low service content in the performance of the marketing tasks. The low service content is, however, only apparent since the costs do not take account of the opportunity cost of the assemblers. Even if the opportunity cost of assemblers is zero, the physical distances covered in collecting animals on foot as well as the time spent to assemble the animals to the distributive markets embodies some service content. This analysis was done for Bamba distributive only. The buyers return to capital per head of small ruminants sold at Bamba was 14.85 percent.

Itinerant traders

Table 4.14 Analysis of marketing costs and marketing margins per head of a small ruminant bought at Bamba market and sold at Vipingo abattoir

Cost to buyer	Amount (Kshs)	Revenue to buyer	Amount (Kshs)
Mean purchase price	240.00	Carcass value(heart, liver,lungs and kidney inclusive)	270.00
Transportation to abattoir	18.00		
Flaying and abattoir fees	10.00	Tripes, head and Trotters	15.00
Meat inspection fees	10.00	Skin	20.00
Taxes, cess	3.00		
Total cost	281.00	Total revenue	305.00

Profit to trader = 24.00
Buyers return to capital investment = 8.51%
Marketing costs = 41
Marketing margin = 65
N=51

Table 4.15 Analysis of marketing costs and marketing margins per head of a small ruminant bought at Tsangatsini market and sold at Mariakani market

Cost to buyer	Amount (Kshs)	Revenue to buyer	Amount (Kshs)
Purchase price/ mean	231.00	Value of animal at Mariakani	266.00
Transport to market (trek)	2.60		
Transport of self and assistants	4.00		
Taxes,cess	6.00		
Total cost	243.60	Total revenue	266.00

Profit = 22.40
Return to buyers capital investment = 9.2%
Marketing costs = 12.60
Marketing margin = 35.00
N = 48

Table 4.16 Analysis of marketing costs and marketing margins per head of small ruminant bought at Tsangatsini market and sold at Mariakani abattoir

Cost to buyer	Amount (Kshs)	Revenue to buyer	Amount (Kshs)
Mean purchase price	250.00	Carcass value (lungs,heart,liver kidneys inclusive)	265.00
Transport to abattoir (trek)	2.00	Skin	20.00
Cess, taxes	3.00		
Transport of self and assistants	2.50	Tripes, head Trotters	17.00
Flaying, abattoir and meat inspection fees	21.00		
Food and drinks	1.50		
Total cost	280.00	Total revenue	302.00

Profit = 22.00.   Marketing costs = 30.00
Marketing margin= 52.00.   N = 122
Return to buyers capital investment 12.8%

Table 4.17 Analysis of marketing margins and marketing costs per head of small ruminant bought at Mariakani market and slaughtered at Mariakani abattoir

Cost to buyer	Amount (Kshs)	Revenue to buyer	Amount (Kshs)
Mean purchase price	266.00	Carcass value (Heart,liver,lungs Kidney, inclusive)	282.00
Transportation to abattoir(trek)	1.00		
Flaying and abattoir fees	10.00	Skin	20.00
		Tripes, head and trotters	15.00
Meat inspection fees	10.00		
Taxes and cess	3.00		
Fees at abattoir	4.00		
Total cost	295.00	Total revenue	317.00

Buyer profit margin = 23.00   Marketing costs = 28.00
N=80 Marketing margin = 51.00   Return to buyers capital = 7.46%

Table 4.18 Analysis of marketing costs and marketing margins per head of small ruminant bought at Bamba auction market and slaughtered at Kasemeni abattoir

Cost to buyer	Amount (Kshs)	Revenue to buyer	Amount (Kshs)
Mean purchase price	240.00	Carcass value (lungs,liver,heart kidneys,inclusive)	297.40
Taxes, cess	3.00		
		Skin	13.00
Transportation to abattoir (trek)	3.00	Tripes head and trotters	15.00
Flaying,abattoir and meat inspection	22.00		
Transportation of self	5.00		
Total cost	272.00	Total revenue	325.40

Profit = 52.40   Marketing costs = 33.00
Return to buyers capital investment = 19.6%
Marketing margin = 85.40. N = 173

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Table 4.19 Marketing cost per head of small ruminant per Km of transfer between different channels for the itinerant traders.

Channel	Marketing cost per Kshs per Km per head
Tsangatsini to Mariakani market	0.36
Bamba to Kasemeni	0.64
Tsangatsini to Mariakani abattoir	0.76
Bamba to Vipingo	1.64
Mariakani to Mariakani abattoir	4.83

Note. Bamba-Vipingo=25Km, Bamba-Kasemeni=50Km, Tsangatsini-Mariakani market=35Km, Tsangatsini-Mariakani abattoir=41Km

Itinerant traders have a greater service content embodied in marketing costs than the assemblers. Apart from the transfer cost of animals from the distributive markets to the abattoirs, they also pay for the slaughter and abattoir fees. The processing cost is therefore a significant component of their total cost of marketing. In terms of rates of profits which is reflected in buyers return to capital investment, the itinerant traders recorded less than 10 percent save for Bamba to Kasemeni channel which recorded 19.6 per cent.

This channel had only 2 traders who trucked their animals to Kasemeni directly. Given that the total number of animals trucked were 173, the cost per head was significantly reduced. The mean carcass value of the animals were also highest among the abattoirs at Kshs.297.00.

In terms of technical efficiency, the channel that provides marketing services at least possible cost is considered relatively more efficient than the rest of the channels. From Table 4.19, small ruminants bought at

Tsangatsini and sold at Mariakani market follow the most efficient marketing channel. Second in rank are those originating from Bamba and destined for Kasemeni abattoir. Notably, the least efficient channel is the Mariakani market to Mariakani abattoir. This market recorded the highest mean purchase price per head during the survey period (Table 4.17). In addition to the above, the abattoir is privately owned unlike Vipingo and Miritini that are owned by the county council of Kilifi. It may therefore not benefit from any government subsidy as a result .

To conclude this section on marketing costs and marketing margins analysis, some limitations of the analysis need to be pointed out. The rates of profits for assemblers were all found to be above 14 percent which was above the bank discount rates. At the time of the survey, the discount rate on savings for post office savings bank (postbank) which is most accessible to rural traders was 12.5 percent. Profit rates for itinerant traders were all less than 10 percent. This was less than the bank discount rates. At the channel levels therefore, the itinerant traders approach a competitive market structure than that of assemblers. All the traders, however, reside in rural areas. The cost of getting to the nearest post office especially for the assemblers, could be greater than the discount rate offered at the postbank. The apparently high profit rates accruing to the assemblers could therefore be justified in real terms.

The turnover rates which is the number of animals sold per given period of time was not established per trader. The apparently low returns per head of small ruminant compared to 30 percent in Chabari's study could be compensated by high turnover rates.

