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Prepared for  
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KENYA

March 1977

International  
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In association with

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**FINAL REPORT**

**LIVESTOCK AND MEAT DEVELOPMENT STUDY**

**Prepared for**

**Ministry of Agriculture  
Kenya**

**Prepared by**

**Chemonics International Consulting Division  
Washington D.C.**

**In Association with  
Hawkins & Associates  
Nairobi**

**MARCH 1977**

**Introduction and Summary**  
**to**  
**FINAL REPORT**

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**MARCH 1977**

**CHEMONICS**  
CONSULTING DIVISION

Mr. S.D. Gathiuni,  
Permanent Secretary,  
Ministry of Agriculture,  
NAIROBI.

March 10, 1977

Dear Mr. Gathiuni,

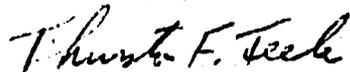
Chemonics takes great pleasure in presenting to the Ministry of Agriculture our draft Final Report on the Livestock and Meat Development Study, prepared in association with our sub-contractors, Hawkins & Associates. The study has been carried out under the contract signed between Chemonics International Consulting Division and the Ministry of Agriculture dated August 27, 1976.

This draft final report is presented for the review of the Ministry and of others whom the Ministry may designate to take part in the review. Upon completion of the review, we will be prepared to discuss with the Ministry any changes in the report considered necessary, and to prepare 30 copies of the Final Report.

In presenting this draft report, we would like to express our thanks to all of those in the Ministry of Agriculture who provided us with information, documents, advice and other assistance. These include the Project Coordinator, Mr. Arthur Chege, his Deputy, Mr. Evans Mweya, Mr. John Larsen and the senior officials of the Range Management Division, the Livestock Marketing Division, the Economic Planning Division, the Animal Production Division and the field staffs in most of the provinces. Valuable assistance was also received from the Agricultural Finance Corporation, the Kenya Meat Commission, the Central Bureau of Statistics, and several other agencies of the Government of Kenya, as well as the World Bank and USAID.

This study has been very interesting and rewarding for our two companies and we would like to express our appreciation to you and to the Ministry of Agriculture for giving us this opportunity.

Sincerely yours,



Thurston F. Teale  
Project Manager

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**CHAPTER I**

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**INTRODUCTION AND SUMMARY**

## CHAPTER I

### INTRODUCTION AND SUMMARY

#### A. Introduction

This is a report of the results and findings of the Livestock and Meat Development study which was carried out between September 1976 and March 1977, for the Ministry of Agriculture. In this initial chapter we provide a brief introduction to the study and summary of the major findings.

The study was carried out by Chemonics International Consulting Division, Washington D.C., in association with Hawkins & Associates, a Kenyan consulting firm based in Nairobi. The work was done under a contract signed on August 27, 1976 between the Ministry of Agriculture and Chemonics International Consulting Division. The contract was approved by USAID/Kenya, since the financing of the study is part of USAID's participation in Kenya's Second Livestock Development Project, which also involves IBRD, British and Canadian financing.

The Terms of Reference for the study were prepared by the Ministry of Agriculture. Under the terms of reference, the Consultant was to prepare a comprehensive study of the livestock and meat industry in Kenya which would deal with a wide range of aspects of the industry, answer specific questions and make policy recommendations. The basic task was to project demand for meat up to 1990 and to project the amounts of livestock and meat which would be supplied to 1990 based on existing livestock and meat policies, and on the Consultant's recommended policies. Another important element in the study was a special management study of the Kenya Meat Commission.

The study was carried out and the report written almost entirely in Kenya. The study team reviewed a very wide range of documents and previous reports which have a bearing on the problem. Numerous individuals involved with or knowledgeable about the industry were interviewed, some many times. Field trips were made to all livestock producing regions of Kenya. The study team carried out extensive analysis of the data. On at least three occasions, formal meetings between members of the study team and key Government officials were arranged at which data and ideas were presented and discussed. Government officials and others also reviewed material informally and made comments and suggestions. The final results, however, are the responsibility of the Consultant.

A total of 13 people served on the study team. A list of team members with the approximate dates of their participation follows.

<u>Name</u>	<u>Position</u>	<u>Date Participated</u>
Don Westwick	Economist and Study	Sept. 2, 1976 to Dec. 16, 1976
Brendan Riordan	Economist	Oct. 16, 1976 to March 5, 1977
Richard B. Peck	Livestock Specialist	Sept. 9, 1976 to Dec. 11, 1976
Raymond Gaarder	Marketing Specialist	Sept. 25, 1976 to Dec. 4, 1976
Donald E. De Tray	Veterinarian	Oct. 16, 1976 to Dec. 15, 1976
R. Starr Parker	Abattoir Specialist	Nov. 3, 1976 to Dec. 11, 1976
S.N. Unsworth	Accountant	Oct. 15, 1976 to Dec. 15, 1976 (intermittent)
R.S. Shah	Accountant	Nov. 15, 1976 to Jan. 25, 1976 (intermittent)
L.J. Deacon	Organisation and Methods Specialist	Nov. 1, 1976 to Jan. 31, 1977 (intermittent)
Bruce Kilpatrick	Management Systems Specialist	Nov. 1, 1976 to Jan. 31, 1977 (intermittent)
Michael Adair	Research Assistant	Dec. 15, 1976 to March 10, 1977 (intermittent)
Condace C. Conrad	Research Assistant (Home Office)	Sept. 10, 1976 to Sept. 25, 1976
Thurston F. Teele	Project Manager	Sept. 2, 1976 to March 9, 1977 (intermittent)

The report is divided into six chapters, including the present Chapter I, Introduction and Summary. Chapter II, Demand for Meat, covers both domestic demand and export demand, through 1990. Chapter III, Supply of Livestock and Meat, contains three sets of supply projections. The first is a basic projection through 1990 assuming that supply will be determined solely by the availability of land for animal production. It assumes no change in today's technology or intensity of livestock production. The second projection is based on our interpretation of present livestock and meat policies and their impact on supply. In order to develop this projection, we made an extensive analysis of present de facto policies. The third projection is based on our detailed

## **policy recommendations.**

Chapter IV is a relatively brief chapter on livestock processing, containing a discussion of existing processing plants and our recommendations regarding additional plants. Chapter V, Marketing, contains detailed discussion and recommendations regarding both domestic and export marketing of meat. The final chapter, Chapter VI, is a report on our management study of the KMC.

In most chapters, there is a basic text and a number of annexes. The annexes contain technical information or further details which may not interest some readers. Identifying the material through the use of annexes is for the convenience of these readers.

### **B. Summary**

In this summary, we set out the main results and recommendations of each chapter of the report.

#### **(II) Demand for Meat**

##### **(A) Domestic Demand**

Demand for meat in Kenya is projected to increase with continuation of growth in both Kenya's population and incomes per person. A continuation of population growth at 3.5 percent a year will itself increase demand by 68 percent by 1990. We examined the past rates of growth in spendable incomes for both urban and rural households always using shillings of constant value. A continuation of these past rates of growth will see these urban real incomes increasing at 2 percent a year, rising 34 percent by 1990 and rural real incomes increasing by 1.15 percent a year. We estimated the effects of these increased incomes on household purchases of the major meat -- beef -- studying both urban and rural households. We concluded that the projected increases would of themselves increase demand by 16 percent. Then with the increases in population and incomes working together we projected a domestic demand for beef rising from 131,000 tons in 1975 to 288,000 tons in 1990, a 120 percent rise. Similar increases are to be expected in the demand for the meat of sheep and goats.

We also examined the effect of rises in the real price of beef on the likely levels of its procurement by urban and rural households. We found very little data on the responsiveness of Kenyan households to changes in the price of beef. However, in view of findings elsewhere we concluded that households in Kenya are likely to be quite responsive to changes in the price of beef. Further, our model of beef purchasing by urban African households, incorporating our findings on price and income elasticities, seemed to be consistent with the available data on quantities of beef purchased by these households. Using this model and a similar one for rural households, we estimated that if beef prices were to be increased by 20 percent in terms of shillings of

constant value, the projected demand for beef in 1990 would be 226,000 tons or 72.5 percent higher than 1975 instead of 288,000 tons without the price rise. If in addition there were to be a further real increase in prices of one percent a year from 1980 to 1990 the projected domestic demand would be 199,000 tons in 1990, a 52 percent increase over 1975.

#### (B) Export Demand

An extensive study was made of the production and consumption of meat in countries of present or potential interest to Kenya. Kenya over the past several years has exported canned corned beef almost exclusively to the United Kingdom and chilled and frozen meat to a very wide range of countries. Those to which 500 tons or more have been exported in any one year since 1972 include Greece, Holland, Hong Kong, Libya, Djibouti, South Yemen and Zaire.

Various sources have projected that East Africa will become a gradually more important net exporter of beef and sheep and goat meat by 1990, but Kenya is regarded as an exception which will become a net importer of both types of meat before 1985.

We have examined the supply and demand projections for several countries in Africa. Three countries, Nigeria, Zaire and Egypt, appear to offer particularly good potential markets to Kenya, and KMC already has relationships with the first two. Nigeria, with its booming economy and continued port congestion, which requires all meat to be flown in, seems to offer particular advantages to Kenya.

The Middle East appears to be the market of the future. Projections show large requirements for beef and even larger requirements for sheep and goat meat in 1985 and 1990. Iran's projected requirements alone are very large, especially for sheep and goat meat.

Several European countries have projected import requirements which are much increased over present levels, as do Japan and, especially, the Soviet Union.

Aggregating the figures for the countries selected for examination, which include some African and European countries, Japan, the Soviet Union and most of the Middle Eastern countries, we calculate a projected import requirement for beef and veal of about 969,000 tons in 1985 and 1,903,000 for 1990. For sheep and goat meat, the projections are even higher, 515,000 tons in 1985 and 2,542,000 tons in 1990. Comparing these projections to projections for world trade in these products, we find that the world-wide beef and veal projections support the projected increases in import demand in the selected countries, but those for sheep and goat meat do not. Either the projections for sheep and goat meat are overstated, or there will be a sharp increase in world trade.

World prices for meat have been depressed since 1974, but, according to IBRD projections, should begin to recover in 1977.

and very much so in 1978. Prices for sheep and goat, especially live, are currently very attractive in the Middle East.

We conclude that there is ample scope for meat exports from Kenya, especially in nearby African and Middle Eastern markets, if Kenya can produce enough meat to maintain an export surplus, or if it should be decided to reduce domestic consumption to support an export program.

### (III) Supply of Livestock

#### (A) Introductory Comments

In this chapter, we calculate the production of beef, sheep meat and goat meat in 1970 and 1975. We then prepare three projections of supply for 1990. The first, our basic projection, assumes no significant change in technology and, therefore, is based on availability of land for livestock. The second projection is based on the assumption that existing livestock policies, as we understand them, continue through 1990. The third assumes that our recommended policies are adopted.

#### (B) Cattle, Sheep and Goat Output

The quantity of livestock and meat supplied has been estimated for 1970 and 1975, using a variety of sources including data on hides and skins. According to our estimates, in 1970, 115,000 tons of beef were produced and 42,000 tons of sheep and goat meat, for a total for these three types of ruminants of 157,000 tons. These figures are believed to be somewhat below the trend line. The production figures for 1975 are considerably larger: 143,000 tons of beef and 66,000 tons of sheep and goat meat, or a total of 209,000 tons.

#### (C) Basic Projections : Land Availability and Current Practice

The basic projection for supply in 1990 is built on the concept that a certain amount of land in each ecological Zone in each region of the country is and must be used for various non-livestock purposes, such as crops, services, forests and national parks. Subtracting all other uses, we calculate that, in 1975, there were a total of 50,310,000 ha. of potential grazing land in Kenya. Analysing this by ecological Zones, we have the following availability of grazing land for 1975 :

Zone II	)		2,005,000 ha.
Zone III	)	high potential	3,967,000 ha.
Zone IV	)		5,375,000 ha.
Zone V	)	semi arid	26,042,000 ha.
Zone VI	)	arid	12,821,000 ha.
Total			50,310,000 ha.

The number of livestock which can be supported on the various ecological zones, with the highest in zone II and the lowest in zone VI. Applying these estimates, we calculate that the 50,310,000 ha. of grazing lands in Kenya, plus by-products of crops from cultivated land, could, in 1975, have supported 11,784,000 Livestock units (L.u.s). According to our estimates, the actual number supported was 6,041,000 L.u.s, defined as an energy equivalent of a 450 kg lactating cow and calf. As noted above, this number of head produced 143,000 tons of beef and 66,000 tons of sheep and goat meat in 1975.

By 1990, the number of ha. of grazing land, and therefore the number of L.u.s which can be supported, based on conventional stock carrying capacities, will be reduced to allow for additional cropland and other land used by the increased population. The 1990 estimated figures are as follows, with 1975 figures repeated to facilitate comparison.

<u>Zone</u>	<u>Hectares available for grazing</u>	
	<u>1975</u>	<u>1990</u>
II	2,005,000	1,563,000
III	3,967,000	2,923,000
IV	5,375,000	5,241,000
V	26,042,000	26,042,000
VI	<u>12,921,000</u>	<u>12,921,000</u>
Total	50,310,000	48,690,000

A small reduction, only about 1,620,000 ha., slightly more than three percent, is therefore estimated by 1990. However, the conventional stock carrying capacity is projected to drop much more, because of the loss of hectares to grazing in the better ecological Zones II and III.

<u>Zone</u>	<u>Livestock carrying capacity in L.u.</u>	
	<u>1975</u>	<u>1990</u>
II	3,794,000	3,023,000
III	4,009,000	3,053,000
IV	1,353,000	1,351,000
V	2,171,000	2,171,000
VI	307,000	307,000
Crop by-products	<u>150,000</u>	<u>257,000</u>
Total	11,784,000	10,162,000

The reduction is about 14 percent.

With regard to the number of animals units actually on the land, we retained the 1975 ratios by region in 1990. That is, for each region, the number of L.u.s on the land as a percentage of L.u.s of conventional stock carrying capacity was assumed not to change 1975 - 1990. This resulted in a somewhat greater fall in L.u.s actually on the land in 1990 compared with 1975, a fall of 17 percent. And when the

the fall off becomes still bigger, over 30 percent, in each case, regions with the higher production coefficients are those with the largest reductions in grazing land. The summary data are as follows.

<u>Livestock on the land and meat production</u>			
	<u>1975</u>	<u>1990</u>	<u>percent change</u>
Livestock units	6,041,000	5,016,000	- 17
Meat production (tons)	209,000	165,000	- 21
of which, beef (tons)	143,000	111,000	- 22

Considering that population is assumed to increase by some 67.5 percent between 1975 and 1990, this basic projection indicates a very major reduction in per capita supplies.

#### (D) Present Policies

We have discussed livestock and meat policies under several headings. In most cases, we have made estimates of the supply impact if the present policies, as we interpret them, are continued to 1990. In some cases, we estimate that the impact will be positive, an increase in meat supplied compared with the basic projections. In other cases, we project a negative impact.

Social Policy and Constraints : We find that Kenya's livestock development is constrained by social policy in at least three ways. First, the Government is attempting to improve production among the pastoralists while disturbing their way of life as little as possible. Secondly, a high priority is placed on land and income distribution, even at the possible risk of production. Finally, the Government has had a policy of relatively low retail meat prices, which has held down producer prices and therefore production. No specific supply impact is attributed to these policies, since they are aspects of other policies described below.

Cattle, Sheep and Goat Policies and Priorities : In spite of the obvious importance of sheep and goats in Kenya's livestock development, cattle gets a much higher priority than sheep and goats. We believe that there is a growing realization of the importance of sheep and goats.

Animal Health : Kenya has a very strong Department of Veterinary Services. The basic animal health policy is to fight disease on a broad front but to depend on quarantines and movement control to minimize disease in the high potential areas of the country where grade animals are concentrated. There are two major problems: a shortage of staff for the DVS and a serious weakening of the

which is resulting in increased foot and mouth disease outbreaks and increased losses to East Coast Fever. If present policies are not changed, we estimate a negative meat supply impact by 1990 of 9,100 tons of meat annually.

Rangeland Development (Blocks) : Rangeland development in the North East is a major element in Kenya's livestock development policy and the Second Livestock Development Project. The project is faced with many problems, most of which can be solved. However, we believe that the Government is failing to institute a reasonable level of grazing control along with the water development, with the result that there has been, and will continue to be, serious range deterioration. This will severely limit the positive supply impact which the range development policy and projects would bring. As a result, we estimate that the positive supply impact of the rangelands development policy will be only 3,100 tons of meat annually by 1990, above the basic projections.

Ranch Development : A second major element in the Government's livestock development policy is ranch development, including commercial, company, cooperative and group ranches. The ranch development part of the Second Livestock Development Project was designed to result in an increase of about 11,500 tons of meat annually at full development. The project has been delayed for various reasons, such as the effects of the drought, weak management, overstocking, low member equity and the like. Because of these problems, we estimate that the present ranch development activities will result in an annual increase in output of 6,400 tons of meat. However, between the planned completion date of the present project and 1990 there is time for at least one more such project, and the expected relative success of the present project seems to justify another project. Therefore, we double the projected supply effect of ranch development, to 12,800 tons of meat, by 1990.

Transportation and Stratification : This heading includes the marketing and transportation activities of LMD, backgrounding and feedlot operation. After a difficult two years, caused by the drought and some poor policies, we believe that LMD has developed a good system of purchasing cattle from the pastoral areas, putting them through quarantine and selling them to the ranches, feedlots and KMC. We believe that the operations of LMD should have a very favorable effect on beef supply, and use 5,000 tons annually by 1990 as an estimate. The feedlots, of which there are currently about eight in operation (or about 35 including smaller farmers who feed animals), appear to be improving their throughput but it is still far below capacity. The major problem appears to be very high feed costs, which makes it difficult to make significant profits even with favorable price ratios between grades. We allocate a positive supply impact of 1,500 tons per year to the feedlots.

High Potential Areas : The high potential areas currently produce most of the beef in Kenya. In spite of significant slaughter being taken out of beef production by 1990, we believe the high potential areas will continue to supply beef.

half of Kenya's beef. There are numerous ways in which we believe high potential area production can be increased, including expanded production of fodder, pasture improvement, alternative cropping, herd improvement through selection and breeding, reduction in calf mortality and other management improvements, increased utilization of by-products and, perhaps, raising of dairy bull calves for meat. The Government has programs in most of these areas, but we believe present de facto policy is not to put sufficient resources into these developments. Secondly, most of these improvements require investment on the part of the producer, now usually a small farmer. Prices are still inadequate to generate much investment. As a result, we assign no supply impact to these developments in the high potential area under current policy.

Price Policies : We believe that present livestock and meat prices are retarding the development of the livestock industry. The Government controls all retail prices, wholesale prices from forequarters of FAQ grade carcasses down through all standard, commercial and manufacturing carcasses, and minimum producer prices. Other prices, such as LMD buying and selling prices are at least indirectly controlled by the Government. Retail prices, some wholesale prices and producer prices, especially for standard grade, have decreased in real terms in the past several years. We estimate a real reduction, using the middle income index of producer prices as a deflator, of about 25 percent. At the same time, production costs have increased sharply. We believe that, if present policies continue, that is, if price increases continue to lag and ratios between prices continue to be incorrect, there will be a further negative supply impact by 1990. The estimated negative supply impact is 3,200 tons from the ranches and an additional 4,000 tons from the high potential areas.

Planning and Policy Formulation : There are a great many agencies in Kenya involved in planning and policy formulation in the livestock industry. This is not unusual, but we believe that the lack of a strong, central coordinating body is serious.

Aggregate Supply Impact of Present Policies : Some of the present policies will, if continued, result in a loss of production relative to our basic projections for 1990, others will result in a gain. According to our estimates, there will be a net gain of 6,100 tons of beef per year by 1990.

#### (E) Supply Projections Based on Current Policies

We project no supply impact for sheep and goat meat resulting from present policies. Therefore, the figure from the basic projection, 54,000 tons, remains unchanged. For beef, our supply projections for 1990 on the assumption that present policies will continue is 117,000 tons, i.e. the base projection of 111,000 tons plus the 6,100 tons net positive impact.

## Recommended Policies

We have grouped our policy recommendations under the same headings used to describe present policies.

Social Policy : We recommend that, although it is desirable to take existing and traditional ways into account in livestock development, the Government make a special effort to change traditional ways as they pertain to grazing control. We recommend no change in the high priority given to land and income distribution. With regard to the consumer, and especially the urban consumer, we believe that his interest in low cost meat must give way to the requirements of the various producers for adequate prices and margins.

Sheep and Goat Policies and Priorities : We recommend that sheep and goats production be given a much higher priority than at present. This recommendation is based on that fact that, even with sheep and goat management at a much lower level in Kenya than cattle management, energy requirements are lower for a kg of sheep and goat meat than a kg of beef. There are several other advantages to sheep and goat production as well. We estimate that, should our recommendation be accepted and implemented, output of sheep and goat meat by 1990, over our basic projections of 54,000 tons, would be an additional 27,000 tons. There would be, according to our estimates, a trade off in the form of a reduction in beef output of 13,500 tons.

Animal Health : We strongly recommend a much more effective effort to control livestock movements, both internationally and within Kenya. We also recommend more adequate funding of the operations of the Department of Veterinary Services. With regard to specific diseases, we recommend :

- That serious consideration be given to nation-wide control of Foot and Mouth Disease.
- For East Coast Fever, in addition to movement control, a strengthening of Government control over dip management and discipline, and continued pursuit of an effective vaccine.
- That an effort be made to achieve full control over CBPP, especially since great progress has already been made on the disease.
- For Trypanosomiasis, that the present approach of control by chemotherapy and prophylaxis coupled with extensive research, be continued.
- For other diseases, continued improvements in control measures now underway.

Should our recommendations be implemented, we project a positive supply impact, above our basic supply projections, of some 22,940 tons of meat per year by 1990.

Rangeland Development (Blocks) : We make several recommendations to strengthen the range development program.

- Permanent water points should be spaced not less than 25 km apart, which is the present approach, and, in absence of strong grazing control, permanent water should be placed on about half of each block. If control can be assured, permanent water should be evenly spaced throughout the blocks.
- The most important improvement in the project would be to obtain grazing control, preferably by making as many arrangements as possible before the water development begins.
- We recommend strengthening of the extension and training programs in the North East.
- We also recommend an improved system for monitoring the grazing resource, an improved research component to the project as well as expanded efforts to utilize existing research, and a grass seed testing and production program.

Based on these recommendations, the estimated supply impact of the range development program, over and above our basic projections, is 5,412 tons of meat per year by 1990. In addition, we believe that implementing these recommendations would greatly improve the quality of the range over the long term.

Ranch Development : Our recommendations for the ranch development program are that greater efforts be made to achieve grazing control and proper stocking rates on the ranches, improved management, finance and planning, and technical assistance. For the present ranch development project, we estimate that the supply impact, as a result of implementing these policies, would increase from 6,400 tons under present policies to 8,000 tons of meat by 1990. Assuming a second ranch development project in the 1980s, with similar supply impact, the total impact of ranch development by 1990 would be 16,000 tons of meat per year.

Transportation and Stratification : With regard to LMD operations, which we generally believe to be going well after a difficult two years, we have the following recommendations:

- We recommend that the Government recognize that LMD plays a very valuable role in

Kenya's livestock development. Successful accomplishment of that task, moving livestock from the pastoral areas into the market, is more important than avoiding financial losses. LMD should strive to be efficient and keep costs down, and to maintain reasonable margins, but if it cannot meet all costs it should be allowed to suffer losses as an indirect subsidy to the industry.

- LMD should continue to make every effort to purchase directly from the pastoralists.
- LMD should make every effort to maintain source identification on pastoral cattle so buyers will know the probable measles incidence.
- We recommend that, with the cooperation of LMD and AFC, a pilot project to establish a Producers Marketing Association be established as an alternative to conventional LMD or trader buying and selling.

With regard to feedlots, we strongly recommend that the Government make every effort to assist the feedlots to obtain feedstuffs at the lowest possible prices. This would include an opportunity to purchase maize, denatured and marked, at an export parity price and priority for the purchase of by-product feeds. We believe this is more important to the feedlots than a revision in livestock and meat prices. We estimate that implementation of this recommendation could increase the feedlot throughput to 30,000 head a year, which would mean a supply impact of about 1,800 tons of meat, as well as upgrading a much larger tonnage.

High Potential Areas : We believe that, in spite of reduced hectareage of land available for grazing in the high potential areas, they will remain very important to livestock and meat production. There is considerable scope for increasing meat output per hectare. We recommend that research and, especially, extension work with small farmers who produce livestock in the high potential areas be greatly expanded. Areas of concentration should be fodder production, improved pastures, alternate husbandry, herd improvement, utilization of by-products and management in general. We estimate that the potential supply impact from implementing these recommendations would be 26,000 tons of meat per year by 1990.

We have also analysed the question of raising dairy bull calves for meat. A significant number, estimated at over 90,000, are killed at birth and many more are raised casually and produce little meat. On the basis of opportunity costs, we recommend that further efforts be made to raise small calves into milk-fed vealers, but that no special effort be

to encourage farmers to raise, intensively, dairy bull calves to maturity.

**Price Policy :** We recommend that the basic price system in Kenya, which is based on grading carcasses and establishing prices based on those grades which assign considerable value to quality improvement, be retained. We further recommend that retail and wholesale prices for FAQ grade and above be decontrolled, and that retail, wholesale and producer prices for standard grade and below be increased. The recommended increase for standard is a little over 20 percent. We also recommend that prices be reviewed annually, as is now the case, but that the Ministry of Agriculture establish a beef price index, combining the middle income index of consumer prices, an index of beef production costs, and an index of export parity. This index would be the basis of annual price increases of all producer, wholesale and retail prices controlled by the Government.

Our recommended prices for each item, grade and level are given below. Since we recommend decontrol of retail and wholesale prices for FAQ and above, the prices shown below for those items are intended to be illustrative. Further, we recommend that the Ministry of Agriculture apply the proposed beef price index to these prices before the end of 1977 to achieve further increases. Should the recommended increases in retail, wholesale and producer prices for standard grade be considered too severe for a single year, they could be spread over a longer period, say four years.

RECOMMENDED LIVESTOCK AND BEEF PRICES  
June 1977 Sh per kg.

<u>Item</u>		<u>Recommended without 1976 BPI</u>	<u>Present</u>	<u>Increase</u>
<u>Retail prices</u>				
Choice	Sirloin and other top cuts	17.50*	14.75	19
	Other cuts	In proportion**		
FAQ	Sirloin and other top cuts	16.25*	14.75	10
	Other cuts	In proportion**		
Other	Sirloin and other top cuts	14.75	14.75	-
Bone in	Bone in	8.85	7.40	20
Bone out	Bone out	10.25	8.60	19
<u>Wholesale prices</u>				
Choice	Hindquarter	11.20*	10.15	10
	Forequarter	8.90*	8.45	5
FAQ	Hindquarter	10.55*	9.90	7
	Forequarter	8.35	6.10	37

<u>Item</u>		<u>without 1975 KMC Program</u>		
Standard	Hindquarter	7.80	6.30	21
	Forequarter	6.70	5.70	18
Commercial	Hindquarter	6.00	5.50	9
	Forequarter	5.50	5.00	10
<u>Producer prices</u>				
Choice	Choice	8.25	7.10	16
FAQ	FAQ	7.85	7.00	12
Standard	Standard	5.95	4.85	23
Commercial	Commercial	4.75	4.25	12
<u>LMD Ranch Sale Prices</u>				
	Up to 200 kg	2.60	2.40	8
	200 kg to 225 kg	2.70	2.50	8
	Above 225 kg	2.80	2.65	6
<u>LMD Purchase price</u>				
All animals		<u>Previous year</u>	<u>Recent</u>	
		KMC realization	KMC	
		price less costs	realization	
			price less	
			costs	

\* Illustrative, since we recommend decontrol.

\*\* The present differentials between cuts can be maintained.

We also recommend that, to support KMC's export program in the face of increasing producer prices and stagnant export prices, an export rebate be granted for chilled and frozen meat exports, similar to the rebate recently granted for canned corned beef.

We believe these price adjustments are necessary for the health of the industry, as well as to begin to reduce per capita consumption which is necessary in view of increasing population and the difficulty of achieving parallel increases in production. Regarding the specific supply impact of our price policy recommendations, we use a figure of 6,600 tons of meat annually by 1990.

It should be noted that these recommendations do not take into account the Sh 0.50 per kg increase in producer prices announced in September 1976, but not implemented as of this writing, or the Sh 0.90 per kg increase in consumer prices announced March 2, 1977.

Planning and Policy Formulation : We recommend the establishment of a planning and coordination body for the livestock and meat industry which might be called the Livestock and Meat Marketing Authority. Represented on this Authority would be all of the interested agencies, and the Authority would serve as a mechanism for orderly planning and policy

## Formulation for the industry.

Aggregate Supply Impact of Proposed Policies : According to our estimates, the aggregate supply impact of our recommended policies would be 70,252 tons of beef, over and above our basic projections, and 27,000 tons of sheep and goat meat.

### (G) Revised Supply Projections Assuming Recommended Policies

Adding the aggregate supply impact of our recommended policies to our basic supply projections for 1990, we have the following supply projections for 1990 :  
Beef 181,000 tons, sheep and goat meat 81,000 tons.

### (H) Conclusions : Supply and Demand in 1990

Putting supply and demand projections together, we find that, under present policies, there will be a very large deficit in meat by 1990. Even under recommended policies, there will be a small deficit unless there is a significant price increase.

## (IV) Processing

### (A) Present Situation

At present there are two modern slaughterhouses operating in Kenya, KMC Athi River and KMC Mombasa. A third, Halal, is nearing completion near Nairobi and is expected to begin operations in April 1977. The total, normal daily single shift capacity of these three units is about 1,400 head of cattle and 1,420 head of smallstock. KMC Athi River can work longer hours or even a second shift, which could bring the total annual capacity to about 546,000 head of cattle per year.

There are apparently no firm figures on numbers of capacities of local slaughterhouses, which is not surprising considering their small size and low investment. A conventional figure is 200 units and a capacity of 500,000 head per year.

The KMC slaughterhouses are modern with a high level of sanitation. Based on its plans and an examination of the construction site, Halal is also to be a modern, good quality slaughterhouse. The existing small local plants represent a very small investment and are of a very low sanitary standard. Some are currently being inspected by the Department of Veterinary Services. According to present plans, some 50 new municipal slaughterhouses with reasonable sanitary facilities are being planned, in part to replace the local slaughterhouses over the next 10 years.

### (B) Recommendations

We recommend that no new modern slaughterhouses be established until the existing three are operating at

nearly full capacity and a real need is demonstrated. Should the need arise, KMC Athi River could go on two shifts. Expansion of the Mombasa plant could also be considered before new plants are planned.

## (V) Marketing

### (A) Export-Domestic Market Tradeoffs

Currently, export of chilled and frozen meat is made at a small profit or loss because of low international meat prices. In the short term, this should change and prices increase. Within a few years, however, domestic demand will overtake supply and exports will only be possible at the expense of domestic consumption. We recommend that they be continued, but that maximum possible returns be sought. Exports under these conditions, or any increase in exports, results in real domestic price increases.

### (B) Domestic Marketing

KMC Competitive Ability to Attract Livestock : KMC is at a competitive disadvantage in attempting to attract livestock because of its price rigidity and its need to accept any animal. Further, its costs are much higher than those of the private slaughterhouses. Taking 1975 throughput and late 1976 prices, and assuming all carcasses are sold on the domestic market with no canning and no export, we calculate that KMC's operating costs were Sh 2.42 per kg CDW, consisting of a margin of Sh 1.50 per kg, a fifth quarter recovery of Sh 0.86 per kg, and a loss of Sh 0.06 per kg. By contrast, we calculate the local slaughterhouses costs as only Sh 0.48 per kg CDW, and he enjoys a margin of Sh 1.00 per kg and a fifth quarter recovery of Sh 0.70 per kg. Thus, KMC can be expected to have great difficulty in competing.

Break Even Analysis for KMC : Using the same assumptions as above, a break even analysis was carried out for KMC. With a margin of Sh 1.50 per kg, KMC's theoretical break even point is 137,000 head. As we vary the assumed margins, the break even changes. At 100 percent of assumed capacity (275,000 head), a margin of only Sh 0.75 per kg CDW would be required.

Policies to Optimize KMC's Operations : We discuss several specific policy matters raised in the Terms of Reference.

Price Policy : We believe that the price schedule described in Chapter III will lead to an average annual throughput of 180,000 head and an average margin of Sh 1.20 per kg., which should allow KMC to at least break even.

Subsidies : We recommend an export rebate for chilled and frozen meat similar to that recently granted for canned corned beef. We believe consideration might also be given to a specific subsidy to compensate KMC for inherent inefficiencies in being a buyer of last resort. We have not developed a specific system for this subsidy, which may not be necessary if other recommendations are followed.

Inspection and Health Standards : Inspection and health standards were studied at KMC plants and at two small private slaughterhouses. There is no comparison. Standards at KMC are very good. Those at the private slaughterhouses are very poor. DVS inspections are carried out at the private plants visited, but under poor conditions and by lay inspectors. Based on 1975 statistics from Coast Province, the rate of condemnations at KMC is much higher than at private slaughterhouses inspected by DVS, which may suggest lower standards. We consider this situation a competitive problem for KMC and a public health problem for Kenya. It may be that the new municipal slaughterhouses will ease both problems.

Grading : Grading is carried out on carcasses at KMC by DVS graders. For carcass grading we recommend adding a maximum age standard for FAQ and additional minimum weight standards for certain grades. We would modify the present maximum fat cover for FAQ and above to a modest penalty for excess fat cover.

We recommend the establishment of a system of live grades and training both KMC buyers and DVS graders in the art of live grading. We believe that live grading at time of purchase, followed by standard carcass grading, would strengthen KMC's competitive position in times of shortage.

Custom Slaughtering : We do not recommend that KMC enter into custom slaughtering as a way to increase throughput. We believe that this would unduly interfere with KMC's main business.

Drought Year Marketing Assistance to Pastoral People : We believe that increased purchasing and transportation operations by LMD are the best approach to providing this needed assistance. We do not believe that mobile or field abattoirs are needed or desirable.

#### (C) Export Marketing

Kenya's Competition : Kenya's chilled and frozen meat exports are very widespread and Kenya faces competition from virtually all of the major meat exporters. These are all more experienced and have much higher volumes to sell. We believe that Kenya does have a good chance to maintain and improve markets in Africa and to carve out small but effective markets in the Middle East.

Steps to Improve Kenya's Competitive Advantage : There is little that can be done across the board to improve Kenya's competitive advantage. Large scale price cutting is not recommended, although if the recommended export rebate is granted it should give KMC a bit more price flexibility. We believe that KMC should explore markets other than the UK for its canned corned beef, markets such as Nigeria.

Target Markets : We recommend that KMC attempt to focus on a small group of target markets and commit as many resources as possible to the development of those markets.

to recommend the ban on export of live animals, for breeding or slaughter, be lifted. The fact that there is now an excellent market for live sheep in the Middle East makes this very urgent.

Export Marketing Recommendations : We believe that KMC must become more oriented to marketing, and that more attention be given to merchandising its products. We hope that our price recommendations will make this possible, especially in the domestic market. Among the steps needed, we recommend the appointment of an experienced, well qualified Marketing Director to work with the present Sales Manager and his staff to improve the marketing program. We do not believe the presently planned one year assignment of an FAO expert to develop a special marketing program for high quality meat satisfies this requirement, although we support the proposal. We also recommend that KMC strive to develop new products and that it experiment with the use of brokers in new markets. We believe that KMC should work more closely with the Kenya External Trade Authority.

Export Slaughterhouses : Existing export slaughterhouses are adequate and no further additions are necessary.

#### (VI) KMC Management Study

##### (A) Introduction

The Terms of Reference requested a special management study of the KMC. The study was carried out by Hawkins & Associates, sub-contractor to Chemonics on the overall study.

##### (B) Aims and Role of KMC

KMC is a parastatal organisation which was created as an agent of Government policy on the livestock and meat industry. Its current role is to operate modern sanitary slaughterhouses to provide both high quality chilled and frozen meat, and high quality canned corned beef, for export, as well as quality meat for the domestic market. It acts as a buyer of last resort for all cattle and certain smallstock. By paying at least the gazetted minimum producer prices it provides a floor price to producers. By grading all of its meat and selling by grade, it is the instrument for the maintenance of quality controls on the domestic market. It is also intended to operate at a profit. It appears that KMC's function as an agent of the Government is incompatible with its long term viability. We recommend that it operate purely as a commercial, profit oriented operation. Its board structure should have a commercial rather than a producer orientation.

**(C) The Controlling Authority**

To assume KMC's role as an agent of Government, and to coordinate all planning and policy development for the livestock and meat industry, we recommend the establishment of a Livestock and Meat Industry Authority.

**(D) Line Functions**

We make several specific recommendations designed to strengthen the management of KMC.

**Operations** : We find that the Managing Commissioner has too many separate units reporting directly to him. Therefore, we recommend the appointment of an experienced, highly qualified individual to a new post of Operations Director. He would supervise the Production Manager, Athi River, Livestock Manager, Chief Engineer and Mombasa Manager, under the direction of the Managing Commissioner. A major task would be to try to level out the throughput to increase the level of efficiency.

**Marketing and Sales** : To strengthen these functions, especially in the area of market strategy and planning, and to ensure that all actions of KMC are built around marketing requirements, we recommend the creation of the post of Marketing Director and the appointment of an experienced individual. This is in addition to the existing sales staff. With this strengthening of marketing staff, positions should be redefined to permit the Sales Manager to concentrate on supervising the sales force and a Sales Administrator to handle administrative details related to marketing.

**Accounts and Finance** : We find that the Accounts Department is large and very important to KMC operations, but there is considerable confusion as to who is performing what functions. We recommend that it be organized into clearly defined sections. Standardization is needed, and we recommend that an accounting manual be drawn up and followed. Finally, financial planning is weak. To implement these recommendations and strengthen the financial planning and management of KMC, we recommend that the post of Financial Director be created and an experienced individual appointed.

**(E) Personnel and Staffing Levels**

Although we were not able to study staffing requirements unit by unit, we find that KMC is overstaffed with permanent personnel. This means there is little flexibility to vary the work force with the work load. In times of high throughput, a large labor force is necessary, but when it falls off, much of the staff is not needed. We believe that the KMC permanent staff of about 1,400 could be reduced by as much as 400, and the shortfall made up, in times of high throughput, by overtime and casual labor. We do not recommend that 400 people be declared redundant, but that this reduction be done through wastage, using a strict hiring system.

We also recommend that the personnel department be strengthened to improve the management of personnel and the personnel costs. This would include the preparation of job descriptions, manpower development plans and progress and hiring controls.

**(F) Management and Accounting Information and its Processing**

We find that the financial, production, sales, livestock and personnel information being prepared is very inadequate for Board use and decision making purposes. We make extensive recommendations for change in the monthly reporting procedures and content. Further, there is duplication, and there are serious gaps, in data availability, and we recommend a comprehensive survey on this point. Finally, KMC is under-using its computer and most of the uses are relatively trivial. We recommend a survey by a professional computer specialist.

**(G) Offices in Nairobi**

Since most KMC operations are at Athi River, we recommend that the head office be moved to that location.

**CHAPTER II**

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**DEMAND FOR MEAT**

## CHAPTER II

### DEMAND FOR MEAT

This chapter covers our analysis of the demand for meat. The first part, Section A, covers the domestic demand, urban and rural, for beef and meat of sheep and goats. Section B covers net demand, with projections to 1990, for beef, sheep and goat meat in a number of countries of interest to Kenya.

#### A. Domestic Demand

##### 1. Introduction

The likely growth in the demand for meat is the topic of this chapter and consideration is given to both the domestic and export markets. In Kenya the main questions are how much households will be prepared to spend on beef and other meats and how many people will there be eating this meat. Thus we will have to examine changes in earnings, meat prices, the numbers of people in urban and rural areas and the bearing of all these changes on the domestic demand for meat.

The spending behaviour of Kenyan households and the plans to export beef need to be related to how much beef is likely to be available. The size of the imbalance between projected spending plans and production plans may then show the scale and direction of efforts needed to maintain adequate supplies in the future, the topic of Chapter III. This kind of forward planning is especially necessary in beef production where it takes many years for the country to make up for shortages or even cut back on output that is excessive and the cause of financial losses. Furthermore, the cost of planning errors in animal production is usually high due to the years of effort involved in the cycle of production, and the fact that the first efforts to improve the situation usually make it worse! Thus if a drought, disease or low prices lead to a fall in cattle numbers and output, the first step in raising cattle numbers and output is to reduce the offtake of females and young males, thus reducing output still further.

##### 2. Demand is not Consumption

Thus far we have discussed intended spending on meat, the demand for meat. No mention has been made of meat consumption because we contend that in rural Kenya the level of consumption of meat exceeds the level of economic demand. This difference is due to the fact that some of the consumption costs virtually nothing, is almost an accident due to disease, or malnutrition and is not transferable between people in one place and those in another. In short some meat that is consumed cannot be marketed. Thus if a calf is about to die but is hastily slaughtered and eaten the meat that is consumed would otherwise have been lost.

since there was nothing else to be done with it. However, if a household slaughters a calf that could well have been sold or reared to yield more meat or more money, then eating the calf has a cost and is the result of a spending decision. Thus while a household's 'spending' or procurement of the produce of its own land is part of the demand for meat, accidental consumption is not part of the demand for meat. It is hard to know how much consumption is not part of demand and we have assumed that it is equivalent to consumption where the hide or skin of the animal consumed is not sold. Thus excluded from demand is most of the consumption of calves, kids etc., and some of the older animals consumed in remote areas where even the hide or skin does not reach a hides and skins buyer. This orientation is in keeping with attention to commercial demand and supply requested by our Terms of Reference.

### 3. Development of a Model of Demand

There is very little data on the quantities of meat procured by households in Kenya. There are a few studies of the patterns of household expenditure but no data on year by year changes in spending in response to changing conditions. We decided that the available data did not justify an attempt to make new estimates of the response of spending on meat to changes in income and the price of meat (income and price elasticities of demand). Further, our review of earlier analyses of demand showed that results were only available for all meat and for beef. Expenditure on the meat of sheep, goats and other animals was too small to be reported separately. Thus most attention will be given to the demand for beef by households and the likely increase in the number of households with the growth of population.

Using the available contributions to demand analysis we propose a model of demand for beef in Kenya. Our model or demand function will show the changes in quantities procured likely to follow real changes in household incomes, numbers in the household and the price of beef. Estimates of incomes, prices and the size of households in some of the years since 1963 are then fed into this model of demand. The resulting estimates of the quantities of beef 'bought' or procured are compared with estimates of the level of beef procurement or supply in each of the years studied. Having checked our model as far as the data would permit we then use it to project the level of demand in 1990 under various assumptions.

### 4. The Pattern of Household Demand for Beef in Kenya

All studies of the spending patterns of Kenyan households have selected either urban or rural households. Thus we propose separate models are needed for urban and rural households and these will be constructed for the major meat -- beef. Using separate models overcomes the problems of the great differences between urban and rural households in their membership, levels of income and patterns of meat procurement and the fact that these have changed much more in urban than in rural households over the past 15 years.

## A Model of Urban Beef Demand

Data on urban household spending has been mainly collected from African households in Nairobi. Only in 1968/69 was additional data collected in Mombasa and Kisumu. The beef buying of non-African households is likely to differ considerably from African households. Hindus for example do not eat beef. What is more the relative amount of beef purchased by the non-African part of the population has fallen considerably since 1963. Thus, three models are used for the urban households, one for African, one for Asian and one for European households. The Asian and European models are very simple as there is no Kenyan data and it is considered that their beef buying has probably changed very little over the years. It is assumed that Europeans would buy 40 kg of retail beef per head per year in view of

- The pattern of meat consumption in Western countries especially Great Britain.
- The high proportion of income earners in the European population.
- The generally high standards of living of the European population and the relatively low prices of beef.

The amount of beef bought by Asian households is taken to be an average of 12 kg per person after allowing for half the households not eating beef and the lower level of beef consumption in other households relative to those in the European population.

The model for expenditure by African households used by Massell and Heyer (1969) and by the Central Bureau of Statistics (Statistical Bulletin June 1972) was :

$$\log E = a + b \log Y + C \log N + u$$

where : E is the household's expenditure on, say, beef  
Y is the spendable income or total expenditure of the household in shillings of constant value  
N is the number of adult equivalents in the household - people under 16 years old counting as half an adult equivalent.

a is a constant.

b is the income elasticity of expenditure on the food - say, beef.

C is the corresponding effect of household size on expenditure E.

u is the difference between the estimated and actual levels of expenditure on beef, the 'error' term.

The results of analysing household expenditure on all meat and beef using this model are shown in the first three entries in Table II-1.

TABLE II-1

## ESTIMATES OF DEMAND ELASTICITIES

Source	Area of data collection	Data collection-time - methods	Analysis	Estimated elasticity of expenditure with respect to:		
				Household Income (a) or Expenditure (b)	Meat	Beef
<u>DFRAN</u> Howe, C.W. (1966)	Nairobi middle income households. Nairobi lower households	1963 Household Survey 1957/58 Household Survey. 11 groups	11 groups. Income elasticities consumption per adult equivalent. Various functional forms	Meat & Meals out 0.329(a)		
McNeill, B.F. and Meyer, J. (1969)	Nairobi middle income households	1963 Household Survey 60 groups of 5 each	Expenditure elasticities per household, double log function	Meat & Fish 0.491(a) 0.477(b)		0.499
Kenya Statistical Digest, 10,2,1-8 (1969)	Nairobi Nairobi, ) Mombasa, ) Kisumu )	1968/69 Household Survey	Disposable income and household size, double log function.	All Meat 0.460(a) 0.428(a)	0.43 (a) 0.426(a)	0.245 0.282
Widdington, J.J. & ... F.A. (1968)	Nairobi	1959-66 Quantities of beef supplied by KMC	Income, consumption per adult equivalent, double log function		1.897(a)	
... (1972)	Not known	Not known	Not known		1.2 (a)	
... B.F. (1967)	Central P. incl. Meru 836 households.	1963-64 Household Survey stratified by Farm size	Expenditure and household size, double log function.  Also subsistence ratio	Meat & Eggs 1.34 (b)  1.20 (b)	1.14 (b)	-0.587

Haessel and Meyer estimated the income elasticity of expenditure on beef at 0.491 on the assumption that the income elasticity of expenditure is 0.80 (p. 229). A slightly lower figure for the meat was derived from the 1968/69 survey and the figures for the income elasticity of beef were slightly lower again at 0.426 to 0.43. The coefficient for household size has been taken as 0.282, following the analysis of the 1968/69 survey.

Estimates of the response, or elasticity of expenditure on beef, to changes in income and household size such as those noted above are often inserted into models of the evolution of food buying over a period of years as was done by Haessel (1976). We also intend to use these elasticities in a model of year to year changes in spending but have taken note of the following difficulties:

- Income elasticities tend to fall as incomes rise (Engels' law).
- An increase of income need not lead households to follow the behaviour of households who previously had this higher income. This is particularly true if there is a general rise in incomes.
- Estimates of the effects of changes from year to year in, say, income on beef expenditure have a different pattern of linkages between the variables, and errors, that differ from those developed from survey data (Kuh 1959). This phenomenon may partly explain the large difference between the first three estimates and Aldington and Wilson's (Table II-1).

A further problem in using the elasticities derived from the household expenditure surveys is that they refer to changes in expenditure on beef not quantity purchased. These two would be the same if everyone paid the same price for beef but this is far from true. In particular high income households are usually found to pay higher prices than low income households. Thus the elasticity of expenditure on beef with changes in income is likely to be higher than the elasticity of the quantity of beef purchased with changes in income. Taking all these points into account it was considered that the quantity of beef purchased is likely to rise 0.4 percent for every one percent rise in urban spendable incomes. Thus the model may be restated :

$$\log E - \log P = a + 0.4 \log Y + 0.282 \log N + u$$
$$\text{or } \log Q = a + 0.4 \log Y + 0.282 \log N + u$$

where Q is the quantity procured.

A model for year to year changes in the quantity of beef purchased also has to take account of the negative effect of price rises on the amount purchased as in the model:

$$\log Q = a + 0.4 \log Y + 0.282 \log N - C \log P$$

where P is the real price of beef  
C is the elasticity of the quantity of beef purchased with changes in its price.

Estimates of the effects of the changes in price on the quantity of beef purchased are about as difficult to make as they are important. Aldington and Wilson only estimated the effect of price changes on that part of the Nairobi market supplied by KMC. They obtained a price elasticity figure of -0.845. As there are no other analyses for Kenya we cast our net wider. A wide ranging study of the effects of price changes on the demand for meat was published by Greenfield (Dec. 1974) in the FAO Bulletin and covered Western countries. Yet in several of these high income countries the price elasticity of demand was found to be larger than -1. A recent study of the effects of price in Africa was that by Haessel (1976). His data were for starchy foods in Ghana over the period 1953 to 1970. His final results were as follows :

	<u>Price Elasticity</u>	<u>Income Elasticity</u>
Cereals : maize, sorghum, millet	-1.69 (0.99)	0.92 (0.54)
Roots : cassava, yams	-1.75 (0.67)	0.91 (0.52)
Rice	-1.26 (0.41)	0.87 (0.49)

The most interesting result is for the price elasticity of roots in being both large and statistically significant. Inference from these findings is difficult as a food like beef with a higher income elasticity of demand would tend to have a higher price elasticity. On the other hand households with higher incomes as those in towns would typically have lower price elasticities. Yet it seems very likely that the quantity of beef purchased by urban African households will change considerably with a change in the price of beef and the elasticity is unlikely to be smaller than -1.2.

Thus our model for the beef buying behaviour of urban African households is

$$\log Q = a + 0.4 \log Y + 0.282 \log N - 1.2 \log P$$

It would be nice to show in the model how a rise in beef prices would lead to larger quantities of mutton etc. being bought as well as smaller quantities of beef. However, there is not only a lack of data for Kenya but, even where it exists, these cross elasticities often fail to be statistically significant. Yet it may be assumed that a rise in the price of beef will be associated with some increase in the

## quantities of mutton and other meat purchased.

### 6. Application of the Model of Urban Beef Demand

Estimates of household incomes, household size and the prices paid for beef were made and used in the model for each of the years 1963, 1964, 1967, 1970, 1974 and 1975. Data for 1967 were used to estimate the constant term 'a' and the model then showed the quantities of beef likely to be purchased in the other years.

The quantities of beef purchased or procured and the prices are stated in terms of beef with bone as this is the common way for buying beef. It is only in the shops licensed to sell named cuts of beef that beef is normally sold without bones. Elsewhere the butchers will usually refuse to sell beef without its bones, selling all parts of the carcass at about the same price. The retail price of low grade beef on the bone is published in the Central Statistics Office series of average retail prices and its maximum retail price as specified in the Kenya Gazette.

#### a. Beef buying in Nairobi

Estimates of the quantity of beef purchased in Nairobi can be obtained from studies of household consumption and from estimates of supplies entering the city. However, the latest published figures showing spending on beef by Nairobi households are from the 1963 survey. The middle income African households surveyed in July 1963 spent Sh 38.50 a month on meat, beef expenditure being about 70 percent of this figure. Thus in 1963 households were spending Sh 26.95 a month on beef and as the price was Sh 3.44/kg of beef with bone, average purchases per household were 7.83 kg a month or 94 kg a year.

Aldington and Wilson (1968) estimated the quantities of beef supplied to Nairobi. We used their figure for 1967 and deducted from it our estimates of the quantities purchased by Asians and Europeans to derive the quantity purchased by African households. Our estimate, in Table II-2, that African households purchased 88.6 kg per household refers to all African households while the figure of 94 kg for 1963 is only for middle income African households whose purchases of beef would probably be higher than the average figure.

**TABLE II-2**

**STRUCTURE OF POPULATION AND BEEF PROCUREMENT : NAIROBI 1967**

	<u>Population estimate</u>	<u>Number of households</u>	<u>Level of beef procurement</u>	<u>Total for Nairobi</u>
African	327,000	83,846	kg with bone 88.6/household = 22.7 kg/head	mt 7,425
Asian	75,000		15 kg/head <sup>(a)</sup>	1,125
European	21,000		50 kg/head <sup>(a)</sup>	1,050
<b>Total</b>	<b>423,000</b>		<b>22.7 kg/head</b>	<b>9,600<sup>(b)</sup></b>

**Notes :**

(a) Derived from retail weights of 12 and 40 kg assuming a carcass yield or retail cuts of 80 percent.

(b) Aldington & Wilson (1968) p.62 and 64.

**b. Other Urban Beef Buying**

The level of beef buying in towns other than Nairobi is probably lower than in Nairobi. This is not only to be expected but may be seen in the analysis of data from Kisumu and Mombasa collected by the 1968/69 Survey (Kenya Statistical Digest 10 No. 2 p.7). Thus it has been assumed that households in Nairobi buy 10 percent more beef than the National average leaving urban African households outside Nairobi buying about 10 percent less than the National average.

**c. Estimates of Household Size**

The next step is to develop data on other parts of the model, specifically on household size, household incomes and beef prices. Household size was recorded in the 1969 census. The average size of households in towns with 2,000 or more people was 4.2 persons, and in Nairobi 4.3 persons. Estimates for other years were constructed by comparing estimates of the population and numbers employed in Nairobi (Table II-3). The notable fall in people per employee since 1970 probably understates the change since then due to the steep rise in the number of people earning a livelihood in ways other than formal employment as shown in data for the Informal sector (Economic Survey 1976 p.39). There has also been a slight fall in the proportion of children in the city and this may be seen in a slower growth in primary school enrolment than in the city's population. We assume that the average consumption of urban households throughout Kenya has been similar to that in Nairobi as shown by the 1969 census.

TABLE II-3

URBAN POPULATION, EMPLOYMENT AND HOUSEHOLD SIZE  
ESTIMATES FOR NAIROBI AND ALL TOWNS 1962-75

N A I R O B I			S I Z E O F A F R I C A N H O U S E H O L D S					
Popu- lation 000 (1)	Empl- ment 000 (2)	People per employee (1) + (2) (3)	N a i r o b i			A l l T o w n s		
			Adults head (4)	Children head (5)	Total head (6)	Number adult equiv. (7)	Total head (8)	Number adult equiv. (9)
1962	267							
1963	293						3.2	2.7
1964	321	149.9	2.1	1.0	3.1	2.6	3.2	2.7
1965	352	150.3						
1966	336	152.3						
1967	423	163.7	2.4	1.5	3.9	3.15	4.0	3.2
1968	464	163.7						
1969	509	163.6	2.8	1.5	4.3	3.55	4.2	3.45
1970	546	164.0	2.9	1.4	4.3	3.60	4.2	3.5
1971	585	178.1						
1972	627	192.3						
1973	673	204.4						
1974	721	227.0	2.8	1.3	4.1	3.45	4.1	3.45
1975	773		2.8	1.3	4.1	3.45	4.1	3.45

Notes :

Col. (1) Population - Annex Table II-1.2

Col. (2) Employment - Annual Enumeration of Employees, reported in the Statistical Abstract.

Col. (4) to (8) Household composition for 1969 from the Census in that year. Figures for other years were estimated.

d. Levels of Household Spending, Urban and Rural

Estimation of changes in levels of spendable income in African urban households poses many problems. None of the accessible statistical series measures changes in urban incomes or urban expenditure. The main methods of estimation that were considered were :

- To divide the 'Private Consumption' figures given in the National accounts between urban and rural populations.
- To use data on wages paid to urban workers, especially those in Nairobi, and deduct an estimate of income taxes paid.

It was considered that use of data on wages paid would ignore the large changes that have occurred in the sources of African urban incomes. Wages, for example, do not take account of earnings from self employment be it through proprietorship

of businesses such as shops or earnings from the activities not covered by the Series on employees' earnings. However, the National Accounting approach required estimates of both resources available for consumption in rural areas and also urban consumption by non-Africans. Yet having made these estimates as detailed in Annex II-2, it was found that the results were in conformity with expert opinion. Furthermore these estimates referred to the same groups of people as were covered by household budget studies and elasticity estimates, namely African urban and rural households. Our approach also takes cognizance of survey findings that a part of rural household income is derived from non-agricultural pursuits. It was not, however, possible to produce independent figures for 1963 so 1964 data was adjusted back to 1963 by the change in earnings from employment.

e. Conversion to Shillings of Constant Value

Deflation of prices and incomes to shillings of constant value or purchasing power is the last step in preparing data for use in the demand model. The middle income index of consumer prices, Nairobi, was examined for this purpose. The series was extended back to 1964 using figures from the Central Bureau of Statistics publication 'New Lower and Middle Income Cost of Living Indices, 1971'. This series was then compared with the series of deflators implicit in the National Accounts data for 'Private Consumption' at constant 1964 prices. It was found that differences between these two series were less than one unit except in 1964 and 1974. The prices of beef and incomes were then adjusted to shillings of constant value using the middle income index of consumer prices - Nairobi, with August 1971 = 100 (Table II-4).

TABLE II-4

MEASURES OF INFLATION AND BEEF PRICES IN CURRENT  
AND CONSTANT VALUE SHILLINGS (Notes next page)

Year	Middle income index of Consumer Prices Aug 1971 = 100	Implicit Deflator for 'Private Consumption'	Beef - Current prices		Beef-Constant Sh 1971 = 100	
			Low grade on bone Sh/kg	Sirloin high grade boneless Sh/kg	Low grade on bone Sh/kg	Sirloin high grade boneless Sh/kg
1963	83.0		3.34	6.75	4.02	8.13
1964	83.8	88.3	3.51	7.28	4.19	8.69
1965	85.0		3.75	8.49	4.41	9.99
1966	88.5		3.97	8.49	4.49	9.59
1967	91.0	91.8	4.56	9.87	5.01	10.85
1968	91.6		4.56	9.87	4.98	10.78
1969	92.6		5.27	10.82	5.69	11.68
1970	94.8	94.8	5.34	11.76	5.63	12.41
1971	100.8	100.0	5.87	11.00	5.80	10.91
1972	105.0	105.4	5.84	11.00	5.56	10.48
1973	118.4	119.4	6.40	12.28	5.40	10.37
1974	134.7	137.0	6.40	12.60	4.75	9.35
1975	159.6		7.23	12.93	4.53	8.10
1976	171.1		7.40	13.88	4.32	8.11

## Sources and Notes

### **Middle Income Index of Consumer Prices**

**Source** : Statistical Abstract and Central Bureau of Statistics.

**Note** : Figures are for December in the year stated.

### **Implicit Deflator**

**Source** : Statistical Abstract : National Accounts, 'Private Consumption' (1964 = 100) as a percentage of the same figures at current prices.

**Beef Prices - Current** : Statistical Abstract : Average retail prices and Gazetted prices for later years.

**Beef at constant prices** : Current prices divided by middle income index of consumer prices.

## 7. Estimating Urban Beef Purchases from the Model

Having developed estimates of the size of urban households, and the levels of spendable incomes and prices in shillings of constant value, we insert them into the model :

$$\log Q = a + 0.4 \log Y + 0.282 \log N - 1.2 \log P$$

The figures used and the resulting estimates of "Q", the quantity of beef likely to be purchased by African urban households, are given in Table II-5. Estimates of purchases derived from the model seem to be in fair conformity with the other figures we have found on urban beef purchasing. The major discrepancy is that the model shows beef buying falling between 1964 and 1967 when most of the other evidence indicates a rise in beef purchases. However, from 1963 to 1967 food prices rose almost twice as fast as other prices and thus the deflated price of beef used might have been too low relative to the prices of foods in 1967.

Alternative figures for deflated beef prices were developed for 1963 and 1964 using the price of food in these years relative to 1967 food prices. The resulting figures, set (b) in Table II-5, results in the figures for beef purchases for households in 1963 and 1964 being slightly below those for 1967.

The estimates of beef purchases by African households of 98 kg for 1974 and 107 kg for 1975 seem in keeping with indications from other sources. Dividing these figures by the number of persons per household of 4.1 in 1974 and 1975 (Table II-3) gives an estimated purchase of beef per person of 26 kg for African urban households in 1975.

We then decided to use this same model for making projections of beef purchases by urban African households in the absence of a better one.

ESTIMATION OF THE AMOUNT OF BEEF PURCHASED BY RURAL HOUSEHOLDS

Year	Log of Year Constant Sh (1971)	Household Income per month (1971)	Household Size Adult equivalents	Price of Beef Sh ('71)/kg	Quantity of beef per household kg	Quantity of beef per household kg (estimated)	Quantity of beef per household kg/person
(1)	(2)	(3)	(4)	(5)	(6)	(7)	
1963	1.4737	482	2.7	4.02 (a) 4.28 (b)	87.6 (a) 81.4 (b)	84.6	27.3 25.4 (b)
1964	1.4737	585	2.7	(4.19 (a) 4.50 (b)	88.1 (a) 80.9 (b)		27.5 25.3 (b)
1967	1.4737	662	3.2	5.01	81.8	81.8	20.45
1970	1.4737	700	3.5	5.63	76.3	..	18.2
1974	1.4737	846	3.45	4.75	98.3	similar	24
1975	1.4737	884	3.45	4.53	107	..	26

**Notes :**

- (a) Results using the deflator in Table II-4.
- (b) Results using the index of food prices.

**Sources :**

- Col. (2) Household income Annex Table II-2.2
- Col. (3) Household size Table II-3, col.(8)
- Col. (4) Table II-4.
- Col. (5) Results from the model.
- Col. (6) Estimates from other sources.
- Col. (7) Col. (5) divided by Table II-3 col. (8).

**8. Rural Demand for Beef**

Even less is known about the beef procurement of rural households than urban households. The three major surveys of rural household budgets are :

1963-1964 Survey of Central Province  
- analysis in Massell (1967) and  
Massell (1972).

1970-1971 Survey of Nyanza - analysis  
in David (1975).

1974 - Integrated Rural Survey.

Of these only Massell's analysis of data from the 1963-1964 survey provides usable estimates of the size of expenditure on meat. In his 1972 paper Massell estimates the elasticity of expenditure on meat with respect to

household expenditure was 1.20 in Central Province in 1963-64. We adopted the lower figure of 1 to take account of the rise in incomes since 1963 and the consequent fall in the effect of further changes in income on beef procurement.

There are no estimates of the effects of changes in beef prices on rural beef procurement. However, price changes are likely to have a larger effect than in towns due to the lower incomes in the country and we have assumed an elasticity of -1.3. But at what price do rural households 'buy' their beef? In his 1972 article Massell uses a subsistence ratio to allow for the price of food to some families being the price at which they sell while for others it is the price at which they buy food. We assumed that the cost of beef procured by the household is somewhat related to the price at which KMC buys standard or third grade beef.

Thus we propose a model of demand for beef by rural households with an income elasticity of 1, a price elasticity of -1.3 and have omitted the effect of household size as it is assumed to be fairly constant.

The model for a rural household may then be written :

$$\log Q' = a + 1.0 \log Y' - 1.3 \log P'$$

where  $Q'$  is the quantity of beef procured by the rural household  
 $Y'$  is the spendable income of the household in shillings of constant value  
 $P'$  is the price paid for beef also in shillings of constant value

Only one survey report was found to show the actual quantities of food consumed. Bohdal, Gibbs and Simmons collected data for only two weeks in various areas, mainly Central Province and Nyanza, over the period 1964-1968, as part of a health and nutrition survey. Data from the Integrated Rural Survey I is too aggregated to show expenditure on beef or even meat but the data seems to be consistent with procurement of beef in the range 5 to 8 kg per person per year.

We have derived estimates of the quantities of beef procured per year using data from our estimates of beef supplies. Our estimate is that overall rural households had about 8.1 kg per person in 1970 and 7.6 kg per person in 1975, and further details on these figures are to be found in Annex Tables II-3.1 and 3.2.

Inspection of data relevant to the model of rural beef procurement in Table II-6, shows that there was very little variation in any of the data over the three years 1967, 1970 and 1975. Further, the estimates are not accurate enough to attach much significance to the small changes seen in the table. Thus it was decided to rely on data from other sources and assume that the model proposed above described the beef procurement by rural households in Kenya.

## RURAL INCOME, BEEF PRICES AND PRODUCTION

	Current Shillings		Shillings 1971=100		Quantity of beef kg/person
	Income per head	Beef Sh/kg	Income per head	Beef Sh/kg	
	(1)	(2)	(3)	(4)	(5)
1967	386	1.18	424	2.78	7.9
1970	392	2.73	414	2.88	8.1
1972	508	3.01	484	2.87	..
1974	594	4.20	441	3.12	..
1975	698	4.74	437	2.97	7.6

Col. (1) Annex Table II-2.2

Col. (2) KMC producer price Standard grade.

Col. (3) : Col. (1) + Urban Middle Income Price Index

Col. (4) : Col. (2) + " " " "

Col. (5) Annex Table II-3.1 and 3.2

### 9. Projection of the Demand for Beef in Kenya to 1990

The models of urban and rural demand are used to project the level of household demand per person to 1990 on various assumptions about the course of incomes and prices. Projections of the population multiplied by the projected demand per person yield the final projections of National demand.

The following two sets of real income assumptions were used.

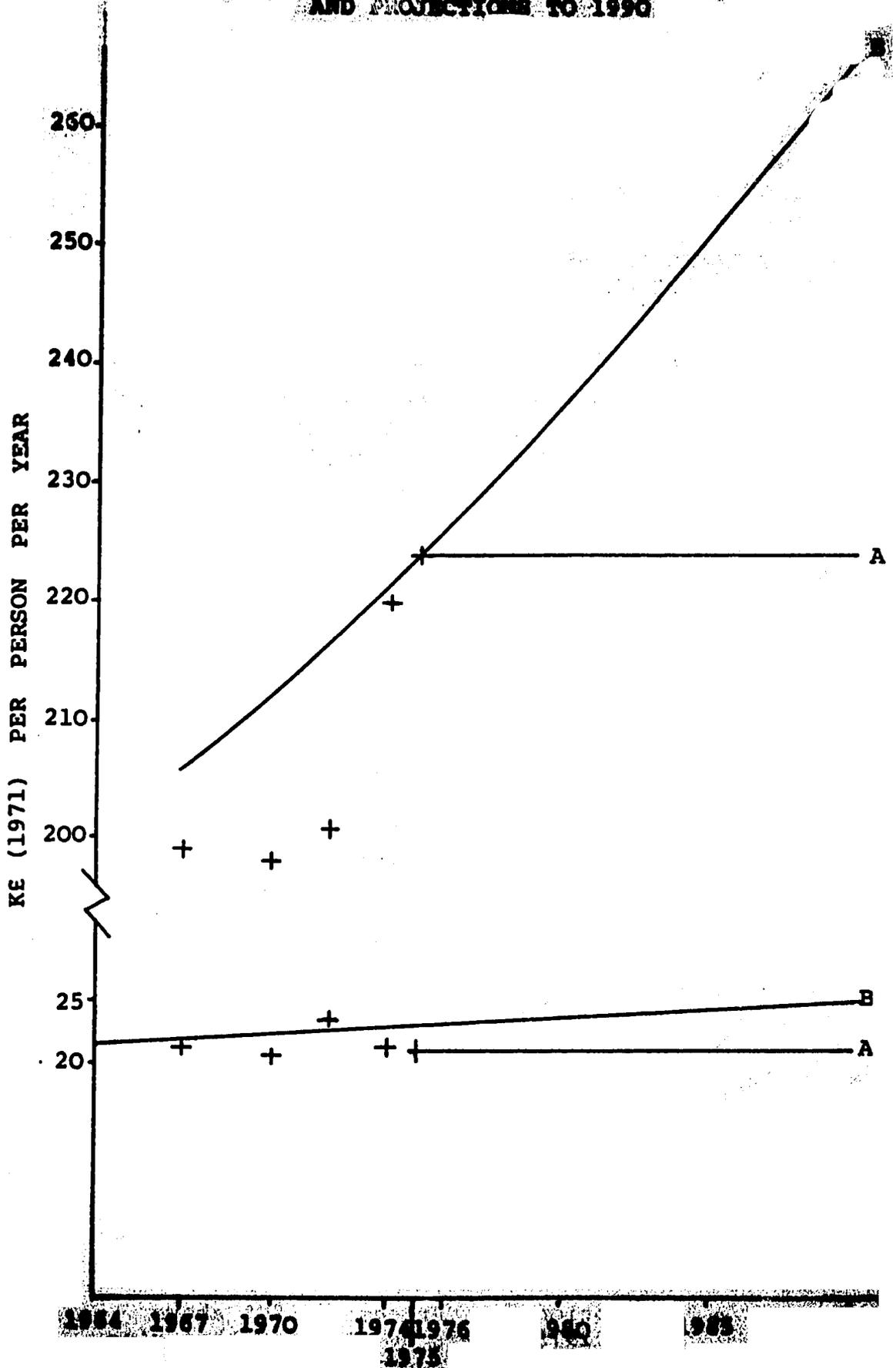
- Assumption A : Incomes per person in 1990 will be the same as those in 1975.
- Assumption B : Incomes will continue increasing at a rate similar to that in the past 10 years or so. Urban incomes were thus assumed to grow at 2 percent a year and rural incomes at 1.15 percent a year.

Annual estimates of urban and rural incomes available for consumption were developed for recent years in Annex II-2 and are shown in Figure II-1 on the following page. The apparently sharp rise in urban incomes between 1972 and 1974 has been considered to be an exceptional shift and has not been projected to recur. Further, if urban incomes were to grow at an even faster rate relative to rural incomes there would be an increase in the flow of rural people into the towns thus reducing the differences between town and country.

The income assumptions and the following...  
of course, stated in terms of...

FIGURE 21-1

RURAL AND URBAN INCOMES 1967-1975  
AND PROJECTIONS TO 1990



However, if inflation continues at, say, an annual rate of 5 percent then it is assumed that money incomes and prices would increase at 5 percent a year in addition to the 'real' changes assumed for the projections. Table II-7 shows the assumptions in terms of 1975 shillings. The greater realism of using shillings at 1975 values was, however, achieved at the cost of introducing a set of figures that appear to differ from data in other tables where shillings of constant value referred to their value in 1971, as for example Tables II-5 and II-6.

TABLE II-7

ASSUMED INCOMES AND PRICES (IN 1975 SHILLINGS)  
AND BEEF DEMAND PER PERSON FOR 1990  
Kg per person

BEEF PRICE ASSUMPTIONS IN SHILLINGS OF CONSTANT VALUE

Income Assumptions	Assumption	Assumption	Assumption
	1	2	3
	No change in prices	Price rise 20% plus	Price rise 20% over 4 yrs then 1% a year
<u>Rural</u>	Sh 4.85/kg	Sh 5.95/kg	Sh 6.64/kg
A. No change Sh 700 per year	7.4 kg	5.7 kg	4.9 kg
B. Increase at 1.15% a year to Sh 840 a year	8.9 kg	6.8 kg	5.9 kg
<u>Urban</u>	Sh 7.40/kg	Sh 8.85/kg	Sh 9.75/kg
A. No change Sh 4,120 per year	25.9 kg	20.7 kg	18.5 kg
B. Increase at 2% a year to Sh 5,540 a year	29.0 kg	23.4 kg	21.0 kg

The following three sets of price assumptions were used :

- Assumption 1 : Prices unchanged from 1975.
- Assumption 2 : Prices rise by 20% to 1990.
- Assumption 3 : Prices are 20% above their 1975 levels by 1980 and then rise at one percent a year to 1990.

The importance of the assumed price change is very evident in its effects on the level of demand per person. Thus the 20 percent price rise nullifies the effect of rising incomes on the demand for beef even though rural incomes are projected to rise 20 percent between 1975 and 1990 and urban incomes to rise 34 percent by 1990.

The overall rate of growth of Kenya's population was assumed to be 3.5 percent as agreed at the First Panel. The resulting population projections, given in detail in Annex II-1, were multiplied by figures of demand per person in Table II-7 to give the projection of total demand for beef in Table II-8.

TABLE II-8

PROJECTED DEMAND FOR BEEF IN 1990  
WITH A POPULATION GROWTH OF 3.5 PERCENT

Income Assumptions		Price Assumptions		
		1 No Change	2 Price rise 20% approx.	3 Price rise 1% plus 20% p.a. from 1980
Procurement		000 m.t.		
A.				
No change	Rural	136	104	90
	Urban (a)	112	90	80
	Total	248	194	170
B.				
Increasing incomes	Rural	163	125	108
	Urban (a)	125	101	91
	Total	288	226	199

(a) Projected requirements of African households plus 1,000 mt for non-African households and 1,000 mt for Tourists.

Population growth, and its especially rapid increase in urban areas, leads to a projected demand of 248,000 tons of beef by 1990, nearly double the 1975 figure of 131,000 tons. The assumed increases in incomes adds a further 40,000 tons to give a projected demand of 288,000 tons (B.1) - a percentage rise of 120 percent over 1975. Then if prices were to rise by 20 percent from their 1975 level in shillings of constant value, the projected demand would be reduced to 226,000 tons (B.2), 70 percent higher than in 1975. If there were to be an additional price rise of one percent a year from 1980 to 1990 making 31 percent in all, a demand of 199,000 tons is projected (B.3), still 52 percent higher than in 1975.

We examined the effects on the projection of a different rate of population growth. Instead of the middle of the range rate of growth of 3.5 percent used in Table II-8, we took a figure of 3.8 percent a year being at the high end of the range of likely rates of population growth. The results are

assuming a population growth of 1.5 percent... Table II-9. The increased population is assumed to have the lower level of beef procurement found in rural areas rather than the urban rate. On these assumptions the higher rate of population growth raises the projected demand by 4,000 tons.

TABLE II-9

PROJECTED DEMAND FOR BEEF IN 1990  
WITH A POPULATION GROWTH OF 3.8 PERCENT

Income Assumptions	Procurement	Price Assumptions		
		1 No Change	2 Price rise 20% approx.	3 Price rise 20% plus 1% p.a. from 1980
		000 m.t.		
A. No change	Rural	143	110	95
	Urban	110	88	78
	Total	253	198	73
B. Increasing incomes	Rural	172	131	114
	Urban	123	99	89
	Total	295	230	203

10. Sheep and Goat Meat

Closely associated with the market for beef is that for sheep and goat meat. Not only do these animals compete with cattle for the same forage but they are usually considered to be in competition with beef in meat markets. Thus if only beef prices rise, more sheep and goat meat will be sold.

At present the amount of sheep and goat meat and offals bought in towns is much smaller than the amount of beef purchased. Due to its minor importance, relative to beef, expenditure on these meats has not been stated separately in household expenditure surveys. However, sheep and goats provide considerable quantities of meat and offals, notably in the rural areas as shown by Table II-10.

TABLE II-10

**SUMMARY OF BEEF, SHEEP AND GOAT PROCUREMENT  
PER PERSON 1970 and 1975**

	1970			1975		
	Beef	Sheep and goat meat and offal	Total	Beef	Sheep and goat meat and offal	Total
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Rural populations</u>	k g. p e r p e r s o n					
<b>Range Regions</b>						
Northern	5.6	13.1	18.7	3.7	13.1	16.8
Southern	22.1	6.0	28.1	8.0	10.2	18.2
<b>Total Range R</b>	<b>9.4</b>	<b>11.3</b>	<b>20.7</b>	<b>5.6</b>	<b>12.4</b>	<b>18.0</b>
<b>Small Farm R</b>						
Coastal	6.3	1.9	8.2	3.4	3.5	6.9
Eastern	5.4	3.5	8.9	4.7	5.3	10.0
Central P	6.3	1.8	8.1	7.3	2.4	9.7
Rift A	8.3	4.2	12.5	9.8	5.0	14.8
Nyanza P	7.2	1.6	8.8	10.1	3.6	13.7
Western P	12.6	0.4	13.0	8.9	1.1	10.0
<b>Total Small Farm Regions</b>	<b>7.5</b>	<b>2.2</b>	<b>9.7</b>	<b>7.7</b>	<b>3.6</b>	<b>11.3</b>
<b>Large Farm R</b>	<b>14.7</b>	<b>3.8</b>	<b>18.5</b>	<b>9.9</b>	<b>9.2</b>	<b>19.1</b>
<b>Total Rural Regions</b>	<b>8.1</b>	<b>3.1</b>	<b>11.2</b>	<b>7.6</b>	<b>4.6</b>	<b>12.2</b>
<u>Urban populations of :</u>						
Nairobi	20.0	8.3	28.3	28.6	5.8	34.4
Mombasa	16.1	8.3	24.4	17.6	5.8	23.4
<b>National Rural and Urban</b>	<b>9.1</b>	<b>3.6</b>	<b>12.7</b>	<b>9.8</b>	<b>4.7</b>	<b>14.5</b>

Sources : Annex Tables II-3.1 to 3.4

Table II-10 shows that the per capita procurement of sheep and goat meat in the range areas exceeds that of beef, and in the Northern Range Region exceeds it by a wide margin. In other areas, beef procurement greatly exceeds that of sheep and goat meat. Still, in the small farm areas, sheep and goat meat appear to be quite important, and possibly rural procurement of sheep and goat meat in these areas can be said to release beef for the urban areas. An examination of the figures for 1970 against 1975 suggests that, in 1970, sheep and goat meat partially filled the gap caused by the below production of beef in that year, especially in the urban

It is to be expected that the demand for sheep and goat meat of sheep and goats will increase in parallel with the projected increases in demand for beef as shown in Table II-3. Thus, the demand for sheep and goat meat would be 107,000 tons in 1990, based on stable incomes. However, should the price of sheep and goat meat increase less than that of beef, then demand for these meats will certainly rise faster than the demand for beef.

To illustrate, in Table II-11 we have shown what might happen if the real price of sheep and goat meat remained stable and the price of beef increased at, say, 20 percent or, alternatively, 20 percent by 1980 and one percent per year thereafter until 1990. On the assumption that half of the price induced reduction in demand for beef would be made up by demand for sheep and goat meat, we show a sharply higher potential demand for sheep and goat meat and offals.

TABLE II-11

PROJECTED DEMAND FOR BEEF, SHEEP AND GOAT MEAT, 1990  
 Assuming Population Increase at 3.5 percent  
 No change in Real Incomes  
 Various Beef Price Assumptions  
 000 m.t.

	Beef Price Assumptions		
	1	2	3
	No change	Price rise 20% approx.	Price rise 20% plus 1% p.a. from 1980
<b>Rural</b>			
Beef	136	104	90
Sheep and Goat (meat and offals)	82	98	105
<b>Urban</b>			
Beef	112	90	80
Sheep and Goat (meat and offals)	25	36	41
<b>Total</b>			
Beef	248	194	170
Sheep and Goat (meat and offals)	107	134	146

Notes :

Col. 1 Sheep and goat meat and offals increasing from level in Table II-3.4 by same rate as beef.

Col. 2, 3. Demand for sheep and goat meat increases by 50% of the reduction in demand for beef because of price rise of beef.

On the other hand, should the price of sheep and goat meat increase in parallel with the price of beef, and the demand can be assumed to increase in parallel, but, of course, at a lower level. If, for example, the price of sheep and goat meat increased 20 percent, as assumed in column 2 of Table II-8, the demand for sheep and goat meat in 1990 would be about 84,000 tons.

## 2. Export Demand

We have reviewed a number of projections of production, consumption and net trade projections for countries in Africa, the Middle East, Europe and elsewhere and, based on these projections and other information, prepared projections to 1990. They indicate large net import requirements for beef and veal, and extremely large import requirements for mutton, lamb and goat meat, in the countries covered. As the countries covered are all potential export markets for Kenya, we can only conclude that there is more than ample export opportunity for Kenya if the surplus production is available. This is in spite of the fact that other countries will provide strong competition.

### 1. World Meat Market Trends

World beef prices are influenced by complicated interrelationships of many factors, including a self-perpetuating tendency for cyclical deviations from the overall trend in beef cattle numbers, volumes and prices.

Production decisions tend to be made on the basis of current prices, other things being equal, and the result is area-wide or world-wide cattle inventory growth and liquidation cycles. It takes several years for production decisions to result in an increased supply of mature, slaughter-ready animals. A down-turn in livestock numbers can, of course, be accomplished more quickly.

An analytical review of cattle cycles in major production areas of the world <sup>1</sup>. brings out the following information and possibilities :

- From 1960 through 1974, cattle numbers (in North America, Western Europe, Latin America and Oceania) increased by about one-third, along with an ever greater increase in tonnage of beef and veal produced. The increase was spurred along by good prices as a result of exceptionally strong demand through most of that time.
- For the first time since the 1950's, cattle numbers cycles in these areas were in phase with each other, all on the upswing together. In 1974-1976, cyclical production peaks were reached in the main beef exporting and importing countries.

1. FAO, Cyclical Problems in World Production and Trade in Beef and Veal : Possibilities of Ameliorative Action. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 75/4. July 1975.

- As early as the middle of 1973, as a result, the profit picture was beginning to change, not only due to larger beef supplies, but also to the rapid and large increases in feed and other input prices, general economic slowdown of most economies, and other factors.
- The world beef outlook is for some price recovery in 1977 and continuing for a few years. World cattle numbers are expected to start down, and stepped-up buying by most of the usual beef markets, including Japan, the Soviet Union etc., is expected. However, by 1985 or so, world cattle numbers may again be at cyclical peaks, with price problems similar to those of 1974 and 1975.

## 2. Major Areas of Interest to Kenya

Over the past several years, Kenya, through the Kenya Meat Commission, has exported meat, especially beef, to a large number of countries. The amounts have varied widely, as well, but the widespread nature of the marketing indicates that a large number of countries are of potential interest to Kenya. We have therefore provided data and projections on a large number of countries. The risks inherent in making projections of meat supply, demand and trade in individual countries for a product as volatile as meat are obvious. Even allowing for large errors, we believe that the projections given here show a very large potential market, in spite of strong competition from other countries.

### a. Past Export Patterns

Before moving to a discussion of potential future export markets, it may be of interest to provide and discuss data on past exports by country. Table II-12A gives data on KMC exports of beef and veal from 1972 through 1975 with estimates by the Marketing Manager for KMC provided for 1976. We provide a few comments following Table II-12A. The subsequent tables, numbered Tables II-12B through G, provide single year data on exports of a number of other meat exports taken from the Annual Trade Report of Tanzania, Uganda and Kenya, East African Community, for the appropriate year. Tables II- H and I give data on the very small KMC exports of mutton and lamb meat in 1974 and 1975. Finally, because hide and skin exports, which derive largely from livestock, represent higher export earnings than meat, we have included one year figures in Table II-12J.

Data on fresh, chilled and frozen beef and veal have been given in considerable detail in Table II-12A, because this has been and probably will be the most important category of meat exports for Kenya in terms of tonnage (around 3,500 tons per

TABLE XI-12A

REPORTS OF MEAT OF BOVINE ANIMALS (BEEF, VEAL) FRESH,  
CHILLED, OR FROZEN, KENYA MEAT COMMISSION, 1972 TO 1976,  
BY COUNTRY OF DESTINATION - METRIC TONS

	1972	1973	1974	1975	1976
Abu Dhabi	-	-	6	53	55
Bahrain	3.9	4.9	-	-	15
Burundi	63.9	54.2	49	53	52
Ethiopia	.4	.6	-	-	-
France	73.5	-	-	-	-
Djibouti	-	-	57	329	625
Germany W	45.9	27.8	-	-	-
Ghana	8.0	6.9	-	12	1
Greece	-	1,273.7	1,091	592	80
Holland	576.7	10.8	6	-	-
Hong Kong	593.6	105.6	180	118	120
India	5.9	-	2	-	-
Ivory Coast	-	-	-	-	6
Kuwait	.3	1.5	45	21	100
Lebanon	-	84.2	-	-	-
Liberia	-	-	-	-	1
Libya	1,297.1	1,024.0	1,203	1,359	340
Mauritius	8.1	10.0	-	-	-
Nigeria	4.4	6.1	-	9	84
Qatar	-	-	-	44	120
Rwanda	2.5	2.8	-	-	-
Saudi Arabia	93.4	.3	-	-	10
Seychelles	5.6	25.2	15	2	26
South Yemen	13.9	-	10	42	1,820
Switzerland	4.2	54.4	82	9	79
Tunisia	-	-	118	-	150
United Kingdom	6.3	-	-	-	-
Zaire	530.2	127.7	-	829	264
Zambia	-	360.8	220	-	2
Other African	64.8	186.9	na	na	na
Other Foreign	53.7	96.8	na	na	na
Aircraft/Ship Stores	85.4	101.5	na	na	na
<b>Total</b>	<b>3,541.7</b>	<b>3,566.7</b>	<b>3,084</b>	<b>3,472</b>	<b>na</b>

Source : 1972 and 1973. East African Community. Annual Trade Report of Tanzania, Uganda and Kenya (for the year indicated; ended 31st December). E. African Customs & Excise Department.

1974 and 1975. Material on KMC Export Sales of Fresh, Chilled, or Frozen Beef and Veal, prepared by KMC.

1976. KMC Marketing Manager, personal file.

year) and revenues (around Ksh 30 million per year). Below are comments on certain entries in Table II-12A obtained in discussions with KMC marketing personnel. They are included because they add flavor to the statistics and throw some light on current status of KMC export marketing, which is discussed in much more detail in subsequent sections of the report.

#### Comments on Table II-12A

- KMC's Marketing Manager states that KMC can now sell frozen beef to Austria and Switzerland. Shipment to Switzerland has stopped, but may be resumed.
- Shipments to Greece have diminished, but discussions in late December 1976 may revive them.
- Ivory Coast was a new market (in 1976).
- Liberia -- new market in 1976 -- Ministry of Agriculture wanted to see a sample.
- Shipments to Libya stopped in April 1976, because :
  - Libya found a cheaper source, according to KMC.
  - Payment took 3 to 4 months -- "through a New York bank and around and about".
  - Libya claimed lack of confidence in the genuineness of KMC Moslem slaughter ritual certification.
- KMC states that, "Any time we want to take the kind of price they are willing to pay, we can go back with Libya."
- Regarding Nigeria's 50 percent duty on meat, the Marketing Manager states that the Nigerian State Trading Company, which imports meat, is subsidised to cover that. KMC is now sending 7 tons a month by air to Nigeria.
- To Qatar, a 39-ton plane is used. It is a problem getting the big plane but KMC is now "... very very out for Qatar and hopes to sell 40 tons per week of FAQ and Choice sides."
- Shipments to Zaire stopped in March 1976 and will resume when Zaire has money.
- South Yemen has made up for the loss of Libya.

1973 EXPORTS OF CHOCOLATE (013 800)

<u>Destination</u>	<u>Quintals</u>	<u>Ksh</u>
Germany W	505	837,099
Sudan	1	504
Switzerland	1	1,121
United Kingdom	19,115	29,301,307
Zambia	367	503,250
Other Foreign	31	35,097
Aircraft & Ships' Stores	15	14,626
<b>Total</b>	<b>20,035</b>	<b>30,693,375</b>

TABLE II-12C

1973 EXPORTS OF OTHER PREPARED OR PRESERVED MEAT (013 809)

<u>Destination</u>	<u>Quintals</u>	<u>Ksh</u>
<b>Total</b> (Almost all to U.K.)	<b>54</b>	<b>121,028</b>

TABLE II-12D

1973 EXPORTS OF MEAT EXTRACTS & ESSENCES (013 301)

<u>Destination</u>	<u>Quintals</u>	<u>Ksh</u>
Germany W	20	110,250
Italy	370	2,140,970
Netherlands	140	1,094,503
Switzerland	230	1,598,563
United Kingdom	360	2,392,991
<b>Total</b>	<b>1,120</b>	<b>7,337,277</b>

1973 EXPORTS OF MEAT, BONE, OFFAL AND  
MEAT (DRIED, SALTED) (012 101)

<u>Destination</u>	<u>Quintals</u>	<u>Ksh</u>
Bahrain	298	376,973
Congo-Saire	191	105,174
Eire	24	22,712
Ethiopia	14	17,391
Ghana	5	5,925
India	14	17,116
Kuwait	21	30,171
Mauritius	342	336,779
Pakistan	2	1,997
Rwanda	1	804
Seychelles	154	157,652
Somalia	3	5,296
Southern Yemen	219	156,378
Sudan	4	2,890
Zambia	1,508	1,342,105
Other Foreign	522	697,114
Aircraft & Ships' Stores	92	101,590
<b>Total</b>	<b>3,414</b>	<b>3,379,067</b>

TABLE II-12F

1973 EXPORTS OF MEAT OF SWINE (PORK) (001 300)

<u>Destination</u>	<u>Quintals</u>	<u>Ksh</u>
Burundi	4	6,707
Congo-Zaire	125	70,170
Ethiopia	6	4,949
Ghana	3	4,449
India	16	13,800
Nigeria	13	15,732
Rwanda	8	11,889
Seychelles	9	10,495
Somalia	2	2,950
Sudan	3	5,408
Zambia	1	822
Aircraft & Ships' Stores	291	260,633
<b>Total</b>	<b>481</b>	<b>408,004</b>

TABLE II-124

1973 EXPORTS OF OTHER MEAT PRODUCTS,  
POULTRY, KILLED OR DRESSED (O11 400)

Exports went to more than 10 foreign countries. Total weight was 521 Quintals at Ksh 541,361.

Biggest outlet : Aircraft & Ships' Stores : 361 Quintals at Ksh 329,140. Next was Zambia with 64 Quintals at Ksh 111,225.

EDIBLE OFFALS (O11 600)

Exports exceeded quantity and value of meat of sheep and goats or pork. They were :

Total : 818 Q worth Ksh 463,277.  
Mostly to Zambia (409 Q at Ksh 165,582)  
and Hong Kong (153 Q at Ksh 23,222)  
and Ship/Plane Stores (189 Q at Ksh 122,803)

LIVE CATTLE \* (001 100)

<u>Destination</u>	<u>Quantity</u>	<u>Ksh</u>
Burundi	26	40,000
Congo-Zaire	6	29,995
Somalia	10	20,000
South Yemen	500	478,750
<b>Total</b>	<b>542</b>	<b>568,745</b>

\* Exports of other live animals much smaller.

TABLE II-12I  
1974 EXPORTS OF KMC MUTTON/LAMB MEAT

<u>Destination</u>		<u>Tons</u>	<u>Ksh</u>
Libya	Lamb	10	110,002
	Mutton	.15	1,947
Burundi	Lamb	.38	4,566
Yemen	Lamb	.54	5,751
Tunisia	Lamb	10	99,089
Djibouti	Lamb	3	30,013
<b>Total</b>		<b>24.07</b>	<b>251,368</b>

Source : KMC.

TABLE II-12I

1975 EXPORTS OF KMC MUTTON/LAMB MEAT

<u>Destination</u>		<u>Tons</u>	<u>Ksh</u>
Yemen	Lamb	2	15,801
Zaire	Lamb	11	117,947
Djibouti	Lamb	15	169,398
Libya	Lamb	36	471,305
Zaire	Mutton	1	9,461
Burundi	Lamb	1	12,706
Abu Dhabi	Lamb	31	284,024
	Mutton	12	123,805
<b>Total</b>		<b>96</b>	<b>1,204,447</b>

Source : KMC.

**TABLE 11-117****1973 EXPORTS OF HIDES AND SKINS**

	<u>No.</u>	<u>Quintals</u>	<u>Ksh 000</u>
Dried bovine and equine hides and skins (211 101)	812,489	35,064	37,745
Wet salted bovine and equine hides and skins (211 103)	57,403	9,191	4,263
Wet blue chrome bovine and equine hides and skins (211 104)	84,820	5,638	6,972
Wet salted calf and kip skins (211 202)	2,072	23	30
Dried goat and kid skins (211 401)	969,555	5,357	14,149
Pickled goat and kid skins (211 402)	6,000	41	94
Wet blue chrome goat and kid skins (211 403)	1,404,669	11,538	18,862
Sheep and lamb skins with wool on (211 600)	85,689	1,617	744
Sheep and lamb skins without wool - dried (211 701)	481,900	3,475	6,057
Sheep and lamb skins without wool - pickled (211 702)	72,837	318	548
Sheep and lamb skins without wool - wet blue chrome (211 703)	705,507	3,702	6,658
Total value			<u>96,122</u>

Source : Annual Trade Reports 1973, E.A. Customs & Excise Department.

**b. Future Meat Requirements in Areas of Interest to Kenya**

The sections to follow contain brief summaries of, and comments on, various forecasts and projections of possible future meat production and consumption for certain, mostly meat-deficit areas and countries of interest to Kenya.

The data, projections and forecasts given in these sections are based mainly on information provided by the FAO in a variety of reports and publications studied. Other sources were also used, as noted. It should be stated that the methodologies and assumptions behind the material used were not uniform and varying forecasts for the same items are available to anyone who reviews a variety of sources.

Actual developments, such as changes in agricultural policy, unforeseen economic developments, and even weather, will inevitably differ from those assumed. Hopefully, the projections indicate directions and orders of magnitude that can be helpful in picking target markets where developments can be closely watched, and specific market opportunities explored. The projections also make clear that there should be an adequate and growing market for Kenya if it can be exploited.

**(1) Africa as a Whole (Except Southern Africa)**

Before dealing with the projections for individual African countries, it may be of interest to examine the projections of the FAO Intergovernmental Group on Meat for Africa as a whole. The FAO Group projected (in 1974) that Africa as a whole, except Southern Africa, would be a net exporter of beef and veal in 1980, and a net importer of lamb and mutton. Eastern Africa would be a net exporter of both categories. The data, including our extrapolations to 1990, are given in Tables II-13A and E.

SELECTED AREAS OF AFRICA, BEEF AND VEAL, PRODUCTION  
AND CONSUMPTION (1969-71), AND PROPOSED PRODUCTION,  
CONSUMPTION AND RESIDUAL NET TRADE (1980)\*, ESTIMATED  
BY THE SAME RATE OF CHANGE TO 1990

<u>Area and item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 m.t. carcass equivalent)		
<b>North-Western Africa</b>			
Production	133	198	295
Net Trade	13	14	13
Consumption	146	212	308
<b>Western Africa</b>			
Production	396	620	971
Net Trade	8	- 5	- 35
Consumption	404	615	936
<b>Central Africa</b>			
Production	151	200	264
Net Trade	- 30	- 27	- 17
Consumption	121	173	247
<b>Eastern Africa</b>			
Production	929	1,393	2,088
Net Trade	- 58	- 99	- 166
Consumption	871	1,294	1,922
<b>Near East in Africa</b>			
Production	339	506	755
Net Trade	25	31	37
Consumption	364	537	792
<b>Total</b>			
Production	1,948	2,917	4,373
Net Trade	- 42	- 86	- 168
Consumption	1,906	2,831	4,205

\* FAO. Review of FAO Meat Production and Demand Projections to 1980. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 74/3. July 1974.

SELECTED AREAS OF AFRICA: HUTTON AND LAMB, PRODUCTION AND CONSUMPTION (1969-71), AND PROJECTED PRODUCTION, CONSUMPTION AND RESIDUAL NET TRADE (1980)\*, EXTENDED BY THE SAME RATE OF CHANGE TO 1990

<u>Area and item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	<u>('000 m.t. carcass equivalent)</u>		
<b>North-Western Africa</b>			
Production	156	228	333
Net Trade	-	-	-
Consumption	156	228	333
<b>Western Africa</b>			
Production	232	330	469
Net Trade	- 1	20	61
Consumption	231	350	530
<b>Central Africa</b>			
Production	31	45	65
Net Trade	- 4	- 5	- 6
Consumption	27	40	59
<b>Eastern Africa</b>			
Production	243	355	519
Net Trade	- 15	- 17	- 18
Consumption	228	338	501
<b>Near East in Africa</b>			
Production	132	189	270
Net Trade	13	31	64
Consumption	145	220	334
<b>Total</b>			
Production	794	1,147	1,656
Net Trade	- 7	29	101
Consumption	787	1,176	1,757

\* FAO. Review of FAO Meat Production and Demand Projections to 1980. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 74/3. July 1974.

(2) East Africa as a Whole

Using data from another international source, which is provisional and therefore not quotable at this time, we find the same trend for East Africa as in the previous tables taken from the Intergovernmental Group on Meat, with the difference found in the magnitude of the regional export surplus at each period. Interestingly, in this projection, Kenya is one of only two regional countries which is projected to shift from a net export position to a net import position during the 1980-90 period. Note, however, that Chemonics' own projections of supply for Kenya presented in Chapter III are based on much more detailed assumptions and calculations. Still, it is interesting to review how one authority sees Kenya in the big picture. Tables II-14A and B provide the derived data.

TABLE II-14A

**EAST AFRICA : BEEF AND VEAL PRODUCTION, CONSUMPTION  
AND RESIDUAL NET TRADE PROJECTIONS FOR 1980 AND 1985\*  
EXTENDED BY THE SAME RATE OF CHANGE TO 1990**

<u>Country and Item</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
	('000 m.t. carcass equivalent)		
<b>Ethiopia</b>			
Production	254	296	345
Net Trade	23	23	22
Consumption	277	319	367
<b>Kenya</b>			
Production	187	229	280
Net Trade	- 9	10	40
Consumption	178	239	320
<b>Malagasy Rep.</b>			
Production	172	211	259
Net Trade	- 86	- 127	- 177
Consumption	86	84	82
<b>Somalia</b>			
Production	33	36	39
Net Trade	- 17	- 18	- 19
Consumption	16	18	20
<b>Sudan</b>			
Production	281	392	547
Net Trade	- 125	- 241	- 395
Consumption	156	151	146
<b>Tanzania</b>			
Production	157	177	200
Net Trade	- 22	- 31	- 42
Consumption	135	146	158
<b>Total</b>			
Production	1,084	1,341	1,670
Net Trade	- 236	- 384	- 577
Consumption	848	957	1,093

\* Derived from unpublished IBRD projections and unpublished  
estimates. (Excludes Uganda.)

TABLE 11-102

**EAST AFRICA : SHEEP AND GOAT MEAT PRODUCTION,  
CONSUMPTION AND RESIDUAL NET TRADE PROJECTIONS  
FOR 1980 and 1985\* EXTENDED BY THE SAME RATE  
OF CHANGE TO 1990**

<u>Country and item</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
	('000 m.t. carcass equivalent)		
<b>Ethiopia</b>			
Production	140	162	187
Net Trade	- 24	- 20	- 13
Consumption	116	142	174
<b>Kenya</b>			
Production	17	15	13
Net Trade	15	25	37
Consumption	32	40	50
<b>Malagasy Rep.</b>			
Production	8	11	15
Net Trade	- 4	- 7	- 11
Consumption	4	4	4
<b>Somalia</b>			
Production	33	34	35
Net Trade	- 14	- 13	- 12
Consumption	19	21	23
<b>Sudan</b>			
Production	107	143	191
Net Trade	- 12	- 34	- 66
Consumption	95	109	125
<b>Tanzania</b>			
Production	29	29	29
Net Trade	10	13	16
Consumption	39	42	45
<b>Total</b>			
Production	334	394	470
Net Trade	- 29	- 36	- 49
Consumption	305	358	421

\* Derived from unpublished IBRD projections and unpublished FAO estimates. (Excludes Uganda.)

(3) Selected Countries in Africa

Using material from various sources, especially FAO's Intergovernmental Group on Meat, we have provided analysis on several individual African countries. Nigeria is given extensive attention because it is a very large actual and potential market because of its huge population, its oil-fired, booming economy and its apparent difficulty in feeding itself. We also provide some data and discussion on Zaire, Uganda and Egypt. For interest and contrast, data on Kenya from some of the same sources is also provided.

(a) Nigeria

Nigeria is an economic giant whose gross national product is equal to all the rest of black Africa combined. While the country's recent spending spree may lead to a tapering off of the rate of increase of imports, the oil-fed boom continues.

The Intergovernmental Group on Meat <sup>1</sup>. projects that Nigeria's total demand for beef and veal, mutton and lamb, pig meat and poultry will each about double by 1980 over 1968/69. The report does not give production estimates, but does say, "... at the present rate of growth in food supplies, Nigeria will not be able to meet its domestic requirements. Major production improvements or imports will be necessary to improve or even to maintain the present level of meat consumption." The report comments on the lack of reliable data for use in making supply projections.

Chemonics has attempted to make projections of production, consumption and import requirements for Nigeria to 1990, based on the data provided by the Intergovernmental Group on Meat and other sources. Figure II-2 A has been prepared to show the possibilities.

This figure contains two arbitrary supply (production) projections for Nigeria to 1990, one assuming a 50 percent increase in production, from 173,000 tons in the 1968/69 base period to 260,000 tons in 1990, and one assuming a 100 percent increase -- to 346,000 tons. We would expect even the former to be optimistic from Nigeria's point of view.