Comparing profit rates with discount rates has another limitation in terms of the magnitude of capital investment being analyzed. The highest capital investment was Ksh.305.00 per head of small ruminant (Table 4.18). "If the capital investment in marketing organization is very little, the profit level may be compared with return to labour income in similar branches of the economy" (Schubert 1973, quoted in Kebede 1990). In this case a better comparison would be with returns to labour in agricultural sector in the area of study. This information is, however, not available. With the limitations above taken into account, the marketing system in the study area still appears to approach a competitive structure.

4.4.2 Price analysis

Price discovery and mode of transaction

At all channel levels of the small ruminant marketing chain, the mode of transaction was by one-to-one bargaining This method has the disadvantage of stifling free flow of market information. At farmgate, the level where assemblers and producers meet, lack of market information was prevalent amongst producers. Information from the on-farm survey showed that none of the producers visited the market before selling their stock. Whereas producers based their selling price mainly on age and sex of the animal, the assemblers, in addition had the advantage of knowing the prevailing price at the distributive markets. The assembler could therefore bargain and get returns to cover both direct and indirect costs. At the distributive markets, the number of market participants possibly increased the level of transparency. Although the one-to-one bargain system was the mode of transaction, availability of many buyers and sellers gave the seller a wider bargaining latitude.

Supply level manifested by the number of animals on offer as well as prevailing prices at the slaughterhouses were noted to be the main factors determining the price. Animal characteristic were also noted to determine price per head. Traders cited animals that "stand tall" from the ground with good finishing as commanding higher prices. The tall animals

were noted to give higher dressing out weights while a good finish reflected a good body condition. The mode of payment both at the farmgate and at the distributive markets was on a cash on sale basis.

Intra annual price variation in the abattoirs

The duration of data collection may not give a clear picture of price variation over the year. Response from livestock traders however indicate low prices in the dry season with prices picking up at the onset of rains, and dropping again at harvest period. Table 4.20 shows intra annual trading activity for small ruminant traders over a period of one year.

Trading activity here refers to total sales volumes per trader in a given trading period. A high trading activity therefore refers to high turnover rates while a low trading activity refers to low turnover rates.

In the dry season, the itinerant traders and the assemblers reported low trading activity. The trading activity picks up at the onset of rains and is highest between August to December.

Table 4.20   Intra annual trading activity for small ruminant traders at the distributive markets.

Period	% of respondents reporting high activity	% of respondents reporting low activity
January-March	8	80
April-July	60	20
August-December	90	8

The period between January and March is the dry season in the study area.   This is also the school fees paying period. Most producers are compelled to sell their animals order to meet both immediate and seasonal cash needs.   The same trend follows until the harvest period sets in August.   The market price of small ruminants at the distributive markets is therefore depressed by supply which surpasses demand during this period.

Fig. 4.2 Nominal price movement at Mariakani abattoir during March-July 1991. Data from second week of March
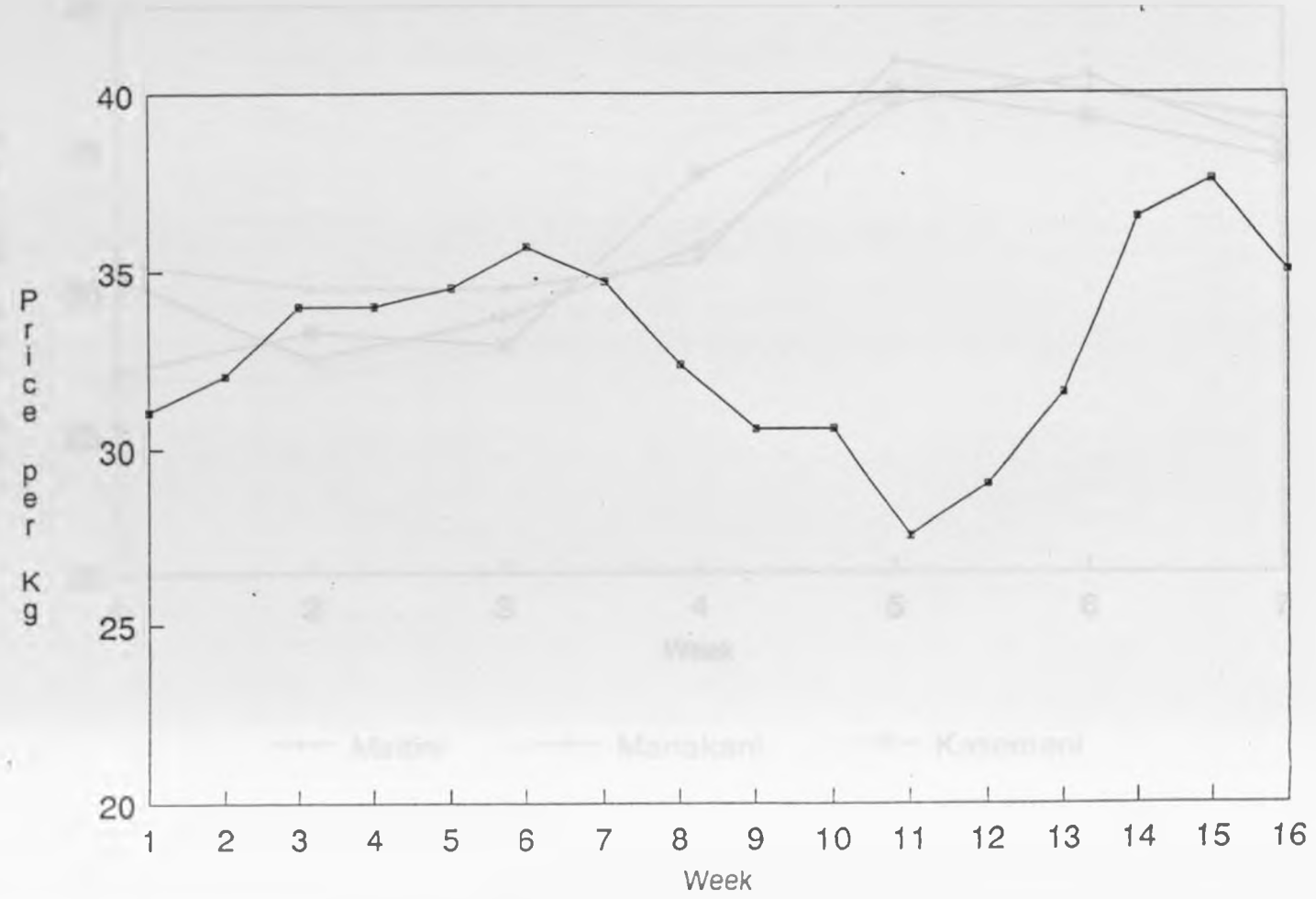
Fig.4.3 Nominal price movement at
Mariakani, Kasemeni and Miritini
abattoirs during June-July 1991
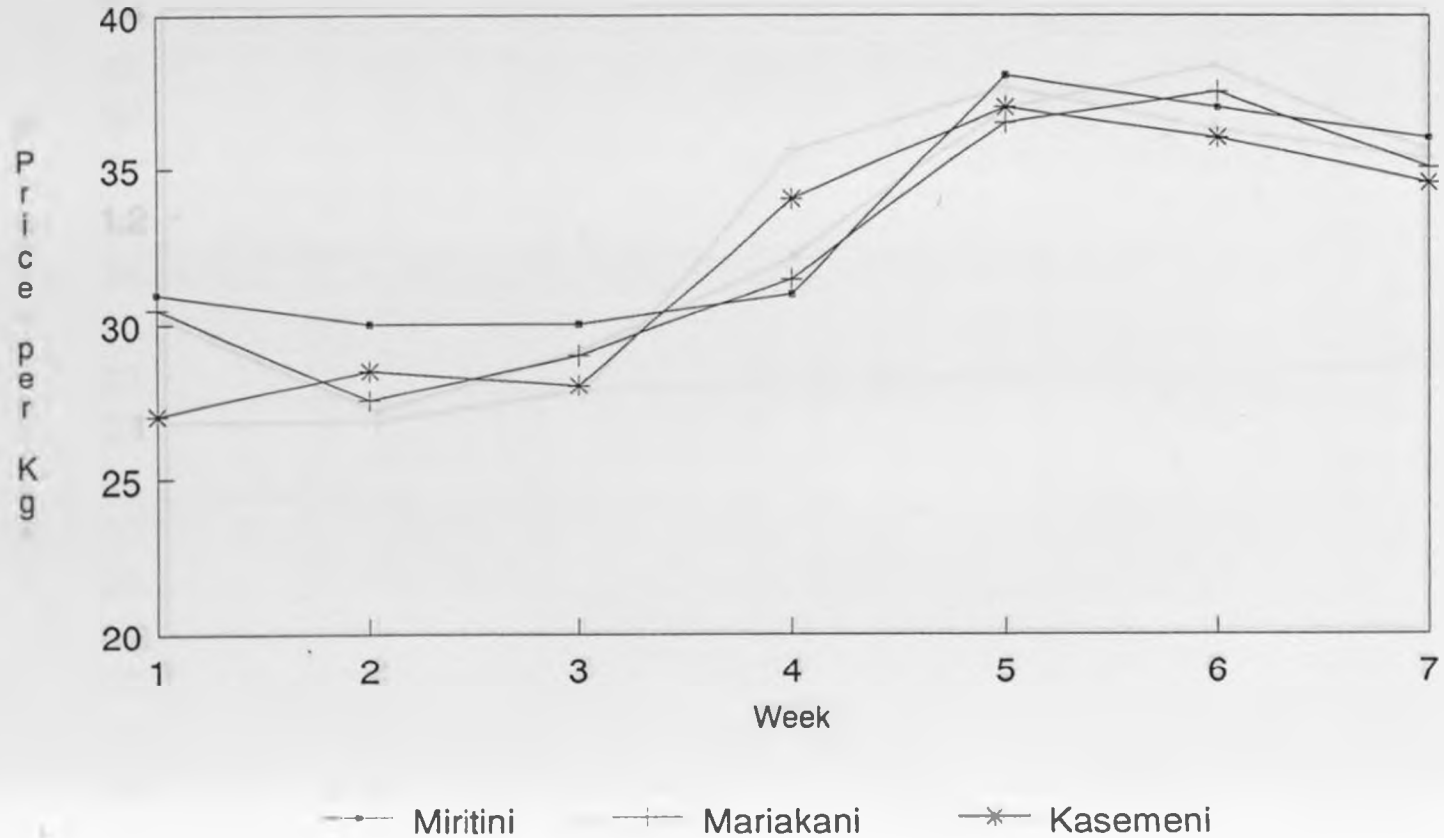
Fig.4.4 Relative price movement of
Small Ruminant meat to beef at Mariakani
and Kasemeni abattoirs June-July 1991
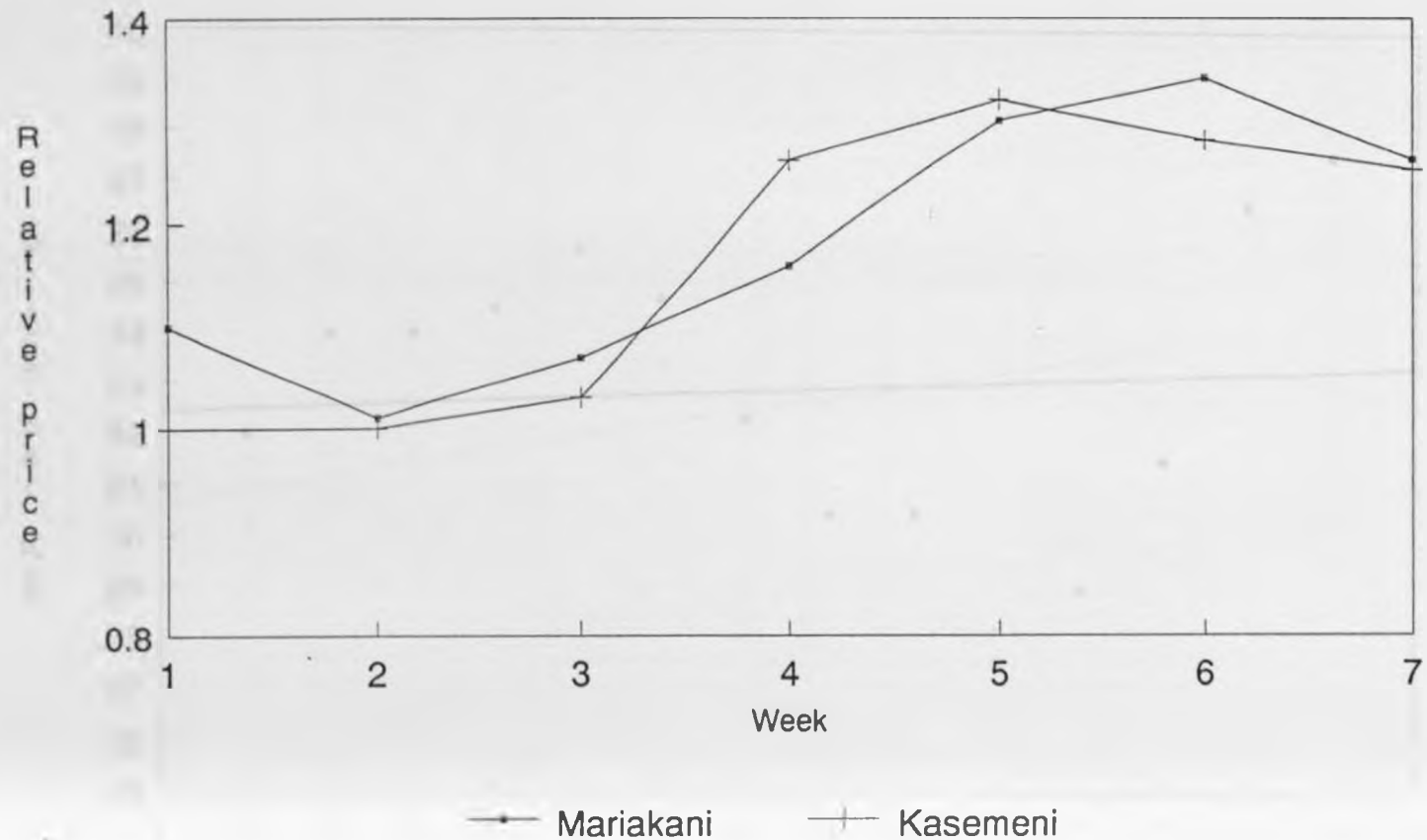
Fig. 4.5 Nominal price trend at
Mariakani abattoir in March-July 1991.
Data from second week of March
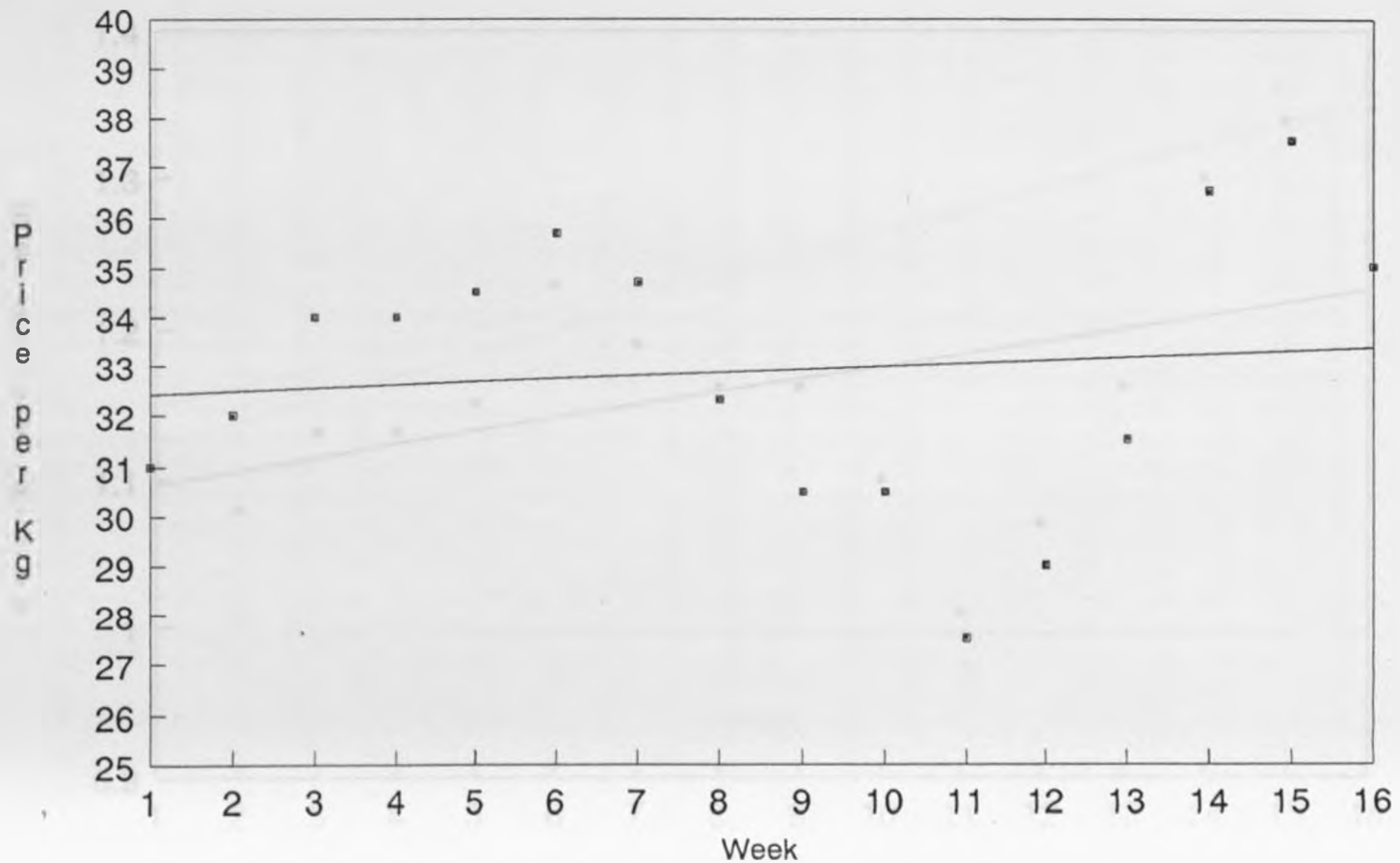
Fig.4.6 Relative price trend per kg of
Small Ruminant meat to beef at Mariakani