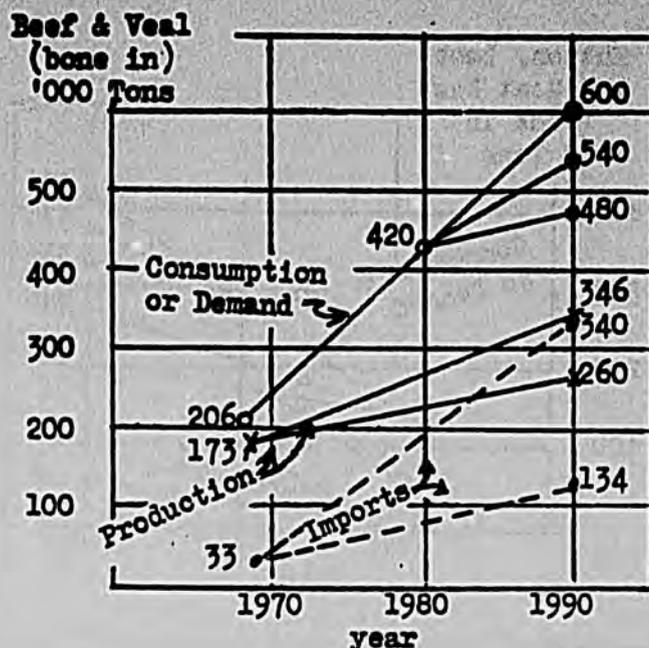
The demand projection for 1980 is 420,000 tons. Extending the 206,500 tons (1968/69) through 1980's projected 420,000 tons, and on to 1990 would give about 600,000 tons "projected" demand. Reducing this latter figure by 10 percent, and also by 20 percent (see figure) results in a possible 1990 demand for beef and veal in Nigeria of from 480,000 to 540,000 tons.

The figures just mentioned should be referred to as possibilities perhaps, rather than projections. However, when the highest production "possibility" is subtracted from the lowest "demand" possibility (480,000 tons, minus 346,000 tons) one can easily foresee beef and veal import possibilities of 134,000 tons, or 4 times the 1968/69 amount (of 33,000 tons) by the year 1990.

1. FAO Summary of Selected National Meat Production and Demand Studies and Comments on the FAO Meat Production and Demand Projections to 1980. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 75/3. August 1975.

FIGURE II-2A

**NIGERIA: BEEF AND VEAL PRODUCTION, CONSUMPTION, AND NET TRADE (IMPORTS) 1968-69; 1980 DEMAND PROJECTIONS (REF 1) AND ALTERNATIVE POSSIBILITIES FOR THE YEAR 1990.**



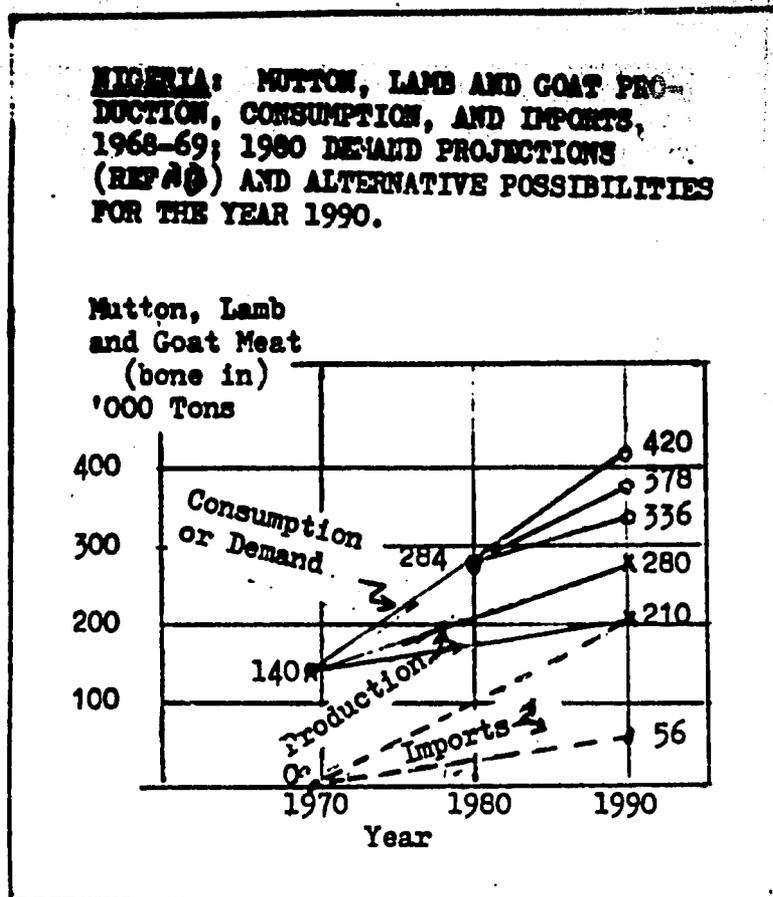
The beef and veal per capita demand projected for Nigeria by the Intergovernmental Group on Meat was only 4.8 kg/year for 1980. It is likely that the people would demand that the government allow more beef imports than that, considering the country's oil revenue.

It is quite possible that the other assumption about 1990 consumption (600,000 tons) and production (260,000 tons) is closer to the mark, and that the country could be importing 340,000 tons of beef and veal -- or more -- by 1990.

KMC has made small shipments of chilled/frozen beef to Nigeria off and on during recent years (see Table II-12A) and is now working hard to get a better foothold in that market. While small, 1976 shipments are far above previous years, and efforts are being made to expand the present 7-tons-per-month volume rate.

With regard to mutton, lamb and goat meat trade with Nigeria, Figure II-2B has been prepared, based on calculations similar to those for beef and veal. Net trade would go from the zero balance of 1968/69 to imports of 20,000 tons by 1990.

FIGURE II-2B



210 thousand tons by 1990 assuming data from the Intergovernmental Group on Meat and assuming the alternative production and consumption percentage increases used in the beef and veal example.

Nigeria is also quite likely to require significant imports of pig meat and poultry. Again, using the basic projections of the Intergovernmental Group on Meat, we can say that should Nigerian production increase by 50 percent between 1968/69 and 1990, by 1990 the Country would need to import 28,300 tons of pig meat. In the case of poultry, should projected increases in consumption take place to 1990, and should 1968/69 production increase by 50 percent during the period, required imports would be about 112,000 tons.

Summing up the Nigerian market situation, the Country is quite likely to be a major importer of beef and veal, mutton, lamb and goat meat over the years. It may also be a significant importer of pig meat and poultry, but the Country is better able to expand production of these items than the other animals, so the projections must be treated lightly.

(b) Zaire

Zaire has been a significant market for Kenya in the past, with over 800 tons shipped in 1975. The Country currently has serious payment difficulties, mostly because of the current fall in the price of copper. It should be a good potential market for the future. Unfortunately, none of the material gathered for this study provides a basis for specific projections.

(c) Uganda

Uganda is also experiencing severe payment problems, but, according to data from the Inter-governmental Group on Meat, projected to 1990 for this study, should offer a large market for the future.

Meat (mostly beef) production and demand projections are shown below for Uganda, along with estimates of 1970 production, net trade and total consumption.

TABLE II-15

UGANDA : MEAT (MOSTLY BEEF) PRODUCTION, TRADE AND CONSUMPTION IN 1970, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE

<u>Item</u>	<u>1970</u>	<u>1980</u> ( '000 tons)	<u>1990</u>
Production	49	52	55
Net Trade	24	41	63
Consumption	73	93	118

(d) Egypt

Although traditionally a "Middle East" country, Egypt is located in Africa. Further, and as a matter of considerable interest, it is a country in which there is a definite consumer preference for beef over mutton, lamb and goats, in contrast to most other Middle Eastern countries. As such it is a potentially interesting market for Kenya. Table II-16 below gives basic projections for 1980 and 1985 taken from unpublished sources, and extended to 1990 at the same rates of change.

EGYPT ; SHEEP AND GOAT MEAT PRODUCTION, CONSUMPTION AND  
RESIDUAL NET TRADE PROJECTIONS FOR 1980 AND 1985  
EXTENDED BY THE SAME RATE OF CHANGE TO 1990

<u>Item</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
	('000 m.t. carcass equivalent)		
Production	235	260	288
Net Trade	16	55	107
Consumption	251	315	395

TABLE II-16B

EGYPT ; SHEEP AND GOAT MEAT PRODUCTION, CONSUMPTION AND  
RESIDUAL NET TRADE PROJECTIONS FOR 1980 AND 1985  
EXTENDED BY THE SAME RATE OF CHANGE TO 1990

<u>Item</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
	('000 m.t. carcass equivalent)		
Production	25	26	27
Net Trade	26	36	48
Consumption	51	62	75

(e) Kenya

We have made considerable use of projections by the Intergovernmental Group on Meat and other sources in this section of the Report. It may be of interest to provide similar projections, from the same sources, for Kenya. An FAO Study, on which current projections by the Intergovernmental Group on Meat are based, using similar assumptions as with Uganda and other countries, indicates that, although Kenya's meat production exceeded consumption by 11,000 tons in 1970, by 1980 this will become a deficit of 14,000 tons. Continuing the production and consumption projections to 1990 shows a huge deficit of 68,000 tons, which we consider very unlikely.

**MEAT (MAINLY BEEF) PRODUCTION, NET TRADE AND CONSUMPTION IN 1970, AND TWO PROJECTIONS FOR 1980\* WITH TRENDS EXTENDED TO 1990 BY ASSUMING THAT THE 1970-TO-1980 PROJECTED PERCENTAGE INCREASE IN PRODUCTION AND IN CONSUMPTION WOULD CONTINUE TO 1990.**

<u>Item</u>	<u>1970</u>	<u>1980</u>	<u>1990</u>
		( '000 tons)	
Production	137	193	272
Net Trade	- 11	14	68
Consumption	126	207	340

\* FAO Summary of Selected National Meat Production and Demand Studies and Comments on the FAO Meat Production and Demand Projections to 1980. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 75/3. August 1975.

One other projection, also quoted by the Intergovernmental Group on Meat, using Country projections and forecasts, came up with a similar result for 1980, a deficit of 12,000 tons.

As noted above, we have proposed our own, more detailed, projections for Kenya.

(4) The Middle East

The Middle East is here defined as those countries in Asia between Africa and the Asian Sub-Continent, excluding the Soviet Union. This area includes several oil-rich countries whose per capita income is already very high and is increasing rapidly. It includes some countries without oil and which remain middle income (Turkey, Lebanon) or even poor (Afghanistan). Taken as a whole, the region has not been a major meat importer in the past, but it is rapidly becoming so as incomes and even populations (because of large scale labor imports) increase rapidly.

The dramatic nature of the expected growth in consumption and importation of meat into Middle Eastern countries is demonstrated by two sets of tables provided below. These have been taken from two entirely separate sources and cover different groups of countries within the Middle East, so cannot be compared directly. Yet they both clearly indicate the trend, and orders of magnitude, which is all one can expect in projections of this kind.

The first, brief set of tables is from the Intergovernmental Group on Meat, which indicates a very rapid increase in consumption of both beef and veal and mutton and lamb, accompanied by very sharp percentage increases in imports. In most Middle East countries, consumption of beef and lamb (in some, Beef is considered inferior,

**TABLE II-18A**

**NEAR EAST IN ASIA : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	486	721	1,070
Net Trade	9	78	219
Consumption	495	799	1,289

Source : FAO. Review of FAO Meat Production and Demand Projections to 1980. Committee on Commodity Problems, Intergovernmental Group on Meat. CCP:ME 74/3. July 1974.

**TABLE II-18B**

**NEAR EAST IN ASIA : MUTTON AND LAMB PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	742	958	1,237
Net Trade	27	287	778
Consumption	769	1,245	2,015

Source : Ibid.

A more detailed set of projections have been derived from unpublished IBRD and FAO data, covering 16 different Middle Eastern countries. For beef and veal, these projections show all countries except Turkey as net importers by 1980 and all countries including Turkey as net importers by 1985. The aggregate net import is more than 500,000 tons by 1985 and, extending the data by a constant percentage rate, more than 1.1 million tons by 1990. We might mention that Pakistan, not included in our definition of the Middle East, is projected to be a major beef exporter (225,000 tons by 1985) and will doubtless supply some of the regional demand. For sheep and goat meat, the projections are even more striking. The projected import tonnage requirement at each year 1980, 1985 and 1990, are about double those of beef and veal. The 1980, 1985, 1990, 1,003,000 and 1,187,000 tons requirements have been made on the basis of...

**MEAT BEEF AND VEAL, ESTIMATES OF PRODUCTION,  
CONSUMPTION AND RESIDUAL NET TRADE, 1969-71, AND  
PROJECTIONS FOR 1980, 1985 AND 1990**

<u>Country and Item</u>	<u>1969-71</u> <u>Av.</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>
	('000 m.t. carcass weight equivalent)			
<b>Afghanistan</b>				
Production	37	37	37	37
Net Trade	2	6	0	10
Consumption	39	43	45	47
<b>Bahrain</b>				
Production	-	-	-	-
Net Trade	-	1	1	1
Consumption	-	1	1	1
<b>Iran</b>				
Production	73	145	176	214
Net Trade	12	54	212	542
Consumption	85	199	388	756
<b>Iraq</b>				
Production	56	91	106	123
Net Trade	- 6	38	137	335
Consumption	50	129	243	458
<b>Israel</b>				
Production	19	25	28	31
Net Trade	37	44	54	66
Consumption	56	69	82	97
<b>Jordan</b>				
Production	1	1	1	1
Net Trade	3	4	6	9
Consumption	4	5	7	10
<b>Kuwait</b>				
Production	-	-	-	-
Net Trade	2	3	4	5
Consumption	2	3	4	5
<b>Lebanon</b>				
Production	2	2	2	2
Net Trade	18	26	33	42
Consumption	20	28	35	44
<b>Oman</b>				
Production	1	1	1	1
Net Trade	1	1	1	1
Consumption	2	2	2	2

<b>Saudi Arabia</b>				
Production	4	8	8	7
Net Trade	6	7	9	13
Consumption	10	12	15	19
<b>Syria</b>				
Production	13	15	23	35
Net Trade	- 1	6	5	2
Consumption	12	21	28	37
<b>Turkey</b>				
Production	196	290	364	457
Net Trade	- 25	- 5	29	85
Consumption	171	285	393	542
<b>United Arab Emirates</b>				
Production	1	1	1	1
Net Trade	1	3	6	11
Consumption	2	4	7	12
<b>Yemen Arab Republic</b>				
Production	13	13	13	13
Net Trade	1	3	4	5
Consumption	14	16	17	18
<b>Yemen P.D. Republic</b>				
Production	1	1	1	1
Net Trade	1	1	1	1
Consumption	2	2	2	2
<b>Totals</b>				
Production	417	627	759	923
Net Trade	53	193	513	1,131
Consumption	470	820	1,272	2,054

MEAT : SHEEP AND GOAT MEAT, ESTIMATES OF PRODUCTION,  
 CONSUMPTION AND RESIDUAL NET TRADE, 1969-71, AND  
 PROJECTIONS FOR 1980, 1985 AND 1990

Country and Item	1969-71	1980	1985	1990
	Ay.			
	('000 m.t. carcass weight equivalent)			
<b>Afghanistan</b>				
Production	108	102	100	98
Net Trade	- 6	- 6	- 12	- 17
Consumption	102	96	88	81
<b>Bahrain</b>				
Production	-	-	-	-
Net Trade	4	7	8	8
Consumption	4	7	8	8
<b>Iran</b>				
Production	215	242	294	357
Net Trade	11	250	666	1,516
Consumption	226	492	960	1,873
<b>Iraq</b>				
Production	70	76	99	129
Net Trade	7	131	305	659
Consumption	77	207	404	788
<b>Israel</b>				
Production	4	4	4	4
Net Trade	-	-	-	-
Consumption	4	4	4	4
<b>Jordan</b>				
Production	7	5	5	5
Net Trade	5	7	13	22
Consumption	12	12	18	27
<b>Kuwait</b>				
Production	1	1	1	1
Net Trade	9	13	20	31
Consumption	10	14	21	32
<b>Lebanon</b>				
Production	7	6	6	6
Net Trade	12	19	25	32
Consumption	19	25	31	38
<b>Oman</b>				
Production	1	1	1	1
Net Trade	1	2	2	2
Consumption	2	3	3	3
<b>Qatar</b>				
Production	-	-	-	-
Net Trade	3	3	3	3
Consumption	3	3	3	3

	1971-72	1972	1973	1974
	Av.			
	('000 m.t. average weight per barrel)			
<b>Saudi Arabia</b>				
Production	19	22	24	26
Net Trade	20	69	132	241
Consumption	39	91	156	267
<b>Syria</b>				
Production	49	76	104	142
Net Trade	- 3	- 3	- 13	- 29
Consumption	46	73	91	113
<b>Turkey</b>				
Production	206	477	633	840
Net Trade	- 10	- 153	- 184	- 218
Consumption	196	324	449	622
<b>United Arab Emirates</b>				
Production	1	1	1	1
Net Trade	5	13	20	31
Consumption	6	14	21	32
<b>Yemen Arab Republic</b>				
Production	55	56	56	56
Net Trade	15	17	14	11
Consumption	70	73	70	67
<b>Yemen P.D. Republic</b>				
Production	6	7	7	7
Net Trade	5	2	-	- 2
Consumption	11	9	7	5
<b>Totals</b>				
Production	749	1,076	1,355	1,673
Net Trade	78	373	1,003	2,297
Consumption	827	1,449	2,338	3,970

future behaviour of real meat prices, which are expected to increase considerably. Thus the consumption estimates are lower than would be the case with a constant real price assumption. However, for the oil rich countries, real price increases are swamped by real income increases.

(5) Selected Individual Middle East Countries

(a) Iran

Iran is much the largest potential meat market in the Middle East, since it has a large population (63 percent of the Middle East OPEC countries' population) and enjoys a high and growing per capita income. Projected imports of sheep and goat meat are truly heroic: 250,000 tons in 1980, 666,000 tons in 1985 and 1.5 million tons in 1990. Projected beef imports are much lower, but still significant; 54,000 tons in 1980, 212,000 tons in 1985 and 542,000 tons in 1990. These figures swamp any conceivable amounts available from Kenya, and the lion's share will be provided by traditional suppliers including Australia and New Zealand and perhaps those countries in East Africa which export large amounts of sheep and goats, Somalia, Sudan and Ethiopia. Nevertheless, Iran should be a market for Kenya in the years to come. Although we have no records of exports to Iran to date, we are aware of recent enquiries, especially for large numbers of live sheep.

(b) Saudi Arabia

Saudi Arabia is a smaller potential market for Kenya meat, but still very large in comparison to probable availabilities. Kenya has sold modest amounts in the past and will be able to in the future. This market is mostly sheep and goat meat, but as a recent mission from Kenya has confirmed, there is also an attractive market for high quality beef which could be exploited.

In several Middle Eastern markets of the future, it appears that the market for live slaughter animals may be especially attractive. We are aware of planned projects for new slaughterhouses in several of these countries, and given the ample investment funds available, it can be expected that some of these projects will go forward. This will reduce the market for meat and increase it for live animals. For Saudi Arabia specifically, there is a very large market for live lambs at the time of Ramadan, a market which is increasingly being satisfied with imported lambs. We have also received information about seven new slaughterhouses being planned for Riyadh and at least one more for Jeddah.

(6) Selected European Countries

Europe represents an attractive market for meat because (1) it imports large amounts of tinned meat, which is an important outlet for lower quality meat from Kenya and (2) it imports higher quality chilled and frozen meat. Kenya has exported significant amounts of non-tinned meat to certain European countries in the past, including France and

Switzerland. Many European markets for meat, however, are very dependent on health standards, with the greatest known case being Switzerland.

Another point with respect to Europe, however, is the importance played by EEC import policy. In the recent past, import policy has resulted in very sharp decreases in meat imports (for example, net imports into the EEC fell from 720,000 tons in 1973 to 77,000 tons in 1975). These reductions have affected the traditional exporters, such as Australia and Argentina, very seriously. Most of the individual countries discussed below are not in the EEC.

Several European countries of past or potential interest to Kenya are projected to increase their requirements for meat imports between now and 1990. We provide brief discussion of Greece, Italy, Spain and Switzerland in this context. Brief discussion of the United Kingdom is also included, although the projections show reduced import requirements, because of the importance of the U.K. market for tinned corned beef.

(a) Greece

Greece is the largest European customer for KMC non-tinned meat. Intergovernmental Group on Meat projections, extended to 1990, for beef and veal and mutton and lamb are given below. They show significant increases in import requirements and therefore suggest potentials for large increases above previous KMC export levels.

TABLE II-20A

GREECE : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
		('000 tons)	
Production	89	115	141
Net Trade	59	92	125
Consumption	148	207	266

**TABLE II-20B**

**SWEDEN : MUTTON AND LAMB PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	89	91	93
Net Trade	48	89	130
Consumption	137	180	223

(b) Italy

Italy has been a significant importer of beef and veal and a lesser importer of mutton and lamb for years. It appears that import requirements for both will increase, and FAO and Italian Government projections reviewed make this clear. However, in reviewing these projections, we find that they may be too high. Although, in 1967, per capita Italian consumption was 87 percent of the EEC average, published projections for 1980 are based on per capita consumption above the EEC average. Since we see no reason why this should be the case, we have reduced the projected values to retain the 87 percent figure. The projections below are made on this basis. It should also be noted that Italy imports a high relative percentage of veal compared to most countries; about 30 percent of normal beef and veal imports are veal. With regard to mutton and lamb, total consumption figures are very much smaller, but Italy is projected to import more than half of her requirements by 1980.

**TABLE II-21A**

**ITALY : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION IN 1967, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1967</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	667	1,009	1,365
Net Trade	443	481	501
Consumption	1,100	1,490	1,866

**MEAT : MUTTON AND LAMB PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	36	39	42
Net Trade	23	41	66
Consumption	59	80	108

**(c) Spain**

We have reviewed several different projections for meat production, consumption and trade, and have selected relatively conservative projections for this Report.

**TABLE II-22A**

**SPAIN : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS TO 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	296	426	613
Net Trade	96	163	272
Consumption	392	589	885

**TABLE II-22B**

**SPAIN : MUTTON AND LAMB PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	136	162	193
Net Trade	-	7	17
Consumption	136	169	210

(d) Switzerland

Switzerland may be of special interest because of past trade with Kenya and because it is not a member of the EEC which eliminates the strict EEC requirements regarding abattoir design, which require separate facilities for suspect meat. According to the projections derived from the Intergovernmental Group on Meat, Switzerland is not expected to become a major importer of beef and veal, but imports will continue and be large enough to be of interest to Kenya.

TABLE II- 23

SWITZERLAND : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71 AVERAGE, AND PROJECTIONS FOR 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
Production	131	167	213
Net Trade	36	39	41
Consumption	167	206	254

(e) United Kingdom

The Intergovernmental Group on Meat reports an FAO projection for 1980 indicating an import requirement for 165,000 tons of beef and veal, and another, by the Government of the United Kingdom itself, showing net exports of 37,000 tons. Although this is a wide variation, both figures are much less than the 483,000 tons of beef and veal imported annually by the U.K. in the 1969/71 base period. The consensus of all authorities checked is that the United Kingdom is moving toward self sufficiency in beef and veal production.

However, virtually all the Kenya's meat exports to the United Kingdom are in the form of tinned corned beef. In terms of tonnage, the amounts are small but the approximately Ksh 30,000,000 per year represented by this tonnage are important. The maintenance of these exports is not really a function of the U.K.'s overall meat balance but rather the continuing demand for this specific product. It is a popular belief that the long term trend of demand for this product is downward, since it is a product of interest mainly to lower income people, but given Britain's economic difficulties which may result in decreased standard of living in the next few years, we are not certain that such decreases will occur.

(7) Selected Other Countries

(a) Japan

Japan is, of course, a very distant market and one in which Kenya would not appear to be competitive. However, Japan is, and is expected to be, an important importer of beef and veal, as the table below indicates. Since Japan's balance of trade with Kenya is very positive (a balance of K\$ 20 million in 1973, for example) meat exports might be arranged to help redress the balance.

TABLE II-24

JAPAN : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION IN 1972, AND PROJECTIONS FOR 1985 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE

<u>Item</u>	<u>1972</u>	<u>1985</u>	<u>1990</u>
		('000 tons)	
Production	290	508	609
Net Trade	77	117	134
Consumption	367	625	743

(b) Soviet Union

The Soviet Union has, in several past years, had considerable difficulty with its agricultural program, caused by weather, management and other problems. As a result, in order to maintain consumer supplies, imports have been necessary. The Intergovernmental Group on Meat projects very large import requirements for 1980 (745,000 tons) and, if we project to 1990 at the same rate, the figure is very much larger. In December 1976, it appeared as though, for the current year at least, these large projections were reasonable, as the USSR sharply increased its purchases. Estimates for the year ranged up to 400,000 tons with 250,000 tons already purchased. The projections are even less certain than those for other countries, because they depend on continuing agricultural production problems on the one hand and the availability of very large amounts of foreign exchange, and the willingness to use it for meat imports, on the other. Nevertheless, the Soviet Union might offer some export possibilities.

**TABLE II-25**

**SOVIET UNION : BEEF AND VEAL PRODUCTION, NET TRADE AND CONSUMPTION, 1969-71, AND PROJECTIONS TO 1980 WITH ITEMS EXTENDED TO 1990 BY STRAIGHT LINE**

<u>Item</u>	<u>1969-71 Av.</u>	<u>1980</u>	<u>1990</u>
		('000 tons)	
Production	4,675	5,592	6,689
Net Trade	75	745	1,765
Consumption	4,750	6,337	8,454

**3. Conclusions**

**a. Gross Import Projections, Selected Countries**

The previous sub-section, Sub-section 2, provided a number of projections for production, consumption and net trade for beef and veal, lamb and mutton and sometimes goat meat for selected countries. The countries were selected because they are in East Africa and/or because they appear to be possible export markets for Kenya. Here we aggregate the projections for net trade for most of the countries discussed above, omitting a number of countries with minor trade projections, and the Soviet Union, because the very large import requirements projected are very questionable and would distort the totals.

Table II-26 below provides the summary or aggregate figures for beef and veal. It shows that, of the countries selected, the European importers accounted for most of the total net imports in 1969/71 but that Africa and the Middle East will take a growing proportion of the net imports in 1980 and more than half in 1990. East Africa, notably excluding Kenya, is projected to be a growing net exporter of beef and veal. The net import figures shown in the table are : 1969/71 783,000 tons (mostly Europe), 1980 969,000 tons and 1990 1,903,000 tons. Excluding East Africa, a net exporter, the net import figures are 1969/71 797,000 tons, 1980 1,164,000 tons, 1990 2,411,000 tons. Again, based on the projections, if one assumes that East Africa's net exports all go to the selected net importing countries, then the first set of figures above would be the required imports from outside of the countries covered, that is, from traditional large meat exporting countries.

These are very large figures indeed, especially those for 1990. They may well prove to be very much off the mark, but may indicate orders of magnitude. In order to check on their plausibility as part of overall world beef and veal production and export trends, the data in Table II- 27 is of interest. It shows 1975 world beef and veal production as about 40 million tons, a figure which increased at an average annual rate of 2.4 percent 1965-75. World gross exports in 1975 were about 5.6 million tons, having increased by an average annual

... of 1.4 percent since 1965. The 1990 projection of a 7.5 percent increase, would be increasing the total net gross exports of 11 billion tons. This is a similar large amount to accommodate the net imports for the selected countries. However, it might be interesting to compare actual and projected world gross exports with actual and projected net imports from the selected Middle Eastern countries :

	<u>1969/71</u>	<u>1980</u>	<u>1990</u>
	('000 tons)		
World Gross Exports	4,610	7,025	11,011
Selected M.E. Net Imports	41	171	1,097

It appears that, although these figures show a very sharp increase in the relative importance of the Middle East as a beef and veal importer, this is in accord with the economic facts of life and thus does not make the projections unreasonable.

Table II-26B gives data similar to Table II-26A for mutton, lamb and goat meat. Here, of course, the Middle East is the dominant factor, and accounts for a large and growing share of the total net imports of the countries covered. The total net import projections are : 1969/71 127,000 tons, 1980 515,000 tons and 1990 2,542,000 tons. This last figure, for 1990, is of course very large indeed and can certainly be questioned.

Carrying out a similar comparison with world data and trends, the projections for these products is further called into question. As shown in Table II-27, world production of veal, mutton and lamb was only 7,217,000 tons in 1975 and had grown at a rate of only .7 percent annually since 1965. Total world gross exports were only 753,000 tons and growing at only 2 percent annually. Clearly, these figures and trends will not support the projections for net imports in the Middle East, especially those for 1990. Very much larger rates of increase in gross exports, and presumably production, would be needed to satisfy these requirements. It is probable that these large projected increases in net imports into the Middle East will not be met, but that world production and gross exports will increase significantly from past rates.

**WORLD PROTECTED NATURAL AREAS - Selected Countries**

<u>COUNTRY</u>	<u>1969/71</u>	<u>1980</u>	<u>1985</u>
	('000 tons)		
<b><u>East Africa</u></b>			
Ethiopia 1.	- 5	23	22
Kenya 1.	- 4	- 9	40
Madagascar 1.	- 16	- 86	- 177
Somalia 1.	- 14	- 17	- 19
Sudan 1.	6	- 125	- 395
Tanzania 1.	- 5	- 22	- 42
Uganda 2.	24	41	63
<b>Total</b>	<b>- 14</b>	<b>- 195</b>	<b>- 508</b>
<b><u>Selected Other Africa</u></b>			
Nigeria 2.3.	33	85	134
Egypt 1.	12	16	107
<b>Total</b>	<b>45</b>	<b>101</b>	<b>241</b>
<b><u>Selected Middle East</u></b>			
Iran 1.	12	54	542
Iraq 1.	- 6	38	335
Kuwait 1.	2	3	5
Lebanon 1.	20	28	44
Saudi Arabia 1.	10	12	19
Syria 1.	12	21	37
Turkey 1.	- 25	- 5	85
U.A.E. 1.	2	4	12
Y.A.R. 1.	14	16	18
<b>Total</b>	<b>41</b>	<b>171</b>	<b>1,097</b>
<b><u>Selected Europe and Japan</u></b>			
Greece 2.	59	92	125
Italy 2.	443	481	501
Spain 2.	96	163	272
Switzerland 2.	36	39	41
Japan 2.	(1972) 77	(1985) 117	134
<b>Total</b>	<b>711</b>	<b>892</b>	<b>1,073</b>
<b>Total Selected Countries</b>	<b>783</b>	<b>969</b>	<b>1,903</b>
<b>Total excluding East Africa</b>	<b>797</b>	<b>1,164</b>	<b>2,411</b>

1. Unpublished UNDP and FAO data.

2. Various reports, Intergovernmental Group on World

3. Unpublished estimate.

**Country****1959/71****1952****1950**

('000 tons)

**East Africa**

Ethiopia	- 1	- 24	- 13
Kenya	-	15	37
Malagasy	-	- 4	- 11
Somalia	- 15	- 14	- 12
Sudan	- 1	- 12	- 66
Tanzania	5	10	16
Uganda	<u>na</u>	<u>na</u>	<u>na</u>
Total	<u>- 12</u>	<u>- 29</u>	<u>- 49</u>

**Selected Other Africa**

Nigeria	-	25	56
Egypt	<u>2</u>	<u>26</u>	<u>48</u>
Total	<u>2</u>	<u>51</u>	<u>104</u>

**Selected Middle East**

Iran	11	250	1,516
Iraq	7	131	659
Kuwait	9	13	31
Lebanon	12	19	32
Saudi Arabia	20	69	241
Syria	- 3	- 3	- 29
Turkey	- 10	- 153	- 218
U.A.E.	5	13	31
Y.A.R.	<u>15</u>	<u>17</u>	<u>11</u>
Total	<u>66</u>	<u>356</u>	<u>2,274</u>

**Selected Europe and Japan**

Greece	48	89	130
Italy	23	41	66
Spain	-	7	17
Switzerland	na	na	na
Japan	<u>na</u>	<u>na</u>	<u>na</u>
Total	<u>71</u>	<u>137</u>	<u>213</u>

**Total Selected Countries**

<u>127</u>	<u>515</u>	<u>2,542</u>
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**MEAT AND SKIN, BONES AND TENDONS  
WORLD PRODUCTION AND TRADE 1969/71 AND 1975  
WITH PROJECTIONS OF 1980-75 PRODUCTION AND 1980  
AND 1990 ('000 M.T.)**

	<u>1969/71</u>	<u>1975</u>	<u>1980</u>	<u>1990</u>
<b><u>Beef and Veal</u></b>				
World Production (2.4)	39,916	40,175	45,223	57,343
World Gross Exports (4.6) (Fresh, chilled, frozen)	4,610	5,609	7,025	11,011
<b><u>Mutton and Lamb</u></b>				
World Production (0.7)	7,224	7,217	7,242	7,750
World Gross Exports (2.0) (Fresh, chilled, frozen)	754	697	770	938

Source : FAO. Midyear Review of the World Meat Situation and Outlook. Committee on Commodity Problems, Intergovernmental Group on Meat. June 1976.

**2. World Market Prices**

Prices of various classes of meat, in various markets around the world, are highly volatile, fluctuating as they do on sharp short term fluctuations in both supply and demand, as well as price and trade policies in the major producing and consuming countries. In the past few years, prices have fallen off in several categories, most notably in lower qualities of beef. Significant increases are now in progress or expected, as demand increases and cyclical production for some categories begin to fall off.

Long term real price trends, of interest to this discussion, are very difficult to arrive at. The World Bank engages in the preparation of long term real price trends and, according to unpublished data available to Chemonics, has until recently been using the following indices :

	<u>1970</u>	<u>1972</u>	<u>1980</u>	<u>1985</u>
Beef	100	116	132	146
Lamb and Veal	100	113	129	144

Another more recent World Bank projection dated November 1975 provided the following constant 1973 dollar price estimates for beef (per kilo) :

<u>1967-9</u>	<u>1970-2</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1985</u>
2.54	2.79	3.18	2.85	2.49	2.65	2.93	3.03	3.11	3.35	3.72

Index : 1970-2 = 100

91	100	114	102	89	95	105	108	111	120	133
----	-----	-----	-----	----	----	-----	-----	-----	-----	-----

The same series, in current dollars, looks like this :

<u>1967-9</u>	<u>1970-2</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1985</u>
1.71	2.20	3.18	3.46	3.36	3.89	4.65	5.15	5.70	6.58	10.25

These series illustrate both the notable drop in prices in 1974 and 1975 and the somewhat more conservative projections of future price increases than those above in the first series above. A November 1976 projection is as follows. It takes into account the failure of beef prices to make significant increases in 1976, because of drought conditions in many parts of the world which caused a shortage of fodder and thus continued heavy slaughterings, aggravating the existing oversupply situation.

Index : 1970-2 = 100, Constant Dollars

<u>1967-9</u>	<u>1970-2</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1985</u>
91	100	89	69	92	112	127	128	128

... through the period 1960-1965. In these years, prices have been conservative, and the possibility of overproduction and consequent price falls. The prospect for major increases in real prices remains good.

It is normal to say that the import demand of the Middle East has no effect on world meat prices because it represents such a small share of the total. This will certainly be less true in the future if the projections have any serious validity. Particularly in sheep and goat meat, the huge requirements of Iran and other Middle Eastern countries cannot help but cause real prices to increase.

#### c. Competition for Kenya

This subject is discussed in more detail in Chapter V MARKETING. Here we limit ourselves to a few basic comments.

Kenya has, and will continue to have, ample competition in all of her markets. Kenya is not the major supplier in any market in which she sells, and this situation is not likely to change. In Europe, Kenya has and will face competition from other European countries and major world meat exporting countries, such as New Zealand, Australia, Argentina and Uruguay. In the Middle East, some of the same major exporters (mainly New Zealand and Australia) will presumably remain strong and there is very considerable competition from other East African countries such as Somalia and Ethiopia. Further, the demands of the major Middle Eastern importers, such as Iran and Saudi Arabia, are (1) so large that they dwarf Kenya's potential availabilities and (2) are mostly sheep and goat meat.

On the other hand, the fact that Kenya has relatively little meat to export, can produce rather high quality if it wishes, and is well located with respect to pockets of demand for high quality meat, could allow Kenya to overcome the large scale competition in small areas and easily market all of its surplus meat at favorable prices.

#### d. Long Term Viability of Export Markets for Kenya

We believe that the extensive material in this section shows that there is and will be ample demand for Kenya's meat in markets close enough for Kenya to be competitive. The important issues are : (1) whether Kenya can produce enough meat to satisfy local demand and have a surplus to export, and (2) the extent to which Kenya can manage its export operations to obtain the highest possible return. These subjects are covered in other sections of the report.

**CHAPTER II**

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**ANNEXES**

## ANNEX II-1

### RURAL AND URBAN POPULATION OF KENYA 1962 - 1975, PROJECTED TO 1990

A census of population in Kenya was taken in 1962 and 1969. The 1969 census provided additional information of particular interest to this study such as

- Details of the population in all towns with 2,000 or more people.
- Details of the average composition of households in Nairobi and all towns with 2,000 or more people.

In Annex Table II-1.1 the population in towns of 2,000 or more has been entered as Urban and the rest of the population in each district entered as Rural.

The rate of population increase continues to rise in Kenya. A middle of the range figure of 3.5 percent growth per year in the National population was adopted by the study at the first panel. However, urban population is projected to grow at 7.2 percent per year from 1969 to 1980 and at 6.2 percent thereafter. Within this general growth in urban population, the population of Nairobi is projected to grow at 7.2 percent to 1985 and at 7 percent thereafter. These projections are of the same order of magnitude as those in the Nairobi Urban Study Group Report 1973, Vol. II, tables 1.8, 1.9 and 1.12, 1.13. After deducting the urban population from the National population, rural population is found to grow at figures close to 3 percent a year.

We have not distinguished between districts in applying the assumed rates of population growth except for districts in the Northern Region. For Districts in the Northern Rangeland Region, our view of the very limited scope for increases in livestock production for these mainly pastoral people cautioned against projecting any growth in the human population beyond the numbers estimated for 1975. Our projection of the population in the Northern Region was thus for 870,000 people in 1990 but with an increase in urban population by 15,000 to a total of 70,000, and rural population decreasing by 16,000 to 800,000.

Thus the projection for 1990 shows a National population of 22,535,000 of whom 18,303,000 are rural mainly in the Small Farm Regions (16,044,000). Urban areas are projected to have a population of 4,232,000 of whom 2,173,000 are projected to be in Nairobi.

ANNEX TABLE II-1.1

(RURAL AND URBAN POPULATION OF KENYA BY DISTRICTS AND REGIONS  
1969, 1975 AND 1990

	1969 Census			1975 Estimated			1990 Projected		
	Urban 000	Rural 000	Total 000	Urban 000	Rural 000	Total 000	Urban 000	Rural 000	Total 000
<b>Range Regions</b>									
Lana	7.4	14.6	22	11.2	16.8	28			
Tana River	3.6	47.4	51	5.8	57.5	63			
N.E. Province	-	246.0	246	-	295.0	295			
Isiolo	8.0	23.0	30	12.1	25.9	38			
Marsabit	6.6	45.4	52	10.0	54.0	64			
Turkana	4.1	160.9	165	6.2	192.8	199			
Samburu	6.3	63.7	70	9.6	76.4	86			
W. Pokot	-	82.0	82	-	98.0	98			
<b>Total Northern R</b>	<b>36.0</b>	<b>682.0</b>	<b>718</b>	<b>54.6</b>	<b>816.4</b>	<b>871</b>	<b>70.0</b>	<b>800.0</b>	<b>870<sup>(a)</sup></b>
<b>Range</b>	<b>2.6</b>	<b>122.4</b>	<b>125</b>	<b>3.9</b>	<b>147.1</b>	<b>151</b>			
Kajiado	-	86.0	86	-	103.0	103			
<b>Total Southern R</b>	<b>2.6</b>	<b>208.4</b>	<b>211</b>	<b>3.9</b>	<b>250.1</b>	<b>254</b>	<b>9.7</b>	<b>397.3</b>	<b>407</b>
<b>Total Range R</b>	<b>38.6</b>	<b>890.4</b>	<b>929</b>	<b>58.5</b>	<b>1,066.5</b>	<b>1,125</b>	<b>79.7</b>	<b>1,197.3</b>	<b>1,277</b>
<b>Small Farm R</b>									
Kilifi	13.5	294.5	308	20.5	352.5	373			
Mwali	2.5	203.5	206	3.8	244.2	248			
Taita	9.7	101.3	111	14.7	121.3	136			
<b>Total Coastal R</b>	<b>25.7</b>	<b>599.3</b>	<b>625</b>	<b>39.0</b>	<b>718.0</b>	<b>757</b>	<b>95.6</b>	<b>1,142.4</b>	<b>1,238</b>
<b>Eastern R</b>									
Machakos	11.6	695.4	707	17.6	833.4	851			
Kitui	3.1	339.9	343	4.7	407.3	412			
Embu	3.9	175.1	179	5.9	210.1	216			
Meru	4.5	592.5	597	6.8	710.2	717			
<b>Total Eastern R</b>	<b>23.1</b>	<b>1,802.9</b>	<b>1,826</b>	<b>35.0</b>	<b>2,159.0</b>	<b>2,194</b>	<b>86.0</b>	<b>3,437.0</b>	<b>3,522</b>
<b>Central Province</b>	<b>46.0</b>	<b>1,630.0</b>	<b>1,676</b>	<b>68.8</b>	<b>1,993.2</b>	<b>2,022</b>	<b>171.0</b>	<b>3,107.0</b>	<b>3,278</b>
<b>Rift &amp;</b>									
Mandi	2.3	206.7	209	3.5	248.5	252			
Kericho	19.7	463.3	479	23.8	555.2	579			
E. Narakwet	-	159.0	159	4.1	189.9	194			
Baringo	2.7	159.3	162	4.1	190.9	195			
<b>Total Rift &amp;</b>	<b>20.7</b>	<b>988.3</b>	<b>1,009</b>	<b>35.5</b>	<b>1,184.5</b>	<b>1,220</b>	<b>77.0</b>	<b>1,884.0</b>	<b>1,961</b>
<b>Nyanza P.</b>	<b>43.4</b>	<b>2,078.6</b>	<b>2,122</b>	<b>65.9</b>	<b>2,489.1</b>	<b>2,555</b>	<b>161.6</b>	<b>3,962.4</b>	<b>4,124</b>
<b>Western P.</b>	<b>10.6</b>	<b>1,317.4</b>	<b>1,328</b>	<b>16.1</b>	<b>1,577.9</b>	<b>1,594</b>	<b>39.5</b>	<b>2,511.5</b>	<b>2,551</b>
<b>Total Small Farm Regions</b>	<b>169.5</b>	<b>8,416.5</b>	<b>8,586</b>	<b>260.3</b>	<b>10,083.7</b>	<b>10,344</b>	<b>630.7</b>	<b>16,044.3</b>	<b>16,675</b>
<b>Large Farm R</b>									
Nakuru	70.8	220.2	291	103.4	263.6	367			
Trans Nzoia	12.0	112.0	124	18.2	133.8	152			
Uasin Gishu	18.0	173.0	191	27.3	206.7	234			
Laikipia	14.2	51.7	66	21.7	62.3	84			
<b>Total Rift B</b>	<b>115.1</b>	<b>556.9</b>	<b>672</b>	<b>170.6</b>	<b>666.4</b>	<b>837</b>	<b>428.7</b>	<b>1,061.3</b>	<b>1,490</b>
<b>Nairobi</b>	<b>247.0</b>	<b>-</b>	<b>247</b>	<b>375.0</b>	<b>-</b>	<b>375</b>	<b>920.0</b>	<b>-</b>	<b>920</b>
<b>Grand Total</b>	<b>1,079.5</b>	<b>9,863.8</b>	<b>10,943</b>	<b>1,634.4</b>	<b>11,816.6</b>	<b>13,451</b>	<b>4,232.1</b>	<b>16,302.9</b>	<b>22,535</b>

Source : 1969 Census.

The Projection Methodology is stated in the accompanying text.

(a) No change from 1975.

**RURAL AND URBAN POPULATION OF KENYA  
1962 - 1975, PROJECTED TO 1990**

Year	Total	Rural	U r b a n		
			Towns >5,000	Towns >2,000	of which: Nairobi
1962	8,636	7,975	661		267
3	8,933	8,232	701		293
4	9,241	8,498	743		321
5	9,559	8,772	787		352
6	9,887	9,052	835		386
7	10,227	9,342	885		423
8	10,579	<u>9,641</u>	938		464
9	10,943	9,863 <sup>(a)</sup>	998	1,080	509
1970	11,326	10,168		1,158	546
1	11,722	10,481		1,241	585
2	12,132	10,802		1,330	627
3	12,557	11,131		1,426	673
4	12,997	11,468		1,529	721
5	13,451	11,812		1,639	773
6	13,922	12,165		1,757	829
1980	14,409	12,089		2,320	1,094
1985	15,976	12,842		3,134	1,549
1990	22,535	18,301		4,234	2,173

(a) In 1969 the definition of urban changed.

## ANNEX II-2

### ESTIMATION OF RESOURCES AVAILABLE FOR CONSUMPTION IN RURAL AND URBAN HOUSEHOLDS 1964 - 1975

Estimates of the resources available for consumption were required for the model of demand. These estimates were derived by using the National Accounts to estimate the resources available for consumption in rural households and then deducting these figures for the entire economy as in Annex Table II-2.1. To arrive at the resources available for consumption in Urban African households it was decided to estimate the earnings of other non agricultural employees as these were more accessible from the Annual Enumeration of Employees, were of declining importance and were also easiest to adjust to an urban basis. It was decided that the possible overestimation of consumption by non-Africans from using earnings figures would probably be counterbalanced by the underestimation of their incomes through using data from the Annual Enumeration of Employees.

#### ANNEX TABLE II-2.1

#### DIVISION OF RESOURCES AVAILABLE FOR CONSUMPTION BETWEEN RURAL AND URBAN HOUSEHOLDS. KE 000,000

	<u>1964</u>	<u>1967</u>	<u>1970</u>	<u>1972</u>	<u>1974</u>	<u>1975</u>
Rural						
GDP at Factor Cost:						
Product outside monetary economy	89.0	107.0	119.6	146.6	175.7	220.9
Monetary economy						
Agriculture, Forestry, Fishing	55.8	60.0	77.3	94.4	129.9	136.1
Total	141.8	167.0	196.9	241.0	305.6	357.2
Deduct capital formation and change in stocks	-12.3	-17.3	-41.8	-27.5	-46.4	-40.0
Government (@ 50%)	21.3	26.5	38.2	52.7	68.0	79.3
Building and Construction (@ 33.3%)	2.3	4.2	5.6	8.1	14.5	15.2
Total Rural Consumption	153.1	180.4	198.9	274.3	341.7	411.7
Urban Consumption (a)	92.7	112.8	145.8	182.6	299.1	321.6
Total Private Consumption	245.8	293.2	344.7	456.9	640.8	773.3

(a) By difference.

Source of data : National Account as published in Statistical Abstract and Economic Survey 1976.

**RESOURCES AVAILABLE FOR RURAL AND URBAN CONSUMPTION  
TOTAL AND PER PERSON**

	<u>1967</u>	<u>1970</u>	<u>1972</u>	<u>1974</u>	<u>1978</u>
<b>Population</b>			<u>000 head</u>		
Rural	9,342	10,164	10,802	11,468	11,812
Urban	885	1,158	1,330	1,529	1,639
<b>Resources used for consumption</b>			<u>KE 000,000</u>		
Rural	180.4	198.9	274.3	341.7	411.7
Urban-African	64.6	93.5	127.6	238.6	319.8
-Total	<u>112.8</u>	<u>145.9</u>	<u>182.6</u>	<u>299.1</u>	<u>376.8</u>
<b>Total Private</b>	293.2	344.9	456.4	640.8	773.3
<b>Consumption per Person</b>			<u>KE current</u>		
Rural	19.3	19.6	25.4	29.7	34.9
Urban-African	90.3	92.9	106.0	166.8	206.3
-Total	<u>127.5</u>	<u>126.0</u>	<u>137.3</u>	<u>195.6</u>	<u>229.9</u>
			<u>KE 1971 = 100</u>		
Rural	21.2	20.7	24.2	21.5	20.9
Urban-African	99.2	98.0	101.0	120.3	123.6
-Total	<u>140.1</u>	<u>132.9</u>	<u>130.8</u>	<u>141.0</u>	<u>137.7</u>

	Meat from District slaughter 000 mt	Meat supplies from other Regions 000 mt	Rural population		Rate of procurement		Total Procurement	
			Urban	Rural	Urban	Rural	Urban	Rural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			000		kg. per head		000 mt.	
					(8) ÷ (4)		(5) × (3)	(1) + (2) - (7)
<b>Range Regions</b>								
Northern	4.6		39	703	16	5.6	0.6	3.9
Southern	4.8		3	215	16	22.1	0.1	4.8
<b>Total Range R.</b>	<b>9.4</b>	<b>-</b>	<b>41</b>	<b>918</b>	<b>16</b>	<b>9.4</b>	<b>0.7</b>	<b>8.7</b>
<b>Small Farm R.</b>								
Coastal	4.3		27	618	16	6.3	0.4	3.9
Eastern	10.4		25	1859	16	5.4	0.4	10.0
Central	10.9	+0.4	49	1680	16	6.3	0.8	10.6
Rift A	8.8		22	1019	16	8.3	0.4	8.4
Nyanza P	16.2		47	2142	16	7.2	0.8	15.5
Western	17.3	+1.2	11	1358	16	12.6	0.2	17.1
<b>Total Small Farm R.</b>	<b>68.0</b>		<b>182</b>	<b>8676</b>	<b>16</b>	<b>7.5</b>	<b>2.8</b>	<b>65.4</b>
<b>Large Farm R.</b>	<b>9.2</b>		<b>123</b>	<b>574</b>	<b>16</b>	<b>14.7</b>	<b>2.0</b>	<b>8.5</b>
<b>Nairobi</b>	( 1.2	+14.0	546		20		10.9	-
<b>Mombasa</b>	(		267		16.1		4.3	-
<b>Grand Total</b>	<b>87.7</b>	<b>+15.6</b>	<b>1158</b>	<b>10168</b>	<b>17.8</b>	<b>8.1</b>	<b>20.6</b>	<b>82.6</b>
			<b>11,326</b>				<b>103.2</b>	

Notes :

Col. (1) Annex Table III-1.2. Cattle and Beef Output.

Col. (2) Supplies from KMC.

Col. (3) and (4) Annex Table II-1.1. Rural and Urban Population of Kenya, 1969 plus the growth rates stated in the accompanying text.

Col. (5) Derived from model of demand, Table II-5.

## ANNEX TABLE II-3.2

## BEEF PROCUREMENT 1975

	Meat from District slaughter 000 mt	Meat supplies from other Regions 000 mt	Human population		Rate of procurement		Total Procurement	
			Urban	Rural	Urban	Rural	Urban	Rural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			000		kg. per head		000 mt	
					(8) + (4)		(5) x (3)	(1) + (2) - (7)
<u>Range Regions</u>								
Northern	4.4		55	815	26	3.7	1.4	3.0
Southern	5.5	-2.4	4	250	26	8.0	0.1	3.0
<b>Total Range R</b>	<b>9.9</b>	<b>-2.4</b>	<b>59</b>	<b>1065</b>	<b>26</b>	<b>5.6</b>	<b>1.5</b>	<b>6.0</b>
<u>Small Farm R</u>								
Coastal	4.4	-1.0	39	717	26	3.4	1.0	2.4
Eastern	16.7	-5.6	35	2160	26	4.7	0.9	10.2
Central	78.1	-2.0	68	1952	26	7.3	1.8	14.3
Rift A	12.5	-	36	1184	26	9.8	0.9	11.6
Nyanza P	26.8	-	66	2489	26	10.1	1.7	25.1
Western	14.4	-	16	1578	26	8.9	0.4	14.0
<b>Total Small Farm R</b>	<b>92.9</b>	<b>-8.6</b>	<b>260</b>	<b>10080</b>	<b>26</b>	<b>7.7</b>	<b>6.7</b>	<b>77.6</b>
<u>Large Farm R</u>								
<b>Total Large Farm R</b>	<b>11.0</b>		<b>170</b>	<b>667</b>	<b>26</b>	<b>9.9</b>	<b>4.4</b>	<b>6.6</b>
Nairobi	14.1 <sup>(a)</sup>	+11.0 <sup>(b)</sup>	770	-	28.6		22.0	-
Mombasa		+ 3.5 <sup>(c)</sup>	375	-	17.6		6.6	-
<b>Grand Total</b>	<b>127.9</b>	<b>+ 3.5</b>	<b>1634</b>	<b>11812</b>	<b>26</b>	<b>7.6</b>	<b>41.2</b>	<b>90.2</b>

## Notes :

Col. (1) From Annex Table III-1.6. (a) from Table III-1.7.

Col. (2) Estimates of movement of meat. (b) Total of meat moved into Nairobi from nearby districts. (c) From KMC.

Col. (3) and (4) Annex Table II-1.1

Col. (5) Urban rate of Procurement

Data from model of demand, Table II-5.

**SHEEP AND GOAT PROCUREMENT - 1970**

	Meat from District Slaughter mt	Meat supplies from other Regions mt	Human population		Rate of procurement		Total procurement	
			Urban	Rural	Urban	Rural	Urban	Rural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			000		kg. per head		mt	mt
					(5) + (4)		(5) x (3)	(1) + (2) - (7)
<b>Range Regions</b>								
Northern	9377		39	703	7.7	13.1	301	9,080
Southern	1320		3	215	7.7	6.0	24	1,298
<b>Total Range R</b>	<b>10697</b>		<b>41</b>	<b>918</b>	<b>7.7</b>	<b>11.3</b>	<b>325</b>	<b>10,378</b>
<b>Small Farm R</b>								
Coastal	1387		27	618	7.7	1.9	207	1,174
Eastern	6698		25	1859	7.7	3.5	193	6,507
Central	3432		49	1680	7.7	1.8	378	3,052
Rift A	4410		22	1019	7.7	4.2	169	4,240
Nyanza P	3857		47	2142	7.7	1.6	361	3,499
Western	627		11	1358	7.7	0.4	85	539
<b>Total Small Farm R</b>	<b>20411</b>		<b>182</b>	<b>8676</b>	<b>7.7</b>	<b>2.2</b>	<b>1397</b>	<b>19,011</b>
<b>Large Farm R</b>	<b>3111<sup>(a)</sup></b>		<b>123</b>	<b>574</b>	<b>7.7</b>	<b>3.8</b>	<b>947</b>	<b>2,161</b>
<b>Nairobi</b>	<b>(6727</b>		<b>546</b>		<b>8.3</b>		<b>4517</b>	
<b>Mombasa</b>	<b>)</b>		<b>267</b>		<b>8.3</b>		<b>2210</b>	
<b>Grand Total</b>	<b>40946</b>		<b>1158</b>	<b>10168</b>	<b>8.1</b>	<b>3.1</b>	<b>9396</b>	<b>31,550</b>
<b>Meat only, CDW</b>	<b>26907</b>				<b>5.3</b>	<b>2.0</b>	<b>6174</b>	<b>20,733</b>

**Notes :**

- Col. (1) Meat and offal from District Slaughter from Annex Table III-1.8 Sheep and Goat output 1970. (a) Includes 209 mt by KMC.
- Col. (2) Movement between regions insignificant.
- Col. (3) and (4) Human Population, from Annex Table II-1.1, 1969 census plus growth rates stated in the accompanying text.
- Col. (5) Urban rate of procurement. Estimates from supplies to Nairobi and Mombasa and assumed to be similar in other urban areas where supplies are likely to be more accessible.

**ANNEX TABLE II-3.1**  
**SHEEP AND GOAT PROCUREMENT 1975**

	Meat from District slaughter mt.	Meat supplies from other Regions mt.	Human population		Rate of procurement: Meat & Offal		Total procurement: Meat & Offal	
			Urban	Rural	Urban	Rural	Urban	Rural
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			000		kg. per head		mt.	
					(5)	(6)	(7)	(8)
					(5)	(6)	(7)	(8)
<b>Range Regions</b>								
Northern	10911		54.6	815	5	13.1	273	10,638
Southern	2560		3.9	250	5	10.2	20	2,540
<b>Total Range R</b>	<b>13471</b>		<b>58.5</b>	<b>1065</b>	<b>5</b>	<b>12.4</b>	<b>293</b>	<b>13,178</b>
<b>Small Farm R</b>								
Coastal	2717	-2000 <sup>(a)</sup>	39.0	717	5	3.5	195	2,522
Eastern	13682		35.0	2160	5	5.3	175	11,507
Central	5104		68.8	1952	5	2.4	344	4,760
Rift A	6099		35.5	1184	5	5.0	178	5,921
Nyanza P	9196		65.9	2489	5	3.6	330	8,866
Western	1862		16.1	1578	5	1.1	81	1,781
<b>Total Small Farm R</b>	<b>38660</b>		<b>260.3</b>	<b>10080</b>	<b>5</b>	<b>3.6</b>	<b>1303</b>	<b>35,357</b>
<b>Large Farm R</b>	<b>7006</b>		<b>170.6</b>	<b>667</b>	<b>5</b>	<b>9.2</b>	<b>853</b>	<b>6,153</b>
Nairobi	(4290)	+2000 <sup>(a)</sup>	770.0	-	(5.8)		6632	
Mombasa	( )	+ 342 <sup>(b)</sup>	375.0	-	( )			
<b>Grand Total</b>	<b>63427</b>	<b>+ 342</b>	<b>1639</b>	<b>11812</b>	<b>5.5</b>	<b>4.6</b>	<b>9081</b>	<b>54,688</b>
<b>Meat only, CDW</b>	<b>41678</b>	<b>+ 225</b>			<b>3.6</b>	<b>3.0</b>	<b>5967</b>	<b>35,935</b>

**Notes :**

Col. (1) From Annex Table III-1.10 Sheep and Goat Output 1975.

Col. (2) (a) Even more sheep and goat meat might have been sent from Eastern Region, especially Machakos, to Nairobi.

(b) Estimated supply of meat and offal from KMC. 1975 KMC purchased 492 mt CDW and supplied approximately 225 mt CDW to the domestic market.

Col. (3) and (4) Human population from Annex Table II-1.1

Col. (5) Urban rate of Procurement. Estimated from supplies to Nairobi and Mombasa and assumed to be similar in other urban areas. These supplies are likely to be used as follows:

**CHAPTER III**

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**SUPPLY OF LIVESTOCK**

## CHAPTER III

### SUPPLY OF LIVESTOCK

#### A. Introduction, Sources and Problems

##### 1. Introductory Comments

This chapter is the central one in the whole report. It deals with the supply of livestock, which is the key issue, since the supply is in part dependent on land availability, which is decreasing, and, with domestic demand increasing and with reasonably attractive export markets projected to be available, it is vital to increase the supply of livestock available to these markets.

The discussion is based on three sets of supply projections. In the course of developing the three sets of projections, we must deal with current livestock development policies as we see them, make our rather extensive recommendations on policy, and most important and difficult, estimate the effect on supply to 1990 of both existing policy and our recommended changes if implemented.

The three projections developed are (1) supply projections based on land availability and current practice, (2) revised supply projections based on our interpretation of current livestock policy and the assumption that these policies would continue without change and (3) further revised supply projections assuming that our recommendations are implemented.

##### 2. Sources and Problems

A very wide range of sources has been used to carry out the work of this chapter. For our estimates of current (1975) livestock and meat production, we have made extensive calculations using data on hides and skins production, movement of animals between districts with veterinary permits, KMC slaughter data and other raw data.

For basic projections, we have used an approach based essentially on land availability. All land in Kenya has been classified into ecological zones, I through VI<sup>1</sup>, and for each we have adopted an animal carrying capacity in livestock units. The first priority land use in the higher rainfall ecological zones especially, is cultivation of crops. The balance of the land suitable for agriculture, after deducting requirements for cultivation, is the land available for livestock production.

1. First developed in Pratt, Greenway and Gwynne, "A Classification of East African Rangeland" in the Journal of Applied Ecology, November 1966, pp. 309-393, and since modified.

We have made calculations on this basis for 1970 and 1975, and then 1990. For 1975 we also have estimates of actual numbers of livestock in each district and these data have been factored in. For our basic projections of livestock supply for 1990, we make certain assumptions regarding the utilization of available grazing land, basically that, assuming current practice, available land in each region will be used to the same extent it is now used.

Existing policies were developed in two ways. First, we attempted to determine what Kenya's broad policies in the livestock and meat area were. A list of such policies was made up and presented to the first panel meeting on the study, November 11, 1976. Modifications were suggested. The original list and the modifications as received are included in this Chapter as sub-section D.1. It is clear that they only serve as a backdrop to more detailed policy discussion.

Detailed description and discussion of present livestock policy was worked out as follows. The various specialists on the study team examined the existing status of the various elements of livestock policy, such as social policies, cattle, sheep and goat priorities, animal health, ranch development, rangeland development, transportation and stratification, pasture improvement and pricing. They held discussions with officials of many different agencies and organisations, in Nairobi and the field, with producers and with others. They reviewed reports and they travelled throughout the country to observe first hand livestock policies being implemented. On this basis, they came to conclusions as to present and projected de facto livestock policy.

For each policy area, we have attempted to determine the supply impact of present policy, that is, the effect of present policy in the area on the basic supply projections. This can be done in only the broadest way, of course, since there are many factors which must be estimated. These estimates normally assume that all other policies remain unchanged. However, it is clear that there is considerable interaction between policy areas, with price policy perhaps the most important in this respect.

Our policy recommendations have been done in much the same way as our determination of existing policy. The specialists have made recommendations in their respective areas and these have been consolidated and an attempt made to determine the supply impact of their implementation. The third set of supply projections is made on this basis.

## **B. Cattle, Sheep and Goat Output**

**Estimates of output were constructed to meet the following objectives :**

- To show the contribution to meat supplies being made by the different regions of the country and by the three species.
- To provide a base for examining the effects of various policies and for making projections.
- To provide data for estimating the pattern of supply utilisation and the levels of meat procurement in each part of the country.

Attainment of each of these aims was central to the tasks set out in the Terms of Reference and thus much effort was put into output estimation. Our approach, described in Annex III-1, was to use data on hides and skins output and the movement of livestock between districts, following the approach used by Spinks (1966) and Aldington and Wilson (1968). We put most of our effort into making estimates for 1970 and 1975.

1970 came at the end of a series of years favorable to livestock production while the drought of 1971 marked the start of a series of years of poor plant growth in many range areas, culminating in 1976. These changes in output over the years are illustrated by annual data on the output of hides (Figure III-1) and sheep and goat skins (Figure III-2). The temporal pattern of output of sheep and goat skins resembles that of cattle even though sheep and goats are less affected by dry conditions than cattle. Yet the greater resistance of sheep and goats to dry conditions leads to them being used as a reserve to meet times of crisis in the cattle economy. Diseases, such as Contagious Caprine Pleuro Pneumonia, may also account for part of the large fluctuation in the output of sheep and goats.

### **1. Beef Output**

Our estimates for the cattle population in 1970 is 8,716,000 head, and for beef output 115,200 tons. For 1975, these figures are estimated to have increased to a population of 9,697,000 and a beef output of 142,600 tons. Table III-1 provides the details.

There appear to have been dramatic changes in the pattern of beef populations and output between 1970 and 1975. The estimated population of cattle in the Small Farm Regions has increased by nearly 2 million head. On the other hand the scanty data on the Range Regions indicates a fall in recorded output and cattle populations. The fall in output from the range regions is probably due to the lack of rain and plant growth starting with the drought in 1971. Thus increased

FIGURE III-1

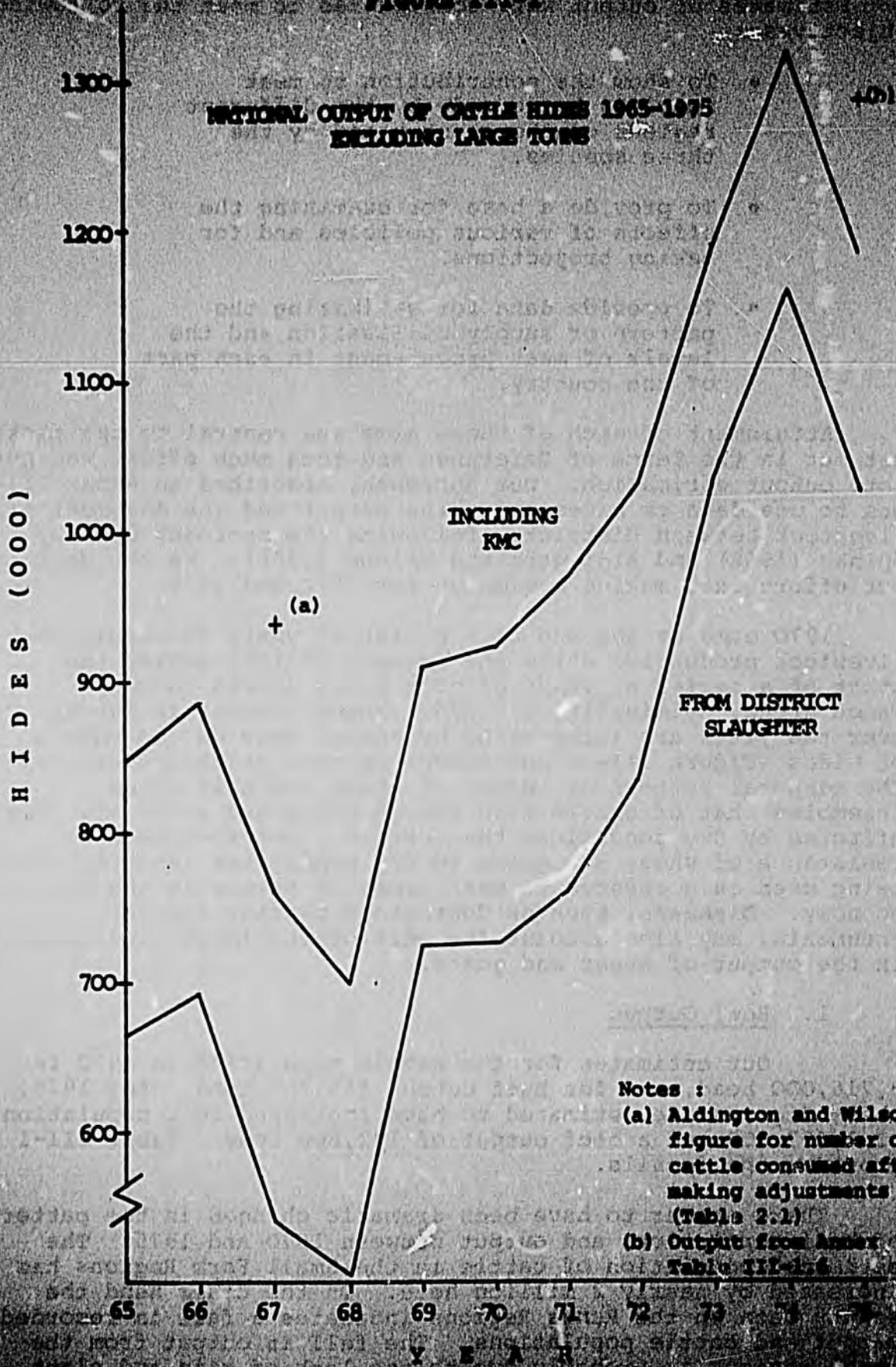
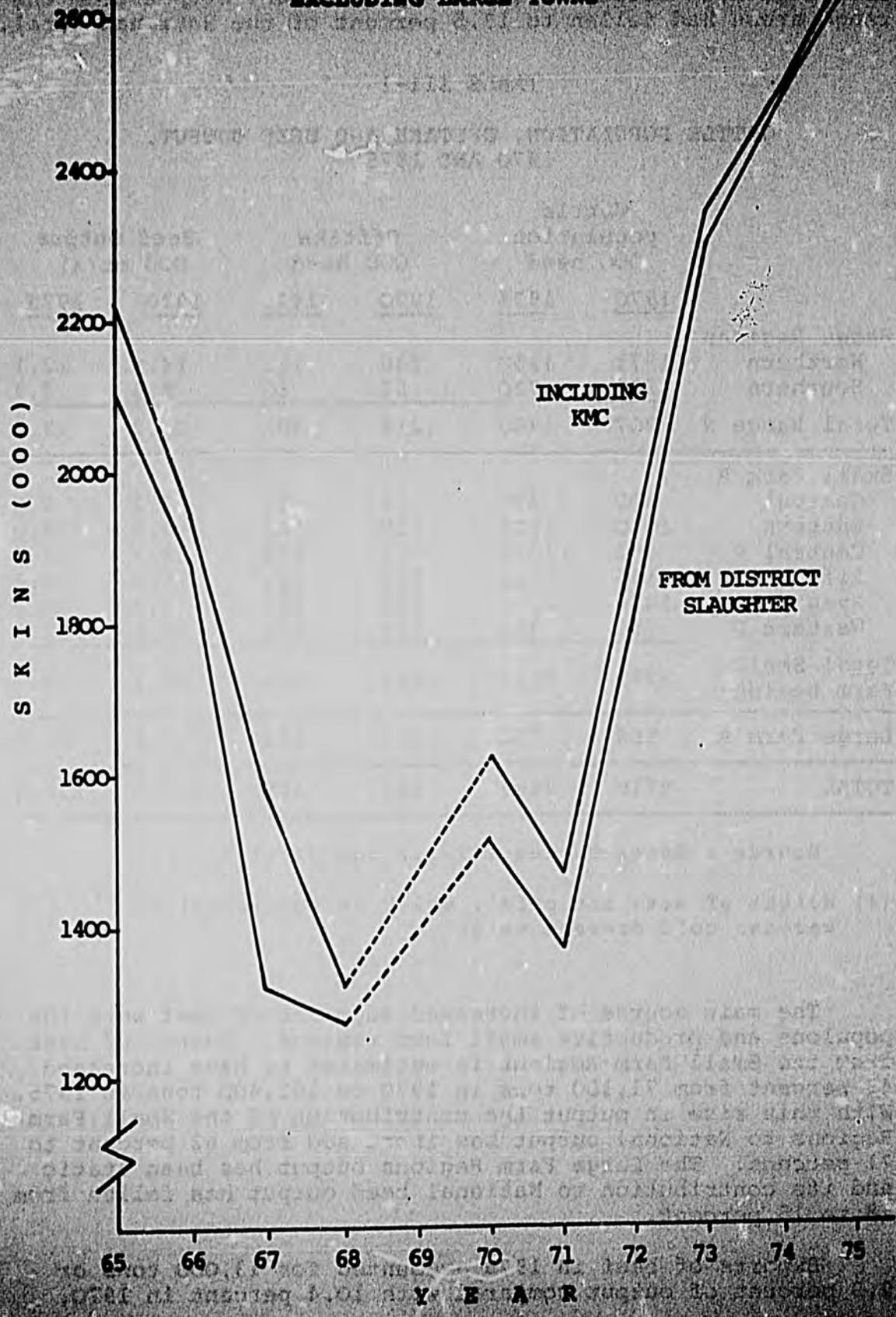


FIGURE III-3

NATIONAL OUTPUT OF SHEEP SKINS 1965-1975  
EXCLUDING LARGE TOWNS



rainfall in the range regions could well reduce the cattle population and eventually the output to levels estimated for 1970. Nevertheless these large but dry range areas of the North and the Southern regions only contributed 20 percent of estimated beef output in 1970. By 1975 beef output from the range areas had fallen to 13.5 percent of the National total.

TABLE III-1  
CATTLE POPULATION, OFFTAKE AND BEEF OUTPUT,  
1970 AND 1975

	Cattle population 000 head		Offtake 000 head		Beef Output 000 mt (a)	
	1970	1975	1970	1975	1970	1975
<b>Range Regions</b>						
Northern	1571	1250	136	121	14.9	12.1
Southern	1336	730	83	80	8.3	7.2
<b>Total Range R</b>	<b>2907</b>	<b>1980</b>	<b>219</b>	<b>201</b>	<b>23.2</b>	<b>19.3</b>
<b>Small Farm R</b>						
Coastal	300	370	32	55	3.2	5.0
Eastern	1090	1523	109	183	12.6	19.0
Central P	482	1081	57	139	8.7	19.3
Rift A	1145	1106	128	181	14.9	18.8
Nyanza P	1478	2327	155	264	17.2	26.4
Western P	756	760	131	129	14.5	12.9
<b>Total Small Farm Regions</b>	<b>5251</b>	<b>7167</b>	<b>612</b>	<b>951</b>	<b>71.1</b>	<b>101.4</b>
<b>Large Farm R</b>	<b>558</b>	<b>550</b>	<b>121</b>	<b>133</b>	<b>20.9</b>	<b>21.8</b>
<b>TOTAL</b>	<b>8716</b>	<b>9697</b>	<b>957</b>	<b>1285</b>	<b>115.2</b>	<b>142.6</b>

Source : Annex Tables III-1.2 and III-1.6

(a) Weight of meat and offal, which is equivalent to carcass cold dressed weight.

The main source of increased supplies of beef were the populous and productive small farm regions. Output of beef from the Small Farm Regions is estimated to have increased 43 percent from 71,100 tons in 1970 to 101,400 tons in 1975. With this rise in output the contribution of the Small Farm Regions to National output has increased from 62 percent to 71 percent. The Large Farm Regions output has been static and its contribution to National beef output has fallen from 18 to 15 percent.

Exports of beef in 1975 accounted for 13,000 tons or 9.3 percent of output compared with 10.4 percent in 1970.

## 2. Sheep and Goat Output

Output from sheep and goats was estimated for 1970 and 1975. Our estimates in Table III-2 show (A) the output of meat and offal and (B) the output in terms of carcass cold dressed weight. Based on CDW, output is estimated to have increased from 27,340 tons in 1970 to 42,190 tons in 1975. The upward shift in numbers and output of sheep and goats from 1970 to 1975 is similar to that of cattle. However, there are interesting differences in the composition of output. In the Range Regions sheep and goat production is estimated to have risen while cattle production fell. This has further increased the contribution of sheep and goats to rangeland output and they now produce almost as much meat and offal as cattle in the Range Regions. The contribution of sheep and goats in the range regions to National output has fallen but at 26.3 percent in 1975 was twice the contribution of rangeland to cattle output (13.5 percent). Large increases in output were also recorded in the other regions. However, we have not been able to establish the reasons for this upward shift in output. It appears from Figure III-2 that part of the rise might simply be a return to earlier levels of population and output rather than entirely new growth in the numbers and output of sheep and goats.

TABLE III-2

SHEEP & GOAT POPULATION, OFFTAKE  
AND MEAT OUTPUT 1970 & 1975

	Population		Offtake		(A) Output Meat & Offal		(B) Output Meat CDW	
	OOO head		OOO head		OOO mt		OOO mt	
	1970	1975	1970	1975	1970	1975	1970	1975
Range Regions								
Northern	2827	3678	474	566	12.4	14.3	8.15	9.40
Southern	855	850	143	128	2.9	2.6	1.91	1.71
Total Range R	3682	4528	617	694	15.3	16.9	10.06	11.11
Small Farm R								
Coastal	363	744	71	140	1.3	2.7	0.85	1.77
Eastern	1607	1879	360	737	7.1	14.6	4.67	9.59
Central P	697	1211	109	207	2.8	4.5	1.84	2.96
Rift A	1553	949	280	311	5.6	6.3	3.68	4.14
Nyanza P	1000	1718	206	454	3.9	8.6	2.56	5.65
Western P	203	245	34	98	0.7	1.9	0.46	1.25
Total Small Farm Regions	5423	6746	1060	1947	21.4	38.6	14.06	25.36
Large Farm R	435	566	159	226	4.9	8.7	3.22	5.72
<b>TOTAL</b>	<b>9540</b>	<b>11840</b>	<b>1836</b>	<b>2867</b>	<b>41.6</b>	<b>64.2</b>	<b>27.34</b>	<b>42.19</b>

## **C. Basic Projections : Land Availability and Current Practice**

Cardinal to our view of the course of livestock production in Kenya are projections of land use and agricultural productivity. We see the amount of meat produced as dependent on :

- The amount of land of each level of agricultural potential available for livestock production.
- The productivity of each of these areas of land in terms of its output of animal nutrients, especially energy.
- The utilization of the available feed by domestic livestock and the efficiency of its conversion into animal products, especially meat and offals.

We have concentrated our attention on domestic herbivores -- cattle, sheep and goats -- as they can produce valuable food from feeds that are not eaten by the human population. Furthermore, the production of forage for herbivores can either form a part of an efficient cycle of land use to maximise the output of human food as demonstrated by Kitale, or the forage comes from areas of low potential for cultivated crops. We make little mention of meat from non-herbivores like pigs and poultry. We acknowledge that pigs and poultry do contribute to the supply of animal protein but a large expansion of output of meat would lead to them competing for foods against the needs of the human population. There is thus no great scope for using pigs and poultry to achieve a large increase in the supplies of relatively cheap meat.

### **1. Analytical Approach**

Our methods of projecting land use are similar to those used by the Town Planning Department and discussed by Mbithi and Barnes (1974, p.37-48). However, realising that highly productive land will become increasingly scarce in the face of rapid population growth, we have not projected an increase in the amount of cultivated land per person in farming, except to compensate for extension of cultivation onto land of lower agricultural potential. Our projection methodology, described in Annex III-2, projects the increase in areas of land put under cultivation with the increase in population up to 1990. There will thus be a continual reduction in the amount of land available for livestock production, especially in regions of high agricultural potential. However, current upward trends in productivity of the livestock sector will probably make up for some of the reduction in grazing land. We see trends favorable to increased productivity as :

- Increased planting of land to highly productive grasses and fodders, and
- Skillful management of temporary and permanent pastures that seems to have enabled farmers in some high potential areas to support high levels of livestock activity per hectare.

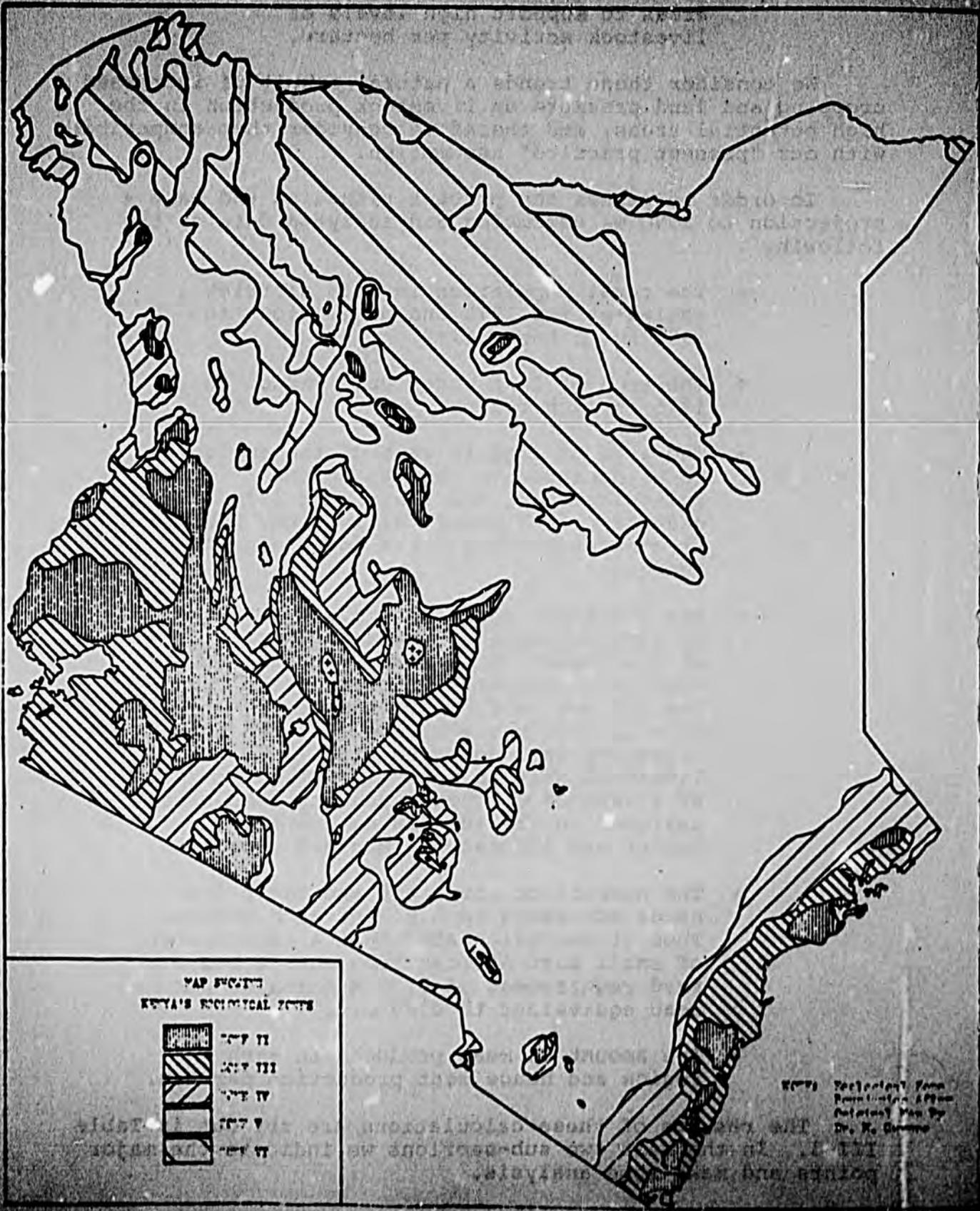
We consider these trends a natural result of increased cropping and land pressure on livestock production in the high potential areas, and therefore consider them compatible with our "present practice" assumption.

In order to assess the present situation and make a projection to 1990 we assembled and analysed data on the following :

- The rural population in each district : estimates for 1975 and projections to 1990 as in Annex II-2.
- The area of land under cultivation in 1975 in each region.
- The area of land in each of the ecological zones depicted on the map on the following page, and the amount left after deducting land under cultivation, housing or otherwise unavailable for producing fodder.
- The livestock carrying capacity of land in each ecological zone using estimates of the number of hectares required to sustain a livestock unit of one 450 kg cow and her calf. For example, for Zone II, 0.6 ha. would be required per livestock unit compared with 42 ha. per livestock unit in Zone VI. Higher levels of livestock carrying capacity were also assigned to the increasing areas of fodder and intensively managed grassland.
- The numbers of livestock and their food needs expressed in L.u. for each region. Thus it was calculated that a typical herd of small East African Zebu cattle had a feed requirement of 0.29 Megajoules per head equivalent to 0.49 L.u.
- The amount of meat produced in each region and hence meat production per L.u.

The results of these calculations are set out in Table III-3. In the next two sub-sections we indicate the major points and make some analysis.

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MAP SHOWING  
 KENYA'S ECOLOGICAL ZONES

	ZONE I
	ZONE II
	ZONE III
	ZONE IV
	ZONE V

1977. Reprinted from  
 "Kenya's Ecological Zones"  
 by Dr. R. G. Bailey

TABLE I  
BASIC SUPPLY PROJECTIONS  
LAND AVAILABILITY AND PRESENT TECHNOLOGY

1975

Region (a)	1975 pop. Estimated 000	Cultivated land per person Ha	Total cultivated land 000 Ha	Estimated area grazing land by ecological zone. 000 Ha.						Conventional stock carrying capacity by ecological zone 000 livestock units	Livestock units recorded 000 L.u.	Meat output. 000 mt								
				II	III	IV	V	VI	Total			Cattle	Goats	Total						
Northern R	816	0.04	32	369	646	1737	19210	12911	34873	-	615	646	434	1601	307	3603	1001	12	14	26
Southern R	250	0.27	68	621	402	1309	1350	-	3682	5	1035	402	327	113	-	1882	422	7	3	10
Coastal R	717	0.25	177	73	755	712	1065	-	2605	8	153	755	178	89	-	1183	242	5	3	8
Eastern R	2160	0.29	636	29	78	440	3552	-	4099	38	72	117	119	296	-	642	922	19	15	34
Central P.	1952	0.19	432	186	260	46	2	-	494	25	452	260	12	-	-	749	714	19	5	24
Nyanza P.	2489	0.16	400	40	732	-	-	-	772	28	100	735	-	-	-	863	1318	26	9	35
Western P.	1578	0.19	296	131	263	-	-	-	394	21	219	263	-	-	-	503	401	13	2	15
Rift A R	1184	0.22	261	244	411	187	755	10	1607	10	443	411	47	63	-	974	630	19	6	25
Rift B R	667	0.38	252	312	420	944	108	-	1784	15	705	420	236	9	-	1385	391	22	9	31
Urban	1639																			
Total	13451	0.22 <sup>(b)</sup>	2554	2005	3967	5375	26042	12921	50310	150	3794	4009	1353	2171	307	11784	6041	143 <sup>(f)</sup>	66	208 <sup>(f)</sup>

1990

Region	1990 pop. Estimated 000	Cultivated land per person Ha (d)	Total cultivated land 000 Ha	Estimated area grazing land by ecological zone. 000 Ha.						Conventional stock carrying capacity by ecological zone 000 livestock units	Livestock units (e) projection 000 L.u.	Meat output. 000 mt								
				II	III	IV	V	VI	Total			Cattle	Goats	Total						
Northern R	800	0.04	32	369	646	1737	19210	12911	34873	-	615	646	434	1601	307	3603	1001	12	14	26
Southern R	397	0.26	106	584	402	1309	1350	-	3645	8	972	402	327	113	-	1822	409	7	2	9
Coastal R	1142	0.26	302	50	653	712	1065	-	2480	15	125	664	178	89	-	1071	219	4	2	7
Eastern R	3437 <sup>(c)</sup>	0.32	760	29	78	329	3552	-	3988	46	72	117	113	296	-	644	925	19	15	34
Central P.	3107 <sup>(c)</sup>	0.23	637	186	78	23	2	-	289	37	465	91	6	-	-	599	571	16	4	19 <sup>(f)</sup>
Nyanza P.	3962	0.18	695	40	437	-	-	-	477	49	100	462	-	-	-	611	933	19	6	25
Western P.	2511	0.20	491	86	134	-	-	-	220	34	143	134	-	-	-	311	248	8	1	9
Rift A R	1884	0.15	287	104	411	187	755	10	1467	19	245	411	47	63	-	785	508	15	5	20
Rift B R	1062 <sup>(c)</sup>	0.78	828	115	84	944	108	-	1251	49	286	126	246	9	-	716	202	11	5	16
Urban	4233																			
Total	22535	0.23	4137	1563	2923	5241	26042	12921	48690	257	3023	3053	1351	2171	307	10162	5016	111	54	165

(a) Note that the Districts are grouped in regions which may/may not coincide with provincial boundaries.

(b) Per capita of rural population.

(c) Included in these figures are people for whom an area of food production was provided outside the region.

(d) These figures are designed to show the agricultural performance of the region by relating cultivated land to the population of farming households.

(e) Livestock units projected 1990 calculated using the same ratio of stock carrying capacity to L.u. as in 1976.

(f) Does not add - rounding.

## 2. August 1975

The first three columns of Table III-1 show our calculations of the number of hectares in each region available for cultivation. The fourth column gives the results of our calculation of available grazing land made by subtracting the cultivation requirements, and other non-agricultural uses as explained in Annex III-2, from total hectares in each ecological zone. The table indicates that, in 1975, there were 50,310,000 hectares available for grazing. Applying our conventional stock carrying capacities for each ecological zone and in each region, the next column shows that these 50,310,000 hectares of land available for grazing had a total conventional stock carrying capacity of 11,784,000 livestock units, as defined above. However, the total number of livestock units recorded was only 6,041,000 livestock units, which is our animal population figure developed in Section B above translated into livestock units. The meat output in the final column is also from the analysis in Section B above. Thus, based on conventional stock carrying capacity, considerable capacity is unutilized.

Further, comparison of the estimated carrying capacities and the number of livestock units being sustained in 1975 shows considerable differences between the two columns of figures. In the Northern and Southern Range Regions and in the Coast Region the carrying capacity far exceeds the estimated number of livestock units being sustained. There are various explanations for this difference but there is a general presumption that these regions could be developed to sustain higher levels of livestock activity than at present. However, the difference between carrying capacity and the estimated number of livestock units being sustained probably overstates the scope for increased output due to :

- Absence of data on the number of livestock other than cattle, sheep and goats and thus omission of the forage needs of camels and wild life.
- Constraints on the numbers of domestic herbivores other than food, such as tsetse fly along the Coast.
- Forage output far below the potential of the region due to denudation, relatively unproductive types of plant cover and adverse weather.
- The possible understatement of the number of domestic herbivores in the region.

Eastern Region and Nyanza Region appear to be sustaining more livestock activity than their estimated carrying capacity. This may be simply due to enormously high estimates of the numbers of domestic herbivores but could also be accounted for by low levels of livestock performance, or high

levels of forage productivity.

### 3. Projection to 1990

The projected population increase of 57.5 percent between 1975 and 1990 sets in train the changes in land use and livestock production shown in our projections in the lower half of Table III-3. The relatively small amount of land (1,620,000 ha.) transferred from grazing to cultivation comes mainly from Zones II and III and thus causes a notable drop in livestock output under our current practice assumption. The area of Zone II grazing land falls by 22 percent and that in Zone III by 16.3 percent. The livestock carrying capacity of Zones II and III then falls by over 20 percent despite the projected increase in intensive forage production. Overall the projection shows a 14 percent fall in the livestock carrying capacity of the country. The projection then shows meat output falling 21 percent from 209,000 tons to 165,000 tons due to :

- The fact that most of the reduction in carrying capacity occurs in regions with above average livestock productivity.
- The assumed absence of change in the levels of productivity and utilization of the grazing areas by cattle, sheep and goats.
- The assumed absence of change in the amount of meat produced per livestock unit.

We stress that these are our basic projections and are dependent on the assumptions made. We do not believe meat production in Kenya will fall to such an extent. These basic projections are needed to construct our other two projections : assuming a continuation of current livestock and meat policies (sections D and E below) and assuming implementation of our recommended policies (sections F and G below).

## B. Livestock Policies

In this section, we describe the present Kenyan livestock policies as we observe them. The first section covers the broad policies; the second, much longer, the detailed policies. The detailed policies cover only livestock production, since the objective is to determine the impact on supply. An exception is price policy, which is covered as a whole.

### 1. Broad Policies

We have been unable to find a written statement of broad livestock policy in Kenya. This is not surprising, as Governments rarely set out broad policies in writing. Therefore, we prepared, during the course of the study, a brief statement of our own as to what broad livestock policy is, and submitted it to the first panel group convened by the Ministry of Agriculture. There was some discussion during the meeting and subsequently written comments were provided by the Ministry. Below, we provide our brief summary of broad livestock policies as presented to the panel, divided into eight points, along with the comments provided by the Ministry of Agriculture.

#### a. Orientation of the Livestock Sector

It is desired to increase livestock production faster than the population increase. Both domestic consumption and exports are to increase. There is no stated priority between domestic consumption and exports, but de facto policy is to favor domestic consumption. That is, the local population will be given meat first and it is not the intention of the Government to promote an export surplus by policies which will reduce domestic consumption (prices, taxes, subsidies).

The main thrust of policy will remain toward beef, in spite of the preponderance of beef in the local livestock marketing picture. Sheep and Goats are not to be emphasised. A significant effort in poultry is desired.

#### Comment

It is not true to say that the de facto policy is to favor domestic consumption over export. Most of the investments in the livestock industry, especially beef, is aimed at enabling the country to produce an export surplus. Although there is a deliberate attempt to achieve a balance between domestic consumption and export, there is no intrinsic reason why in the long run exports of beef cannot qualify for export subsidy as many other products that earn Kenya Government foreign exchange.

It is not true to say that sheep and goats are not to be emphasised. The Sheep and Goat Project indicates the emphasis the Government places on sheep and goats.

b. Land Use

Expansion of smallholder agriculture in livestock, and income distribution through livestock ownership is a high priority. Takes precedence over national production:

Comment

The statement that expansion of smallholder agriculture in livestock and income distribution through livestock ownership is a high priority is acceptable. However, it is not true to say that this policy takes precedence over national production. (Ref: Livestock Development in Kenya, a final Report of the livestock and meat working party, 1971 - Part one, page 216 paras 10.73 - 10.74)

c. Price

Policy is to carefully balance needs of consumer for reasonably priced meat and those of producers for adequate income. Priority is (1) consumers, (2) producers and (3) middlemen, such as abattoirs and butchers.

Comment

The policy is to carefully balance the needs of :

- (a) Consumers (especially middle and lower income groups) for reasonably priced and readily available meat with those of
- (b) Producers who must have profits and incentives to get an adequate return on investment, pay off loans and further invest in the livestock industry, and
- (c) Butchers who must achieve certain profit levels as well.

This policy is achieved through a price control system whereby KMC's floor producer prices and also KMC's wholesale prices for the local market are set by Government. All beef, sheep and goat retail prices are set by Government.

In the process of trying to mediate between the needs of consumers, producers and butchers (as to the price levels they can achieve) there are sometimes inequalities and lags which favour one group or another. However, the Government intention is to attend to the needs of each.

One other factor worth noting is that the pricing system is intended to distribute incomes to the farming sector by obtaining better terms of trade between Agriculture and other sectors of the economy. While looking at this side, we nevertheless make sure that price

Rises do not induce "cost push" inflationary spiral because meat is one of the "Wage goods". The argument often advanced that our pricing system, particularly with regard to beef, protects, subsidises the Urban elite is no longer valid in the experience of the last 3 years.

#### d. Organisation of Industry

Human habitation and crops have a higher priority than meat livestock. Therefore, policy is to shift livestock production to low potential areas less suitable for crops, and stratification, which implies movement of animals, and feedlots. Again, however, human consumption of grain comes first, so feedlots must use non-human grain feeds.

#### Comment

It is not correct to make a general statement that human habitation and crops have a higher priority than meat livestock because this ignores regional comparative advantages. Development on beef cattle, sheep and goats will be mainly confined to medium and low potential areas which are less suitable for crops but dairy cattle (which also produce beef), cattle, pigs and poultry production will remain in the high potential areas.

#### e. Pastoralist Management

A major element in increasing marketing production is to increase offtake rates of pastoralists. But there is no policy of legal or economic coercion and incentives are mainly making marketing services available. De facto this policy is not high priority, on the basis of LMD actual operations.

#### Comment

LMD operations are a priority in our integrated approach to livestock development.

#### f. Support for Sector

Clear policy to provide, directly and through foreign assistance, heavy technical and financial support to the sector, including veterinary, range and water development, loans, marketing services and facilities, feedlots and processing facilities.

#### Comment

Agreed.

#### g. Wildlife and Livestock

Although ultimately there may have to be a choice between the two, policy is to find ways to promote both tourism (wildlife) and livestock production. When

hard decisions are required, livestock will be

### Comment

Agreed. But, when hard decisions are required, each decision will be considered on its merit based on land use information and recommendations available at the time.

#### h. K.M.C.

It is desired that the KMC provide a variety of benefits, such as high quality processing, buyer of last resort, exporter, employer and instrument of Government control over the industry, as well as commercial profits. The non-commercial services have priority.

### Comment

No comment received.

We believe this was an interesting exercise, but one which will not move matters ahead very much. We proceed to the discussion of detailed policies and observed and understood by the study team.

## 2. Detailed Policies as Observed

Detailed policies are covered under several headings. We begin with a general discussion of the policy toward social constraints which we consider vital to the basic problem of grazing control. We then cover, also rather generally, the policies and priorities between cattle and smallstock. More detailed coverage is given to rangelands development, ranch development, transportation and stratification, high potential areas, and price policies. In each of these, we make an attempt to quantify the supply impact of the existing policies. Since the policies have overlapping effects, we have had to separate out the effects in each area, a rather artificial but useful exercise. Price policy, reserved for last, clearly runs through all other policy areas.

The second half of the analysis, involving our policy recommendations and their supply impact, is covered in Section III-F below.

### a. Social Policy and Constraints

A major livestock policy factor in Kenya is social policy and social constraints.

First, much of Kenya's livestock production is carried out by pastoral or nomadic people who have traditional ways of doing things. Significantly, this frequently involves open rangeland and a complete absence of grazing control except that forced by drought. This is a way of life and is very well documented. As population, both human and animal, increases, there is a natural tendency to increase stocking rates.

land. This leads to overgrazing, which in turn leads to range deterioration. In periods of limited rainfall, the effects are very serious. Since Kenya has just passed through a period of severe drought, the effects are obvious and on everyone's mind. A few good years of rain will allow significant range recovery, increased stocking rates, and the problems may fade from view until the next drought period. On the other hand, in much of Kenya, drought of some kind occurs in some areas every year, so the problem on a smaller scale is always present.

It is our observation that current policy is to take these traditional methods and arrangements into account when implementing livestock projects. This is obviously beneficial from the point of view that it encourages much needed cooperation on the part of the nomads and pastoral people. On the other hand, it makes the Government hesitant to exert strong pressure on the herdsmen to change their methods and, especially, to organise themselves to manage the grazing lands. As a result, grazing management and control are the weak points in the livestock development effort.

A second observed de facto policy is to give high priority to ownership change and income distribution through agricultural, including livestock, development policy. Individual, usually European ownership has gradually shifted, through Government pressure and finance, to African ownership, usually by groups of people. The Government's policy is, obviously, to achieve production increases at the same time, but the ownership change and income distribution priorities are high indeed and, in reality, are considered higher priority than production increase. This is doubtless a necessary policy but it does constitute a constraint on optimisation of production.

Third, we observe that a major policy objective is low priced meat for the consumer, especially the poorer consumer. To date this has put a cap on the prices which could be charged and obtained throughout the livestock and meat producing and marketing chain.

These three areas of constraint are important in that they prevent policy makers from making policy decisions for the livestock and meat industry totally on economic grounds. Of course, such policy decisions are never made in any country on totally economic grounds, but it may be that the social factors are relatively more important in Kenya than in some other countries.

The effect of these policies is not quantified here but their impact is felt, and discussed, under various other headings. Needless to say, however, they tend to hold down output and to increase consumption of meat in Kenya.

b. Cattle, Sheep and Goat Policies and Priorities

In Kenya, meat for consumption is provided by cattle, sheep, goats and non ruminants such as pigs and

poultry, as well as game animals. The ruminants account for the bulk of the total, and among the ruminants cattle account for a far larger proportion than do sheep and goats. Statistics on this point are given in Section C above and elsewhere in this report. We believe that the relatively small contribution of sheep and goats is, in large measure, a result of the relatively low priority which has been placed on this aspect of the industry in Kenya. One need only look at the relative number of projects and sums spent for the development of sheep and goats as compared with cattle. There has been, to our knowledge, only one significant sheep and goat project carried out in recent years and that, although successful, is coming to an end.

We believe that one of the reasons for this relatively low priority is the lower degree of interest, traditionally, displayed by the African herdsmen in smallstock. Traditionally, smallstock has been the province of the women in the family while the men managed the cattle.

The priorities have resulted in a lower than optimum ratio of smallstock to cattle in Kenya and, therefore, to lower overall meat production. In Section F below, where we make our recommendations, we recommend greater emphasis on smallstock on the basis of our analysis of the most economical sources of animal protein.

We might also note that there appears to be a growing belief in Kenya that the past priorities have been somewhat misplaced and that sheep and goats should have a higher priority.

## **c. Animal Health**

### **(1) General Comments**

Animal health was not listed specifically in the Terms of Reference as a policy area to be covered. However, we have chosen to include it because of its importance as a factor in livestock production and therefore the supply of livestock.

Animal diseases constitute one of the most important constraints on an efficient and profitable livestock industry. In Kenya, disease loss is probably between 30 percent and 40 percent, although we have been able to obtain no official or research-based figures on this point. If malnutrition and "hollow belly" are included, the loss percentage would be still higher. And these high loss figures are in spite of Kenya's having one of the best Department of Veterinary Services in Africa.