abattoir during March-July 1991
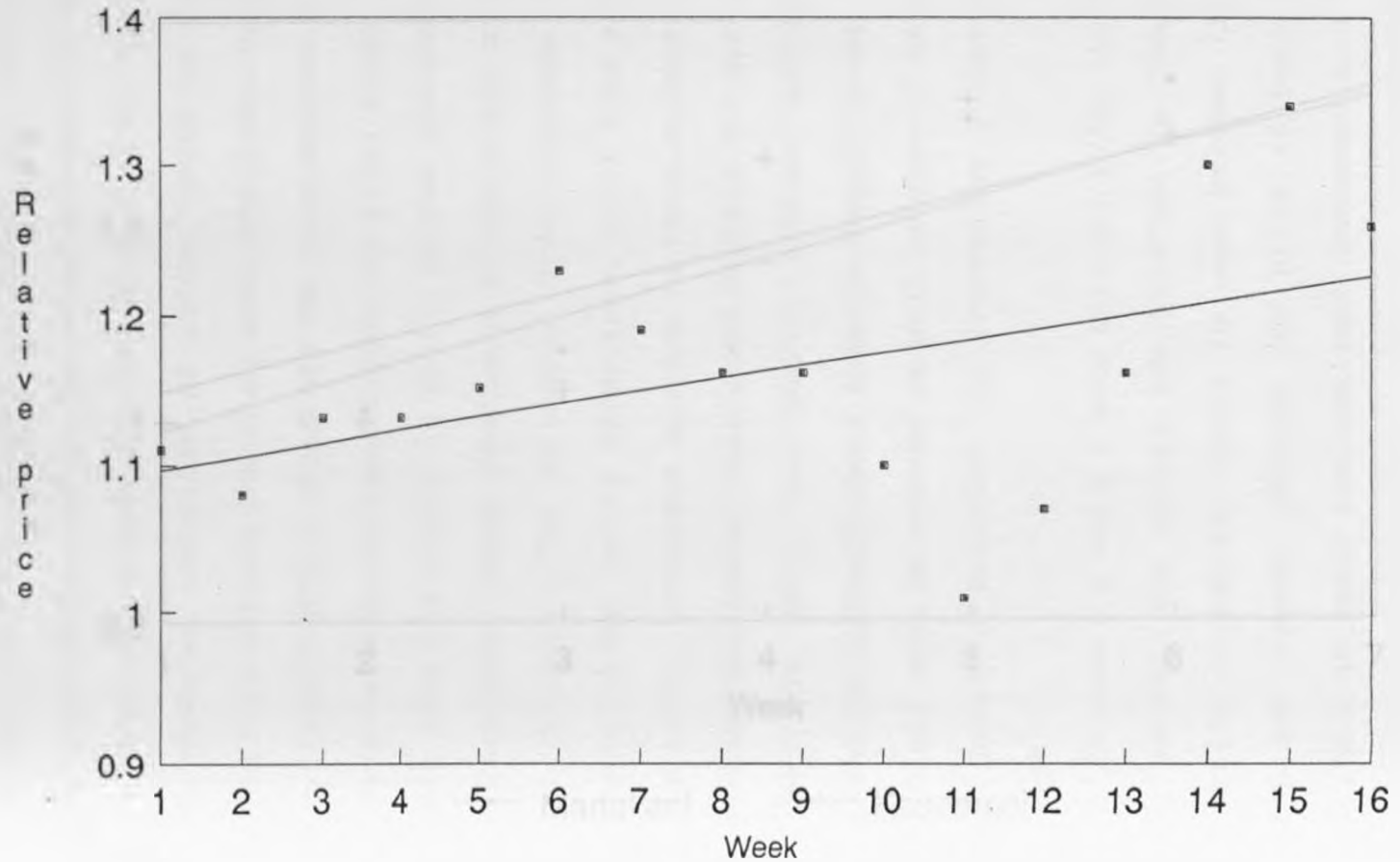
Fig.4.7 Relative price trend per kg of
Small Ruminant meat to beef at Mariakani
and Kasemeni abattoirs in June-July 1992
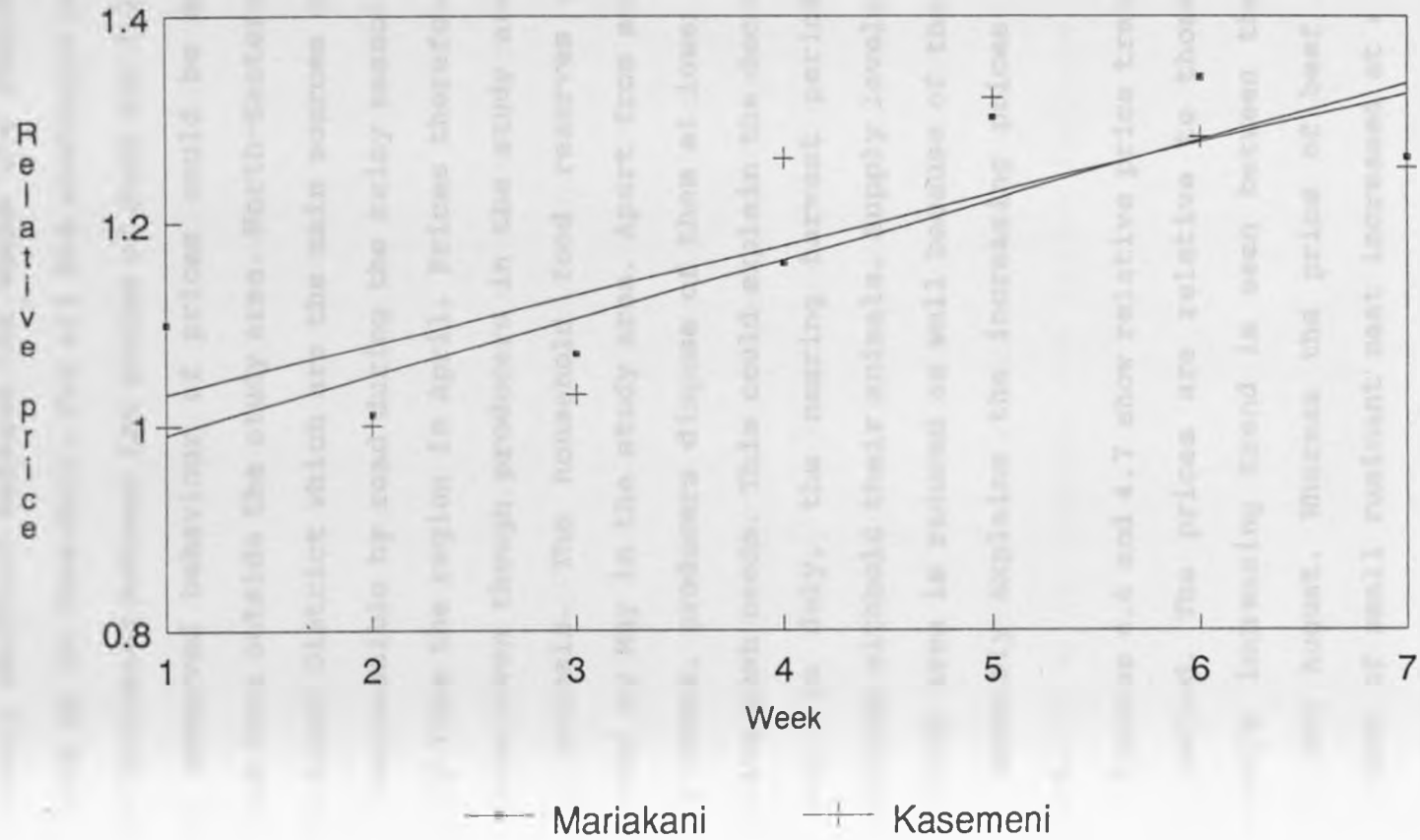
Figure 4.2 shows increasing nominal price levels for Mariakani abattoir between the weeks 1-6 (March-May) before picking up in June-July. For all the abattoirs nominal prices also increased between the months of June and July (fig.4.3). The observed behaviour of prices could be due to supply levels from outside the study area. North-Eastern province and Tana river District which are the main sources of Galla goats are inaccessible by road during the rainy season thus cutting supply from the region in April. Prices therefore continue to increase even though producers in the study area still sell their animals. The household food reserves are possibly depleted by May in the study area. Apart from selling more of their stock, producers dispose of them at lower price due to pressing cash needs. This could explain the decreasing prices in May. In July, the nearing harvest period makes most households withhold their animals. Supply levels from outside the study area is reduced as well because of the same reason. This possibly explains the increasing prices in June-July period.