It is sometimes argued that developing countries such as Kenya put too much emphasis on animal health, with the result that cattle populations, relieved of the worst epidemics of highly fatal diseases such as rinderpest, grow too rapidly and cause overgrazing, range deterioration and erosion problems. We do not accept this argument, and, rather, believe that overgrazing and other problems must be attacked directly, rather than depending on disease to control populations. A possible exception is tsetse infestation, which is discussed in some detail below. Generally, we agree with the idea that a modern livestock industry cannot be developed or maintained until and unless the major epidemic diseases are controlled.<sup>1</sup>

### **(2) Basic Animal Health Policy**

We interpret Kenya's basic animal health policy as taking a strong leadership role in the control or eradication of major epidemic diseases, notably rinderpest, which has been eradicated in Kenya, coupled with a pragmatic, areas-based policy on other diseases. In the recent past, this has meant the establishment and maintenance of a "Disease Free Zone" (DFZ)<sup>2</sup> in the central, high potential part of the country, with compulsory vaccinations and strict quarantine procedures to prevent the entry of diseased animals from outside of the zone. In other areas of the country, the policy has been to do some preventative and curative vaccination work on an area by area and disease by disease basis, but not to attempt any full scale eradication programs. A major reason for not doing so, other than cost,

1. Prichard, W.R. Animal Disease Constraints to World Food Production. Theriogenology, August-September, 1976.

2. The DFZ is better called a Specific Disease Free Zone (SDFZ) and now, with FMD outbreaks, a "Compulsory Vaccination Zone".

Is the fact that the Northeastern and Northern borders are open to animals crossing between Kenya, Somalia, Ethiopia and Sudan, with the result that disease can easily re-emerge even if it were eradicated in Kenya. The result of not eliminating major diseases in most of the country's area is that very heavy dependence is placed on quarantine procedures.

A further element in Kenya's animal health policy is the continuing support of research into many areas of animal health. The Department of Veterinary Services carries out considerable research as to a number of local and international institutions located in Kenya. More is given on this subject in Annex III-5, covering research programs in Kenya.

In support of its animal health policy, Kenya has created and supports an excellent Department of Veterinary Services, one of the best in Africa. The Department has several operational units, which indicate the coverage and responsibility. These include Field Services - Disease and Pest Control, Research and Vaccine Production, Hides and Skins, Meat Inspection, Artificial Insemination and Clinical Services, which has recently been added. A partial organisation chart giving the authorised staffing is given at the end of this section.

### (3) Major Problems

Based on observation, discussions and a review of pertinent reports, there are two major problems with Kenya's de facto animal health policy. First, although the Department of Veterinary Services is an excellent and well-run operation, it has inadequate financial support. There is adequate, or nearly adequate manpower but much of the manpower appears to be less than fully effective because of a lack of operating funds. There are too few vehicles, petrol and maintenance funds are lacking and, we understand, even essential equipment such as syringes, needles and drugs are in short supply. This is a situation common to Government services in many countries, but with a department which is basically so strong, and whose role is so crucial to the industry, it seems very short sighted to starve it for operating funds. Continuation of this policy can lead to a serious deterioration of the whole Service and industry.

The second major problem is that of illegal movement of cattle, which appears to be growing. As noted above, Kenya relies very heavily on quarantine and movement control to prevent the spread of disease from those areas not under full control into those key areas which are under control. Illegal movement defeats the system, and illegal movement from areas suffering outbreaks to other areas also spreads disease. This is a trend which could get progressively more serious unless it can be reversed. Reversal will require a major de facto policy change coupled with increased financial support for movement control. We are aware that the recent drought has probably caused part of the upswing in illegal movement, but this does not change the basic point.

#### (4) Specific Diseases

##### (a) Foot and Mouth Disease (FMD)

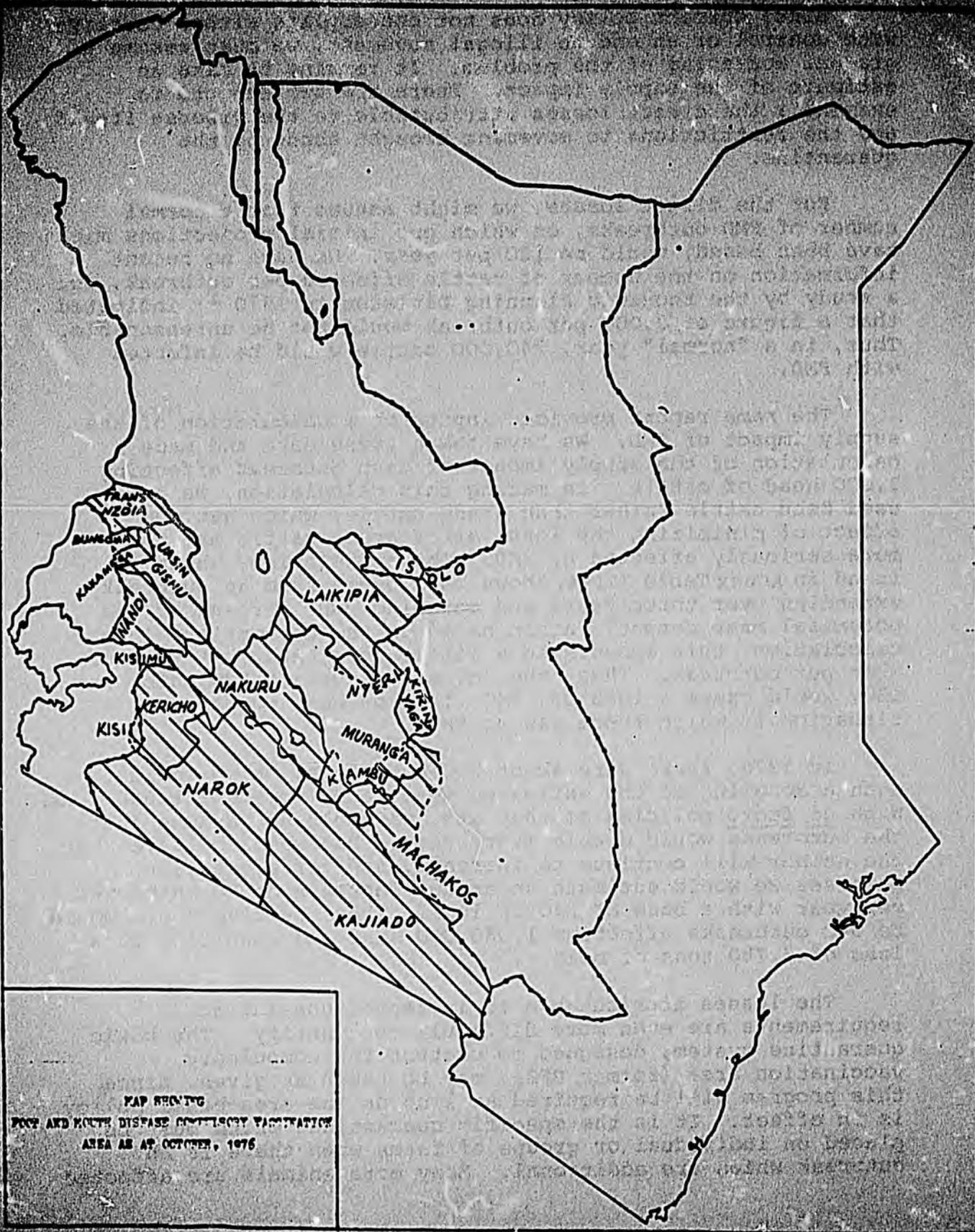
FMD is a major epidemic disease in Kenya. It has serious economic effects. Although mortality is usually low, the number of animals affected is high and the disease causes loss of milk production, abortions and some calf deaths, lameness and general loss of condition. Surviving animals may never return to normal. It is difficult to place a figure or value on the economic losses, especially since there are four major types of FMD active in Kenya (of the seven identified worldwide), A, O, C and SAT2, which differ in their effect on cattle and which require differing vaccination programs. FMD also has an important effect on the export program, particularly to Switzerland, which was dependent on a reasonable degree of assurance that the cattle slaughtered for that purpose are free of the disease. Export to Switzerland is currently suspended.

The Government clearly recognises the seriousness of FMD and operates a special FMD laboratory at Embakasi. Further, with the help of a special Livestock Disease Control Program (Swedish assisted) has extended the compulsory vaccination area to Kajiado and Narok and is carrying out the vaccination campaigns.

Nevertheless, it appears that the problem of FMD is becoming more serious. The annual reports of the Veterinary Services Division in each province cover the number of FMD outbreaks and we have been able to review these, with the assistance of the Ministry of Agriculture Economic Planning Division, for 1973, 1974 and 1975. These reports show for all provinces combined approximately 240 FMD outbreaks in 1975 as compared with approximately 130 in 1973 and 135 in 1974. We say approximately, because we were not able to locate all provincial reports for each year and had to do some minor estimating.

The major problem areas in 1975 were Eastern Province which reported 81 outbreaks, far above normal, and Central Province, with 41 compared with 7 in 1974. Note that the entire Central Province is located within the former DFZ, although the current map of the "compulsory vaccination area" for FMD, furnished by DVS, excludes parts of the Province. We do not have data for 1976 but have heard from several sources that it was also a bad year for FMD.

The main problem is clearly illegal movements, as stated and agreed by virtually all veterinary and other officials with whom the matter was discussed. Kenya's policy is obviously to stop illegal movements, but de facto we do not see it happening, since it requires both a major political/policy decision and resources to implement the policy. A second problem is that some FMD outbreaks are inevitable as long as the area-based policy remains in effect. In other words, the only way to control FMD completely in any part of Kenya, is to control it in all parts of the country through



MAP SHOWING  
POX AND MOUTH DISEASE COMPULSORY VACCINATION  
AREA AS AT OCTOBER, 1976

## country-wide program of massive vaccination.

Since current policy does not contemplate either country-wide control or an end to illegal movement, we must assume a gradual worsening of the problem. It remains to make an estimate of the supply impact. There are two aspects to examine: the direct losses attributable to the disease itself and the restrictions to movement brought about by the quarantine.

For the direct losses, we might assume that a normal number of FMD outbreaks, on which our initial projections might have been based, would be 120 per year. We have no recent information on the number of cattle affected per outbreak, but a study by the Economic Planning Division in 1970<sup>1</sup> indicated that a figure of 2,000 per outbreak would not be unreasonable. Thus, in a "normal" year, 240,000 cattle would be infected with FMD.

The same report provided inputs to a calculation of the supply impact of FMD. We have taken these data and made a calculation of the supply impact of each outbreak affecting 2,000 head of cattle. In making this calculation, we have used Zebu cattle rather than grade cattle, which has the effect of minimizing the loss, since grade cattle are much more seriously affected by FMD. The calculation, which is found in Annex Table III-4, shows the losses from an outbreak extending over three years and totaling ten percent of the potential meat output. Again based on the assumptions in the calculation, this amounts to a little more than 7.0 tons of meat per outbreak. Thus, the "normal" level of FMD outbreaks, 120, would cause a loss of 840 tons of meat compared to a situation in which there was no FMD.

In 1975, there were about 240 outbreaks, which would mean a doubling of the estimated meat loss, to about 1,680 tons. With de facto policies as they are, we would not assume that the outbreaks would double every year. But we do believe that the number will continue to increase, and for projection purposes we would estimate an annual increase of 20 outbreaks per year with a base of 240 in 1975. Thus, by 1990 there would be 540 outbreaks affecting 1,080,000 head and resulting in a loss of 3,780 tons of meat.

The losses attributable to increased quarantine requirements are even more difficult to quantify. The basic quarantine system, designed to protect the compulsory vaccination area (former DFZ), may be taken as given, since this program will be required as long as the area-based policy is in effect. It is the specific quarantines which must be placed on individual or groups of farms when there is an outbreak which are additional. Many more animals are affected

1. Constable, M. Draft Evaluation of the Proposed Phase One Extension of the Foot and Mouth Disease Control Programme in Kenya, MoA, Economic Planning Division, Sept. 1970.

by these quarantines than by the disease itself. The loss of condition etc. is clearly less severe than with the disease itself, but the quarantines require uneconomical holding of animals otherwise ready for slaughter, sometimes carry animals over into the dry season where grass is less available and weight loss is possible, and there are losses simply due to delayed sales. We believe that these would add up to a loss in potential meat production of 50 percent of the direct costs of the disease itself.

Thus, the 1990 "cost" of the present policies continuing could be over 5,600 tons of meat.

(b) East Coast Fever (ECF)  
and other Tick-borne Diseases

ECF is the major killer of cattle in Kenya. The mortality rate is high; about 90 percent of fully susceptible cattle die when infected with this blood protozoa. It is reported that, in endemic areas, 10-30 percent of calves die from this disease. The Department of Veterinary Services (by Dr. W.P.H. Duffus) has estimated that approximately one half of the total cattle population in Kenya lives in areas where the main tick vector, Rhipicephalus appendiculatus, is present. Total ECF deaths in cattle more than one year old are estimated to be 50,000 to 70,000, with very large numbers of calf deaths as well. A recent IDS paper<sup>1</sup> indicates that 35 percent of all heifers produced by A.I. never calve, 80 percent of them because they die of tick-borne diseases. The paper estimates that of 112,000 A.I. heifers born in 1973, 28 percent, or more than 30,000, died of ECF. Presumably a similar number of grade bull calves also died. We might estimate that there are as many as 100,000 calf deaths annually due to ECF and related diseases. This disease hits grade cattle and improved local breeds very hard, thus increasing the economic loss. An important hidden cost is that, in infected areas, the risk of ECF discourages upgrading of cattle. And there is the direct effect of ticks on cattle, which involves loss of blood, abscesses and toxins which interfere with metabolic processes and liver functions.

Currently, the only protection against ECF is short interval dipping or spraying with acaricides, as often as twice weekly. This is expensive, but its worth is widely recognised in Kenya and dipping is actively pursued by all types of cattle producers and the Department of Veterinary Services. Outside of cost, the main problem is poor dip and spray maintenance, with chemicals not up to strength, and poor dip discipline. There are still not enough dips, presently an estimated 4,500 in the country with a requirement for 1,500 more.

1. Hopcraft, P.N., Musangi, R.S. and Ryanga, R.B. An Evaluation of the Kenya Dairy Improvement Program, IDS, occasional paper No. 20, 1976.

As with many other diseases, a spread of the disease is to be expected, since the movement of an infected animal, or an animal carrying infected ticks, can spread the disease into new areas. Illegal movement, then, can be a serious problem and is reported to be so.

Another more desirable approach to combat ECF is immunisation. Work done in Kenya, spearheaded by the FAO team at Muguga, is a major scientific breakthrough. There is, however, controversy about the use of this and other possible vaccines, with regard to effectiveness and the possible danger of creating a carrier state in cattle. Research is continuing. Even a successful vaccine would not eliminate the need for dipping against other tick-borne diseases and the tick itself, but the interval could be longer and, presumably, the cases arising from poor dip discipline and management would be very much reduced.

We interpret current de facto policy as being to complete the construction of dips so that there will be an adequate number. There are proposals for a complete takeover of dip supervision by DVS in areas where dip management and discipline are weak, mainly smallholder areas, and there have been funding requests to support this effort. However, we see no strong policy to control increasing illegal movements which are tending to spread the disease into new areas and require more extensive dipping. Thus, in spite of the present policy to both expand the number of dips and to try to improve dip management and discipline, we believe that the increasing problem of illegal movement will gradually result in increased ECF around the country. To quantify the losses reflected in this gradually increasing incidence of ECF, we would estimate that the number of deaths in cattle one year old and above would increase by 3,000 head per year, or from a current estimated base of 70,000 to 112,000 by 1990. For calves, we would project an annual increase of 5,000 head, or an increase from an estimated current base of 100,000 head to 170,000 head by 1990.

Losses resulting from ECF strike most heavily in graded cattle, which means they effect milk production as much or more than beef production. However, since we are concerned mainly with meat production, we state the entire loss in terms of meat. For cattle more than one year old, we calculate that each death loss results in the loss of 100 kg of meat. For calf deaths, the calculation could be very complicated indeed, but to obtain an order of magnitude, we will use a figure of 40 kg of meat. For grade calves, this very much understates the actual monetary value of the animal lost to ECF. The present losses due to ECF, according to these rough calculations, is 11,000 tons of meat, and this will increase by 1990, under present policies regarding movement control, to 18,000 tons, a difference of 7,000 tons.

### (c) Trypanosomiasis

Trypanosomiasis, transmitted by the tsetse fly, is a major disease problem over about two-thirds of tropical Africa, including perhaps half of the actual and potential grazing area of Kenya. It is a highly controversial subject. Some regard it as the largest single factor inhibiting livestock production in Africa; others look upon it as the most important factor preventing overgrazing and range deterioration.

Unlike Uganda and Tanzania, Kenya has engaged in relatively few large scale tsetse fly eradication programs. Currently, there is some bush clearing carried out to reduce infestation, and there are other areas, such as the Kerio Valley, which appear to offer good returns from bush clearing and other eradication efforts. Basically, Kenya's policy is to control the damage by the disease through chemotherapeutic preventive prophylaxis and treatment, while encouraging and supporting extensive research on the subject, particularly at the International Laboratory for Research on Animal Diseases (ILRAD) at Kabete. Present policy is to continue this approach and to refrain from large scale eradication programs until (1) land use is intensive enough in the area to be cleared, such as the Coast, to justify the very high cost and (2) population density is high enough so that the bush will remain cleared and reinfestation prevented. In the case of the Coast, item (1) may be a long time coming and item (2) may never come even with full ranch development. Therefore, it may be that Kenya can and should continue the present major dependence on drug inoculation.

This report is clearly not the place to try to settle the complex issues surrounding tsetse fly and trypanosomiasis. The disease is definitely a problem in large parts of Kenya and especially at the Coast. Kenya is depending heavily on increased cattle production in Coast Province. The presence of tsetse fly has been and will continue to be an obstacle to full development, although development of ranches is moving ahead. We believe that the tsetse fly will prevent the theoretical optimum utilization of the Coast area for cattle grazing if major dependence is placed on chemotherapy and prophylaxis. There are surely areas of fly concentration so high that this approach will not work and the land will not be used for cattle. This will mean that the Coast will not achieve full theoretical utilization shown in the basic projections under present policies and present technology.

However, we are reluctant to state that present policies definitely mean that full utilization of the Coast lands for livestock production cannot be achieved. We offer two possibilities. First, in areas where cattle cannot be raised with chemotherapy and prophylaxis, it is quite possible that other animals, such as goats, may be. Secondly, with the high level of research under way in Kenya and elsewhere, it is quite possible that a major breakthrough will develop which will permit an eradication program with less cost and less environmental risk than is now the case. Therefore, although

we do recognise that under present technology, the present policies will not permit full utilisation of the Coast areas for cattle production, we will not lower our projections for that reason.

(d) Contagious Bovine Pleuropneumonia (CBPP)

The incidence of CBPP is rather low in Kenya. Its main effect is the cost of the quarantine program needed to keep it out of the high potential parts of the country, since all cattle coming from the Northeast are held in CBPP quarantine for at least three months. When cases are discovered, the quarantine period becomes much longer. All of this very much delays cattle movements. Present policy does not seem to be for a complete eradication program, although with so little of the disease in Kenya one would be possible. We would not attribute any negative supply effects to the present policies.

(e) Contagious Caprine Pleuropneumonia

This is a very serious disease which affects goats, and appears to be on the increase. It has a very high mortality and no effective vaccine is available. Antibiotic treatment is effective if initiated early, but involves the risk that goats so treated may become carriers and spread the disease. Many feel that treatment is worse than no treatment and that affected goats should be allowed to die.

Kenya's policy is to seek a vaccine through research work at Kabete. This is essential since an effective vaccine is necessary if goats are to become significantly more important in the meat supply of Kenya.

(f) Rift Valley Fever (RVF)

This is an insect-transmitted virus which does not appear to be a major problem at the present time. High abortion rates and other losses in calves and lambs accompanied a heavy outbreak in the 1950s and, with the buildup of sensitive animal populations, another outbreak is easily possible. An excellent vaccine is available and is used in small amounts.

(g) Rinderpest (R)

This was a top priority in Kenya for many years, but for the past 15 years has been under control through effective vaccination. Vaccination must continue in calves and yearlings to maintain control, and this is present policy.

(h) Reproductive Diseases

There are several of these, including Mastitis, Vibriosis, Trichomoniasis, Bovine Leishmaniasis, and

epidemiology. They cause low reproductive rates. Isolated cases of these diseases, particularly brucellosis, are reported each year and vaccine treatments are given. Although, presumably, a campaign to eliminate these diseases would result in increased calving rates, we do not have information to quantify this.

(i) African Swine Fever (ASF)

This disease, which was first identified in Kenya, is potentially very serious in that no vaccine exists and it is potentially very dangerous. It is carried by wild swine and ticks. Kenya's policy has been to control the disease through strict enforcement of the Pig Paddock Ordinance, which breaks contact between wild and domestic pigs. This has been successful and, although there is always a threat of a breakout, we do not believe present policy carries a negative supply impact.

(j) Internal Parasites

The two main diseases in this category are helminthiasis and coccidiosis. We believe the incidence of these problems is widespread, but have no quantitative data. They have a significant effect on meat output because a wormy animal is an inefficient animal. Coccidiosis causes rapid loss of weight and may cause death. The problem can be eased by improved sanitation and by systematic use of dewormers, particularly in younger animals. We have not identified any specific policy toward these problems and so make no estimate of supply impact.

(5) Aggregate Supply Impact of Present Policies

Although we offer a number of recommendations in Section F.3 of this chapter, we conclude that current policy with respect to only two animal diseases, FMD and ECF, will have a negative supply impact between now and 1990. For FMD, we have used a fairly elaborate calculation to determine that the annual losses will increase from 1,680 tons of meat (sharply up from two years earlier) to about 3,780 tons between 1976 and 1990. Our calculation for the increasing losses to ECF is less sophisticated, and suggests that meat losses will increase from 11,000 tons at present to 18,000 tons by 1990. Aggregating the losses, we have an increase of from 12,680 tons to 21,780 tons, an increase of 9,100 tons.

**FIGURE III-3**

**PARTIAL ORGANISATIONAL TABLE OF THE DEPARTMENT OF VETERINARY SERVICES. (DOES NOT INCLUDE FINANCIAL, SECRETARIAL, OR AUXILIARY STAFF SUCH AS DRIVERS, ETC.)**

**DVS**

**DDVS**

<b>Field Services- Disease &amp; Pest Control</b>	<b>Research &amp; Vaccine Production</b>	<b>Hides &amp; Skins</b>	<b>Meat Inspection</b>	<b>Artificial Insemination</b>	<b>Clinical Services</b>
7 PVOs	CVRO	9 VOs	Chief	1 SVO	
69 VOs	DCVRO	4 Inspectors	Deputy Chief	3 VOs	
130 LOs	6 SVROs	18 Hides & Skins improvement officers	13 VOs	45 LOs	Just becoming operational
809 AHAs	19 VROs + technicians & Lab. assistants		56 lay inspectors	195 AHAs	

**Abbreviations :**

<b>DVS</b>	<b>Director of Veterinary Services</b>
<b>DDVS</b>	<b>Deputy Director of Veterinary Services</b>
<b>PVO</b>	<b>Provincial Veterinary Officer</b>
<b>VO</b>	<b>Veterinary Officer</b>
<b>CVRO</b>	<b>Chief Veterinary Research Officer</b>
<b>DCVRO</b>	<b>Deputy Chief Veterinary Research Officer</b>
<b>SVRO</b>	<b>Senior Veterinary Research Officer</b>
<b>SVO</b>	<b>Senior Veterinary Officer</b>
<b>LO</b>	<b>Livestock Officer</b>
<b>AHA</b>	<b>Animal Health Assistant</b>

#### d. Rangelands Development (Blocks)

A major livestock development policy in Kenya is to increase the production of livestock in certain, very large pastoral areas through range or block development programs. These programs are being carried out in the North Eastern Province and part of the Eastern Province, in districts that are entirely in ecological Zones V and VI.

##### (1) Description of Projects

There are two major range development projects. The most important is the North Eastern Range Development Program, which has completed Phase I and is now implementing Phase II. These phases have been carried out under the First and Second Livestock Development Projects respectively, and are financed largely by USAID. The second project is the Isiolo Range and Water Development Program, also included under the Second Livestock Development Project, but with Canadian funds. This project is just getting under way and will not be discussed further.

There are also other rangeland development projects in Kenya which reflect policy to develop rangelands and livestock. An example is the USAID-supported Masai Range and Livestock Development Project. We do not deal specifically with these projects, and assume for convenience that their contribution to supply are part of the base projection.

Phase I of the North Eastern project began in 1970 and was completed in 1974. It involved 924,000 ha.<sup>1</sup> of rangeland in North Eastern Province in three grazing blocks: West Mado Gashi, East Mado Gashi and Kalalut, plus partial development of two more. The project involved providing water sources through a combination of boreholes, deep pans (dams) and shallow pans.

1. There is considerable difference in interpretation over the area developed in Phase I. The figure of 924,000 ha. is from the World Bank Review Mission Draft Report, p.26. Current maps of the original three blocks add up to 944,000 ha. The original USAID feasibility study in 1970 used 1,745,000 acres, or 706,000 ha. In 1971, several other blocks were added to Phase I, but funds were exhausted before they could be completed. In its Capital Assistance Paper (CAP) for Phase II, released in 1974, USAID took the position that the actual development in the first three blocks was 1,408,000 acres (570,000 ha.) but that half of block 5 (Buna) was also developed (576,000 acres/ 236,000 ha.), which would bring the total to 806,000 ha. Mr. Frank Abercrombie of USAID would add one half of Giriftu Block (800,000 acres or 324,000 ha.) to Phase I as well. Phase II, according to the CAP is 14,336,000 acres or 5,804,000 ha. This, added to USAID's 806,000 ha. for Phase I, brings the total for the two projects to 6,610,000 ha. This is the total figure used in the World Bank Review Draft. Thus, we will base our analysis of the project on 6.6 million ha.

The first two are permanent water (assuming adequate rainfall), the third wet season water only. The project also involves a variety of other facilities such as access roads and, most important, the preparation of grazing management plans providing, in most cases, rotation in use, and defoliation and rest designed to allow the range to recover periodically. The plans also incorporated the concept of a wet season-dry season rotation.

Phase II of the Project was originally designed to provide similar improvements (with some changes, such as in the density of water points) to 2.8 million additional ha. in the North East, a figure which was increased to 5.7 million ha.<sup>1</sup> to compensate for the shortfall in Phase I. Thus, the two projects together are designed to increase the level of utilization of 6.6 million ha.<sup>1</sup> of relatively arid land in the North East.

## (2) Potential Impact on Livestock Supply

The fundamental objective of these projects, as we see it, is to provide water, other facilities, and management, to allow the beneficial utilization of livestock of range resources which, in the absence of the project, would not be utilized. This is mainly dry season utilization. In the pre-project situation, generally, most of the rangeland area is grazed during the wet season because there is enough temporary water to permit livestock access. In the dry season, or as the dry season approaches, the nomadic herdsman must withdraw their cattle from areas without permanent water and concentrate their grazing on areas which have permanent water. This means that the areas without permanent water are underutilized, those with permanent water tend to be overutilized, and the total livestock populations are held down. The addition of permanent water and other facilities, plus grazing movement and grazing control, is supposed to eliminate underutilization. The addition of water, itself, is intended to pave the way for relatively sophisticated grazing management techniques.

The key element in determining the potential impact on supply is to determine the amount of unutilized forage in the area and the number of additional livestock units which, under proper management, could be supported by that forage. We have found no detailed analysis of the amount of such forage in the North East or in the overall areas specifically covered by either Phase I or Phase II, in the numerous documents reviewed. There is an estimate in Annex III of the USAID Capital Assistance Paper on Phase II that only 50 percent of the rangeland in the North Eastern Province is grazed during the dry season, but no detailed support.<sup>2</sup>

1. See footnote 1. on previous page.

2. In the individual block management plans, there are field surveys to determine the amount of additional forage which would become available after water development.

We recognize that a detailed survey of such areas would have been difficult. It may eventually be done under the KREMU project, using Landsat Imagery and other data, but we understand that, at present, KREMU cannot provide information on this point either.

Nevertheless, estimates have been made in various documents regarding the potential increase in animal populations in the project areas. For Phase I, the following increase figures were used: from 22,000 Animal Unit Years pre-project to 54,000 AU<sup>1</sup> for an area of about 700,000 ha. devoted to range livestock under the project, or an increase from one AU per 32 ha. to one per 15 ha., i.e. from 38 ha/Lu to 17.6 ha/Lu. For the larger Phase II project, which originally involved 2.8 million ha., the IBRD Appraisal Report projected an increased animal population for the area from 100,000 head (one per 28 ha.) to 250,000 head (one per 11 ha.), an increase of 150,000 head.<sup>2</sup>

A more detailed discussion is found in the USAID Capital Assistance Paper on Phase II, covering the full 5.7 million ha. The paper notes that "experience has shown" that the carrying capacity of North Eastern rangelands can be increased from one AU per 36 ha. to one per 16 ha. (From 42 ha/Lu to 18.8 ha/Lu.) However, the projected increase for the project area was from 212,980 AU to 352,882 AU by year 20, about 1994. We assume that, since the 212,980 is much higher than 36 ha/AU, the land must have been overstocked. Combining the projected figures for both phases, we have, over 6.6 million ha., an increase in Animal Unit Years from 234,980 (22,000 + 212,980) to 406,882 (54,000 + 352,882). We have, however, seen no detailed explanation of these figures in any of the documents reviewed, although we cannot say categorically that no such material exists.<sup>3</sup>

To summarise in terms of Livestock Units used elsewhere in the text, the USAID appraisals of Phases I and II see an increase in Lu from 200,000 (234,980 AU) to 345,000 (406,882 AU).

The project is also intended to increase offtake rates through increased calving rates, lowered mortality rates and other improvements resulting from the water development, other

1. USAID. Development Plan and Feasibility Study on a Pilot Range Development Project, North Eastern Province, Kenya. June 29, 1970. The project area was enlarged to its present 900,000 plus ha. after completion of the Feasibility Study. One AU is the equivalent of one 360 kg cow (800 lb/.85 Lu).
2. We assume this is Kenya Stock units (KSU), although the World Bank Report does not specify.
3. One possible weakness on the Phase II project, it seems, is that it was initiated before the results of Phase I were assessed with regard to grazing control. Neither was there a detailed feasibility study of Phase II.

improvements and grazing management, as well as from pasture improvements. The feasibility study for the Phase I project uses an increase in offtake from 9 percent to 16 percent with some increase in average weight. The Phase II project uses an increase from 11.5 percent to 16.3 percent with apparently no allowance for change in average weight, since the key table in the CAP (Annex XII, Table 2) uses an unchanging value per head.

For the two phases combined, using offtake rates of 11 and 16 percent, the project would increase offtake from 25,850 AUy to 65,100 AUy, or, expressed in terms of LU, 22,000 to 55,200.

### (3) Current Status of the Project

As noted above, the project has been increased to a planned coverage of 5.7 million ha. The project is reported to be somewhat behind schedule, in its physical aspects, but perhaps can be completed on time, although we doubt it. More important, both capital and operating costs of the various facilities have sharply increased. Finally, it is clear that the non-physical developments, in the areas of grazing management and control, are progressing even less well.

The North Eastern project has been reviewed on several occasions and severely criticised. There are clearly many problems with its implementation. To select one evaluation, that prepared by Utah State University Evaluation Team in 1975, the following is a list of problems noted :

- Lack of basic data and inadequate utilization of that available.
- Difficulties encountered in adapting grazing schemes to Kenyan conditions (this refers to grazing management plans, which were worked out by American experts, and which have not been applied effectively).
- Ineffective integration of PASA planning teams into project and Government of Kenya structure. (Planning teams are restricted to planning only, not implementation.)
- Too intensive water development in a limited area. (This refers mainly to the Phase I pilot project, where the intensity was around 18 km. between permanent water points, a spacing which has been criticised by many. The Phase II project has greater spacing.)
- Failure to mount an effective means of coordination.

- Divided responsibility for administration and operation of the range and ranch planning and development functions in the Government.
- Inadequate logistical support to planning and construction teams.
- Uncertainties in acceptance of improved grazing practices by pastoralists.
- Insufficient numbers of technically trained Kenyan personnel.
- Relations between program and other donors and participants in the livestock program.

More recently, the World Bank In Depth Review Mission stressed three points :

- The need to develop ways to implement workable grazing management systems.
- The need to develop regular borehold and dam maintenance systems.
- The need to develop a system under which the pastoralist beneficiaries of the program pay part of the operating costs.

These two lists are provided to indicate that there has been ample analysis and criticism of the program. Many of the criticisms, especially most of those by Utah State University, are common to developing projects of all kinds in all developing countries, and can be solved in time if the effort is made.

We believe that the main problem, and the one which, under present policies, will in significant part nullify the project's potential positive supply impact, is grazing control.

#### (4) Grazing Control

On the basis of our observations in the North East and discussions with a great many individuals, we must conclude that present de facto policy in the grazing blocks is to provide water without assurance of obtaining control of grazing. To develop water on the assumption that somehow control can be achieved before most of the forage is killed by overgrazing in a nomadic society is a gamble. We believe that the project is losing the gamble on the blocks developed. Evidence of extensive use by traders and others who are not considered to belong to the area is plentiful, and it is apparent that many of those herdsmen for whom the improvements were intended are also overgrazing. It is the classic problem of the "tragedy of the commons".<sup>1</sup>

1. The dangers of supplying water without grazing control have been recognised for many years. For a particularly strong statement, see FAO, East African Livestock Survey, Vol. II, (MacGillivray) 1967, pp. 48-50.

The problem is most serious in the pilot project areas, where the permanent water is closely spaced. Such spacing leads to very high levels of overstocking because the cattle can cover the entire range. With wider spacing, say 25 km. between permanent water points, some areas of the range are out of reach of the stock during the dry seasons and therefore are saved from destruction. This wider spacing is the basis of the Phase II project.

Still, in many areas observed, and on the basis of discussions with range management personnel in the area, the range area of the North East, especially that developed with water points, has suffered very heavy damage and may not recover for many years. The drought has contributed heavily to this result, but the main blame must be put on the policy of water development without effective control.

A factor contributing to the failure to institute effective grazing control may have been the construction of deep dams at some points rather than boreholes, since the reservoirs so created cannot be controlled even as well as boreholes can. However, boreholes could not be dug in some places which were then served by deep dams. Although boreholes are to be preferred for better control, the evidence is that boreholes have also resulted in range destruction because of lack of control.

There are very good reasons why, in Kenya and elsewhere, de facto policies of providing water development without effective grazing control persist, in spite of considerable past experience. We offer our brief version of the general phenomenon :

- The pastoralists naturally desire water development and resist grazing control. This is in part because of the independent nature of pastoralists and in part because it is economic logic for the individual pastoralist who obtains all of the benefit from his personal overgrazing but only shares in a small way the long term costs. Hence the tragedy of the commons.
- Faced with widespread resistance to grazing control, aggravated by drought conditions, and lacking any well established methodology to achieve control, the development organisations make an effort, through grazing committees, management plans and the like, but are unable or unwilling to make the implementation of control a condition of water development, or to use strong measures to maintain control.
- The effort which is made is weakened by various problems. These include too few Range Management personnel, the fact that very few are of the same ethnic group as

the pastoralists, the fact that they lack both facilities (transport) and incentive to spend as much time as they should with the pastoralists, and the natural susceptibility to political pressure of officials to "turn on the water" when there are shortages, in spite of the damage to the range.

- Grazing control replaces Nature's impersonal and often harsh control over the size of livestock and human populations in a region. Thus inevitably if grazing is to be managed the managers have to limit the number of livestock and eventually the number of people. There are obvious attractions in avoiding these hard decisions and leaving them to the even stricter control of the unmanaged natural environment.
- For development organisations, putting in the water development is a relatively straightforward activity, involving the application of funds and technology with easily measurable results. There is a natural tendency to push ahead with this development in spite of the failure to achieve effective grazing control.

The fundamental problem of water without control, and the resulting overstocking and range degradation, is very common, because the elements listed just above are common to many countries.

This does not alter the fact that the overstocking has and will, under present de facto policies, lead to a progressive degradation of the range, following on the heels of the progress of water development. The ultimate result may well be a range which will support a lower, rather than a higher, livestock population.

#### (5) Supply Impact of Present Policies

We believe that everywhere that permanent water is provided without effective grazing control, overgrazing will result and the average livestock carrying capacity of the land will be reduced. When determining the effect of present de facto policies, we assume that the permanent water will have a radius of 13 km. (spacing of 26 km) around each water point, a spacing adequate to avoid the destruction of much of the range even without grazing control.

To determine the effect on carrying capacity of overgrazing, we divide the range into concentric circles around each permanent water point. As we get further from the water point, the range destruction, which is assumed to be complete within one km., gradually decreases, and the carrying capacity accordingly increases. The circles and the carrying capacity

in livestock units are given below, along with the numbers of hectares in each circle. In reading this, it should be remembered that the pre-development carrying capacity is assumed to have been 42 ha/Lu (36 ha/AUY) according to USAID.

<u>Radius around Water Point</u>	<u>Area of Circle</u>	<u>Carrying Capacity</u>	<u>Lu</u>
1 km	314	0	0
4 km	4,714	60 ha/Lu	79
9 km	20,429	40 ha/Lu	511
13 km	<u>27,658</u>	20 ha/Lu	<u>1,384</u>
Total	52,115	27 ha/Lu	1,972
Pre-development		42 ha/Lu	1,265
Increment over pre-development			707 (56%)

Applying this to the entire 6.6 million ha. of Phase I and II, we have a livestock carrying capacity of 244,000 Lu (about 287,000 AUY) as opposed to a carrying capacity before development of 157,000 Lu and an actual estimated population of 200,000 Lu. This should also be compared to a carrying capacity projected by the project of 345,000 Lu. In summary :

	<u>Pre-development Correct</u>	<u>Actual</u>	<u>Projected</u>	<u>Present Policies</u>
Lu on 6.6 million ha.	157,000	200,000	345,000	244,000

We should state, again, that this relatively unfavorable result is attributable to the 26 km spacing of permanent water points. With an 18 km (9 km radius) spacing, the results clearly would be much less favorable - an average carrying capacity of 1,282 Lu or almost the same as pre-development. Thus the project would achieve nothing in increased carrying capacity.

We can carry out a similar operation to obtain meat yield. To do so we use an offtake rate increase of from 11 percent pre-development, used by USAID in the CAP, to 14 percent after development. USAID used 16 percent after development, and although we consider this a bit high, we accept it for the discussion. We do not believe that it need be reduced because of the partial deterioration of the range as a result of failure to institute grazing control. However, we do believe that part of the increase in offtake must be attributed to improved marketing facilities rather than to water and related development efforts, and rather arbitrarily assign 2 percent to marketing, bringing the gain from this development to 3 percent, i.e. 11 - 14 percent.

Since there are sheep and goats in the picture, we have considered them separately, assuming, again arbitrarily, that they will retain their existing proportion of the Lu.

10 percent. Actually, since sheep and goats are more efficient from several points of view, we recommend elsewhere that the proportion be increased. There follows a calculation of the meat yield of the area under present policies vs. pre-development. In this case, we use only the stated pre-development carrying capacity, not the estimated actual pre-development population.

**ESTIMATED MEAT SUPPLY IMPACT OF 6.6 MILLION HA.  
BLOCK DEVELOPMENT IN NORTHEAST  
(Data Per Water Point)**

<u>Item</u>	<u>Pre-development (Calculated Carrying Capacity)</u>	<u>Present Policies</u>	<u>Proposed Policies (Grazing Control)</u>
<b>Cattle</b>			
Carrying capacity	1,265 Lu	1,972 Lu	2,640 Lu
Cattle (90% Lu)	1,138.5 Lu	1,775 Lu	2,336 Lu
No. head at .55 Lu/hd.	2,070	3,227	4,320
Offtake rate	11%	14% <sup>1.</sup>	14% <sup>1.</sup>
No. head offtake	227.7	452	604.8
Weight per head			
Live	240 kg	220 kg <sup>2.</sup>	220 kg
CDW (.45)	108 kg	99 kg	99 kg
Total offtake	24,592 kg	44,748 kg	59,875 kg
<b>Sheep and Goats</b>			
Sheep and Goats (10% Lu)	126.5 Lu	197.2 Lu	264 Lu
Lu per head	.13	.14	.14
No. head	973	1,409	1,886
Offtake rate	33%	42%	42%
No. head offtake	321	592	792
Weight per head			
Live	39 kg	39 kg	39 kg
CDW (.45)	17.55 kg	17.55 kg	17.55 kg
Total offtake	5,635 kg	10,383 kg	13,900 kg
Total offtake, All Species	30,227 kg	55,131 kg	73,775 kg
Hectares Used	53,115	53,115	53,115
Kg. CDW/Ha	.569	1.038	1.389
Tons CDW for 6.6 million Ha.	3,755	6,851	9,167
Increase above pre-development		3,096	5,412
Percent		82.4%	144.1%

1. Offtake without credit for marketing improvements.

2. Small reduction because higher percentage of immatures taken.

This is the estimated supply impact of present policy. It assumes that the North Eastern project will eventually be completed in its physical aspects but that no more success in achieving grazing control will be met in the future than has been in the past. It further assumes that beyond Phase II there will be no further major development projects of this type. Thus a reasonable assumption of the assumption about no effective grazing control is valid.

This is because, although our calculations show that even with overgrazing, there is an increase in output from the project as a result of increased average carrying capacity, the gain is much smaller than projected at project appraisal, and almost surely would make the project not cost beneficial.

With regard to the balance of the Zone V and VI rangeland in North Eastern Province and rangeland in other provinces, mainly Eastern (Marsabit and Isiolo) and Rift Valley (Samburu) which constitute an area of 16.9 million ha.,<sup>1</sup> which are potentially subject to similar projects, we assume that, unless grazing control is established first, that major projects will not be undertaken. Small scale improvement efforts are inevitable and should result in small areas of increased carrying capacity, which should offset inevitable, scattered range deterioration due to overgrazing. Therefore, we limit our estimate of present policy supply impact to that arising from the North Eastern Development Project.

1. North East	12,552,000	-	6,600,000	=	5,952,000
Marsabit	6,966,000				
Isiolo	2,506,000				
Samburu	<u>1,485,000</u>				
	<u>16,909,000</u>				

## Ranch Development

### (1) Background, Classification and Statistics

#### (a) Background

Ranch development has to be considered the backbone of Kenya's livestock development policy. Ranches have traditionally supplied most of the beef in Kenya and this will continue, but there have been and will continue to be many changes. These changes are being promoted and supported by the Government, assisted by international donors.

Three main areas of change can be summarized as follows :

- Change of ownership of existing ranches from individual Europeans or firms to individual or groups of Africans. Ranches affected fall into the categories of commercial or cooperative ranches.
- Transformation of some pastoralists, in Kajiado, Narok and Samburu mainly, into a more organised, ranch-type system, called group ranches. The objective is social - to make the people involved more settled, and economic - to increase output and reduce range destruction.
- Opening up new lands, previously very sporadically used, to ranch livestock production. These are company or cooperative ranches and are located mostly in Coast Province and Kitui District, in areas where lack of water in the past has made livestock production very difficult. This effort is aimed mainly at production increase.

#### (b) Classification and Statistics

##### (1) Classification

In Kenya, ranch types are rather specific, and in some cases are even tied to specific geographic areas. There follows a classification of ranch types in Kenya.

- Commercial : Owned by one or more individuals on freehold or leasehold land. Originally most were owned by individuals or firms of settlers, and some remain in European hands. They are gradually being sold to African individuals or groups, sometimes as many as 500 farmer shareholders. These ranches are mainly located in Laikipia, Nakuru (Rift Valley Province), Nyandarua (Central Province) and

## Maunabo (Eastern Province) District

- Company : There are enterprises in which land is leased from the Government or County Councils by groups of people who purchase shares in the Company with cash or by putting up cattle. The animals are collectively owned. Legally, these are limited liability companies under the Companies Act (Registrar of Companies) and there is supposed to be a limit of 50 members. In practice, some of the members or owners reside and work on the ranch and others do not. These are mostly in Coast Province and Kitui District (Eastern Province).
- Directed Agricultural Company : Basically the same as the Company ranch except that there may be more than 50 members and the Government, through the District Range Officer, retains 51 percent of the voting rights, and thus "directs" the operation.
- Cooperative : There appear to be two kinds of cooperative ranches. First, those which are similar to the Company ranches above except they may utilize trust lands. Many classifications include them with Company ranches. The second type is a regular cooperative ranching enterprise under the Ministry of Cooperatives. Some of these are former commercial ranches on which ownership has changed into the cooperative form.
- Group Ranches : These have been established on formerly open rangeland. Fifty to 100 families (or more) collectively obtain title to the land through an adjudication and registration process. They jointly finance, usually through loans, common facilities such as dips and water points, but continue to own the livestock individually. Shares of joint costs are on a "per head" basis. Members agree to a management plan involving stocking levels, allocations, grazing rotation and the like. The objective is to confer land title and stabilize utilization of lands formally under a nomadic pattern.

Some of these ranch types are traditional (commercial, some cooperatives) and some are essentially new, created to solve current economic and social problems with the impetus of international financing (company and group). As noted above, some of the traditional ranches are supported by the ranch development program, mostly, but not exclusively.

ownership change.

As a further attempt to organize and classify ranch systems in Kenya, two tables are provided. Table III-4 summarizes the above information in tabular form. Table III-5 approaches the matter from another direction, that of range-land type. The material has been derived from work by R. Von Kaufman and discussed with his successor at AFC, Mr. R.E.M. Kachula.

TABLE III-4

RANCH TYPES

<u>Type</u>	<u>Authority</u>	<u>Former</u>	<u>Location</u>
Commercial	Various Organisational Arrangements, in this geographical area.	Commercial	Nakuru Laikipia Machakos Nyandarua
Company	Companies Act (Registrar of Companies) (Private Limited Liability Company - 50 max.)	Commercial Unused State Lands Trust Lands	Coast Province; Kitui District; Elsewhere (not under Project)
Directed Agricultural Company	Companies Act (Public Limited Liability Company, Unlimited)	Unused State Lands Trust Lands	Coast Province; Kitui District; Elsewhere (not under Project)
Cooperative	Ministry of Cooperatives	Unused State Lands Commercial Communal	Coast Province; Elsewhere
Group Ranch	Registrar of Group Represent.	Common grazing	Kajiado Narok Samburu Baringo

TABLE III-5

RANGELAND AREAS - VON KAUFMAN <sup>1.</sup>

<u>Type</u> <u>(Von Kaufman)</u>	<u>Form of</u> <u>Former</u>	<u>Development</u> <u>Present-Future</u>	<u>Major Groups</u>	<u>Major Locations</u>
<b>Commercial Ranching</b>	Commercial Ranching	Some commercial unchanged. Some new commercial	Europeans	Laikipia Nakuru Machakos
	cow/calf		African Groups	
	cow/calf-finish	Company Ranches	African Groups	
	backgrounding/ finishing	Directed Agricultural Companies Cooperatives	African Groups African Groups	Central Province
<b>State Lands</b>	Unused (lacked water, trypano- somiasis)	Company Ranches	African Groups	Coast Province (Taita/Taveta)
		Directed Agricultural Companies	African Groups	Kilifi
		Cooperatives	African Groups	Kwale
<b>Bedentary</b>	Common Grazing	Group Ranches Individual Plots (group services) (demonstration)	Masai Samburu Tugen	Kajiado Narok (Kwale) Samburu

<u>(Von Kaufman)</u>	<u>Form of Development</u> <u>Former</u>	<u>Development</u> <u>Present-Future</u>	<u>Major Groups</u>	<u>Major Locations</u>
Migratory Pastoral	Open Range	Open Range Block Development	( Somalis ( Orma	North East
Hill Adjacent Ranch Lands	Mixed Farming with Low Livestock Priority	Cooperative Ranches (Tribal Trust Lands)  Communal Coops.  (trend toward subsistence and less cattle)		

Derived from Von Kaufman R., "The Development of The Range Land Areas", in Heyer, J., Mitha, J.K., Senga, W.M., eds. Agricultural Development in Kenya, An Economic Assessment. Nairobi, 1976.

**(ii) Statistics**

Full statistics on the ranching sector appear to be difficult to obtain. Table III- gives basic information on all company, cooperative and group ranches which we have been able to obtain. It also gives data on commercial ranches under the Livestock Development Project loans. The summary data on these ranches, plus commercial ranches located in Laikipia District not under the program, is as follows. We have not been able to obtain similar data on commercial ranches not in the program located in other districts. These data have been provided by several sources, including the Ranch Section of AFC, the Range Management Division of the Ministry of Agriculture, the Ministry of Cooperative Development and the Kenya National Farmers Union.

TABLE III-

BASIC SUMMARY DATA ON ALL GROUP, COOPERATIVE AND COMPANY RANCHES, ON COMMERCIAL RANCHES IN THE LIVESTOCK DEVELOPMENT PROGRAM AND OTHER COMMERCIAL RANCHES IN LAIKIPIA DISTRICT

1. Commercial Ranches

	<u>Number</u>	<u>Ha.</u>
Phase I	34	133,733
Phase I and II	2	8,275
Phase II	<u>16</u>	<u>83,287</u>
Sub-total	52	225,295
No Loan in Laikipia	86	563,872

2.. Company Ranches

	<u>Number</u>	<u>Ha.</u>
Phase I only	6	103,346
Phase I and II	4	397,768 <sup>1.</sup>
Phase II only	3	49,532
No Disbursement	<u>1</u>	<u>10,121</u>
Total Ranches	14	560,767 <sup>1.</sup>

<sup>1.</sup> Includes 300,000 ha. for Galana

### 3. Cooperative Ranches

	<u>Number</u>	<u>Ha.</u>
Phase I only	5	27,889
of which, not on Min. Coops. List	4	7,311
Phase I and II (B-2 Yatta) <sup>1</sup> .	1	21,513
Phase II only (none on Min. Coops. List)	2	21,840
	—	—
Sub-total	8	71,242
No Loan	<u>21</u>	<u>na</u>
Total	29	na

### 4. Group Ranches

	<u>Number</u>	<u>Ha.</u>
Phase I	15	244,437
Phase II	7	26,697
Registered, No Loan	<u>73</u>	<u>1,092,249</u>
Total	95	1,363,383

1. Combined from two previous ranches, Kanyonyoni and Katotini

### (2) Indicated Policy of Ranch Development

#### (a) Basic Policy

Kenya's basic policy toward ranch development appears to be to continue to promote the three major changes described above, which are designed simultaneously to solve social problems and increase livestock and meat output.