Figures 4.6 and 4.7 show relative price trends during the same period. The prices are relative to those of beef. A generally increasing trend is seen between the months of March and August. Whereas the price of beef increased as well,that of small ruminant meat increased at a faster rate. A number of reasons could possibly explain this trend. Beef

prices are generally more stable reflecting a stable supply level. It is also possible that demand for small ruminant meat is stratified compared to that of beef even though they are considered substitutes. This could also explain the generally lower price of beef compared to small ruminant meat during the same period. The discussion above is consistent with the results in Table 4.20 where traders response to periods of high or low business activity also show similar patterns. A high business activity in this study refers to high sales volumes by the traders whereas low business activity refers to low sales volumes by the traders. The period between August and December is the harvest and post harvest period when on-farm income is highest. This is also the period when the end of the Mijikenda year falls, apart from Christmas and New year festivities. Many consumers are therefore more likely to purchase small ruminants as compared to the earlier parts of the year. The effect of festivities like Easter and Idd-ul-fitr also influenced prices although this could not be quantified as it requires time series analysis.

4.4.3 Market integration

Price correlation analysis

There is evidence of supply and demand interplay settling price at the abattoirs. There is also evidence from traders survey that supply levels at the abattoirs have an effect on prices at the distributive markets whereas at the homesteads, it is mainly market information which gives the buyer the bargaining power to fix prices.

Table 4.21 Correlation matrix for prices per head between the distributive markets

	Mariakani	Tsangatsini	Bamba	Kinango
Mariakani	1.00			
Tsangatsini	0.0512	1.000		
Bamba	0.5185**	0.1290	1.000	
Kinango	0.6210**	-0.0275	0.5297**	1.000

** Significant at α =.05
Note: only 12 cases were examined due to closure of Kinango auction yard before the survey period was over.

From the results of price correlation coefficients, all the distributive markets have insignificant correlation coefficients save for Mariakani/Bamba, Mariakani/Kinango and Bamba/Kinango that are significant at α=.05 (Table 4.21). Evidence from stock flow pattern indicates movement of animals from Bamba to Mariakani and Kinango to Mariakani. Bamba and Mariakani as well as Kinango and Mariakani are integrated. There is, however, lack of supportive evidence about Kinango and Bamba being integrated although the prices show a high degree of positive and significant correlation

coefficient. A possible reason could be short term movement in prices which may cause high correlation coefficient between markets.

Table 4.22 Correlation matrix of prices between distributive markets and abattoirs

Abattoirs	Distributive markets			
	Mariakani	Bamba	Tsangatsini	Kinango
Mariakani	0.1857	0.2594	0.3425	0.3137
Kasemeni	-0.1860	-0.1420	-0.2529	-0.4804
Vipingo		-0.0466		

The correlation coefficients between the distributive markets and Mariakani abattoir are all positive. The rest are negative and insignificant (Table 4.22). To ascertain these results, bivariate regression analysis is applied.

Table 4.23 shows positive and significant correlation coefficients of prices between the abattoirs suggesting integration.

Table 4.23 Correlation matrix of prices between the abattoirs

	Vipingo	Miritini	Kasemeni	Mariakani
Vipingo	1.000			
Miritini	0.5690**	1.0000		
Kasemeni	0.6661**	0.6764**	1.0000	
Mariakani	0.6602**	0.70002**	0.8777**	1.000

** significant at $\alpha=.001$

Table 4.24 Summary of bivariate regression results between distributive markets and the abattoirs.

Channel	R^2	SE	Coefficients			
			$\hat{\alpha}$	α^*	$\hat{\beta}$	β^*
Bamba and Mariakani	.17	32.20	607 (13.16)	90.50	-0.14 (-6.11)	0.84
Bamba and Kasemeni	.39	33.02	3975.2 (11.47)	497.80	15.16 (10.57)	2.85
Tsangatsini and Mariakani	.54	21.2	86. (4.86)	35.33	.86 (12.17)	0.14
Mariakani and Mariakani	.80	21.81	-16.13 (-3.22)	0.11	1.03 (17.91)	36.80

Note. The Superscripts ^ and * denote estimated and computed range for 0 value of the coefficients respectively while the values in brackets are the t ratios.

Table 4.25 Summary of bivariate regression results between the abattoirs

Channel	R^2	SE	Coefficients			
			$\hat{\alpha}$	α^*	$\hat{\beta}$	β^*
Miritini and Mariakani	.49	1.73	18.41 (8.59)	4.28	0.42 (6.57)	0.13
Miritini and Kasemeni	.45	1.78	20.65 (11.55)	3.95	0.36 (0.20)	0.11
Kasemeni and Mariakani	.73	2.19	0.43 (0.19)	0.00	0.979 (0.44)	1.64
Mariakani and Vipingo	.22	3.25	-14.05 (-1.16)	0.00	1.50 (3.84)	0.76
Vipingo and Kasemeni	.33	3.48	-34.92 (2.60)	26.74	2.17 (5.02)	0.86
Vipingo and Miritini	.32	0.77	23.48 (15.2)	3.08	0.22 (4.64)	0.09

Note. The superscripts ^ and * denote estimated and computed range for 0 value of the coefficients respectively, while the numbers appearing in brackets are the t ratios.

The zero values for Mariakani -> Kasemeni and Mariakani -> Vipingo were obtained directly from the regression outputs.

Bivariate(simple) regression model

The following function was estimated for pairs of prices between markets:

$$P_1 = \alpha + \beta P_2.$$

Table 4.24 shows a summary of the regression results between the distributive markets and the abattoirs. The R^2 are low(between .17 and .55) save for Mariakani market and Mariakani abattoir which is .80. The standard errors are all over 20.00. This has an effect on the confidence intervals hence the relatively large intervals suggested by the computed values of the regression coefficients.

Bamba shows lack of integration with Mariakani abattoir since coefficient ß is not significantly different from 0. There is both absolute arbitrage cost and percentage mark up between Bamba and Kasemeni abattoir as coefficient α is significantly different from 1 and coefficient β is different from 0 and 1. This is reflected in the high profit rates (19.6%) observed in marketing margins and costs analysis. Prices between Tsangatsini and Mariakani abattoir indicate pure arbitrage costs in price difference and the same applies to Mariakani auction yard and Mariakani abattoir. Price per head of small ruminant both at Tsangatsini and Mariakani auction yards as well as prices per kilo at the abattoirs influence each other.

On the other hand, Bamba auction yard shows statistically independent prices with Mariakani abattoir. A possible explanation could be the distance involved in

movement of animals from Bamba to Mariakani which is 50 km. This may hinder free flow of market information since most traders prefer trekking the animals.

All the abattoirs are integrated as shown in Table 4.25. Prices between Mariakani, Kasemeni and Vipingo are statistically identical. The rest of the abattoirs indicate existence of arbitrage costs which is the cost of buying from surplus areas and selling to areas of deficit and percentage mark up. The location of the abattoirs surveyed in this study make flow of price information fast since they are all located within a radius of 30km from Mombasa town centre.

The market integration analysis suggest an efficient transmission of market information between the distributive markets as well as the abattoirs. This could be a sign of a well developed marketing system. Coupled with the low marketing margins accruing to the itinerant traders in the marketing costs and margins analysis, the overall picture emerging is that of an efficient marketing system. Marketing is not a constraint to expansion of small ruminant production in the study area. Production constraints could be more biological for example health, nutrition and breeding.

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CHAPTER FIVE

5. Conclusions and recommendations

5.1 Conclusions

Improvement of market performance of any marketing system can only be achieved if production goals of the producers make it feasible. In this study, two aspects of market performance have been diagnosed: technical efficiency and pricing efficiency. Technical efficiency is attained when least cost combination of marketing activities are employed thereby leading to provision of goods and services at minimum average cost. Free flow of price information along the marketing chain coupled with market participants' ability to adjust to the changing prices results in pricing efficiency.

The analysis of marketing costs and margins shows that the returns to traders' capital and labour investment at all channel levels studied are less than the prevailing bank interest rates. The low returns to middlemen of marketing is an indicator of a relatively competitive marketing system. Since the middlemen's objective is profit maximization, it is possible that high turnover rates allow them to remain in business.

It could be argued that improvement of supply volumes from the study area is possible by substituting trekking with trucking especially from the distributive markets. But investment in trucks for transporting stock from the production and distributive areas could as well be

unjustified on the basis of high capital outlays. Flock sizes are small. Sales levels, apart from being low are also erratic. The average household sales in the previous year was two animals. Assemblers therefore take a long time to assemble a flock for the distributive markets.

Producers in the study area mainly keep small ruminants for sale to meet seasonal cash needs. The sale for cash need motive to meet subsistence needs has implications for market intervention by limiting opportunities to improve offtake rates. However, the earlier assumption that the offtake rates in the study area are low is not true since the commercial offtake rates are close to 30 per cent. Although mature males comprise 10 per cent of the flocks, their offtake rates are the highest among the different sex and age groups. They also fetch the highest price in the market. The preference of males to females for sale confirms Jarvis' contention that sale for cash need does not imply lack of market orientation. Producers respond to price signals but lack of alternative investment opportunities make small ruminant enterprise an insurance to the farm family. Other socio-cultural roles of small ruminants though important, are secondary to the sale for cash need motive. Technical inefficiency is not a constraint to expanded small ruminant production and marketing in the study areas.

At the production level, lack of market information has been shown to exist amongst farmers. Distributive markets are situated outside agro-ecological zones cl3 and

cl4 as shown by the Geographical information systems (GIS) maps in chapter 3. The situation improves, however, as the animals move towards the terminal markets in as far as number of buyers and sellers of small ruminants are concerned.

The price of small ruminant meat was decontrolled in Kenya in order that market forces could play a greater role in price determination. It was assumed that by decontrolling the price of beef and small ruminant meat, returns to livestock producers would automatically rise. An increasing price trend was observed for small ruminant meat during the period of study. Apart from an indication of the general inflationary pressure, the administered prices before decontrol were possibly below the equilibrium price. The decontrol is therefore having the desired effects.

Results also showed existence of integration in price between the abattoirs. The distributive markets were also integrated with the abattoirs with the exception of Kasemeni. This implies an efficient transmission of price information at these channel levels.

The existing scenario suggests that the Arid and Semi-arid hinterlands have a comparative advantage in meeting market demand in terms of quality and quantity.

5.2 Recommendations

The established auction rings in the study area serve mainly cattle traders. The one-to-one bargaining system observed in small ruminant transactions, however, still

stifles flow of information as compared to the auction system. An auction system is therefore recommended at the distributive markets. The government could improve the system by setting up the auction rings. The animals could be auctioned in flocks rather than singly to reduce any increased cost of marketing that may arise. This would also save time.

When small ruminants are slaughtered in the abattoirs, there are tripe and the skin which are joint products with meat. From the marketing margins and marketing costs analysis, it appears that the profit for the middleman who slaughters his animals in the abattoirs comes from these by-products. A study of the marketing system of skins for example would reveal whether a constraint in skins marketing results in reduced sales from the study area. This is an area which is alleged to be dominated by few traders and where the price setting mechanism is not clearly understood. It is possible that with improved prices of goat and sheep skins, returns to producers would also increase.

As a methodology, bivariate regression provided results consistent with traders observations in all the cases. Price correlation coefficients showed lack of integration between the abattoirs and the distributive markets. For future studies, a model incorporating a vector of other significant market determinants is suggested since it would give more conclusive results about market integration. In addition price series covering a

longer period is desirable for a more detailed analysis of market integration.

Finally, although it is not quantitatively demonstrated that Gala goats are preferred to the Small East African goat, other studies have indicated that animal characteristics such as body condition, sex, and age influence price per head (see Francis et al 1988 Chabari 1986, Kebede 1990). Being bigger, Gala goats are therefore preferred by retailers of small ruminant meat. A breeding program for improvement of dressing out weights of sheep and goats could result in higher returns to producers. Animal health and husbandry research on ways and means of reducing mortality of the young goats and the Gala should be conducted. This could increase the relative competitiveness of small ruminant enterprise in the coastal region. In addition, a comparative study on whether the Gala goats are preferred to Small East African goats should be conducted.

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APPENIX 1

LIVESTOCK MARKETING

QUESTIONNAIRE FOR SMALL RUMINANT SALES IN RURAL, MARKETS AND URBAN MARKETS

Enumerator ....   Date................

Name of Respondent.....................   Market.............

Area of Residence......................   District...........
(Village)

1. How long have you been a trader?

    (a) Less than 6 months (b) 6 months to 1 year (c) Over 1 year

2. Do you have business associates and if so how many ....

3. Do you have other occupations, kinds of work?...............

4. How many days in a week do you spend in livestock trade
    (buying, selling, butchering etc)?........................

5. Are there certain times/months of the year when your trading
    activity increases/decreases?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High (Increases)	:	:	:	:	:	:	:	:	:	:	:	:
Low (Decreases)	:	:	:	:	:	:	:	:	:	:	:	:

6.What type of livestock (cattle/small stock) do you mainly trade?
    .... Cattle .... small stock.

Why...

7.What type of small stock do you buy at this market?

    Sheep .... goats ....

8. At what other markets do you call livestock?

Market   Types of livestock

....

....

9. Any other places where you sell livestock?....................

....

10. What is the maximum/minimum number sold in one day in 1990 at
    this market?

    Maximum ....

    Minimum ....

    Average ....

11. What type of livestock have you purchased today?

Type of livestock	Breed	No.	Sex	Price per head(KShs.)
....	......	...	....	....
....	......	...	....	....
....	......	...	....	....

12. To where and how will you transport them?

Immediate destination	Final destination	Mode of transport	own/hired	Estimated cost per head(KShs.)
....	....	....	....	....
....	....	....	....	....
....	....	....	....	....

13. Do particular breeds/sex/type of sheep/goats fetch higher prices? ....

If so, which ones?

Breed	Sex	Colour	Body condition
.....	....	......	....
.....	....	.....	....

14. As a trader what characteristics do you look for when buying an animal?

....

....

15. How do you dispose of each type of livestock you buy?

....

....

16. Do you process them in any way before disposing of them?.....

If so, how?

....