The method is a combination of very extensive financing for the various types of ranches, provided through the Agricultural Finance Corporation (AFC) using, in part, international aid funds, and provision of technical assistance to the ranches. The technical assistance is mainly in the areas of range management and financial management. The main assistance is being furnished under the first and second Livestock Development Projects. The second project is currently operating and utilizing loan funds, for the ranching program, from the World Bank (IDA) and USAID. The financing covers capital development costs on the ranches for water, dips, buildings, equipment, tracks etc., cattle purchases and other capital costs. In some cases, it also covers the cost in change of ownership situations.

The financial assistance from the first project was based on original development targets of the second and is summarized as follows,

Number and Area of Ranches Given Loans

<u>Type</u>	<u>First Project</u>	<u>Second Project</u>
<u>Commercial (ex Feedlots)</u>		
No. ranches	38	100
000 Ha.	166	350
<u>Company</u>		
No. Ranches	10	21
000 Ha.	257	588
<u>Group</u>		
No. Ranches	15	60
000 Ha.	221	960

Source : Adapted from IBRD Review Mission Draft Report, Annex 23.

(b) Intended Supply Impact

Surprisingly, the intended supply impact of the ranch development program is not clearly stated in the basic project documents of the Second Livestock Development Project.<sup>1</sup> At several points in the IBRD Appraisal Report it is stated that the incremental production from the overall Second Livestock Development Project will be, at full development (1985), 140,000 head (presumably cattle) annually. This increase in number of head, coupled with an increase in average carcass weight from about 140 kg. to 165 kg., would result in an increase in annual meat output of 23,000 tons. The report further states that "about half" of the incremental increase in production would be attributed to ranch development (page 18), while the other half is attributed to the Northeast grazing development and the development of livestock marketing. There is no specific back up for these figures.

Both the IBRD and USAID documents do provide ranch models for the three ranch types to be assisted under the project. On examination, these ranch models, in aggregate, support the above figure of about 70,000 head per year supply impact from the ranching development program. The following is summary data from the models.

<sup>1</sup> IBRD, Appraisal of Livestock Development Project, Vol. 1, 1974 and AID, Capital Assistance for Livestock Production, 1974.

**TABLE III-7**

**SUMMARY SUPPLY IMPACT DATA  
FROM IBRD RANCH MODELS**

**1. Group Ranches Model 16,000 Ha.**

	<u>Pre Project</u>	<u>Full Development Year 7 onward</u>	<u>Increment</u>
No Animal units held Model 1.	2,461	3,555	1,094
No Animal units held 60 Ranches	147,660	213,300	65,640
Stocking Rate A.u./ha	6.5	4.5	2.0
Sales A.u. Model	317	994	677
Sales A.u. 60 Ranches	19,020	59,640	40,620
Extraction Rate %	12.9	26.5	13.6

**2. Company Ranches Model 28,000 Ha.**

No. A.u. held Model	1,187	3,000	1,813
No. A.u. held 21 Ranches	24,927	63,000	38,073
Stocking Rate A.u./ha	23.6	9.3	14.3
Sales A.u. Model	185	881	696
Sales A.u. 21 Ranches	3,885	18,501	14,616
Extraction Rate %	15.6	24.9	9.3

1. An Animal unit as used here is any bovine except a weaner.

**3. Commercial Ranches Model 3,400 Ha.**

	<u>Pre Project</u>	<u>Full Development Year 7 onward</u>	<u>Increment</u>
No. A.u. held Model	970	1,129	159
No. A.u. held 100 Ranches	97,000	112,900	15,900
Stocking rate A.u./ha	3.5	3.0	0.5
Sales A.u. Model	208	383	175
Sales A.u. 100 Ranches	20,800	38,300	17,500
Extraction Rate %	21.4	27.3	5.9
	<u>Aggregate</u>		
No. A.u.	269,587	389,200	119,613
Sales	43,705	116,441	72,736

Analysing these data, we see that very heavy dependence is placed on supply increments from the group ranches (more than 50 percent of the total) even though the problems faced in developing these ranches are probably more difficult than for other ranches. With regard to the relatively modest projections for the commercial ranches, it might be noted that much of the investment in these ranches is needed to prevent serious output reductions, so, compared with output without the project, the project would presumably be responsible for "incremental" production considerably in excess of the figures shown. Company ranches at the Coast are expected to provide the smallest component of incremental increase, 14,616 animal units annually. This may be reasonable considering that development must start almost from scratch on these ranches, but this is a very small proportion of the increment we believe must come from the Coast if Kenya is to produce adequate supplies of meat.

### (3) Status of Ranch Development

The ranch development under the Second Livestock Development Project has gone somewhat more slowly than expected. There appear to be several reasons for this, including a slowdown in the planning and application procedures, management problems and financial problems faced by existing ranches because of the drought, price problems and others. Following is data from the IBRD Review Mission Draft Report on the present status of the program, from the point of view of loans approved (not necessarily disbursed) and hectares covered. There have been some minor changes since this information was prepared, but they are not considered significant. The summary below also gives the estimates of the Review Mission regarding the number of loans and hectares which will be covered at the end of the five year project.

#### NUMBER AND AREA OF RANCHES GIVEN LOANS UNDER PHASE II; AND REVIEW MISSION PROJECTIONS

<u>Type</u>	<u>Original Estimate</u>	<u>To date</u>	<u>Review Mission est. - End of Project</u>
<u>Commercial (ex Feedlots)</u>			
No. Ranches	100	15	46
OOO Ha.	350	71	204
<u>Company</u>			
No. Ranches	21	8	29
OOO Ha.	588	268	659
<u>Group</u>			
No. Ranches	60	7	29
OOO Ha.	960	27	650

Source : Adapted from IBRD Review Mission Draft Report, Annex 23.

Thus, all three ranch types have shared the slowdown, but the group ranches, which were counted upon for the major share of the supply impact have been most seriously affected. On the other hand, there are some nine large group ranches in Kajiado which are ready for loans, are not overstocked now and have the possibility for significant stocking and output gains.

#### (4) De Facto Policy

As elsewhere in this report, we use the term de facto policy to mean what is actually happening in the area. We then make our own supply impact estimates on the assumption that the de facto policy will continue.

In discussing our interpretation of de facto policy we will rely on our own field observations, discussions with those responsible for the ranch development program and a study of the IBRD Review Mission Draft Report. This latter is very important because the Mission did a very comprehensive analysis of the status of the ranching program, which ran to 14 pages in the body of the report and more than 130 pages of annex. Our interpretation and analysis is much briefer.

It should be stressed that these ranches are all business operations of one kind and another, and like all such organisations are very much affected by prices of inputs and outputs. Therefore, price policy in the livestock and meat industry is undoubtedly the most important policy matter affecting ranch development. It is clear that the ranches are currently caught in a price squeeze with operating costs having increased much more than livestock and meat prices. There are major issues about proper solutions and we prefer to deal with the question of price as a whole. Therefore, it is only mentioned here.

There follows a discussion of the de facto policy on each of the three main ranch types.

##### (a) Company Ranches

A number of company ranches were visited by the study team, which confirmed that they were suffering severely from the drought. In discussions with management, it appeared that this ranch form offers a better prospect for strong management and avoiding problems of overgrazing than is the case of group and cooperative ranches.

Apart from a price squeeze, the main problems noted with the commercial ranches are listed below. Much of this material is taken from the IBRD Review Mission Draft Report supported by the views of the study team members who visited the ranches.

##### (i) Management

Although management may be stronger in the company ranches than in the group or cooperative ranches, it is still uneven. Some managers appear to be doing very well under the difficult drought conditions but others are much too

inexperienced. This clearly aggravates the problems.

(ii) Overstocking

Overstocking was noted on several ranches. Since the animals are owned by the ranch, and not the individual members, it is not a case of the "tragedy of the commons". Rather it appears to be a case of trying to add more animals to compensate for the cost/price squeeze, and the fact that, under drought conditions, animals fatten more slowly and must be kept longer. Government (AFC) policy appears to have abetted this trend.

(iii) Breeding Herds

There seems to have been a tendency to try to develop breeding herds to the exclusion or detriment of steer fattening. This causes cash flow problems for the ranches, reduces the market for North East steers and, most important, reduces flexibility in the face of drought. It is more difficult to destock to avoid overgrazing.

(iv) Member Equity

The Government (AFC), in an effort to move the program along, has provided loans to ranches which have permitted them to begin operations with very little equity, even less than the 20 percent required by the IDA. This means a very heavy debt burden and restricted profitability and cash flow.

(v) Too Rapid Development

Many of the ranches receiving loans have apparently developed too rapidly, and with too many expensive capital items. The result is very heavy debt service costs which are difficult to meet, especially if management is inexperienced and the technical coefficients not very good.

In spite of these problems, the prospect for ranching on the Coast is sufficiently attractive, because of the large amounts of available land, that the IBRD has increased its acreage projections for company ranches under the project from 588,000 ha. to 659,000 ha. The model has also been changed to provide for the recommended use of purchased steers for fattening.

(b) Group Ranches

Group ranches represent a very interesting effort to assist a special group of nomadic herdsmen to stabilize their way of life, improve their incomes, solve their overstocking problems and provide for their growing population, while still allowing for individual ownership of cattle. And the development of group ranches is supposed to have a major impact on livestock supply through modest increases in carrying capacity and significant increases in offtake rate. The approach is to combine the provision of

land tenure rights with loans for capital improvement and technical assistance to achieve management.

It appears that the program has had considerable success in giving a sense of land ownership, causing more attention to the problem of overstocking and increasing the willingness to sell animals, at least under drought stress. We also noted in visits to the area a tendency for group ranches to share rangeland during drought with those ranches with adequate water allowing cattle from others to use the land. This should be only an interim arrangement, of course, since the better reaction to drought stress is selling down to the basic breeding herd and then supplemental feeding if necessary. The group ranch system should eventually make this easier to do.

We also believe that the present group ranch system is an interim solution to the problem. We believe that either the strongest members of the group will eventually acquire most of the cattle and land, through purchase or other means, and the land will be further subdivided. Or they could evolve into company or directed agricultural company ranches, although this involves giving up individual ownership of cattle.

In the meantime, the group ranches are facing a variety of difficulties which can be summarised as follows :

(i) Overstocking and Allocations

Although the group ranches represent an improvement over the previous situation, overstocking remains a difficult problem and adequate systems of allocation acceptable to all members have defied development. In part, it is a "rich vs. poor" problem, with each economic group trying to ensure that it does not pay too high a share of the price of destocking. A related problem is the fact that reasonable stocking rates would mean some members would fall far below the subsistence level and have to leave ranching. Until this overstocking problem is solved, output will be held down and the range will continue to deteriorate.

(ii) Small size

Many group ranches are too small to be viable. This is now rather widely recognised, but some of the existing small ranches will continue to have difficulty.

(iii) Management

As with other ranch forms, the group ranches suffer from weak management, which is not surprising. As a result, herds remain badly structured, high grade bulls

1. A less favorable view of the success of the group ranches to date is in R. Von Kaufman, "The Development of the Range Land Areas", in Hoyer, J. ed., *Development of the Range Land Areas in Kenya. An Economic Assessment*, 1964.

provided under the project are badly used and there are a variety of other inefficiencies.

(c) Commercial Ranches

The major policy problem facing commercial ranches, including the older commercial ranches and those assisted under the First and Second Livestock Development projects, is price. This is discussed elsewhere.

Other problems, especially facing the newer commercial ranch groups, are similar to those faced by other ranch forms, but are perhaps less severe. These include some instances of weak technical input, because of inexperienced management, inadequate extension and training support and a tendency to favor breeding herds over steer fattening.

(d) Cooperative Ranches

The Chemonics team visited several cooperative ranches and found them to be particularly poor in terms of management and apparent results. The period of the visits was, of course, one of severe drought and so conditions were unusually poor. Nevertheless, the team concluded that the cooperative form as practised on the ranches visited produced very unsatisfactory results. Some of the weaknesses noted were :

- Although there is a ranch manager, the members believe that they can overrule the manager's decisions as they see fit.
- Considerable amounts of cooperative ranch lands are removed from cooperative ranching by the members' squatting.
- Although members are supposed to have a specific number of cattle in the cooperative, members often bring all their cattle to graze the cooperative pastures, which results in totally uncontrolled grazing.
- The District Range Officer has no voice in the management of the cooperatives visited.

(5) Supply Impact of De Facto Policies

Under present de facto policies in the ranching sector, the supply impact will certainly be lower than that originally projected for the Second Livestock Development Project.

If we take the IBRD Review Mission estimates of the numbers of ha. to be developed, we can construct the following rough table.

TABLE IZI-8

## REVISED SUPPLY IMPACT OF REVISED RANCHING PROGRAM

	<u>Original</u>	<u>Revised</u>
<b>Commercial</b>		
Ha. developed, 000	350	204
A.u. marketed, Incremental	17,500	10,150
<b>Company</b>		
Ha. developed, 000	588	659
A.u. marketed, Incremental	14,616	16,370
<b>Group</b>		
Ha. developed, 000	960	650
A.u. marketed, Incremental	<u>40,620</u>	<u>27,215</u>
Total A.u. marketed, Incremental	72,736	53,735
Percent change		- 26%

Source : Derived from IBRD Review Mission Draft Report, Annex 23.

This analysis covers only the slower rate of development, not problems such as poorer than planned results in developed ranches because of overgrazing, range deterioration and other factors. Taking these into consideration in a very broad way, we would estimate that the current ranch development program might result in an annual increment of 40,000 a.u., equivalent, at 160 kg CDW per head, of 6,400 tons of meat per year.

This would make only a small contribution to Kenya's overall meat requirements by 1990, but would still represent enough of a success so that the Government and the donors would probably follow the existing program with similar, perhaps improved programs in the 1980s. We would estimate that, by 1990, these new programs would have resulted in a further annual incremental production at the same level, say 40,000 a.u. and 6,400 tons of meat. Thus, by 1990, we can estimate that the present policies for ranch development, if continued, will result in an overall increase in meat supply of about 12,800 tons annually.

BASIC DATA ON RANCHES : ALL RANCHES OPERATING UNDER THE  
COOPERATIVE, PLUS COMMERCIAL WHICH ARE UNDER PROGRESSIVE PLANS

<u>GROUP</u>	<u>Ha</u>	<u>Owners</u>	<u>Location</u>	<u>Phase</u>	<u>Capital</u>
Marushi Group Ranch	18,546	3217 (70)	Kajiado	I	
Mihoko Group Ranch	15,870	66	"	I	
Obakarar Group Ranch	10,280	60	"	I	
Poka Group Ranch	8,926	30	"	I	
Mhillin Group Ranch	14,723	64	"	I	
Mbuko Group Ranch	18,477	89	"	I	
Nkama Group Ranch	39,760	322	"	I	
Arroi Group Ranch	18,692	113	"	I	
Inaroro/Mashuru Group Ranch	19,483	334	"	I	
Erankau Group Ranch	8,985	68	"	I	
Ilsamin Group Ranch	12,194	94	"	I	
Emarti Group Ranch	13,211	91	"	I	
Empuyiangat Group Ranch	15,270	76	"	I	
Embolaai Group Ranch	24,000	248	"	I	
Olninos Group Ranch	6,020	196	"	I	
Olkeri	981	18	Narok	II	
Olmamutiai	3,726	19	"	II	
Marua	2,170	84	"	II	
Nkairamiram	4,375	88	"	II	
Ilmashuriani	4,993	97	"	II	
Morijo Narok	1,515	23	"	II	
Olonensis	9,007	180	"	II	
Empuyiankat	15,270	76	Kajiado		
Kimana/Tikondo	25,120	167	"		
Oldonyonyokie	68,566	162	"		
Rombo	38,265	512	"		
Kilonito	25,685	122	"		
Shonbole	62,689	366	"		
Olkeramatian	21,612	199	"		
Kuku	96,000	544	"		
Enkaroni	11,173	257	"		
Nkoile	5,934	171	"		
Osilalei	38,629	435	"		
Esokota	4,109	72	"		
Oloiyankalani	9,606	118	"		
Olkiloriti	6,436	88	"		
Elangatanuas	59,497	416	"		
Olkeri	24,851	164	"		
Olopito	6,280	78	Narok		
Naibor/Ajijik	6,984	120	"		
Oletukat	13,776	107	"		
Kotikashi	959	28	"		
Olmakongo	1,661	69	"		
Kawa/Kibet	39,790	488	"		
Maso/ngiro	27,704	136	"		
Makairasa	2,349	65	"		
Makairasa	1,829	35	"		
Makairasa	6,576	122	"		
Makairasa	4,927	88	"		

<u>NAME</u>	<u>Ha</u>	<u>Owners</u>	<u>Location</u>	<u>Area</u>	<u>Value</u>
Oloibichai	7,562	132	Warak		
Daglan	847.5	43	"		
Fasara	6,970	14	"		
Ollingal	78,725	137	"		
Kotiyadi	87,591	290	"		
Oloisusiu	4,700	66	"		
Laparakuo	840	18	"		
Olalusie	6,352	128	"		
Shartuka	7,538	182	"		
Kapuro	2,471	220	"		
Nanyiany	814	53	"		
Olabongit	796	47	"		
Oienkaroni	1,069	90	"		
Emorogi	390	26	"		
Osupukiai	832	53	"		
Kipoki	39	8	"		
Mafuta	280	15	"		
Kijabe	6,251	123	Lalkipia		
Musul	2,646	73	"		
Mnishoi	678	26	"		
Ilpolei	1,931	47	"		
Ilmotiok	3,692	59	"		
Tiammut	5,155	106	"		
Koija	7,554	148	"		
Nkiroriti	2,812	30	"		
Mwereni	43,466	2910	Kwale		
Samburu South	63,655	3702	"		
Ndegwe	16.5	41	Siaya		
Kongelai	22,221	412	West		
			Pokot		
Kanyarkwat	11,000	266	"		
Serewo	10,105	233	"		
Chesera	10,635	131	"		
Nguni	9,379	45	Kitui		
Ngunyuma	4,935	518	"		
Amisigiyoi	2,895	94	Samburu		
Kirimun	10,695	245	"		
Ilkiloriti	5,116	335	"		
Mbaringon	4,359	307	"		
Lodoketek	10,588	437	"		
Mugwe	502	29	Embu		
Gekara	1,019	27	"		
Ruaru	123	18	"		
Gamamu	71	9	"		
Kathi	271	12	"		
Wazu	11,933	273	Kilifi		
Kayafungo	9,325	1398	"		

COMPANY

Lalinyi Ranching Co.	42,123	50	Taita	I/T	5,000/75
Gacha Ranch	10,121	2	"	I (so)	
	21,232	353			
	18,818				

<u>NAME</u>	<u>Rs</u>	<u>QTY</u>	<u>Location</u>	<u>Class</u>	<u>Value</u>
Wakana Ranch	20,920	112 (72)	Taita	I	
Wakana Ranch	34,412	48	"	I/II	
Taita Ranching Co.	38,057	50	"	I	6,200
Tingo Mwangi	2,000	1	"	I	200
Elind Mwangi	2,060	1	"	I	
Galena Game and Ranching Ltd.	300,000	8	Tana/ Kitui (Kilifi)	I/II	16,000
Muki	2,023	5	Taita	II	
Mirchi	21,610	4	Lamu	II	
Girama	25,899	50	Kilifi	II	
<u>COMPANY/COOPERATIVE</u>					
Ida-sa-Godana	20,578	99	Tana/Lamu (Galole)	I	1,200
Taru	20,970	24	Kwale	II	
Kanyonyoni R. Coop.) Society and ) Katotini R. Coop.) Society ) now called					
B2-Yatta	21,513	366	Kitui	II	
<u>COOPERATIVE</u>					
(No Loan AFC)					
Masai Stock Farmers			Kajiado (Karen)		
Drumvale Farmers			Machakos		
Kineni Farmers		1800	Kisii		
Meru Ranching	16,000		Meru		
Nguu Ranching			Machakos		
Chepterit Ranching			Uasin Gishu		
Kimiti Farming			Machakos		
Mikuyuius Ranching			Kitui		
Ingaru Mihirica Ranching			Embu		
Kishushe Ranching			Taita		
Ndeiya Beef			Kiambu (Limuru)		
Embu Mwea Ranching			Embu		
Kaitet Ranching			Kericho		
Kapiyo Ranching			Siaya		
Kabkuress Ranching			Kericho		
Kiwoto Farmers			"		
Keiyian Farmers			Narok		
Kiu Ranching & Farming (dairy)	4,375				(dairy) 300
Maa Livestock Market C.S.			Kajiado		
Maa Ranching C.S.			Lamu		
Mwambi Kaviti Ranching Coop.			Litui		

Name	Value	Count	Location	Category
...	567	1	Laikipia	I
...	2,102	600	"	I
J.O. Evans	12,030	1	"	I
Maria Ltd.	18,218	1	"	I
Colchus Ltd.	6,251	1	"	I
H. Ruff	1,336	1	"	I
Mikotatu Co. Ltd.	8,049	600(75)	"	I/II
H. Crayton	696	1	"	I
John Clave Nixon	2,368	1	"	I
Ugumno Nyonjoro Coop. Soc. 1.	810	?	"	I
Muruku P. Coop. Society 1.	2,690	500(71)	"	I
Nkurumo Ltd.	14,170	8	"	I
Chololo Ranch	5,975	1	"	I
J.J. Hall	2,960	1	"	I
Kimugandura	2,374	15	"	I
Matanya Estate Ltd.	3,605	1	"	I
Cikaria	5,533	1	"	I
J.K. Mucambi	725	1	"	I
Aguthi Ranching Co.	1,652	740?	"	I
H.K. Wanderi	243	1	"	I
T.N. Malinda	1,892	1	Machakos	I
J.N. Hopcraft	11,336	1	"	I
Syokimau	1,744	50?	"	I
J.K. Milandi	420	1	"	I
Kimithi Coop. Soc. 1.	3,406	?	"	I
Mboguni Ranch	1,805	?	Nakuru	I
M. Matu	4,049	1	"	I
Midas Ltd.	226	7	"	I/II
Kikapu Farmers Coop. Society 1.	405	?	"	I
Nightingale (Sasumua Park)	610	1	"	I
Viscount Mandeville	606	1	"	I
Lari Windani Coop. Society	2,748	978	"	I
Ndimu Farmers Co. Ltd.	762	?	"	I
New Kapate Farmers	2,321	596	"	I
Kedong Ranch	8,187	50(76)	"	I
Naivasha Kikuyu Farmers	2,267	300	"	I
Tarabete Farmers Ltd.	2,385	50	"	I
Ngeteti Farmers	560	40	"	I
Ereri Co. Ltd.	3,026	130	Kitui 2.	I
Mwakini Ranching	8,210	50?	"	I
South Ngariama Coop. Soc. 3.			Embu or Kirinyaga	I
Mumoi	2,334	205	Nakuru	II

1. Not on list of Cooperatives by Ministry of Cooperative Development.  
2. Same name in Laikipia.  
3. Ministry's Cooperatives List.

	En	Ch. 22	Location	
	209	1	Nakuru	HH
Wak Kabia	9,712	2642	"	HHHHHH
Nacha	2,318	160	"	HHHHHH
Makopada	1,217	2	"	HHHHHH
Kivara Sawa	5,472	1500	"	HHHHHH
Jawal	3,875	5	Laikipia	HHHHHH
O'Naisor	12,025	1	"	HHHHHH
Ereri 1.	11,757	134	"	HHHHHH
	(8,370)			
Gattan	8,094	1	"	HHHHHH
Kisara	1,086	10	"	HHHHHH
Kararakwa	8,142	3000	"	HHHHHH
Machakos	5,771	2	Machakos	HHHHHH
Gama	8,213	2	"	HHHHHH
Thugi	2,853	50	Muranga	HHHH
Chebet	209	1	Nakuru	HH
<u>COMMERCIAL/COOPERATIVE</u>				
Kikapu 2.	870	260	"	HH

1. Same name in Kitui.

2. Not on list of Cooperatives by Ministry of Cooperative Development.

Name	Area	Area	Area	Area
	209	1	Nakuru	II
Kitui	9,712	2500	"	II
Kitui	2,318	180	"	II
Kitui	1,217	2	"	II
Kitui	5,472	1500	"	II
Jambani	3,875	5	Lalikipia	II
Ol'haior	12,025	1	"	II
Ereri <sup>1</sup>	11,757	134	"	II
	(8,370)			
Gatton	8,094	1	"	II
Kimara	1,086	10	"	II
Rararalom	8,142	3000	"	II
Machakos	5,771	2	Machakos	II
Gawa	8,213	2	"	II
Thugi	2,853	50	Muranga	II
Chebet	209	1	Nakuru	II

COMMERCIAL/COOPERATIVE

Kikapu <sup>2</sup>	870	260	"	II
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1. Same name in Kitui.
2. Not on list of Cooperatives by Ministry of Cooperative Development.

## 2. Transportation and Stratification

This section discusses a variety of subjects under the above heading; mostly involving the movement and subsequent further treatment of cattle from the pastoral areas : buying, transport, quarantine, backgrounding on ranches and fattening on feedlots.

### (1) Transportation and Related Activities

#### (a) Stated Policy

It is clearly the policy of the Government to assist in the commercialisation of pastoral cattle through the provision and support of marketing and transportation services. The main instrument for the implementation of this policy is the Livestock Marketing Division (LMD) of the Ministry of Agriculture. The role and goals of the LMD are as follows :

- To purchase livestock in the pastoral areas, thereby helping to increase the rather low offtake rates and increase meat production..
- To supply to ranches and feedlots with immature animals, which have passed through quarantine, for fattening.
- To supply animals directly to the Kenya Meat Commission.
- To support the efforts of private traders to carry out the above three activities by maintaining stock routes, holding grounds and transportation equipment for their use as well as LMD's own use.

The theory is that the establishment of these support facilities is an activity which can only be carried out by a Government agency. Even with facilities established, and made available to private users at subsidised prices, the risks involved in moving animals through the system, and especially through quarantine, are such that private traders cannot be depended upon to operate at a sufficiently high level to satisfy the policy objectives. Thus LMD is a buyer and seller of cattle as well as a provider of services.

Government's policy to support commercialisation and stratification is further demonstrated by the fact that a significant portion of the resources of the Second Livestock Development Project (9 percent at appraisal) is devoted to this activity. The project is assisting in the development of more than 30 new or improved buying stations, equipped with weighbridges and water facilities, about 30 new holding grounds and other improvements in the stock routes, as well as new cattle trains and trucks to permit rapid and efficient subsidised transportation of cattle over long distances, thereby reducing losses connected with foot transport.

With the completion of this project, LMD will have a very elaborate system of stock and feeder routes, holding grounds, buying stations and related facilities. It will have a capacity of well over 200,000 head per year. Figure III- 4 at the end of this section gives a current breakdown of existing feeder and stock routes and some of the supporting facilities, and we have also prepared a map, based on LMD data, showing the existing and planned buying stations.

(b) Indicated Supply Impact

The improvement of these facilities and the internal transportation system is expected to increase significantly the meat supply. The IBRD Appraisal Report (p.18) suggests that by the end of the project, 50,000 head out of the total of 140,000 head increase in annual offtake estimated for the project, could be attributed to offtake rate increases from the improved marketing program. In Annex 3 of the Appraisal Report, market improvements are shown to account for an increase in the offtake rate of 2.7 percentage points for the North East Region as a whole, which, based on the Bank's projections regarding cattle population, would amount to 67,000 head in year 20. For the Southern Region, 10 percent of a net three percentage point increase in offtake rates is attributed to improved markets, which would account for an additional 17,600 head taken off by year 20. This total of 84,600 is obviously in excess of the 50,000 mentioned above, and we are unable to reconcile the figures. In either case, however, the supply impact indicated by the World Bank is considerable.

(c) De Facto Policy

Our examination of the current status of the LMD and the marketing program indicates that the de facto policy is essentially the same as the stated policy in spite of some rather serious difficulties experienced by the program during the recent drought. We make several specific observations.

(i) Impact on Pastoralists

Although the program is clearly aimed at helping the pastoralists market their cattle at acceptable prices, and although the need for these services is most acute during drought, the performance of LMD in the past two years has not been good. In the North East our study team was met with widespread complaints that LMD had not been seen for "three years" or similar extended periods of time. Clearly, during the drought, pastoralists had many more cattle to sell than LMD was willing to buy. The actual LMD figures on purchases by province suggest that many of the complaints were exaggerated, but it is important that the individuals involved saw fit to make them. It is also quite clear that LMD was severely limited in the number of cattle it could buy because of quarantine troubles, which choked the holding grounds, and a very weak demand for the cattle on the part of the ranches, which were slower than expected to develop and.



in any case, also had suffered from drought and had no grass to support purchased animals. It would seem that LMD was governed by a policy of trying (not very successfully) to link purchases with sales, rather than having as a main priority the purchase of animals from the North East to help the pastoralists and reduce range degradation.

A second element regarding the impact on the pastoralists is the role and influence of the private traders. In the past two years, with LMD making few and rather sporadic buying expeditions in the North East, a large proportion of the animals that were purchased were bought from private traders rather than directly from producers. LMD paid a good price for the animals, but the producers, who lacked information about LMD's plans and the resources to make the sale direct, received a relatively small proportion of the receipts. This has the effect of encouraging the traders, who do have a role to play, but discouraging the producers, whose role is much more important.

We understand that, with the opening up of more of the buying stations with weighbridges, it should be possible to give the pastoralists themselves a better chance to sell directly to the LMD. It is the intent of LMD that this be done.

#### (ii) Quarantine Problems

A major service of the LMD is to provide quarantine holding grounds and to hold animals in FMD and CBPP quarantine before allowing them to move South into the Specific Disease Free Zone. This should require holding animals for three or four months, but in recent years it has often been necessary to hold them for much longer because of the presence of reactors and sick animals in the herd. This has reduced LMD's capacity to handle animals and potentially caused serious losses to the Division because of loss of condition. The holding grounds tended to become seriously overgrazed as well.

#### (iii) Mortality

LMD's mortality experience has been rather poor, thus increasing operating costs and, of course, reducing meat production. LMD mortality experience, according to the IBRD In Depth Review Draft Report, has fluctuated between .5 percent and 27 percent, with an average of about 11 percent. This is in part because of the need to hold animals for a long time in large, crowded holding grounds, but more because of the practice of purchasing animals in poor condition.

#### (iv) LMD Operating Losses

LMD has suffered continuous operating losses. This is because (1) trading profits, the difference between prices paid and prices received, have either been negative or, if positive, very small, (2) through-

put has been low relative to capital investment and staffing, and (3) operating costs, including mortality, have been high. Some of these factors are a result of inefficiency, but we believe a larger proportion result from deliberate policy, as for example, to pay a good price for cattle or to subsidize some of the services. As such, much of this loss does constitute a subsidy to the livestock industry, especially the pastoralist (and trader) and the ranchers who purchase the animals without paying the full transportation and quarantine costs. We believe that if LMD attempted to cover all costs, including management and debt service costs which do not now appear as part of LMD losses, the marketing system would collapse because it could not bear the full costs. On the other hand, costs can be reduced, and consumer prices increased to permit wider margins to LMD and the private traders using LMD facilities. This is discussed under price policy.

#### (b) Supply Impact Under De Facto Policy

We do not believe that the various problems just cited should significantly affect the supply impact of the marketing program. We believe that LMD is well on its way to solving some of the more severe problems and is not likely to attempt to become self sufficient by charging all costs, including quarantine, against the industry, which means in effect the producers, at least until there is a significant price increase at the consumer end to permit wider margins throughout the system.

However, under present policies, we do not believe the supply impact will be as high as that estimated by the World Bank. In our discussion on range development in sub-section d. above, we estimated that, under current policies, the number of livestock units on the 6.6 million hectares of the North East project would be 244,000 rather than the 345,000 projected for the project. Stated in terms of head, this would be about 443,000 head rather than 627,000. Taking a two percent increase in offtake rate as attributable to the marketing improvements, the shortfall from the original projections would be about 3.7 thousand head. With other shortfalls elsewhere in the system, under the present policy assumption, we would project that the marketing improvements would result in an increase of 40,000 head per year by 1990, rather than the 50,000 head projected by the IBRD. It should be stressed again, however, that this is a result of lower animal population rather than any serious difficulty in increasing offtake rate through the marketing improvements.

#### (2) Backgrounding

This is really part of ranch development policy, since it is intended that most of the new ranches use significant portions of their land and resources to feed immature steers raised in the pastoral areas, especially the North East. Thus, the ranches are an important link in the chain, and must function if the program to move immatures off the North East rangelands as soon as possible and into better

... be responsible for eventual success or failure of financing is going to work. There is no separate supply impact to be discussed on this point.

### (3) Feedlots

Feedlots are areas of limited size in which cattle are fattened under a high quality feeding regime in order to produce rapid weight gain and quality or grade gain as well.

#### (a) Stated Policy and Developments

For the past several years, it has been Government policy to support the development of feedlots as a means of producing high quality beef using relatively small amounts of land in the high potential zone. The effort began in 1968 when, with assistance from the FAO, an experimental feedlot program was launched. The program combined research with actual feedlot operations and was generally considered to be successful. The Government has continued to support the project but for the past few years the feedlots themselves have become "commercial" and operate outside of the project, but with continuing technical assistance from the project. A total of 12 commercial feedlots, some owned by the Government's Agricultural Development Corporation, were established and the Second Livestock Development Project included financing for an additional three lots, to be located in new areas outside of the "Disease Free Zone".

In addition to supporting feedlot development through the Beef Industry Development Project and the Government's own ownership of two commercial feedlots, feedlot development was encouraged through paying a feedlot bonus for cattle finished in feedlots or under other supplemental feeding programs. This bonus was to encourage feedlots to produce the higher quality carcasses required by KMC. An additional bonus was paid to feedlots producing carcasses which met certain further standards considered necessary for the Swiss market, and was called the Swiss Feedlot Bonus. The present feedlot bonus is Sh .30 per kg, and the Swiss Bonus, no longer paid because KMC is not selling to Switzerland, Sh .50 per kg.

In 1974, the costs of feed and other inputs as compared with beef prices became much less favorable and the rate of growth in feedlots ceased. Some feedlots closed. There are now, apparently, eight active feedlots as follows<sup>1</sup>:

1. The eight active feedlots on the following page are those which fit the definition of a full feedlot by the Kenya Beef Industry Development Project. KMC, on the other hand, pays the feedlot bonus to anyone who feeds cattle intensively. Under this definition, about 15 "feedlots" are receiving the feedlot bonus.

<u>Area</u>	<u>Location</u>	<u>Capacity</u>
ADC	Lanet	2,500
ADC	Endebess	1,800
Eldoret	Eldoret	1,400
Sengema	Menengai	1,800
Nidas	Solai	2,000
Ol Goroche	Subukia	1,400
Erbori	Timau	2,200
Kenya Cannery	Thika	<u>1,000</u>
		14,100

Source : Michael Creek, Beef Industry Development Project

In spite of price and other problems, the number of cattle placed on feed has gradually increased since 1974, and there has been some lessening in the wide seasonal fluctuations, which are basically caused by climatic factors. According to the Beef Industry Development Project, total numbers placed on feed for the three years 1974-76 were :

<u>1974</u>	<u>1975</u>	<u>1976</u>
18,584	20,460	24,385

While this number is not very significant compared with Kenya's total cattle herd, it has been shown by the Beef Industry Development Project that the feedlots are now supplying a large and growing percentage of the quality (FAQ and above) carcasses processed by KMC. In 1975 the estimate is that 73 percent of such carcasses came from the feedlots; the rest presumably came from the better ranches mostly in the high potential area. Thus, the Beef Industry Development Project points out 1. that the operations of the feedlots tend to mask significant changes in land use in the high potential areas, which are changing from beef to dairy and crops production, and that, had it not been for the feedlots, which use only a few hundred hectares of land for silage production and cattle feeding, the supply of quality carcasses would have fallen off even more rapidly than it did.

It should also be pointed out that this level of feeding, 24,000 head per year, is considerably below the capacity of the existing feedlots, about 50 percent based on year round use. Considerably more cattle could and should be put through the existing feedlots before additional lots should be considered.

#### (b) De Facto Policy

In trying to determine de facto policy toward feedlot development, we have come up with a few

Observations regarding the current situation of the feedlots which could be considered deviations from full support.

Needless to say, as an operation which must pay for all of its inputs, the feedlot is highly sensitive to price relationships. For the feedlots, prices of both immatures and prices received from KMC for fattened animals are very important. Beef prices are discussed under price policy. Price paid by the feedlots for feedstuffs, all of which are bought except for silage grown by most of the feedlots themselves, are also very important. It would seem that the Government has no policy for ensuring the feedlots stable prices or stable supplies of these feedstuffs. In the case of maize grain, the feedlots must compete with very high prices set to support the maize producers (Sh 80 per 90 kg bag) even when the Government must subsidise the export of large amounts of maize. For by-products, the feedlots must compete with other uses, including export, and receive no assistance in obtaining supplies.

A second possible problem is the current, reported LMD policy of not identifying accurately the source location of immatures purchased and transported to the high potential area for feeding. Since different areas are known to have very different incidences of measles, failure to identify sources means that the feedlots must assume that all pastoral cattle offered by LMD are from the high risk areas, which means either they must take very large risks, decline to purchase, or offer much inferior prices. This is because, if an animal has measles he will be heavily downgraded by KMC and all the benefit of the feeding will be lost. The result is that fewer North East immatures are being purchased by the feedlots and, presumably, a lower throughput is achieved.

#### (c) Effect on Supply

We believe that current de facto policies toward feedlots will have the effect of holding their development, and throughput, at about current levels of 25,000 head per year. If we assume that each animal fed gains about 60 kg CDW (say about 110 kg live weight), then the supply impact of the feedlot program might be 1,500 tons of meat per year. This is a small amount, but from an economic point of view, is more important than the actual weight gain because the quality of a much larger tonnage, say 5,000 tons of meat, is considerably upgraded.



Stock Route	TR	300,000	1	1	
<u>Moyale - Isiolo</u>					
Moyale					
Marti				1	
Archer's Post					
Kipsaing	R			1	(Wall, dam)

NORTH CENTRAL MARKETING SYSTEM

<u>Stock Route B1 :</u>					
<u>Moyale - Isiolo</u>					
Moyale	R	(5,000)			(1)
Turbi		100,000	1		(1)
Liis					(1)
Bubisa					(1)
Marsabit	TR		1		1
<u>B1 - By-Pass</u>					
Jaldesa		100,000	2		(1)
Lac Lobo			1		(1)
Laisemis					(1)
Archer's Post		10,000		Pumped	1
Isiolo					

<u>Feeder Route A/B</u>					
<u>North :</u>					
<u>Giriftu - Jaldesa</u>					
Giriftu					
Giriftu - Jaldesa		(3 0/s 5,000 ea)			(3)
Jaldesa					

<u>Feeder Route B/a :</u>					
<u>North Hor -</u>					
<u>Marsabit</u>					
North Hor					(1)
North Hor -					
Marsabit					(4)
Marsabit					

<u>Stock Route B2 :</u>					
<u>Moyale - Marti</u>					
Moyale					(6)
Moyale - Marti					
Marti					

<u>Feeder Route B3a :</u>					
<u>Archer's Post</u>					
Archer's Post		5,000	(1)		
Archer's Post					(1)

... (1) ...  
 ... 10,000 1 ...

Feeder Route B3c :  
Moratal - Kilele  
 Moratal  
 Kilele 4,000 (repair) 1

WESTERN MARKETING SYSTEM

Stock Route G1 :  
Masaba Market -  
Kisumu  
 Masaba (2,000) (1) (1)  
 Kisumu T

Stock Route G2 :  
McCalder's Mine  
- Kisumu via  
Lake Victoria  
 McCalder's Mine 1  
 Kisumu

COAST MARKETING SYSTEM

Stock Route H1 :  
Kilifi - Mariakani  
 Kilifi  
 Bamba  
 Mariakani T

Feeder Route H1a :  
Malindi - Bamba  
 Malindi  
 Bamba

Additional  
Facilities  
not on routes  
 Bachuma T 15,000 1 1  
 McKinnon Road 15,000 1 1

EASTERN MARKETING SYSTEM

Stock Route AC :  
Wajir - Garissa  
 Wajir  
 Lac Dima (5,000) 1 3769  
 (100,000) 1 3726  
 Garissa (30,000) 1 3696  
 (10,000) 1 3770

10 Miles S. of Garissa		(10,000)						
Garissa				1				
<u>Stock Route C1 :</u>								
<u>Wado Gashi</u>								
30 Miles S. of Wado Gashi		(5,000)	(1)					
Garissa	TR			1				
<u>Stock Route C2 :</u>								
<u>Garissa - Mombasa</u>								
<u>Via Lamu</u>								
Garissa				1				
Garissa - Ijara		(2 0/s 5,000 ea)		2				
Ijara		(5,000)	(1)					
Bodhai		(50,000)		2				(1)
		54,000		(2)				
Dol Dol			1					
Baragoni	R	50,000		1				(1)
<u>Feeder Route C2a :</u>								
<u>Koblo - Bodhai</u>								
Koblo				1				
Bodhai								
<u>Stock Route C3 :</u>								
<u>Garissa - Mombasa</u>								
Garissa								
Bil Bil		40,000		1	1(2)			(2)
Wenje	R	20,000			1			2
Karawa	R	35,000		(2)	2(2)			1
Sabaki	TR	600			1			
Mombasa	TR							
<u>Feeder Route C3a :</u>								
<u>Lamu - Garsen</u>								
Lamu								
Witu		50 0/s						
Garsen	R							

SOUTH CENTRAL MARKETING SYSTEM

<u>Stock Route D1 :</u>								
<u>Kilgoris - Kiljabe</u>								
Kilgoris		2,000						
Emarti		3,300			1			1
Nyare Nyare		2,000	1					1
Oi'along'a		10						
Mandi	T	2,000						Piped
Mandi		2,000						Piped

**Feeder Route D1b :**

Marok	2,000
Makindu	2,000
Mwaji	2,000
Mwaka	2,000
Mwara Dura	2,000
Mwaji Moto	2,000
Marok	2,000

1

Piped

**Feeder Route D1b :**

Olusuru - Marok

Olusuru	2,000
Marok	2,000

Piped

**Stock Route D2 :**

Namanga - Athi River

Namanga	T	2,000	1
Ngatataik		300	
Bissel		2,000	(1)
Kajiado	TR	2,000	
Kitengela CC	R	2,000	1
Kitengela LMD		9,000	

1

1

1

1

1

**Feeder Route D2a :**

Shombole - Kajiado

Shombole	4,000
Koora	2,000
Mile 46	2,000
Kajiado	

1

1

1

**Alternate**

**Route D2b :**

Koora - Kajiado

Koora	
Uaso Kidong	
Kibiko	2,000

1

1

1

**Stock Route D3 :**

Taveta - Ewali

Taveta	2,000
Njukini	1,000
Lassit	72
Ongaraika	
Rongaira	1,000
Maruashi	2,000
Ewali	2,000

1

1

1

1

1

1

1

**Feeder Route D3a :**

Makindu - Ewali

Makindu	2,000
Ewali	

1

Lantit  
 Nyakini  
 Taveta

Stock Route D4 :  
Garissa - Kilwezi

Garissa						
Mringi				(1)		(1)
Kangonde	4,559	1				(1)
Ndolo's Corner (Kaurtai)				(1)		
Athi Tiva	54,831		1	1	(3)	(1)
Kiangini						

Stock Route  
Alternate D4 :  
Kangonde - Athi  
River via Thika  
 Kangonde  
 Bombing Range

1

SOUTH CENTRAL MARKETING SYSTEM

Stock Route D/G :

Emerti -  
Muhoroni

Emerti						
Bomet	288				1	
Leiten	16					
Kericho	6	T				
Thessalia	392				1	
Muhoroni	973				1	

Alternate D/G :  
Kericho - Lumbwa

Kericho						
Tugeon	15					
Lumbwa						

CENTRAL MARKETING SYSTEM

Stock Route E1 :

Kiriman -  
Hampson's Falls

Kamar	R	52,000	3	5	1	5
Kiriman	R	50,000	2			1
Hampson's O/s		175				
Carlson's O/s	(	190				
	(	200				
	(	200				
	(	110				
		125				

... 303  
 ... 214

**Stock Route E2 :**

... 1 1 4 (2)  
 ... R  
 Allen's O/s ( 175  
 ( 204  
 De Back's O/s 2,993  
 Nanyuki O/s 50 1

**Stock Route E3 :**

Isiolo - Nanyuki  
 Isiolo  
 Bird's Hill 1  
 Lessa Downs 277  
 Mile 17 O/s 650 1  
 Ngare Ndiare 411  
 Timau O/s 690  
 Nanyuki TR

**Stock Route E4 :**

Thompson's Falls - Nyeri  
 T. Falls O/s ( 160  
 ( 169  
 ( 174  
 Ngobit O/s 373  
 Solio O/s ( 91  
 ( 185.7

**Nyeri**

Alternate Outspans

O/s 89  
 " 154  
 " 151  
 " 208  
 Olpejeta " 482  
 " 45.2  
 " 93  
 " 7.14

**NORTH WESTERN MARKETING SYSTEM**

**Stock Route F1 :**

Lodwar - Sabatia/ McCall's Siding  
 Lodwar  
 Lotong'ot 1  
 Sigar 1,200 1  
 Kinoo 3,000 1  
 Black Ravine 112  
 Sabatia  
 ... 902  
 ... 634  
 ... 634

Item	Value	Notes	Other	Other	Other
Alala	5,000	3		(1)	
Lason	1,000	(1)		(1)	
Fingon	3,000		1		
Endick	5,000			(1)	
Pachaliba	1,000		1		1
Propoch	10,000				
Mwisha Farm	2,500		1		
Mwisha Farm	3,468				
<b>Feeder Route F2a :</b>					
<u>Lotong'ot -</u>					
<u>Mwisha Farm</u>					
Lotong'ot			1		
Sigor					
Ortum					1
Nashakuta	1,200		1		1
Kaibabich	500				
Mwisha Farm					
<b>Stock Route F3 :</b>					
<u>Kinyang - Luoniek</u>					
Kinyang		1		(2)	(1)
Luoniek	R 50,000	3(1)	(3)	1	3(2)

**Notes :**

- Figures in parenthesis indicate future development plans, those without indicate current facilities or those to be completed this financial year. Numbers under "Boreholes" indicate the borehole registration number.
- R Radio Link )  
T Telephone ) Noted the first time they appear above.
- \* 4 million gls except Garba Tulla at 3 million gls
- \*\* County Council facilities
- \*\*\* To be relocated
- Any stop point over 2,000 acres can be considered a Holding Ground.
- Major quarantine Holding Grounds (for P.P.)
  - Isiolo, Longopito, Kipsing - 350,000 acres
  - Kirimun
  - Mar Mar
  - Luoniek
  - Kurawa
  - Mwisha Farm (West Pokot)
- Every Holding Ground (Shipping Point) does FMD control.
- C/S - Outspan.

## 9. High Potential Areas

This section briefly discusses current policies toward livestock production in the high potential areas. Certain aspects are covered elsewhere, under animal husbandry or price policy, for example. Here we attempt to cover several other topics which are of special concern in the high potential areas and which may have an impact on meat supply.

The high potential areas clearly remain very important to livestock and meat production, in spite of the widespread belief that these areas are rapidly changing to crop and dairy production. It is true that the trend in the high potential areas is toward more crop and dairy production, but data developed for this study indicates that beef production is and will remain important.

To define the high potential areas, we take the term to mean all or part of the following districts, located in ecological Zones II and III.

### Small Scale Farming

Kilifi, Kwale, Taita, Machakos (part), Kitui (part), Embu (part), Meru (part), Central Province, Nandi, Kericho, E. Marakwet (part), Baringo (part), Nyanza Province, Western Province.

### Large Scale Farming

Nakuru, Trans Nzoia, Uasin Gishu.

With regard to cattle population, this adds up to something like 6.5 million head out of our 1975 estimated 9.7 million head in the country as a whole, which indicates the importance of the area. We could add the high potential, Zones II and III, areas of Narok and Kajiado to this total, which would increase it even more, although at the moment this land is not used intensively. As discussed in detail in Section C above, the total amount of high potential land, Zones II and III, available for grazing in 1975 was a little less than 6 million ha. Our estimates for 1990 show a reduction in Zones II and III land available for grazing to about 4.5 million ha, still a considerable amount. Looked on from the point of view of carrying capacity, we estimate that the Zone II and III land available for livestock will still have a carrying capacity of 6.3 million L.u. in 1990, down from our 1975 estimate of 7.95 million L.u.

#### (1) Intensive Fodder, Pasture Improvement, Alternate Husbandry

A major way of increasing carrying capacity and production in high potential areas is through pasture improvement, intensive fodder production and schemes of alternate husbandry, alternating between crops and grazing. Apparent *de facto* policy is to encourage these approaches and there is considerable research being done at the National

National Agricultural Research Station at Kitale. However, we see little evidence of an active program, through extension or other means, to spread the practice. A review of the annual reports of the Animal Production Division for 1974 and 1975, for example, produces no mention of activities to spread these practices, although there is considerable mention of the feedlot development program.

On the basis of our observation and discussions with people in the industry, as well as the results of the Integrated Rural Survey, we conclude that there is some activity along these lines in Central, Eastern, Nyanza and Rift Valley Provinces, but there is much more scope for these activities, apparently, in all provinces except Central. Areas that appear to be little affected by these improvements are Coast Province, the high potential areas of Narok and Kajiado, and Western Province.

And yet, the possibilities appear to be very great. Analysing data supplied by Kitale and other sources, it appears that, in Zone II, a switch to intensive fodder production or pasture improvement in place of unimproved grazing increases the average carrying capacity, on average, from .6 ha. per L.u. to .3 ha. per L.u.<sup>1</sup> or twice as much. In Zone III, the carrying capacity also doubles, from 1 ha. per L.u. to .5 ha. per L.u.