17. If resold, to whom and in what form do you resell?

Market outlet	Place (name)	No or Kg sold	Price/head/kg KSh.(F/V)	Frequency D/W/M	Form
....	.....	.....	....	....	.....
....	.....	.....	....	....	.....
....	.....	.....	....	....	.....

18. What expenses do you incur in relation to marketing?

Expense   Cost(KShs.)

(a) Transportation of self(1 return trip)   ....

(b) Transportation of assistants(1 return trip)   ....

(c) Food and drinks expenses (1 return trip)   ....

(d) Lodging expenses 1 return trip   ....

(e) Taxes (paid per head)   ....

(f) Dipping fees   ....

(g) Slaughter fees   ....

(h) Meat inspection fees   ....

(i) Others (specify)   ....

19. What investments have you made in connection with your
     livestock trade?

Item		Year	Value KShs.
Truck for live animals	make	....	.....
Butchery	location	......	......
Holding yard	location	......	....
Abattoir	location	......	....
Meat delivery van	make	......	....
Distance travelled/day	If van or truck		
Others (specify)			

20. On average what losses do you incur in the course of marketing
    (deaths/thefts/injuries)

Type of livestock	Avg lost	Causes	Estimate value
....	....	......	....
....	....	......	....
....	....	......	....

21. We have observed that although there are many households
    keeping small ruminants, few are actually selling them. In
    your opinion, why is this?

    ....
    ....
    ....

22. In your opinion is there any one person or group of people who
    dominate the buying and selling of small stock at this market
    i.e. the small animals market is not operating
    freely?...................

    If yes, who? ....

23. In your opinion, how might the marketing system be changed for
    the better i.e. to make the smallstock marketing more
    attractive for you as a trader?

    ....
    ....

24. What problems do you in particular face as a trader? e.g.
    (capital/low selling prices/high taxes/high losses/high buying
    prices)?

Problem	Time of the year encountered
....	....
....	....
....	....

APPENDIX 2

PRODUCER PRODUCTION OBJECTIVE AND MARKETING STRATEGY

ENUMERATOR.....................................DATE....................

RESPONDENT................................LOCATION..................

DIVISION....................................VILLAGE..................

FORM NO............DISTRICT............HOUSEHOLD HEAD..........

Size of Farms(ACRES) (1)......(2)......(3)......(4)......(5)......

1.   Position in the household (Husband/wife/child)................

2.   No. of wives resident in the household (total)................

      belonging to head of household.......... others..............

3.   No. of children resident in the household....................

4.   Religious festivals observed in the household................

(a)   ....

(b)   ....

(c)   ....

(d)   ....

5.   What are the main crops grown on your farm(s)?

Crop	Hectarage	total yield/ season	Value (KShs.)
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

6. Do household members have off farm salaried employment?

Family member Employer Job description Monthly income(KSh.)

....

....

....

....

7. If off farm self employment name type of self employment.

Name   Average monthly income

....

....

....

8. When and why does the household feel constrained for cash?

Month (period)   Reason

....

....

....

9.

	GRADE			ZEBU	
Heard value	No	value(KSh.)		No	Value(Ksh.)
Bulls	....				
Mature females	....				
Male calves	....				
Female calves	....				
Postweaning males	....				
Post weaning females	....				

10. Flock value
    Size of flock for goats sheep and goats separately

	Goats	
	Number	Value(KSh.)
Preweaning males	.....	....
Preweaning females	.....	....
Postweaning males	.....	....
Postweaning females	.....	....
Adult entire males	.....	....
Adult females	.....	....
Castrates	.....	....

	Sheep	
	Number	Value(KSh.)
Preweaning males	.....	....
Preweaning females	.....	....
Postweaning males	.....	....
Postweaning females	.....	....
Adult entire males	.....	....
Adult females	.....	....
Castrates	.....	....

11. Why do you keep small ruminants? List in order of importance.

    (a) ....

    (b) ....

    (c) ....

    (d) ....

12. What were the sources of this stock?

(a) Bought ....

(b) Inherited ....

(c) Gift ....

(d) Loaned from outside ....

(e) Paid as dowry ....

(f) Others (specify)...

....

....

13. Small ruminant consumption in the household.

Period	Frequency or festivity	Source e.g. own flock or retailer etc.
During festivities	....	....
Normal household meals	....	....
Others specify	....

....

....

14. Offtake from the farm in the past 12 months

Reason	age			No	
	m.(g)......(s).....(g).......(s).......
Slaughtered	f.(g)......(s).....(g).......(s).......
	c.(g)......(s).....(g).......(s).......
Exchanges	m.(g)......(s).....(g).......(s).......
	f.(g)......(s).....(g).......(s).......
	c.(g)......(s).....(g).......(s).......
Given as gift	m.(g)......(s).....(g).......(s).......
	f.(g)......(s).....(g).......(s).......
	c.(g)......(s).....(g).......(s).......
Other Reasons	m.(g)......(s).....(g).......(s).......
	f.(g)......(s).....(g).......(s).......
	c.(g)......(s).....(g).......(s).......

15. Stock sales in the past.
    Who makes the decision and who actually sells small stock in
    this household?

    Decision maker   Actual seller

    _____   _____

Species	Type of Livestock sold/no	Price per head	Place of sale (Boma, market waterpoints)	When sold/ month
Preweaning male	....	....	....	.....
Preweaning female	....	....	....	......
Preweaning male	....	....	....	......
Preweaning female	....	....	....	......
Adult male	....	....	....	......
Adult female	....	....	....	......
Castrates	....	....	....	......

16. To whom did you sell the animals? specify species in each
    case.

	Wholesaler	Retailer	Final consumer
1.	....	....	....
2.	....	....	....
3.	....	....	....
4.	....	....	....
5.	....	....	....
6.	....	....	....

17. Where was the actual sale done?

    1. ....

    2. ....

    3. ....

18. Did you visit a formal market before selling?

    If so why ....

19. When not selling how often do you visit the market?

    1)   Regularly   Why? ....

    2)   Occasionally   Why? ....

    3)   Never   Why? ....

20. How did/do you determine the price you sold/sell at?......

    1)   Agreement subject to a reserve price
    2)   Prevailing market price at the nearest formal market
    3)   1 and 2 above
    4)   Others (specify).................................

          ....

21. Do you have specific buyers you consider regular customers?
    YES/NO

22. If YES, where ....

    Are they sellers, butchers, contract suppliers

    Others (specify) ....
23. How do you transport your sheep and goats to the market?

    Mode of transport   Estimated Cost/head/kg

    Trek   ....

    Truck   ....

    Distance to place of sale km   ....

24. If sold at home, to where and how did the buyer transport them?

Destination   Mode of transport

....

....

....

25. How many and when do the buyers/buyer visit?

No. of buyers   Frequency/season of visit

....

....

....

26. What are the problems you face in selling sheep and goats?

Problem   When experienced

....

....

....

27. How would you describe the existing sheep and goat marketing system as compared to other systems that you know?

    (1) Good   (2) Fair   (3) Bad

28. Why?..