We believe that a certain amount of increased intensive fodder production and pasture improvement is inevitable with the increasing amount of land placed under crops in Zones II and III. Our basic projections have taken this into account as follows :

<u>Region</u>	<u>Estimated Area under Improvement or Fodder Production 000 ha.</u>			
	<u>ZONE II</u>		<u>ZONE III</u>	
	<u>1975</u>	<u>1990</u>	<u>1975</u>	<u>1990</u>
Central	83	93	-	17
Nyanza	20	20	3.4	24.6
Western	-	-	-	-
Rift A	23	43	-	-
Rift B	111	57	-	42
Coast	19	25	-	11
Eastern	14	14	39	39
<b>Totals</b>	<b>270</b>	<b>252</b>	<b>42.4</b>	<b>130.6</b>

<b>Totals</b>	<b>1975 :</b>	<b>312.4</b>
	<b>1990</b>	<b>382.6</b>

1. The stock carrying capacity of .3 ha./L.u. is based on expected yields from intensive fodders or grass leys of 10,000 kg D.M. per ha. per year, the lower end of the results reported by Kitale. Source : A General Guide and Introduction to Programmes and Activities of the National Agricultural Research Station, Kitale. August 1976.

Under present policies, we would not project any significant expansion of these practices beyond that used in our basic projections. Although there is research, there is little apparent extension activity. There is a belief among many that there is little land available for grazing that is really suitable for these practices on which they do not already exist, although our data and observations suggest otherwise. Under the present policies assumption, then, we would assign no further supply impact to these potential improvements.

We might add that price is an important factor here. Pasture improvement and the other techniques discussed require significant investment, which in turn requires that beef production be profitable. If farmers do not believe prices are adequate to ensure profits, they are unlikely to be willing to make the improvements discussed.

## (2) Herd Improvement

The high potential areas have significant numbers of grade cattle, mostly for dairy but also for meat. In a situation in which the amount of grazing land is gradually declining, it clearly makes sense to improve the herds to increase yields per hectare or ton of food consumed. Over the years Kenya has been a leader in livestock breeding and herd improvement, and the improved cattle types do provide much of the higher grades of carcass beef and higher meat and milk yields.

It is Government policy to continue to promote herd improvement through breeding and selection, and several stations are involved in experimentation. Further, there are the dairy and recently established beef recording schemes aimed at recording the results of progeny in an effort to select improved stock for further breeding.

However, in several respects, we must conclude that this policy is not being supported at a level adequate to achieve notable results.

First, it appears that the base for herd improvement is contracting, rather than expanding. The number of people in the industry maintaining high quality breeding stock has gone down in recent years. Secondly, the beef recording scheme is still very limited in its coverage; only three ranches at present. Thirdly, the Government policy of effectively banning the export of breeding stock acts as a disincentive to those who engage in the production of improved stock, since demand for their stock is reduced and, more important, profit opportunities sharply curtailed.

We have not studied these matters in detail, but must conclude that, under present policies the opportunity for significant increases in production in the high potential zone through herd improvement will not be realized, and there will be no significant supply impact.

### (3) CALL MORTALITY

It appears that calf mortality is still about 30 percent, a rather high figure, in the high potential zone. Basically, calf mortality in these conditions is a matter of management. Because mismanagement of cross cattle leads to greater losses than occur with the harder but less productive short horn Sabu, there is an urgent need for improved management here. In the high potential zone, intensive livestock production puts a premium on matters which are of lesser importance under range conditions, such as scours and worms. Extensive work at the Mariakani Animal Husbandry Research Station has demonstrated systems which bring calf mortality, under high potential area conditions, down to the 2-5 percent range, and there seems to be no technical reason why these systems cannot be adopted by the small scale farmers. Further, adoption of these systems, which improve health and nutrition, also tend to increase the rate of live weight gain.

In spite of the impressive research results, however, we see little attention being paid to encouraging and assisting the small holder farmers to adopt improved management systems in order to reduce calf mortality and raise the weight of calves at weaning.

### (4) Utilization of By-Products

There has been encouraging work in Kenya on utilization of by-products and crop residues for feed. Most of the formal research has been in connection with the feedlot program, but there would also seem to be excellent opportunities for their use as supplemental feed by ordinary farmers in the high potential zone. In fact, of course, a great many farmers do use crop by-products as feed, and we have taken account of this in our analysis in Section C regarding regional and zonal carrying capacities. On the basis of our observation, however, by-products are not being used to the extent they could be, or as efficiently as they could be. Therefore, we will again assign no supply effect to utilization of by-products beyond that already reflected in our basic projections.

### (5) Dairy Bull Calves

A large number of dairy bull calves, mostly in the high potential areas, are slaughtered soon after birth. This is because of the relative prices of milk and meat and the fact that some of the breeds are relatively poor performers as beef animals. A survey by Kamau and Meyn in 1972 indicated that 27 percent of all dairy bull calves are slaughtered at birth and, of course, many others die long before they reach maturity. Under present policies, we see no change in this situation, in spite of the fact that some research into the problem is underway. We discuss the matter in more detail in the recommendations section, Section F, of this chapter.

We have been so much of the time...  
concern with the high potential area, the...  
the majority of the area and will soon be...  
to have the impression in our field trips...  
although the Government provide transportation...  
the small holder in the high potential area...  
effective help or encouragement in marketing...  
we have not studied the matter enough to...  
impact or make any recommendations in Section F below.

[Illegible text]

[Illegible text]

[Illegible text]

[Illegible text]

## (1) Present Policies

The present aim of policy in the beef sector is to provide prices which are adequate to promote increased production, in conjunction with other policies aimed at increasing production, and to prevent excessive increases in the price of beef to consumers, especially middle income and poorer consumers. Based on study of the data, current policies favor the lower and middle income consumers.

There are many different levels of livestock and beef prices in Kenya or in any other country. A list of such prices would include the following.

- Prices paid to primary producers for immatures.
- Prices at which immatures are sold to ranches or feedlots.
- Prices paid to ranches by feedlots.
- Producer prices paid by processors, KMC and others.
- Wholesale prices charged by KMC and others.
- Retail prices.

These prices are all interrelated and all must, in the long run, be adequate to attract resources to the industry to keep production going. The adequacy of the prices, and the margins to producers in the chain, are also dependent on costs of production at each level.

The Government's price policy impinges on several, but not all, of the prices listed above. The main points at which Government price policy impinges are in :

- Prices paid to primary producers for immatures, controlled through the LMD buying prices, especially in range areas.
- Prices at which immatures are sold, controlled through LMD selling prices.
- Producer prices paid by the KMC for each grade, controlled (minimum) directly by the Government. For other processors, no control.
- Wholesale prices for each grade charged by KMC to retailers. Controlled for each

Headquarters and below by the processors.  
For other processors, no control.

- Retail prices. Maximum prices controlled directly for specific cuts and for "bone-in bone-out" meat, but not by grade.

It is widely believed that present price policy is setting the prices, and margins, too low and this is favoring the consumer at the expense of the producer and at the expense of increased output. In the sub-sections which follow, we discuss current policy at each level.

(a) Prices at Each Level

(1) LMD Buying Prices

Primary cattle producers sell direct to processors, to traders, to other producers such as ranches or feedlots, or to the Livestock Marketing Division. Government policy impinges on direct sales to KMC, discussed below, and on LMD buying prices generally for immatures and almost always in the pastoral areas.

In the recent past, LMD has apparently been purchasing immatures in the North East for relatively high prices, say Sh 2.20 to 2.40 per kg. liveweight, and taking a rather heavy loss because of mortality, the need to hold animals for a long time in quarantine and generally unfavorable prices when the animals were sold. Unfortunately, most of the cattle purchased were purchased from traders rather than producers themselves.

LMD's current policy, as of December 1976, is to purchase cattle by weight, directly from the producer, and at the KMC realization price for recent experience, less certain costs.<sup>1</sup> The KMC realization price for Mombasa currently being used is Sh 4.55 per kg CDW, which, assuming the carcass is 47.5 percent of liveweight, works out to about Sh 2.16 per kg liveweight. For Athi River, the KMC realization price being used currently is Sh 4.16 per kg CDW, or Sh 1.98 per kg liveweight. The difference is largely due to a much higher rate of retention for measles at Athi River. Costs have been calculated for each buying center and include factors such as distance needed to transport and measles incidence. The actual prices paid to producers is between Sh 1.60 and Sh 2.00 per kg liveweight, depending on the center. As a matter of policy, LMD now makes all purchases by weight and eartags all animals so that records can be kept.

1. LMD calculates all direct purchasing and transportation costs, a measles factor and a mortality factor. Headquarters costs and most depreciation, interest and related costs are not included, so there is still a significant subsidy in the system, which we support.

Now that LMD is making a major effort to purchase livestock from producers, it appears that the prices being paid are unable to call forth supplies of pastoral cattle. This view has reportedly been expressed to LMD by the pastoralists and LMD's current experience indicates that it is true.

Conclusion : present policy is to pay enough or more than enough to encourage pastoralists to sell their cattle.

(ii) LMD Selling Prices, Immatures

LMD either sells its cattle directly to KMC, without a CBPP quarantine, and at the regular KMC prices, or to ranches and feedlots. For the ranch and feedlot sales, the cattle must be placed in CBPP quarantine. There are costs involved, even though the cattle hopefully gain weight during the quarantine. LMD calculates that it costs Sh 0.15 per month to hold the cattle in quarantine and there is a mortality risk. Therefore, sales prices to ranches and feedlots are above the KMC realization price, assuming that the weight gain just mentioned doesn't also mean a grade gain. Current sales prices to ranches and feedlots are :

Liveweights up to 200 kg	Sh 2.40 per kg
200 kg to 225 kg	Sh 2.50 per kg
Above 225 kg	Sh 2.65 per kg

These prices have remained stable for two years or more. Note that a price of Sh 2.65 per kg liveweight is equivalent to Sh 5.58 per kg CDW (at 47.5 percent), a price which is 15 percent above the price for Standard grade at KMC. Seen another way, a third of the animals would have to grade FAQ in order for this to be a KMC realization price.

From the point of view of LMD, these prices are the lowest possible prices which can be charged. The increase over the KMC realization price barely covers the additional quarantine and mortality costs, even assuming a daily weight gain of 200 grams in the holding grounds. One could argue that quarantine costs are "government costs" and should be absorbed by LMD on behalf of the Government, thus making the LMD selling price the same to ranches or feedlots as to KMC. We believe this is a valid argument and would prefer to see identical prices.

We also find a system of higher per kg prices for heavier immatures rather strange. However, we understand that ranchers and feedlots prefer the larger animals since it reduces the time needed to hold them to make a grade gain. So given the system of large between grade differentials, the pricing system appears to be rational.

From the point of view of the ranches, these prices have been, in the past year, too high, since they have meant that part of the grade gain had to be shared with the pastoralists or LMD. For full ranch viability, they may well be too high.

...will settle to feedlots for ...  
 ...at this price ...  
 ...above the LMD ceiling price ...  
 ... (1) the crossbreeds tend to ...  
 and (2) the incidence of measles is considerably lower.

**Conclusion :** present policy is to avoid losses by LMD (by a specific definition) and to give less consideration to possible problems of the ranches and feedlots, since there is always the possibility of selling to KMC.

**(111) KMC Buying Prices**

KMC minimum buying prices from the producers are set directly by the Government. There follows the basic buying prices which have been effective since 1972. These prices are normally reviewed annually and sometimes more often.

**KMC BUYING PRICES, 1972-1975**  
 Sh per kg. CDW

	<u>72</u>	<u>1/73</u>	<u>7/73</u>	<u>1/74</u>	<u>2/75</u>	<u>4/75</u>	<u>6/76</u>	<u>(9/76)</u>
Choice	4.45	4.65	4.87	5.30	5.85	6.15	7.10	(7.60)
FAQ	4.20	4.40	4.61	5.00	5.50	5.80	7.00	(7.50)
Standard	3.15	3.40	3.67	4.20	4.85	4.85	4.85	(5.35)
Commercial	2.80	2.95	3.19	3.60	4.25	4.25	4.25	(4.75)
Manufacturing	1.50	1.58	2.20	2.20	2.20	-	2.45	(2.95)

**Notes :** Prices for retained carcasses (measles) are lower. Prices paid to feedlots are higher. Current bonus for FAQ and above, passed, is Sh 0.50 per kg. The 9/76 price represents a Sh 0.50 per kg increase not yet implemented.

These KMC buying prices are important both for their general levels and for the size of the differentials between them. Below, we provide the differentials, using standard = 100.

**KMC BUYING PRICE DIFFERENTIALS**  
 Standard = 100

	<u>72</u>	<u>1/73</u>	<u>7/73</u>	<u>1/74</u>	<u>2/75</u>	<u>4/75</u>	<u>6/76</u>	<u>(9/76)</u>
Choice	141	137	133	126	120	127	146	(142)
FAQ	133	129	126	119	113	120	144	(140)
Standard	100	100	100	100	100	100	100	(100)
Commercial	89	87	87	86	88	88	88	(89)
Manufacturing	48	46	60	52	45	-	51	(53)

These KMC buying prices can be discussed from many points of view. They represent the returns to ranches and feedlots, and to other producers who sell direct to KMC. They make up a significant part of LMD's producer price calculations. For KMC, they represent costs which must be related to the ultimately retail prices. The implications are...

... after the policies regarding wholesale and retail prices are clarified.

(iv) Wholesale Prices

The Government controls cost in KMC wholesale prices. Other KMC wholesale prices are uncontrolled but are controlled indirectly by retail price controls.

There follows a table showing the wholesale prices which KMC is allowed to charge, along with KMC's own desired prices for those items not controlled.

**KMC WHOLESALE PRICES  
COMPARED WITH PRODUCER PRICES  
June 1976 to Present (2/77)  
Sh per kg.**

	<u>Producer</u>	<u>Wholesale</u>
<u>Choice</u>		
<u>Producer</u>	7.10	
Hindquarter		(10.15) (a)
Forequarter		(8.45)
<u>FAQ</u>		
<u>Producer</u>	7.00	
Hindquarter		(9.90)
Forequarter		6.10
<u>Standard</u>		
<u>Producer</u>	4.85	
Hindquarter		6.30
Forequarter		5.70
<u>Commercial</u>		
<u>Producer</u>	4.25	
Hindquarter		5.50
Forequarter		3.00

(a) KMC target prices in the absence of price control in ( ).

As indicated, wholesale prices are controlled on all items from FAQ forequarters down. In relation to producer prices paid by KMC, it would appear that the FAQ forequarters are rather low. The Sh 9.90 indicated for hindquarters is needed to bring the average yield up to about Sh 8.00 for FAQ, and Sh 8.00 is not really adequate considering that processing costs can be as high as Sh 1.50 per kg depending on throughput (see Chapter V B 1.2), and at least some FAQ carcasses include the feedlot premium and therefore cost Sh 7.50. Other problems are discussed below.

Detail prices are controlled in two separate ways. For regular "bone-in bone-out" meat, a single control price is used for each, "bone-in" and "bone-out". The current price is Sh 8.60 per kg. for bone-out and Sh 7.40 per kg for bone-in. The historical series is as follows :

	<u>12/67</u>	<u>9/71</u>	<u>7/73</u>	<u>2/75</u>	<u>6/76</u>
Bone-in	3.60	5.80	6.40	7.40	7.40
Bone-out	4.00	6.00	7.60	8.60	8.60

These retail prices are, of course, related to standard grade and, to a lesser extent, commercial grade, since these are the grades that are sold in this way. Taking standard only, the price relationships since February 1975 have been as follows :

<u>Producer</u>		<u>Wholesale</u>		<u>Retail</u>
4.85	Forequarter	5.70	Bone-in	7.40
	Hindquarter	6.30	Bone-out	8.60 (a)
	Average	6.00		

(a) Bone-out really doesn't count in this analysis, because the additional price only covers the weight of the bone removed and perhaps the labor of removing it. Also the relationship between these two gazetted prices has been erratic and at present butchers will avoid selling bone-out - see Chapter II.

Note that these controlled prices do not concern themselves with the grade of the meat.

The second set of controlled prices concerns cut meat, and there is a separate price for each of a long list of cuts. A selection is given here.

<u>Cut</u>	<u>9/71</u>	<u>7/73</u>	<u>2/75</u>	<u>6/76</u>
Beef Fillet, Sirloin	11.00	12.60	13.00	14.75
T-Bone	10.00	11.00	11.40	13.15
Rump Steak	9.00	10.00	10.40	12.15
Silverside	7.00	7.90	8.30	10.05
Minced Steak	6.50	7.90	8.30	10.05

These cuts can be made from any grade carcass, since there is no retail grading. Clearly, the better cuts should be made from FAQ and choice carcasses, in which case the desired KMC wholesale prices of Sh 9.90 for FAQ hindquarters, Sh 8.45 for choice forequarters and Sh 10.15 for choice hindquarter, leave little margin for the retail butcher, especially when, in most cases, bone must be removed and some fat trimmed.

We calculate that, based on present prices for cuts and a standard carcass yield into cuts, butchers are currently

earning a gross revenue of Sh 10.50 per kg. for hindquarters and Sh 8.35 for forequarters. Thus, the margins for the retailer would be as follows :

Item	Wholesale	Retail	Margin	
			Sh	percent
Choice hindquarter	10.15	10.50	0.35	3.4
Choice forequarter	8.45	8.35	-0.10	-
FAQ hindquarter	9.90	10.50	0.60	6.1
FAQ forequarter	6.10	8.35	2.25	36.9
Standard hindquarter	6.30	10.50	4.20	66.7
Standard forequarter	5.60	8.35	2.65	46.5

These figures make it clear why butchers have a strong incentive to use standard grade carcasses in making cuts, and why KMC has difficulty in selling the higher quality meat on the local market. The fact that any significant amounts of meat are sold is attributable to the fact that the butchers charge more than the minimum retail prices for higher quality cuts.

KMC itself has been able to make some sales at higher than control retail prices. Sales to institutions are made at higher prices. KMC's recent merchandising innovation, the family pack, which contains sirloins, topside, silverside, thick flank and rolled brisket, sells to institutions and to individuals, by KMC, for Sh 16.50 per kg. Sales are reported to be fairly brisk, which supports the view that there is a market for reasonably quality beef at higher than controlled prices.

Conclusion : present policy is to make a special effort to hold down prices of standard grade meat, but also to hold down all consumer prices at a possible risk to the producers. Probable result of a continuation of present policy is a continuing decline of real prices, although there will be short term increases from time to time.

#### (vi) Export Prices

Export prices are clearly not controlled by the Government. However, they are significant in the overall price structure. Further, Government policy can have an influence on the effective export prices to KMC in various ways, most obvious through export rebates such as the 10 percent (f.o.b. value) rebate recently granted on canned corned beef.

The current export prices are about Sh 150.00 (US\$ 18.00) per case for canned corned beef (less about \$1 transport) and about Sh 9,000.00 (US\$ 1,100) per ton for fresh meat. This latter is mostly hindquarters and only occasionally sides. This price of about Sh 9.00 per kg would be an acceptable price for FAQ sides, but is low for FAQ hindquarters. These fresh meat prices are, of course, still low by historical standards and, as noted in Chapter II B, are virtually certain to increase. At the moment, however, they are low and put a

(b) Basic Elements in Present Price Policy

Before entering into a discussion of specific problems and supply aspects, it would be useful to introduce two basic elements in the present price policy and situation: real price developments at the producer and retail levels, and producer cost changes.

(1) Real Price Changes

It is quite evident that real prices have declined over the past few years for several key livestock and meat prices.

In this discussion, we use the middle income price index as used in Chapter II, Demand. That index is as follows:

Middle Income Price Index, August 1971 = 100

December 1971	100.8
" 1972	105.0
" 1973	118.4
" 1974	134.7
" 1975	159.6
" 1976	171.1

For producer prices paid by KMC, we can examine the real price history from January 1973 to the present (December 1976), and deflate the current prices by 163 (171.1/105.0). The results are as follows:

REAL PRODUCER PRICES  
January 1973 and December 1976  
December 1972 Shillings

	<u>1/73</u>	<u>12/76</u>	<u>Decline in real price</u>
Choice	4.65	4.35	6.5%
FAQ	4.40	4.29	2.5%
Standard	3.40	2.98	12.4%
Commercial	2.95	2.61	11.5%
Manufacturing	1.58	1.50	4.9%

If we want a more striking example of the decline in producer prices, we can take the price of standard between February 1975 and the present, during which there was no increase in the current shilling price of Sh 4.85 per kg. Using December 1974 for the price index, prices increased by 27.3 percent during the period, bringing a real price decrease of that amount.

For retail prices, the story is much the same. Real retail prices of meat have declined rather sharply. The figures follow.

**CURRENT AND REAL BEEF RETAIL PRICES**  
December 1971 - September 1976

	<u>Current prices (av. for yr)</u>		<u>Prices in 1971 Sh</u>	
	<u>bone-in</u>	<u>sirloin</u>	<u>bone-in</u>	<u>sirloin</u>
1971	5.87	11.00	5.80	10.91
1972	5.84	11.00	5.56	10.48
1973	6.40	12.28	5.40	10.37
1974	6.40	12.60	4.75	9.35
1975	7.23	12.93	4.53	8.10
1976 (to Sept)	7.40	13.88	4.32	8.11
Percent change			-25.5	-25.7

For retail prices especially, the true decrease is actually somewhat higher than shown, because beef prices themselves make up about seven percent of the price index. Holding the price of meat down has had the effect of holding the price index down as well.

(ii) Producer Costs

While producer and retail beef prices have been increasing slowly in current terms, and decreasing in real terms, it seems clear that producer operating costs have been increasing very sharply. A number of previous studies have investigated this question, and we draw upon a few such studies to illustrate the point.

For feed costs at the feedlots, the Beef Industry Development Project<sup>1</sup> has made extensive studies and has calculated the current shilling costs of feed to fatten an animal for 97 days, using 930 kg of dry matter, as follows :

<u>June 1973</u>	<u>July 1975</u>	<u>Sept. 1976</u>
Sh 264	Sh 336	Sh 418

For the three month period, this represents a cost increase of 58 percent. During the same period, producer prices for FAQ have increased about 52 percent, excluding bonuses.

For ranch operating costs, the IBRD In Depth Review Draft Report covered the subject quite exhaustively. Of course, different types of ranches and indeed individual ranches have differing operating costs, but as a general statement, ranch operating costs appear to have increased from Sh 90 to Sh 180 per animal per year, or 100 percent, between 1973 and 1976.<sup>2</sup>

1. Creek, M.J., Beef Production and Beef Prices in Kenya, Beef Industry Development Project, October 1976.
2. IBRD, In Depth Review Mission, Draft Report, p. 12.

January, 1974 and August 1976, and the figures are as follows.

	<u>Jan 1974</u>	<u>Aug 1976</u>	<u>% Increase</u>
<u>Cattle Feed and Supplements</u>			
Bran 45 kg	13.65	25.00	83
Maize 90 kg	47.00	80.00	70
Molasses 1 drum	30.00	60.50	100
Urea 1 ton	910.00	2151.00	126
Salt 100 kg	30.40	61.00	100
Macklick - Super 25 kg	34.10	93.85	175
Di-Calcium Phosphate 50 kg	63.00	195.00	209
<u>Other Regular Inputs</u>			
<u>Dipping fluid</u>			
Delnav DFF 5 lt	335.00	660.00	97
Baler Twine 8 kg	45.00	70.00	56
Diesel 1 lt	.99	1.80	82
Petrol 1 lt	1.31	2.49	90
Lorry transport cost			75
<u>Labour</u>			
Wages per month	85.00	173.00	100
<u>Miscellaneous</u>			
Tractor, Machinery and Vehicles spare parts	50% - 100%		75
Veterinary	50% - 100%		75
<u>Capital Equipment</u>			
Tractors			Over 100.
Barbed wire H/T 16G x 25 kg	125.00	188.00	50

(c) Discussion of Problem Areas

As discussed above, livestock and meat prices at several different levels are subject to direct or indirect control by the Government. Based on our discussions with those involved with the industry and our review of other reports, several of these prices represent problems for the industry and, by threatening the viability of a group in the industry, threaten the continuity or increase in supplies. Others, such as LMD buying prices for North East immatures, do not appear to present problems since they have recently been effectively increased. Here we discuss those prices which do appear to present problems. The

discussion is carried out by the type of producer affected.

(i) High Potential Area Producers

In our discussion of high potential areas, and elsewhere, we took the position that, although the land in the high potential areas available for livestock production will be sharply reduced by 1990, considerable livestock will still be raised and that there are significant opportunities for increasing output per hectare of available land. Much of this will be dairy output rather than beef, but we believe that beef production can also be augmented with improved practices.

The investments required to increase output, such as improved pastures, fodder production, alternative cropping, reduced mortality and the like, have a cost and are unlikely to occur unless beef prices are attractive. With present milk prices, dairy production is clearly more profitable in these areas than beef production, and we would not expect it to be possible to increase beef prices enough to reverse this. On the other hand, improved real beef prices would doubtless promote additional investment in improved beef technology as well.

If we assume that current Government price policy will result in continued long term declines in real prices, we would have to assign a supply impact in the high potential areas over and above that already covered under specific high potential area policies. In other words, some of the increased intensification and use of by-product feeds assumed in our basic projections would be foregone and movement away from meat production would be faster than that accounted for by basic land use changes required because of increased food requirements. Quantification can only be a guess, but as a guess we would use a 5 percent reduction in meat output from the high potential areas below that covered in the basic projections. Since the basic projections provided for 3,472,000 L.u. and approximately 80,000 tons of beef from the high potential areas (Zones II and III, country-wide), a 5 percent reduction would amount to 4,000 tons by 1990.

(ii) Ranches

Ranches are concerned mainly with KMC producer prices and secondarily with LMD sales prices for immatures, since many of the ranches purchase steers for fattening from LMD.

The effect of present price policy was analysed in detail in the IBRD In Depth Review Draft Report. The Mission took the position that, at present prices, company ranches at the Coast<sup>1</sup>, new commercial ranches under the Second Livestock

1. IBRD, In Depth Review Mission, Draft Report, p.11.

Development Project 1., and group ranches 2. all face very severe financial problems, including bankruptcy, at present prices, and recommend in each case an immediate increase in FAQ prices from Sh 7.00 to Sh 8.05, and in standard prices from Sh 4.85 to Sh 7.25 (30 percent plus 15 percent) to save the ranches.

However, the IBRD Mission used as average carcass weights by grade at KMC the following : FAQ 206 kg, standard 152 kg, and commercial 109 kg. These are the approximate weights which were reported in the KMC annual report for 1967. The 1975 annual report shows 199 kg., 126 kg. and 93 kg. for the same grades, and preliminary 1976 figures obtained from KMC, pertaining to Athi River only, are 184 kg., 122 kg. and 87 kg. These 1976 weights are 10 and 20 percent lower than the 1967 figures. Applying the system used by the IBRD in Appendix 3 Table 5 of the Draft Report, we estimate that the difference in average weights per grade, in FAQ, standard and commercial, means an increase in ranch revenues of 10 percent if we use 1975 weights and 15 percent if we use 1976 weights. In other words, a higher proportion of the animals would be FAQ and a lower proportion standard.

We are unable to assess the impact of these changes on the IBRD's models and recommendations; we understand that the IBRD has done so. However, in spite of these changes in average weight, which may constitute a de facto increase in producer prices<sup>3</sup>, we still believe producer prices are too low to make many of the newer ranches, with high capital costs and relatively weak management, viable. Further, for the older ranches, which produce mainly FAQ in any case, we believe that the present prices may be adequate to allow them to continue operations, but inadequate to encourage them to make output-increasing investments.

Therefore, we do not agree with the IBRD In Depth Review Mission Draft Report that, with present prices, the ranch development program should and probably will come to a halt. We would, however, project a further slowing down of development and a negative supply impact resulting from present price policies. In our discussion of ranch development policies in section e. above, we projected an annual supply impact from the ranch development program of 12,800 tons of meat by 1990. We would reduce this by 25 percent, or by 3,200 tons of meat, as a result of present price policies. For older ranches, we would assign no negative supply impact to present price policy which would affect our basic projections.

1. IBRD, In Depth Review Mission, Draft Report, p. 17.
2. Ibid, p. 24.
3. This phenomenon may not be entirely a de facto price increase, since it may also reflect, in part, the discontinuance of heavy cattle, such as dairy cattle, which grade standard.

Present price policies are believed to be one reason why feedlots are not operating at full capacity. Feedlot costs have increased sharply, as noted above. However, feedlots make their money on a combination of weight gain and grade gain, and so the price differential between the grade at which an animal is bought for feeding (assuming that the price more or less reflects the grade<sup>1</sup>) and the grade at which the animal is sold, is crucial. Feedlots generally purchase animals which would grade standard, and feed them up to FAQ or choice. With the June 1976 price increases for FAQ and Choice, the differential between standard and FAQ has become rather wide, Sh 4.85 to Sh 7.00, or Sh 2.15 per kg., or 44 percent based on the standard price. This is the widest the differential has been since 1972, either in terms of money or percentage. It may explain why, in spite of high feed costs and other problems, the numbers of animals on feed increased in 1976.

Still, feedlots are not being used to capacity. It may be that, even though the standard-FAQ differential is relatively high, the low price of standard is and will increasingly hold down ranch production and thus the availability of feeders for the feedlots, and the low price of choice relative to FAQ discourages feeding to choice, which is the special province of the feedlots.

Finally, the relatively low retail prices for cuts of meat discourage KMC from producing high quality meat for the local market and this, coupled with current low export prices, makes KMC a less than eager purchaser of feedlot output.

Still, we believe that high feed prices are a more important problem to the feedlots than are low meat prices, and we assign no specific negative supply impact to present price policies as they pertain to feedlots. This is in spite

1. The price for feeders does not exactly reflect the grade. As noted above, LMD charges more than the standard realization price. Ranches with grass and a potential to bring an animal to FAQ are reluctant to sell for less than Sh 3.00 per kg liveweight, about halfway between FAQ and standard.

The truth of the statement that feedlots must have the grade gain to make money is clear from an analysis of figures from Beef Production and Beef Marketing in Kenya, Kenya Beef Industry Development Project, p. 12. Using September 1976 prices, it shows a cost of Sh 6.43 per kg of liveweight gain. If we assume that an animal which adds 100 kg liveweight in a feedlot adds 60 kg of edible tissue, the cost per kg of edible tissue is Sh 10.71, which is considerably more than choice is worth. If the net gain is 70 kg, the cost is Sh 9.19 per kg. The value increase of the original meat on the investment is crucial to feedlot (and ranch) operations.

of the fact we have heard of two feedlots which are ready to close down if the producer price for choice, including bonus, does not reach Sh 10.00.

(iv) KMC

KMC is affected by prices in several different ways. Its buying prices affect its competitiveness with private slaughterhouses and, of course, the overall supply of animals forthcoming. Wholesale prices related to buying prices dictate KMC's margins and, along with operating costs, its profitability. Retail prices partially control those wholesale prices not directly controlled, by dictating what the butchers will, in fact, pay at the wholesale level. Export prices, which are not directly controlled by the Government, also affect KMC's margins.

In Chapter V B 1. we make an analysis of KMC's margins and operating costs on the assumption of 100 percent domestic marketing, late 1976 prices and 1975 throughput. Our calculated margins for each grade are as follows :

Choice	Sh 2.23 per kg CDW	(based on target wholesale prices)
FAQ	Sh 1.08	" (based on target hindquarter wholesale prices)
Standard	Sh 1.17	" (based on controlled wholesale prices)
Commercial	Sh 1.51	" ( " , assuming commercial sold in this way)
Manufacturing	Sh 2.01	" ( " )

The weighted average margin was calculated at about Sh 1.50 per kg. On the basis of the rather low 1975 throughput, operating costs for domestic production are calculated as Sh 2.42 per kg. CDW, made up of the margin of Sh 1.50, a fifth quarter recovery of Sh 0.86 and a loss of Sh 0.06 per kg. CDW. On the other hand, we estimate that the 1976 level of throughput, 228,000 head, would lower operating costs by about Sh 0.64 per kg. CDW, or down to Sh 0.92 plus the Sh 0.86 fifth quarter recovery. We believe these two throughputs are extremes and that a realistic operating cost would be Sh 1.20 per kg plus the fifth quarter yields and a throughput of 175,000 head. But to obtain this throughput in a "normal" year, with no drought bringing large numbers of animals for slaughter, we believe KMC must be able to offer somewhat higher prices. Further, current margins on the two key grades, FAQ and choice, are not even at the desired Sh 1.20.

Therefore, from KMC's point of view, we believe that producer prices for standard are too low and that virtually all wholesale and retail prices are too low. The result is the producer price of standard and in all other grades.

prices would strengthen KMC's competitiveness and profitability.

With regard to exports, KMC must accept the prices available on the world market, although improved packaging and merchandising should increase realized prices to some extent. As noted above, current export prices for fresh beef are only about Sh 9.00 per kg, and mostly for FAQ and choice hindquarters. Even at present producer prices, this is not a profitable business. If producer prices are increased, it will be less profitable. Other than encouraging and assisting in better merchandising, the Government could provide to KMC an export rebate which, especially in times of low world prices, could help make export profitable.

With regard to supply impact, we believe that a continuation of present policies will make it difficult for KMC to operate profitably and thus inhibit its efforts to promote production through imaginative buying policies. However, we would not assign a direct supply impact to these problems.

#### (v) Butchers

Present retail price controls, which cover types of cut but not grade or quality, obviously have the effect of discouraging butchers from purchasing quality meat from the KMC and to substitute lower quality meat for higher. For those shops whose customers know quality and can demand it, the system encourages the butcher to break the controlled prices through various mechanisms. We do not believe these problems are major in the "bone-in bone-out" shops, but they are serious in the cut meat shops. The effect, we believe, is to lower the quality of Kenya meat and generally discourage the production of a quality product. There is, however, no significant supply impact.

#### (2) Supply Impact of Present Policies

Supply impact is discussed under various headings above. We conclude that present policies have a dampening effect on livestock and meat production, but have assigned specific negative supply impact, relative to our basic projections for 1990, to only the high potential areas and to the ranch development program. For the high potential area, our estimate is a reduction of 4,000 tons of meat, and for the ranch development program a further 3,200 tons, for a total of 7,200 tons.

##### 1. Planning and Policy Formulation

In Kenya, as in most countries, there is no formal mechanism, as far as we know, for the formulation of policies pertaining to the livestock and meat industries. Several agencies and units seem to be involved in policy making. These include the Economic Planning Division of the Ministry of Agriculture, the several operating divisions of the Ministry and of course its top leadership, the Ministry of Development, the Agricultural Finance Corporation, and

We believe that this is too decentralized and diffuse for effective planning and policy formulation in a sector as important as this one. There is no doubt that all of the agencies mentioned, and several more, have an interest in livestock and meat policy, but the lack of a central, coordinating unit is, we believe, a serious weakness.

**j. Aggregate Supply Impact of Present Policies**

In sub-sections a. through i. above, we analyze present policies, as we observe and understand them, in various parts of the livestock and meat industry. In many cases, we have attempted to estimate a supply impact arising from present policies, either positive or negative. That is, we have attempted to say whether, and to what extent, present policies will result in an increase or a decrease in supplies projected for 1990 in our basic projection given in section C above.

The listing of estimated supply impacts is as follows: Policies with no supply impact are not listed here.

**SUPPLY IMPACT OF PRESENT POLICIES  
TONS OF MEAT**

<u>Policy Area</u>	<u>Positive</u>	<u>Negative</u>
Animal Health		9,100
Rangeland Improvement	3,100	
Ranch Development	12,800	
Transportation	5,000	
Feedlots	1,500	
Price - High potential		4,000
- Ranches		3,200
<b>Total</b>	<b>22,400</b>	<b>16,300</b>
<b>Net</b>	<b>6,100</b>	

Thus we estimate that the net aggregate supply impact of present policies will be an increase of only 6,100 tons above our basic projections for 1990.

**E. Supply Projections Based on Current Policies**

The basic supply projections given in Section C above indicated that a total of 5,016 L.u. would be supplied in 1990, based on land availability and existing practice plus "inevitable" modifications. We have assumed that this would work out to 111,000 tons of beef and 54,000 tons of smallstock.

The supply impact of present policies is calculated at 6,100 tons of beef. In view of the minimum attention being given to smallstock, we assume no increase in smallstock meat acreage. Therefore, under present policies, 117,100 tons of beef and 54,000 tons of smallstock meat would be produced in 1990. This is considerably below the 1975 production figures.

and, considering the much larger population which must be fed by 1990, will mean that demand and supply will be seriously out of equilibrium and per capita consumption will be very much reduced. If these estimates are correct, it is certainly necessary to modify present policies.

We have made an effort to distribute the various beef supply impacts among the different regions of the country, in order to show the projected output by region in 1990 under present policies. The results are below.

TABLE III-10  
BEEF  
PRESENT POLICY SUPPLY IMPACT BY REGION

Region	Basic Projection	Animal Health	Rangeland Improvement	Ranch Development	Transportation	Feedlots	Price	Revised Projection
Northern	12,000	-900	+3,100	+200	+3,000		-250	17,150
Southern	7,000	-400		+3,400	+2,000		-1,100	10,900
Coastal	4,000	-800		+6,000			-1,650	7,550
Eastern	19,000	-2,000		+2,000			-850	18,150
Central	16,000	-1,300				+500	-750	14,450
Nyanza	19,000	-2,000					-900	16,100
Western	8,000	-400				+500	-400	7,700
Rift A	15,000	-900		+1,200		+500	-950	14,850
Rift B	11,000	-400					-350	10,250
<b>Total</b>	<b>111,000</b>	<b>-9,100</b>	<b>+3,100</b>	<b>+12,800</b>	<b>+5,000</b>	<b>+1,500</b>	<b>-7,200</b>	<b>117,100</b>

## F. Recommended Policies Which Would Impact on Supply

In the previous two sections of this Chapter, we have analysed in some detail present policies in the livestock industry as we have observed them, and attempted to quantify their impact on the supply of livestock in the future and up to 1990. Section E, just above, shows the aggregate supply effect. In this section, we make our own policy recommendations in these areas and attempt to quantify the supply impact of those recommendations. Section G following gives the aggregate supply impact.

### 1. Social Policy

In our discussion of observed present policy, we concluded that, in the three areas of social policy covered, (1) continued support for traditional methods was retarding the implementation of grazing control, (2) the requirement to support ownership change and income distribution in the livestock industry risked production losses and (3) the aim of protecting the urban consumer through price controls tended to retard production. Briefly, our recommendations in these areas follow.

We believe that the policy of taking traditional pastoral methods into consideration is a good one, and should always be the starting point for proposed changes. However, with population increase, grazing control is a must even if traditional ways must be sharply modified in this area. We recommend that the Government be prepared to push harder in this area and be prepared to sacrifice traditional methods.

The policy of ownership change and income distribution is certainly necessary and we do not recommend change. We do recommend that the program go more slowly if necessary to ensure sound business practices. The final result should be the same, but perhaps more time should be taken to get there.

With regard to the urban consumer, we believe that, if necessary, his interest in low priced meat must give way to the needs of the producer and others in the production and marketing chain. Our price policy analysis covers this in considerable detail.

### 2. Sheep and Goat Policies and Priorities

In Section D.2.b above, on current policies, we took the position that the development of sheep and goat production has a relatively low priority in Kenya. Here we recommend that sheep and goats should be accorded a much higher priority.

In arriving at this recommendation, we make use, first, of an analysis of the net metabolisable energy requirements of the two species, and determine that, even at present in Kenya, that sheep and goat production receives less Government attention than cattle production, the food requirements for the production of a kg. of sheep and goat meat are estimated to be 15 percent lower than for cattle. We consider that there is

great scope for increasing sheep and goat production and reducing the amount of food they require to produce a kg. of meat. Secondly, we provide some general observations on the advantages of sheep and goats over cattle.

a. Most Economical Shares : Relative Metabolisable Energy Requirements under Kenya Conditions

We have made a detailed calculation to determine the relative energy requirements for cattle vs. sheep. The calculations are on Tables III-11 A and B, and III-12 on the following pages. They show that, based on assumed herd structures and production coefficients, one kg. of beef requires 767 MJ of metabolisable energy, compared with only 644 for sheep. Sheep therefore require 16 percent less energy and, other things equal, are a more efficient source of animal protein.

b. General Comparisons

In addition to requiring less energy, we believe there are other advantages to sheep and goat production which should be taken into account.

First, sheep and goats are more resistant to drought than are cattle. This has been demonstrated in the pastoral areas during the recent drought and in many other countries. This resistance to drought reduces losses and smooths out the production over time when there are changes in climatic conditions.

Secondly, the production cycle is much shorter with sheep and goats. Therefore, they can increase, or decrease, in numbers much more rapidly than cattle. This allows for adjustment of the flock to food availability. Their fecundity also enables them to recover quickly from setbacks.

Sheep and goats, especially goats, utilize non-grass range resources, such as browse and forbs, to a higher degree than cattle. Thus they utilize resources which cattle do not utilize. This does not mean, of course, that there cannot be overgrazing with sheep and goats. The risk is certainly there.

With sheep and goats, meat can be produced in smaller increments than with cattle. The taking of a single animal does not reduce the normal flock by as much of a proportion as the taking of a cow or steer. The general greater ease of obtaining meat from sheep and goats also enhances their value to producers especially pastoral people.

The potential offtake rate of a flock of sheep or goats is considerably higher than with a herd of cattle.

We might also add that the export market, in the Middle East, is much more attractive for sheep and goats than beef, both in the present and immediate future and probably in the long run. Prices are especially attractive for sheep and goats at present.

TABLE III-11 A

NET DIGESTIBLE ENERGY REQUIREMENTS OF  
RED NUBAI FLOCKS IN KENYA 1975

Animals	Number	No. of	Grazing months	Factors			Total MJ
				Approx. average weight kg	Gain kg/ day	MJ per month	
<b>Females</b>							
Lambs born @ 55%	55.0	48 x 1	4	0.130	30 <sup>(a)</sup>	1,440	
Perinatal mortality 30%	-16.5	)					
Mortality to weaning 20%	-7.5	) 40 x 3	11	0.100	180	21,600	
Lambs to 4 months	31.0						
Mortality 4-8 months )	-5.0	28 x 4	23	0.060	231	25,872	
8-12 months )		28 x 4	27	0.050	222	24,864	
Lambs surviving 1 year	26						
Offtake	-9						
Young entering ewe flock	17	26 x 2	30	-	230	11,960	
Ewe mortality 12%	12	)					
Ewe offtake 5%	5	) 100 x 12	30	-	223 <sup>(b)</sup>	267,600	
Ewe Flock (static)	100						
Total Females		1,644				353,336	
<b>Males</b>							
Lambs born @ 45%	45	38 x 1	4	0.130	30	1,140	
Perinatal mortality 35%	-15	)					
Mortality to weaning 20%	-6	) 24 x 3	11	0.100	180	12,960	
Offtake	-9	)					
Lambs to 4 months	15						
Mortality 4-8 months	-2	14 x 4	23	0.060	231	12,936	
8-12 months		14 x 4	27	0.060	222	12,432	
Lambs surviving 1 year	13						
Offtake	-8	8 x 12	30	0.050	222	3,552	
Lambs entering adult flock	5						
Adult offtake and mortality	-5		30		190	79,800	
Adult males	35	35 x 12					
Total males		652				122,820	
Females and Males		2,296				476,156	

(a) Energy mainly from milk.

(b) Average, assuming one lamb a year, the typical energy requirements of lambing and lactating.

TABLE 713-11 B  
 FLOCK OUTPUT  
 SHEEP - RED NASAL FLOCK

<u>Animals- Offtake</u>	<u>Liveweight kg</u>	<u>Number</u>	<u>Total yield of meat and offal 70% l.v. kg.</u>
Females	28	14	274
Males	30	9	189
Lambs	11	<u>13</u>	<u>100</u>
Total		36	563
<u>Losses over 4 months</u>			
Females	13	17	155
Males	15	<u>2</u>	<u>21</u>
Total		19	176
Total Output Meat and Offals			739 kg
Annual Net Digestible energy required by the flock			476,156 MJ
MJ per kg meat and offals			644 MJ/kg

TABLE III-12

HERD OUTPUT AND NET METABOLISABLE ENERGY REQUIREMENTS :  
SMALL EAST AFRICAN ZEBU IN KENYA

<u>Herd Group</u>	<u>Percentage</u>	<u>Number</u>	<u>Yield of meat and offal kg per head</u>	<u>Total meat output kg</u>	<u>MJ per head per day</u>	<u>Total MJ per day</u>
<u> FEMALES</u>						
Calves % of cows	36.7	279				
Mortality % of calves	25.0	69.8			10	2,400 <sup>(b)</sup>
Calves < 1 yr		209.2				
Mortality	10.0	20.9				
Heifers 1-2 yrs		188.3			25	4,707.5
125 kg, Lw Gain 0.17 kg/day						
Mortality (a)	10.0	18.8	28	526.4		
Heifers 2-3 yrs		169.5			28.7	4,864.65
186 kg, Lw Gain 0.11 kg/day						
Mortality (c)	10.0(c)	2.8	42	117.6		
Offtake		37.7	84	3,116.8		
Heifers entering cow herd		129.0				
Cow mortality	10.0	76.0	58	4,408		
Cow Offtake	7.0	53.0	115	6,095		
Cow Herd (static)		760.0			39.3	29,868
225 kg, 60% in milk						
15 kg/day; 70% carry						
a calf						
<b>Total Females</b>		<b>1,327.0</b>		<b>14,313.8</b>		<b>41,840.15</b>

<u>Herd Group</u>	<u>Percentage</u>	<u>Number</u>	<u>Yield of meat and offal kg per head</u>	<u>Total meat output kg</u>	<u>MJ per head per day</u>	<u>Total MJ per day</u>
<u>Males</u>						
Calves % of cows	33.3	253				
Mortality % of calves	25.0	63.25				
Offtake % of calves	8.0	20.20	18	363.6	10	2,000 <sup>(d)</sup>
Calves < 1 year		169				
Mortality %	10.0	16.9				
Males 1-2 years		152.7			29	4,428.3
170 kg, Lw Gain 0.17 kg/day						
Mortality	10.0	15.3	35	535.5		
Offtake	6.0	9.2	70	644.0		
Males 2-3 years		128.2				
233 kg, Lw Gain 0.12 kg/day						
Mortality	10.0	12.8	50	640.0		
Offtake		65.4	100	6,540		
Males entering Adult group		50				
Mortality	8.00	17.8	75	1,335		
Offtake of adults		32.2	150	4,830		
Males in adult group		223			40	8,920
340 kg Lw		—				
Total Males		673		14,888.1		19,582.2
Total Herd		2,000		29,201.9		61,422.35
MJ per kg meat and offals	768 MJ/Kg					

(a) It is assumed that half the meat from mortalities is used.

(b) Assuming the equivalent of 240 head being fed.

(c) 2 months only

(d) Assuming the equivalent of 200 head being fed.

### **c. Recommended Higher Priority**

In view of the apparent advantages of sheep and goat meat production over cattle and beef, we recommend that higher priority be given to improving the sheep and goat industry in Kenya.

We do not have a specific program to suggest. We do suggest that a program include the following elements.

- Continuation and strengthening of the Sheep and Goat Project.
- Strengthening the sheep and goat component of the range research activities and in the training programs for range management personnel.
- Increased emphasis on sheep and goat disease prevention and research.
- Increased attention in the marketing chain to sheep and goats. Specifically, we recommend that the ban on exports of live sheep and goats be lifted and that either KMC or LMD explore the possibilities of live animal exports to the Arab world. Private groups might also be permitted to export live animals. If this proves possible, as we believe it will, LMD should be authorized to make special export purchases from producers of sheep and goats, at premium prices, with the prices tied at least generally to the live animal export realization price. This would have the multiple advantage of (1) giving an incentive and income to producers, (2) removing currently excess animals (males) from the range and (3) opening a trade in live animals with the Arab world and earning foreign exchange.

In considering how many of the Government's relatively scarce resources should be committed to sheep and goat development, we would suggest that, as a first approximation, the resources be divided in accordance with the amount of meat currently produced (using 1975, 143,000 tons to 66,000 tons). However, since we believe the benefit/cost ratio on resources committed to sheep and goat development would be higher than cattle, at least initially, we believe extra resources should be committed to sheep and goats.

Further, since relatively little is now known about sheep and goat productivity, we recommend that the situation be reviewed carefully on a periodic basis, at least every five years. It may develop that the returns on sheep and goat development are even higher than suggested and that an even

higher proportion of resources devoted to sheep and goats would be justified.

d. Supply Impact

In our basic projections of meat supply in 1990, we projected 1990 output of sheep and goat meat at 54,000 tons, down from 66,000 tons (18 percent) in 1975. This was somewhat less than the projected reduction in beef output (22 percent) because less land in the major sheep and goat production areas is expected to be removed from livestock production.

We believe that, if sheep and goat production is given high priority along the lines suggested above, meat output can be at least 50 percent above the level provided in our basic projections, or 81,000 tons rather than 54,000 tons. There would be some trade off with beef production, although not on a one-to-one basis.

A shift from cattle to sheep and goats would, according to our calculations, bring a 20 percent increase in meat output, but with the other advantages mentioned, we would suggest, for illustration, that Kenya could add two tons of sheep or goat meat at a cost of only one ton of beef, within the ranges being discussed. Thus, implementation of our recommendation would increase sheep and goat meat by 27,000 tons while reducing beef output, by 1990, by only half that amount, or 13,500 tons.

### 3. Animal Health

In the discussion of present animal health policy as we have interpreted it, we noted two fundamental problems: the dependence on an area-based strategy, which requires extensive use of quarantines within the country and strict movement control, and the growing failure of movement control and illegal stock movements. These, we believe, will lead to a growing negative impact on supply, particularly from FMD and ECF, in spite of the high level of work done by the Department of Veterinary Services.

Therefore, our recommended changes in health policy begin with a major effort to re-establish movement control, both within the country and across international boundaries. Secondly, we recommend adequate financial support for the Department of Veterinary Services. Thirdly, on specific diseases, we make recommendations which, if carried out, will lessen dependence on internal movement control and quarantines. However, we are aware that some of these recommendations are both difficult and expensive, and we have not carried out cost/benefit analyses. So the basic recommendation is movement control, which, of course, is Kenya's stated policy today.

#### a. Control of Livestock Movements

Illegal livestock movements make control of animal diseases virtually impossible. The Department of Veterinary Services must be given the authority and the support to control all livestock movements. Some will say that the Department already has this authority and on paper this is true, but support is obviously lacking. The stock owners must be educated to the dangers of illegal movements. All politicians and government authorities must support this concept. The police and other security forces must cooperate. The courts must impose severe penalties for those involved in illegal cattle movements. During severe droughts like the present one stock owners must receive special assistance so that they are not forced to engage in illegal movements in an attempt to survive. Without strict control of livestock movements most disease control programs are doomed to failure.

#### b. International Cooperation on Livestock Disease Control

Kenya is particularly vulnerable to incursions of livestock diseases across her extensive international boundaries, particularly to the North and East. These diseases know no political boundaries and nomadic cattle owners pay little or no heed to international boundaries. The Department of Veterinary Services currently vaccinates some 100,000 cattle annually for rinderpest and CBPP that cross the borders into Kenya from Somalia and Ethiopia. This is done willingly in the interest of international cooperation and to help protect the Kenya livestock industry. The Government of Kenya should make a strong appeal through the OAU for better cooperation on livestock disease control from her neighbors.

This approach should be made at the highest diplomatic level. Ultimately the OAU Interafrican Bureau of Animal Resources (IBAR), a bureau of the OAU Scientific, Technical and Research Commission (STRC), should assist in the coordination. We know that such international coordination is possible and formerly it was carried out very successfully under the OAU/STRC Joint Project 15 Regional Rinderpest Campaign which involved 22 OAU member countries. Not only Kenya, but all African countries involved in livestock production, would benefit by improved international coordination.

c. More Adequate Financing for the Department of Veterinary Services

In order to be able to implement a program to reduce or eliminate illegal cattle movement, to carry out the other recommendations with regard to specific diseases, or even to maintain the present level of veterinary services and health standards, more adequate funding must be provided to the Department of Veterinary Services. The major current problem appears to be transport, and transport is absolutely essential to the effective operation of the animal health program. We believe that no effort should be made to expand personnel until adequate transport is available.

d. Specific Diseases

(1) Foot and Mouth Disease (FMD)

Implementation of the two basic recommendations relating to movement control should reverse the trend toward increased losses from FMD, both direct and through increased local quarantine costs. However, we believe that, ultimately, the only way to fully control FMD is through vaccination of all cattle in Kenya, supported by similar programs in neighboring countries and/or strengthened border controls.

We are aware that a country-wide FMD vaccination campaign would be expensive. The estimated total cost of vaccinating an animal twice a year in Kenya is between Sh 5 and Sh 6. The annual cost of the program would be over Sh 50 million, and would have to be carried on for at least three years, and perhaps longer depending on results. Subsequently, areas at risk along the borders would have to be maintained as buffer zones by twice yearly vaccinations. From these cost estimates must be subtracted the cost of the existing, very extensive regional FMD vaccination program, so the net cost would be considerably less than suggested by the above figures. Further, if the full control program is not carried out, the present extensive vaccination/quarantine program will have to be continued indefinitely.

With regard to supply impact, a full control program would eliminate the losses attributed to worsening of the FMD problem used above, and also greatly reduce the current level of losses.

(2) Best Control Program and Other FMD Control Measures

We make three recommendations on ECF. First, the improved movement control needed in any case to fight FMD would also greatly ease the ECF problem. Secondly, the program of dip construction must be pursued and, more important, the Department of Veterinary Services must be given support and resources to improve its supervision of dip management and discipline. Thirdly, we strongly recommend that the matter of an effective vaccine for ECF be pursued and the controversy over the efficacy of the procedure developed by the FAO team be resolved by further research as soon as possible. An extensive, well supervised and monitored field trial of the immunizing procedure should be initiated as soon as feasible. Also on research, studies of the significance of the carrier state in cattle, and on an ECF immunizing method by tissue culture procedures should be continued.

We believe that, if these steps are followed, not only will the projected increase rate of loss from ECF suggested above be avoided, but a real reduction in the current level of losses could be achieved. For these projections, we assume that deaths of cattle over one year old could be reduced to about 5,000 per year.

(3) Contagious Bovine Pleuropneumonia (CBPP)

Although this disease itself does not now cause major losses in Kenya, the quarantine requirements required to control the disease are very disruptive. Therefore, we recommend that a major effort be made to eradicate the disease throughout Kenya. We believe this can be done without excessive expense, since the disease is already largely eradicated. It may be possible to combine a CBPP eradication campaign with the recommended FMD country-wide vaccination campaign, but some research is needed into this approach. Whether combined or not, the requirement is for vaccination of every animal, rather than the current estimated level of 70-80 percent of all animals. Also required is immediate slaughter of reacting animals, which is current policy.

Should this be successfully carried out, the extensive internal quarantine requirements could be eliminated, and a buffer zone at the frontiers substituted, unless the neighboring countries carried out a similar program.

(4) Contagious Caprine Pleuropneumonia

Our only recommendation here is that the fine work under way at Kabete toward developing an effective vaccine be given full and continuing support.

(5) Reproductive Diseases

Since there are major gaps in our knowledge about the impact of reproductive diseases, we

... that a comprehensive survey of the incidence and effect of these diseases, especially brucellosis, be carried out. On the basis of such a survey, appropriate measures can be initiated.

#### (6) Trypanosomiasis

This disease was discussed at some length under current policy. The policy issued with regard to this disease are very complex and controversial. For reasons already discussed, we believe current policy is correct and that it be continued. This means continued control through chemotherapy and prophylaxis on the one hand, and continuing emphasis on research on the other. Should research develop a feasible, low cost approach to eradication, such as the sterile male technique, it may be desirable to adopt a program of eradication for certain large areas, after extensive cost/benefit studies have been carried out. Otherwise we would assume that the present policy would be continued. We would assign no negative supply impact to this policy.

#### (7) Other Sheep and Goat Diseases

We believe that more emphasis and effort must be put on sheep and goat diseases, as well as camel diseases. The FAO Sheep and Goat Development Project has initiated a very promising, systematic approach to assess the constraints on smallstock production caused by diseases, and to find solutions. This excellent work has been limited by a lack of resources, but deserves full support.

#### e. Aggregate Supply Impact of Proposed Policies

To sum up, our animal health policy recommendations call for strong, effective efforts to stop illegal cattle movement, more adequate financing of the Department of Veterinary Services, nation-wide control campaigns for FMD and CBPP, a broad attack on ECF including use of vaccines, and more intensive research and related efforts on other diseases. In assessing the supply impact of these recommendations, we must consider the following :

- Although livestock disease currently results in large numbers of deaths, and the above program would reduce the number substantially, this does not necessarily mean a fully commensurate increase in livestock and meat supply. There is always other restraints, including the restraint of land, grass and feed.
- On the other hand, calf deaths, and other disease losses, and the current costs of disease limitation, all tend to reduce gross margins earned from livestock production. This tends to make livestock production less

attractive and drives marginal producers into other activities.

For the purposes of this study, we quantify the benefits of our proposed programs as follows :

**FMD**

**Institute effective movement control**

Bring loss rate back to 1973 level, estimated at about 840 tons of meat per year. Saving of 2,940 tons of meat by 1990.

**Full control of FMD**

Eliminate all losses. Further saving of current estimated loss of 840 tons of meat plus reducing risk of much higher losses.

**Improved policies on ECF**

Reduce projected loss of 18,000 tons of meat down to about 500 tons, a saving of 10,500 tons compared to current estimates and 17,500 tons compared with current policy 1990 projections.

**Other improved policies**

Estimate an additional .3 percent increase in livestock supplies annually to 1990. This would amount to about 380,000 additional head and, using an offtake rate of 20 percent and an average CDW of 125 kg, an additional 9,500 tons of meat.

Aggregating all the estimates, and assuming full control of FMD, we estimate that an additional 30,780 tons of meat could be obtained compared with our estimates based on current policy, if all recommendations were carried out. Compared with present loss levels, ignoring our estimates of increasing losses due to current policies, the additional meat which might be produced is 22,940 tons.

#### 4. Rangelands Development (Blocks)

##### a. General

In the above sub-section covering existing policy, we took the position that, although there are many problems with the current policy and program of rangelands development in the North East, most could be solved, and will be solved to a reasonable extent, and the physical aspects of the program will be implemented. Our main concern is that current de facto policy does not achieve grazing control in connection with the water development. We projected that this failure will virtually eliminate the benefits of the water and other development efforts through range deterioration.

This conclusion, unpalatable as it is, assumes that the planned, wider spacing of permanent water for Phase II will be followed. We strongly recommend that this be done and the first set of recommendations below cover the point.

The main recommendations below add up to a strong recommendation that grazing control be achieved and some tentative suggestions for doing so. We are well aware that the problem has occupied the efforts of many experts and that the solutions are far from easy.

We also provide a few other recommendations to cope with other current deficiencies which we discovered in the course of the study.

##### b. Approach to Water Development

It is current policy to carry out less intensive water development under Phase II of the project than was the case in Phase I, and the initial water points provided bear this out. Our specific recommendations on this point are the following.

First, preference should be given to boreholes for permanent and emergency water. Deep pans should be used only if no underground water is available at the maximum practicable depth. The reason is that boreholes are somewhat easier to control than deep pans, although there is ample evidence that control of boreholes is not easy. The boreholes should be spaced at intervals of not less than 25 km which is the distance a herd can move in a day under stress. This provides an escape route during drought and at the same time limits the risk of overgrazing in the areas relatively further from the boreholes.

Secondly, shallow pans should continue to be built between the boreholes, since they augment water supplies only during good years and when the range is in relatively good condition. They dry up when there is no rain and thus do not contribute to overgrazing.

The location and timing of permanent and emergency water points is also important. If we assume, as we do, that

discussion, that real grazing control is not to be obtained, then it is very important that permanent water points be established over as short a time period as possible in a given, large area, to avoid the initial water points being inundated by cattle from areas not yet served. This requires higher investment but should nevertheless be done to the extent possible.

Again, assuming weak grazing control, it is probably preferable to follow the USAID view of dividing an entire block into a wet season area, served only by shallow pans which dry up in the dry season, and a dry season area which is supplied by permanent water. This helps prevent the year round use of the wet season pasture with consequent deterioration. Without management, there will still be some deterioration, because the animals tend to graze the wet season pastures just at the growing season, which causes serious damage.

If grazing control can be assured, which we recommend and discuss in the following sub-section, then we believe that permanent water should be spaced evenly over the entire block. This allows all pastures to be used for either wet or dry season pasturage depending on the actual condition of the range. It allows for flexibility in the face of widespread variations in weather patterns.

### c. Grazing Control

Grazing control, including the inevitable movement of some people out of the industry and area, sometime in the future, is a must if significant increases in livestock production are to be obtained from the Zone V and VI rangelands. This, of course, applies to all such rangeland including that slated for group and other ranch development as well as that slated for block development discussed here. Our suggestions follow.

#### (1) No Water Without Control

The major weapon the Government has to achieve grazing control is, of course, the potential of water development itself. The difficulty is that the weapon is not used effectively, in Kenya or in many other countries. It must be used. We recommend that the Government announce and implement a policy of completing the development of water points now under construction and under contract, but starting no new work until firm agreements on the principle and practice of grazing control are in hand. The mechanism for such agreements would be the grazing committees already existing or planned.

The grazing management would presumably be based on the grazing management plans already prepared for each block prior to its development. Elements in putting the plan into effect would include :

- Preparing lists of pastoralists and herd numbers for all pastoralists considered by the Grazing Committee and the Block Manager to be authorized to use the grazing in the block or sub-block. Determination by the Block Manager, and the Grazing Committee, on the basis of the management plan, whether that number of animals can be handled under various seasonal and rainfall conditions. If not, the list must be reduced through common agreement (we have no illusion that this last is easy).
- Issuance of licences or permits to the pastoralists, by the Committee and the Block Manager, for the number of cattle authorized. Under drought or other negative conditions, the authorized number will have to be reduced.
- A system of surveillance and enforcement of the management plan and the authorized stocking levels with the combined effort of the Grazing Committee and the Block Manager. The most important element is keeping off the block cattle belonging to traders and other outsiders, unless it is determined that grass and water is available to extra animals. In which case, special licences can be issued.
- A system of payments to cover at least the operating costs of the water facilities, collected in connection with issuance and renewal of licences. These payments are required by the World Bank loan but should also carry an important incentive for self policing of the system.

We would recommend that all of this work be done before water points are provided. Situations, of course, vary.

For blocks which are already developed and in which grazing committees are in place, that is, the three blocks in the Phase I pilot project, there is no practical way for making water unavailable to force adherence to the management plan. Still, efforts can be made through the committees by demonstrating that range destruction will render the water useless. If the payments scheme can be put into place, this should give an incentive at least to reduce the incursions from outside.

For the two blocks under Phase II which are fully developed (Giriftu and Buna) and the two which are under development (Tarbaj and Aja), none of which have grazing

committees organized to date, we imagine the situation is much the same as in the Phase I blocks. It is too late to try to withhold the water which is already in place. Grazing Committees should be formed and the other steps started, using the payment system, extension, and a program for joint Committee/Block Manager enforcement effort, particularly at the water points.

It is the remaining 10 blocks which have had little or no development to date where the real opportunity for establishing an effective system of grazing control before water development exists. We strongly urge that the main elements be put in place before the first track, well or pan is provided. This includes appointment and emplacement of the Block Manager and his Range Assistants, establishment of the grazing committee, preparation of the management plan (preferably with input from the Block Manager and Grazing Committee) and the other items listed above.

It will take considerable time to do all this work, and perhaps it might be considered expensive to do so in advance of providing the water, but it seems obvious that this expense is well justified if it makes grazing control possible in the remaining blocks.

Even having all of this work done in advance of providing the water does not guarantee that the system will operate once the water is in place, but it increases the chances substantially. Continuing sincere efforts will be necessary. We list below some of the steps which may be helpful in implementing grazing control efforts in all blocks.

## (2) Stronger Extension and Supervision

The basic means of implementing management plans and therefore grazing control is through the Block Manager and the Range Assistants, which constitute, along with the Grazing Committee, the link between the Government and the pastoralists. We believe that there are adequate personnel in the operating blocks, but, as noted above, they should be in place much earlier, during the planning phase when the grazing control system is established. There are also problems of inadequate resources, mainly vehicles, to permit them to do their jobs. This should be rectified. In order for the personnel to be effective, there should be a vehicle for each two field staff.

## (3) Training

Training of pastoralists is already an important activity in the project, with training centered at the Giriftu Range Training Center. We suggest that, through this training as well as through the regular extension type activities of the field staff, the long term economic consequences of overgrazing and the advantages of following the management plan be stressed. The real advantages of a system which protects an individual's grass from intruders should be emphasized. The training should be as outdoor and

as practical as possible.

**d. Other Recommendations**

As a result of our extensive travel in the North East, we offer a few additional recommendations.

**(1) Monitoring the Grazing Resource**

Although there have been some efforts to monitor the grazing resource in the North East in the past, it appears that little is being done currently. Transects of a permanent nature have been set up in the project area, but now cannot be located and so are not useful. This should be corrected. Further, the grazing surveys must be improved by adding survey of the browse/shrub resources to accompany those of the grasses. The carrying capacity of the range cannot be adequately determined without this. Any effort to carry out these activities in the project area should be coordinated closely with the KREMU project, which has excellent resources for this type of survey work. We understand that, to date, the KREMU project is not yielding this type of data, but should do so in the future.

**(2) Improved Research Capacity and Application**

We believe that there should be a stronger research component of the rangelands project and also that the project should be tied in more closely with existing research programs, which in turn should be strengthened. We are aware of research underway at Kiboko and Bachuma, at the new Arid Lands Project in Marsabit and elsewhere. We are also aware that few of those research results to date appear to be applicable to the problems of the North East and, in any case, do not seem to be used in connection with the project. Research into the recovery potential of presently overgrazed ranges and the utility of native or introduced plants and grasses which might economically be reseeded is especially important, along with practical methods of reseeded.

**(3) Seed Testing and Production**

We also suggest that a small irrigated area near Garissa be established for seed production tests of species which may be suitable for re-seeding purposes. If grazing controls are established and research indicates candidates for re-seeding, seed can be produced without excessive delay.

**e. Supply Impact of Recommended Policies**

Our main recommendation has been for the Government to make a much greater effort to ensure grazing control before providing water and related developments on the rangelands in the North East and elsewhere. Other recommendations are supportive, but grazing control is the key. The supply impact could be considerable. It may be recalled that, according to our interpretation of the survey

information available on intended results of the Phase I and Phase II projects, animal populations would increase as a result of the project from 200,000 to 345,000 L.u. and, thanks to an increase in offtake rates (in part attributable to marketing improvements), the offtake from 22,000 annually to 55,200 L.u. We would assume the average weights at offtake would drop from 240 kg (108 kg CDW) to 220 kg (99 kg CDW) even with a successful project, because of the higher proportion of immatures taken.

With grazing control, the full benefits of the project can be assumed to be realized. The carrying capacity of the project area (Phases I and II) would be increased from 157,000 Lu (pre-project population 200,000 Lu) to 345,000 Lu, and the annual offtake increased from 3,755 tons CDW to 9,167 tons CDW, as compared to 6,851 tons CDW without the grazing control. This increase in offtake is based on an offtake rate after the project has been implemented of 14 percent. The actual expected offtake rate is 16 percent, but the final two percentage points of increased offtake is attributed to marketing improvements rather than the range development activities.

The gain of 2,300 tons of meat attributable to grazing control in the project area is important, but perhaps less important than the reduction of the risk of serious range deterioration should the water points be placed closer together than assumed, or should the degree of deterioration be more severe than expected under present policies.

## 5. Ranch Development

The section on ranch development included under Section D - Present Policies, above, covered the subject in considerable detail. Present policies are expected to result in a successful program but one which will result in incremental meat output at a relatively low level, even assuming programs continuing through the 1980s. In this section, we make a few recommendations and estimate the production impact should the recommendations be successfully implemented.

### a. Recommendations

#### (1) Grazing Control

We believe that the biggest area of weakness in the ranch development program is in grazing control. If this cannot be solved, the long term future of the program is bleak.

In the group ranches, we can only recommend that the Government and AFC put more emphasis on getting the groups to agree on imposing stock allocations at levels which will reflect range carrying capacity, and that the Government will undertake the necessary programs to assist those members who end up with too few cattle for minimum support. Allocations can, of course, vary with weather conditions, and can be allowed to increase in years of plentiful rainfall. But there must be an acceptable system for rapidly reducing the allocations, and selling down the herds, when the rainfall is poor.

On the basis of our field visits, the cooperative ranches are very badly conceived from the point of view of grazing control. We recommend that, if possible, they be changed over to other forms, such as company or commercial ranches.

We believe that company and commercial ranches are best geared to provide grazing control. Their main problems are price and financial, in that, faced with narrow margins, they have a tendency to crowd more animals onto the ranch, which means that they exceed the stocking capacity and overgraze. We believe that improved price policies would help cure this problem, as would improved management.

#### (2) Management

A second, closely related area of weakness in the current ranch development program is management. The Government and AFC are aware of this and have devoted considerable attention to it, but we can only urge that it be given even more attention. The extensive program of providing assistance in ranch planning carried out by AFC with foreign technical assistance is very valuable but not enough. We have three suggestions :

First, that an expanded training program be organized and sponsored by AFC for ranch managers. This would go beyond range management training which, at present, many seem to believe is enough for ranch managers. The course would cover, in addition to range management, animal husbandry, disease control, marketing, budgeting and finance and personnel management. It would not attempt to cover all of these subjects in depth since the students would have some background in most of the areas already. We would suggest a concentrated six month course at Egerton College followed by a several month, clearly directed apprenticeship at a well managed company or commercial ranch. Managers so trained would be placed in ranches of various types as a condition of financing by AFC, a concept which is already well accepted.

A second approach recommended is to select young men from the group ranches for special on the job training at well managed company or commercial ranches. Following training, they could be appointed as assistants to the group ranch manager and perform as field extension advisers to extend the reach and the scope of the manager's influence over technical developments.

Finally, we recommend that more emphasis be given to management through management firms. We understand that the management assistance provided by Allied Ranching has been very valuable. There are other groups and firms in Kenya with extensive ranching experience which could assist in difficult cases. Their services tend to be expensive, and, especially in times where profit margins are narrow, it may seem impossible for the ranches to carry these management costs. On the other hand, the costs of failure of the ranches because of continued bad management, with the resultant large losses in production and in AFC loan funds, would be much greater.

### (3) Finance and Planning

The ranch development program is based on loan financing through the AFC. The AFC therefore can have a very great influence over developments. The IBRD Review Mission Draft Report covered the subject of financing policies and options in very great detail. Here we only highlight a few items which we consider to be of key importance.

It seems clear that more equity is needed. Developing ranches on the basis of owner equity of less than 20 percent is very poor policy. It creates a very heavy debt burden and, at the same time, encourages individuals or groups with very limited resources, and presumably experience and management ability, into the industry. The equity requirements for ranch development with AFC financing must be sharply increased, even if this means a slower rate of development, which it probably does.

Ranch development must be done more slowly and in a more cost conscious way. There is a tendency to try to do

everything at once, and on a "first class" basis. It is always difficult for a new enterprise to support this approach. Again, the alternative is slower development, but this is necessary to avoid serious financial problems.

We are convinced by the many arguments in favor of stressing steer fattening over breeding herds in the early years of ranch development. The more rapid returns and their favorable effects on cash flow, and the greater flexibility in the face of drought or other adverse conditions, argue strongly for this approach. For the system as a whole, the need to have a market for immatures from the pastoral areas argues for this approach. With AFC providing the loan funds, it is in a position to insist on greater emphasis on steer fattening.

#### (4) Technical Support

Continued increases in the technical support to the ranches provided by the Ranch Management Division through the DROs and their staffs are necessary to the continued development of the ranching sector. A great deal has been accomplished in this area, but, as the program expands, more resources will be needed.

#### b. Supply Impact

We do not attribute a major supply impact to these recommendations. Indeed, some progress on them may be needed to ensure that the modest supply impact of the ranch development program described above under present policies is, in fact, achieved. Further, price policies remain a key element in the picture, and we have not included them here, preferring to handle price policy as a unit.

However, we would say that successful implementation of the above recommendations could bring the incremental number of a.u. marketed as a result of the ranch development program from 40,000 to 50,000, an increase in meat production from 6,400 tons to 8,000 tons, for the current program. Again, assuming that similar programs would take place in the 1980s, the total incremental production from the ranch development program would come to 16,000 tons annually.

## 6. Transportation and Stratification

In Section D below, we make a few comments on this subject area, which includes buying, transportation, quarantine, selling, backgrounding and feedlots. Here we make a limited number of recommendations which we believe would result in improvements in the livestock and meat industry.

### a. Transportation and Related Activities

The Livestock Marketing Division of the Ministry of Agriculture is the key agency in the purchase, transportation and quarantine of animals from the pastoral areas. As discussed in Section D, the LMD has faced serious difficulties in the past two years, but we now believe that things are improving with the addition of equipped buying stations, improved stock routes and further transportation equipment. We have the following recommendations.

#### (1) Role and Operations of LMD

LMD has a very important role to play in the marketing of livestock from the pastoral areas, especially when one realizes the importance of increasing the offtake rate from these areas. The Government has stepped in, through LMD, because the costs and risks of this operation is too high for the private sector. LMD should be as efficient as possible, but we do not believe it should have self sufficiency as a major goal. If LMD loses money, as it has in the past, this is acceptable as long as the Division operates with reasonable efficiency and as long as it does its job, which is the removal of animals from the pastoral area and the supply of animals to the ranches, feedlots and the KMC.

#### (2) Support for Buying Operations

We have two recommendations regarding support for buying operations.

First, it is the intent of LMD to purchase as much as possible from the producers rather than the traders. The establishment of buying stations with weighbridges, and the manning of these continuously, should make a big difference. We recommend that the help of the state radio, VoK, be enlisted in support of this operation through broadcasts, in the appropriate language, of information about LMD buying plans and operations, including prices being paid. We have discussed this with VoK and are advised that, although there are several agricultural programs broadcast regularly, no programming of the type recommended now exists.

Secondly, we recommend that LMD encourage the establishment of markets or small stores near the livestock markets which would sell items needed by the pastoralists. We have observed, and been advised, that there is a lack of such outlets, especially in Masailand, and that this is considered by many to be a reason for reluctance to sell on the part of pastoralists. It is clearly not the only reason, but such

systems could be effective in increasing the number of animals sold in non-crisis periods.

### (3) Measles

We recommend that LMD make every effort to identify the source of animals purchased and to maintain that identification until the animals are offered for sale. This is to give purchasers, especially feedlots, guidance as to the probable incidence of measles. Needless to say, a second step could be for LMD to pay less for animals from high incidence areas, and to charge less when selling. We are aware of problems of pastoralists or traders moving animals from one location to another to avoid such identification, but the opening of buying stations and the close relationship which should develop between LMD buyers and the pastoralists should minimize this problem. We understand that current methods of LMD, involving purchase of animals by weight and maintaining records, should essentially result in the implementation of this recommendation.

### (4) Quarantine

To the extent possible, we recommend that animals be held in quarantine in groups which are as small as possible and segregated by original source. This is to reduce the spread of disease among the animals while in quarantine.

### (5) Alternative Buying Arrangements

We recommend that, at least on a pilot basis, an alternative buying-selling arrangement be tried, which might be called a producers' marketing association. Since LMD is a buyer of last resort, and is prepared to provide certain services to cattle being moved and quarantined by others, LMD is willing to support such alternative approaches. The study team discussed the possibility of a producers' marketing association at a meeting with producers in Wajir in October 1976 and there appeared to be great interest.

The basic objective would be to bring the producers and the ultimate purchasers into much closer contact through the producers' marketing association (PMA) and its representative. LMD would still provide services and do so, hopefully, at rates which would provide no less subsidy to a PMA than the Division's normal operations do to producers. In general terms, the PMA would work as follows.

With the assistance of the Range Management Division and the Agricultural Finance Corporation (AFC), a producers' marketing association would be formed by the producers registered on a grazing block. The members would provide to the association a list of the livestock they would be prepared to sell at a specific time or at regular intervals. A representative of the association would visit potential purchasers, whether ranchers, feedlots or the LMD, and make a forward sale on a per kg basis, subject to whatever conditions were considered necessary and appropriate.

... payment would be made.

The association would then collect the animals and, using financing from APC or elsewhere, purchase the animals (ear-tagging to retain identity) and arrange for LMD to provide the transportation and quarantine services. The price paid would not be the full expected price less costs, but hopefully would be higher than the price paid by the traders. The association would provide the herdsmen during quarantine. After quarantine, the animals would be transported, again by LMD, to the purchaser and the balance collected. The association would deduct from the sale price the costs incurred and then pay to the producers the remainder, if any.

We recommend that a PMA be established on a pilot basis. However, before the PMA actually begins buying and selling operations, discussions should be held with the LMD to determine its policies for the period in question. If LMD plans to purchase directly in the area, and to purchase at a price which will probably require it to absorb all or most of the transportation, quarantine and mortality costs, then the PMA would not operate because it would not be competitive with LMD and therefore would only penalize its members. If, on the other hand, LMD was not prepared to engage in significant buying operations during the period, or was planning to arrange prices to cover all or most costs, and if competitive prices for LMD services to the PMA could be agreed, then the PMA would be encouraged to begin operations. In other words, we do not envisage the PMA as an outright competitor to LMD because it clearly cannot compete if LMD should decide otherwise. Full cooperation from LMD would be essential.

#### (6) Supply Impact

We regard these recommendations as designed to strengthen the operations of LMD or to provide a viable alternative. We would not assign any additional supply impact, but we believe that they would help ensure the supply impact already indicated for the improved marketing system.

#### b. Backgrounding

As noted in Section D, backgrounding is essentially covered under ranching development.

However, in the course of our field work we developed a rather specific recommendation for a backgrounding operation in the North East. Along the Tana River in Garissa District small plots are being irrigated by pumping, usually a lift of about 25 feet. The soil is highly productive, especially when proper drains are constructed. We recommend that, in addition to the crops now being grown in this way, small plots be developed for irrigated pasture and forage production. The irrigated pastures would be designed for putting 100 to 150 kg on two to three year old steers or growing out yearlings to a final weight of 250 to 280 kg. Another portion of the area would grow forage for silage to feed out the steers to the

150 to 375 kg. The animals could then be transported to the KAC plant in Mombasa. The quarantine requirements could presumably be satisfied while the animals were being fattened, so transportation to Mombasa could be direct. This scheme would allow for backgrounding in close association with the range production area.

We are aware, of course, that there are long term plans for large scale irrigation in the Tana River area. We recommend that these small projects be initiated now and later become absorbed in the larger project.

### c. Feedlots

As noted elsewhere, feedlot operation is highly dependent on price, and the price of animals and meat is discussed under price policy.

Here we do recommend that an effort be made to support feedlot development through assistance in obtaining feedstuffs at the lowest possible prices. We recognise that this recommendation has been made before.

A special situation involves maize prices. The maize price is supported at a current level of Sh 80 per 90 kg bag. At current meat prices, this is far too high for feeding. Further, maize is a staple human food in Kenya and there is opposition to diverting it to animal feed. However, in most years Kenya produces a surplus of maize and exports considerable amounts, usually at a price far below the support price. We recommend that feedlots be offered denatured (marked) maize at the export price with an appropriate adjustment for transport differentials, which would probably favor the feedlots. This would not guarantee supplies or prices to the feedlots, but in some years would get them feed supplies at acceptable prices.

With regard to other feedstuffs, especially by-products, a wide range of by-products is now being used. However, the feedlots must compete against other uses including export, and the market appears chaotic. We recommend that a policy favoring feedlots in their quest for supplies be established, under which producers of by-products would be required to give first consideration to the needs of the feedlots. This does not mean that the feedlots would be given more favorable prices than other users, but only that they be given the best possible chance to purchase at competitive prices.

With regard to new feedlots, we would certainly agree with others that new feedlots should not be established, with Government funds, until the throughput of the existing feedlots is nearer to full capacity. However, should this occur, as a result of the implementation of the above recommendations and price improvements, consideration should certainly be given to at least one additional feedlot. The Second Livestock Development Project apparently included new feedlots in the West (Kisumu) and in Masailand. We would suggest a feedlot at the Coast be considered, to take advantage of the high prices

of by-products which should be available, as well as the proximity of the KNC slaughterhouse and the growing number of ranches in the area. Of special interest is the possibility of growing sugar cane specifically for feeding in such a feedlot.

With regard to supply impact, we believe that these recommendations for assistance with feed prices, even without a major shift in livestock and meat prices, could increase feedlot throughput to about 30,000 head per year, compared to the 25,000 head assumed under current policies. This additional 5,000 head, at a feedlot gain of 60 kg each, would mean an additional 300 tons of meat, plus a grade gain on a much larger tonnage.

## High Potential Areas

In this section we make recommendations for policy change toward livestock production in high potential areas, recommendations which cover the few topics raised in Section D - Present Policies, below. We give special attention to the matter of dairy bull calves since this was specifically requested in the study terms of reference.

### a. Intensive Fodder, Pasture Improvement, Alternate Husbandry

We are convinced that there is considerable further scope in the high potential areas for increasing livestock and meat output through an expansion of these techniques. We recognise that prices must be considered right before these investments will pay and therefore have any hope for implementation. Further, we believe that a much greater research and extension, especially extension, effort is needed to promote these practices among small farmers in the high potential areas. In Narok and Kajiado, of course, it is probable that major changes in land tenure and way of life would be necessary, even if the land officially designated Zone II and II in those districts is really suitable for such improvement.

According to our estimates in Section C above, there will be 1.56 million ha. of land in Zone II and 2.92 million ha. of land in Zone III still available for livestock by 1990. We have calculated that 270,000 ha. of Zone II land and 42,400 ha. of Zone III land are already under one or another of these forms of improvement. Our basic projections assumed that, by 1990, there would be 252,000 ha. in Zone II and 130,600 ha. in Zone III under these improvements, a natural result of the increase in cropping and related activities. On the basis of our study of land characteristics, we estimate that a further 50,000 ha. in Zone II and more than 800,000 ha. in Zone III would be suitable for these improvements. With an active policy of research and extension, we would estimate that 30,000 additional ha. of Zone II and 300,000 ha. of Zone III could be put under one or more of these systems by 1990.

The supply effect would be considerable. For Zone II, land so improved would have an increase in carrying capacity from .6 ha. per L.u. to .3 ha. per L.u. Thus the carrying capacity of the 30,000 ha. would increase from 50,000 to 100,000 L.u. For the 300,000 ha. of Zone III land, the carrying capacity would increase from 1 ha. per L.u. to .5 ha. per L.u., or from 300,000 L.u. to 600,000 L.u. The total potential increase would be 350,000 L.u. Using an offtake rate appropriate to improved pasture in these zones, 20 percent, and a CDW of 200 kg per L.u., the incremental meat supply per year would be 14,000 tons.

### b. Herd Improvement

We recommend that further attention be given to herd improvement. The beef recording scheme should be

gradually strengthened and the efforts of those in the business of selection and improvement of livestock encouraged in any way possible. Especially, we would recommend that the export of breed cattle be encouraged in order to encourage the breeders. The local market for improved cattle would be encouraged through a variety of measures, including credit, price policy (see below), improved disease control as discussed elsewhere, and others. We are not in a position to make meaningful estimates of supply impact on these recommendations, especially since they are so entwined with other recommended improvements. For illustrative purposes, we might say that an active program of herd improvement could result in an additional 15 percent (about 1 million head) of the population in the high potential area, being upgraded to yield an additional 25 kg CDW of meat. With an offtake rate of 20 percent, this would yield an additional 5,000 tons of meat per year.

#### c. Calf Mortality

We recommend that a greater effort be made to encourage improved management of livestock in the small farm areas in the high potential zone, with the objective of improving the calf mortality figures as well as many other technical coefficients. We would propose a target reduction in calf mortality from 30 percent to 15 percent. This improvement would clearly have a significant supply impact, since it would bring widespread changes in herd structure. We have not been able to make the detailed calculations necessary to determine supply impact. Rather than have no figure for our aggregate supply impact discussion, we will arbitrarily assign a figure of 5,000 additional tons of meat by 1990 from this source.

#### d. Utilization of By-Products

Again, we recommend that greater effort be made to encourage more effective use of by-products for animal feed outside of the feedlots. Our basic projections assume a certain increase in this use, tied to increased cropping. If a greater effort is made, we would assume that a further supply impact could be achieved. For illustrative purposes, we estimate that an additional 2,000 tons of meat per year could be produced.

#### e. Dairy Bull Calves

The terms of reference specifically request an analysis of the dairy bull calf problem and the supply impact of a policy to reduce the early slaughter of these calves. Since these calves are in the high potential area, we are discussing the question here.

##### (1) Number Involved

According to the Integrated Rural Survey, the 1974-1975 improved dairy cattle population was 1,691,000 head. With regard to the numbers of calves slaughtered, a survey conducted in 1972 by the Animal Breeding Station at

Malvasia (Kanan and Mayn) indicated, for the population sampled, that 52,000 out of 190,000 were killed during the first five days after birth. This is 27 percent of the calf crop and we use it for our analysis.

The distribution of dairy cattle by breed is of importance, because some are more useful than others as potential meat animals. IRS Working Paper No. 261 in 1974 made the following estimates :

Ayrshire	27.6 percent
Guernsey	24.1
Friesian	21.7
Jersey	13.2
Zebu Cross	13.4

We assume that, since the Jersey and Guernsey are the least likely to make good meat animals, that these are the ones killed at birth. Under the circumstances, then, there is little that anyone could or should do to prevent this level of slaughter at birth. It is recommended that this slaughter be accepted as an economic necessity and that attention be concentrated on the remainder as a possible meat source.

An analysis of the numbers is given in Table III-13. It indicates that, in addition to the 27 percent killed at birth, there is a normal 10 percent calf mortality, and a further calf loss to all causes of 27 percent in the first year. Thus, there are 182,000 potential survivors for backgrounding and fattening.

TABLE III-13

AVAILABILITY OF BULL CALVES BY BREED ('000 HEAD)

Breed	% of Improved Dairy Cattle	Bull Calves Born (45% of Cows)	After 10% Mortality	Bull Calves Killed at Birth (27%)	Survival for Feeding	Killed during 1st yr (27%)	Survive First Year
Jersey	13.2	50.2	45.2	45.2	-	-	-
Guernsey	24.1	91.6	82.4	40.1	42.3	11.4	30.9
Ayrshire	27.6	104.8	94.4	7.0	87.4	23.6	63.8
Friesian	21.7	82.5	74.3	-	74.3	20.1	54.2
Zebu-X	13.4	50.8	45.7	-	45.7	12.3	33.4
Total	100.0	380.0	342.0	92.3	249.7	67.4	182.3

Base Data : 1,691,000 improved dairy cattle - June Survey, IRS No. 1 1974-75.

Assumption : 50 percent of cattle are cows.

(2) Development to Mature; Impact on Supply

Starting with these 182,000, we can say that, with good management and ample pasture or green chop, these animals will double their weight to 350 kg in one year, making them eligible for either slaughter at Standard grade or putting into feedlots for 100 days to FAQ, at 450 kg. Allowing 30 mortality, at two years there would be 176,000 head yielding @ 160 kg CDW or 28,000 tons of Standard Quality meat, or if feedlotted for 100 days, @ 225 Kg. CDW or 40,000 tons of FAQ Quality meat.

This potential 182,000 head of yearling bull dairy calves, if not properly managed on good improved pasture or green chop, would follow the present pattern, which is that between one and two years of age an estimated 30 percent would die or be killed for local meat. This leaves 127,000 which would probably all be slaughtered sometime between 2 and 3 years of age at about 250 kg liveweight. Being in poor condition on the average they would yield about 110 kg. of Commercial Grade, or 14,000 tons.

The difference between proper management-good pastures and no programming for these dairy steers is :

	<u>If properly Backgrounded (tons)</u>	<u>If Finished in Feedlots (tons)</u>
If Programmed	28,000 Standard	40,000 FAQ
If not Programmed	14,000 Commercial	14,000 Commercial
<hr/>		
Difference added by Programming :	14,000 Standard	26,000 FAQ
	+14,000 Raised 1 grade from Commercial	+14,000 raised 2 grades from Commercial

Feedlots have gained a reputation for taking thin cattle and making money on a short-fed upgrading program. As discussed above, we believe that Kenya has the capabilities in its high potential high rainfall zones of establishing more improved, artificial pastures which will be competitive with feedlots.

Given an input of good management, heavy fertilizing, and the right combination of introduced grass and legumes (including Nandi setaria and Chloris gayana), these potentially high-producing pastures will put on weight gains of .75 kg. per head daily.

These pastures will, in the future, have to play an important role in the highlands of Kenya to not only support the dairy feed economically but to create the necessary carrying capacity for the dairy bull calves which lack space

for finishing to a sub-feedlot finish.

For the smallholders who have most of the dairy cattle and who will have very limited space for handling their dairy herd, the same heavy-intensity program is needed even more. There are high producing species, for example, elephant grass (Napier) and Pennisetum purpureum, which produce enormous yields per hectare. But its best use is in providing forage which can be hand chopped daily for hand feeding to the dairy cows, as well as for growing out and fattening dairy bull calves on a small scale. Just a few hundred square meters of ground in Napier will provide sufficient forage to fatten one steer or carry a dairy cow for a year. It requires no special machinery or equipment; only planting material, fertilizer at regular intervals (NPK) (especially Nitrogen), and a machete or scythe.

However, although it is quite possible that, with improved pasture, dairy bull calves of the better breeds can be raised to maturity at a profit, it is also quite possible that the opportunity cost is too high; that is, that the same management effort would produce higher returns from more milk production or feeding bought in beef cattle, using immatures of meat breeds. This depends on the future success of pastoral production, offtake, transportation and the like.

### (3) Possibilities for White Veal Production and Impact on Supply

Another, considerably more attractive possibility for utilizing dairy bull calves is for the production of white, milk-fed veal.

Prior to the September 1976 announcement of price increases in milk, trials at Egerton College based on three years of work on behalf of the Ministry of Agriculture, indicated that calves bought at Sh 2.00 per kg liveweight, and fed a full-ration of whole milk for 100 days (cost : Sh 4.75 per gallon), would produce an 82 kg white veal carcass worth Sh 19.00 per kg CDW at KMC.

With 900 liters of whole milk per calf, labor, housing, veterinary and medicine costs, transportation and 5 percent mortality, the net profit was Sh 203.00 per head on a total capital investment of Sh 1365.00. With a turnover of capital three times per year, at 8½ percent interest, this represents close to 50 percent annual rate of return on invested capital.

A small project of this nature, with a little additional capital for supervised slaughtering facilities, could contract with one or more hotels, resorts, etc. in Kenya at an even better rate of return.

If vealed, 60,000 - 100,000 head would be required to produce 5,000 - 8,000 tons of white veal per year. This would no doubt be in excess of domestic markets in Kenya at the moment, although we know of no research on the potential of the tourist trade, hotels, resorts, clubs etc. in this area.

Still, these markets should be promoted. The white veal production is much like poultry -- it takes only a short time to get into production.

Impact on the whole milk supply, if 60,000 head were fed 54 million liters in order to produce 5,000 tons of white veal, would amount to about 4 percent of the whole milk supply of Kenya.<sup>1</sup>

#### (4) Recommendations

We recommend that the Government seek to expand the use of dairy bull calves for the production of white veal by

- Encouraging KMC to develop local and possibly export markets for the product at prices which repay the investment.
- Continuing research into various aspects of the business.
- As markets become apparent, providing extension services to assist the practice.

We can only estimate what the size of the domestic and export market for white veal raised in this way would be. We are pretty certain that the total domestic market, even by 1990, would be considerably less than the 5,000 tons used in the example. We would use 1,000 tons as an estimate. For the export market, small amounts could probably be sold in the nearby target airfreight markets but the large Italian market is probably out of reach for competitive reasons. We might allow another 1,000 tons if KMC follows a program of vigorous promotion of high quality meat exports proposed elsewhere. In any case, although this would be a good and worthwhile business it would not have a significant quantity effect on overall Kenyan meat production. On the other hand, it would represent a net gain to supplies.

With regard to raising and fattening dairy bull calves on improved pasture and perhaps feedlots, it can certainly be done under a very high level of management, and at a profit. The practice should not be discouraged. But we do not believe that it is a high priority area, because of the high opportunity costs compared with using the same resources on other inmaturs. Therefore, although there is a theoretical potential for increasing meat production by as much as 26,000 tons of FAQ (plus raising the grade on an additional 14,000 tons) using current estimated populations, and considerably more considering estimates that dairy herds will grow at an average annual rate of six percent, we do not believe it will happen. And we do not recommend any major effort to see that it does. Therefore, we do not increase our projections of meat production by using this source.

1. Estimated projections of 1976 milk supply based on figures from IPS Working Paper No. 261, 1975.

## 2. Price Policies

This section provides our recommendations with regard to price policies, and our estimates of the supply impact of the recommended policies.

### a. Scope of the Problem

As discussed in Section D 2 h., Present Price Policies, the question is complex and there are many different levels at which prices must be considered. Figure III- beginning on the following page gives an analysis of the various price levels, based on the parties within the industry.

### b. Two Questions for Decision

Any recommendations regarding price policy must deal with two separate questions. First, what should the prices be? Secondly, how should these prices be achieved? That is, should the prices be achieved through direct controls, indirect controls, or no controls. If no controls, this means that the specific prices are only suggested and it is assumed that economic factors and the actions of Government agencies will more or less result in these prices. At present, certain livestock and meat prices are controlled directly or indirectly, and others are not controlled at all.

In sub-section c. below, we recommend a set of prices on the assumption that all prices would be controlled. In sub-section d., we make our recommendations regarding which prices should be controlled.

In summary, we recommend the prices be increased, in varying amounts, all through the production and consumption chain. Although we make specific price recommendations for all grades at all levels, we recommend that wholesale and retail prices for grades FAQ and above be de-controlled.

### c. Recommended Price Levels

#### (1) Prices Recommended

In considering what price levels to recommend, we have used the following guidelines.

- For retail prices, there is a role for equity or fairness in setting prices. Consumers should not be unduly favored or penalized.
- Retail prices also have an impact on demand, or quantity demanded, and in view of population increase and land limitations, increases in real consumer prices are generally desirable.
- For producer prices at various levels, the objective should be to provide adequate

FIGURE III-5

LIVESTOCK AND MEAT PRICES  
PARTIES AND PRICES WHICH AFFECT THEM

<u>Party</u>	<u>Prices which affect</u>	<u>Risk if inadequate</u>	<u>Current Status</u>
<u>Primary Producers</u>			
1. Pastoralist - N.E.	Immatures - LMD buying (KMC Realization)  Old range fed (KMC Realization)	Will not sell except in crisis.	Prices adequate
2. Pastoralist - Southern	Various, KMC producer	Will sell less. Probably small impact.	Prices probably adequate.
3. Breeding Ranch	Immatures - Feedlot buying.  Matures - KMC and others.	Will keep on ranch.  Will lose money and fail. Could mean serious output loss.	Prices low.  Prices low.
4. High Potential	Immatures - Feedlot buying.  Matures - Mostly non-KMC.	Will keep.  Will switch to other activities. Could mean very serious output loss.	Prices low.  Prices very low.
<u>Middlemen</u>			
1. Traders	Set own buying prices - compete with LMD. Selling prices : KMC, ranches, other processors.	If margins too low, may withdraw from business.	Probably adequate.

<u>Farty</u>	<u>Prices which affect</u>	<u>Risk if inadequate</u>	<u>Current Status</u>
2. LMD	Set prices, buying or selling.	<p>If producer price too low, could lose throughput.</p> <p>If ranch price too high, unable to sell.</p> <p>If margins too narrow, lose excessive amounts.</p>	<p>Probably adequate, but margins could be wider.</p> <p>Ranch prices perhaps too high.</p>
<u>Fatteners</u>			
1. Ranches	<p>LMD ranch prices</p> <p>KMC purchase prices (standard, FAQ)</p>	<p>If margins too narrow, may fail. Could mean serious check in supply increase from this source.</p>	<p>Margins low.</p>
2. Feedlots	<p>LMD immature prices.</p> <p>Ranch immature prices.</p> <p>Backgrounder prices.</p> <p>KMC producer prices, FAQ and Choice.</p> <p>Feed and input prices.</p>	<p>If margins too narrow relative to feed costs, reduce or close down. Result would be serious loss of Choice and FAQ.</p>	<p>Margins adequate for operations, to FAQ. Inadequate for choice or new investment.</p>
<u>Processors</u>			
1. KMC	<p>Producer prices wholesale and ultimately retail prices.</p> <p>Export prices</p>	<p>Low producers make KMC uncompetitive buyer, reduce throughput.</p> <p>Low margins cause losses, weaken KMC in market.</p>	<p>Producer prices low, especially choice and standard.</p> <p>Some grade margins low.</p>
2. Private abattoirs	Same as KMC, but no control and generally no export.	Costs so low no problem.	Prices adequate

<u>Party</u>	<u>Prices which affect</u>	<u>Risk if inadequate</u>	<u>Current Stat.</u>
<u>Consumers</u>			
1. Tourists	Wholesale and retail prices, FAQ and Choice.	Tourist very little price elasticity of demand, but hotels and restaurants considerable.	Prices low
2. High income urban	Retail price, FAQ	( Considerable price elasticity, estimated ( at -1.2. If prices ( rise, consumption ( should drop.	Prices low
3. Low income urban	Retail price, Standard		
4. Rural	Retail price, Standard and Commercial	High price elasticity probable (use -1.3) but little evidence.	Prices low

margins to encourage increased production.

- All prices should be subject to annual review and increased based on some price or cost index. We recommend that the Ministry of Agriculture develop such an index based on a reasonable combination of : (1) the Middle Income Index of Consumer Prices used elsewhere in this report, (2) an index of beef production costs to be developed by the Ministry, and (3) an export parity price index. For convenience, we call this index to be developed a Beef Price Index (BPI).

Based on these guidelines, we recommend the following price system, which should be put into effect in mid-1977. However, at that time all prices shown here should be increased by the increase in the BPI for 1976. Thereafter all prices should be increased annually by the previous year's beef price index, unless other considerations should require modification. As an alternative, to further strengthen the industry, prices could be increased annually by the BPI plus one percent or some other percentage, thus providing for a real increase in prices.

TABLE III- 14

RECOMMENDED LIVESTOCK AND BEEF PRICES  
June 1977 Sh per kg.

Item		Recommended Without 1976 BPI	Present	% increase
<u>Retail Prices</u>				
Choice	Sirloin and other top cuts	17.50*	14.75	19
	Other cuts	In proportion**		
FAQ	Sirloin and other top cuts	16.25*	14.75	10
	Other cuts	In proportion**		
Other	Sirloin and other top cuts	14.75	14.75	-
	Bone in	8.85	7.40	20
	Bone out	10.25	8.60	19
<u>Wholesale Prices</u>				
Choice	Hindquarter	11.20*	10.15	10
	Forequarter	8.90*	8.45	5
FAQ	Hindquarter	10.50**	9.90	7
	Forequarter	8.35	8.10	3

		Without 1976 BPI Increase	Recent KMC realization price less costs	Number of cuts
Standard	Hindquarter	7.50	6.30	31
	Forequarter	6.70	5.70	14
Commercial	Hindquarter	6.00	5.50	9
	Forequarter	5.50	5.00	10
<u>Producer Prices</u>				
Choice	Choice	8.25	7.10	16
FAQ	FAQ	7.85	7.00	12
Standard	Standard	5.95	4.85	23
Commercial	Commercial	4.75	4.25	12
<u>LMD Ranch Sale Prices</u>				
	Up to 200 kg	2.60	2.40	8
	200 kg to 225 kg	2.70	2.50	8
	Above 225 kg.	2.80	2.65	6
<u>LMD Purchase Price</u>				
All animals		<u>Previous year KMC realization price less costs</u>	<u>Recent KMC realization price less costs</u>	

\* Illustrative, since we recommend decontrol.

\*\* The present differentials between cuts can be maintained.

## (2) Discussion and Justification

The above price system has been set out as a whole, and at the beginning of this section, in order to give the complete picture of the recommendations. In the subsections which follow, we discuss and justify the prices recommended on the basis of the guidelines indicated. For convenience, the discussion is based on the above recommended prices without the 1976 BPI increase.

### (a) Retail Prices

We have proposed that retail prices be increased, in most cases, by about 20 percent. From the point of view of equity, this is reasonable and even conservative, since, as shown in Section D, Present Price Policies, real beef prices have fallen by about 25 percent in recent years. From the point of view of demand, a real price increase of 20 percent will cause a reduction in the quantity demanded which will help bring long term demand and supply into balance. This is discussed in detail in Chapter II.

Our proposal is not for a simple 20 percent retail price increase. For the high quality cuts, we propose to get away from a single price for each cut and have separate prices for choice, FAQ and other cuts. This will allow greater differentials between choice and FAQ and give KMC and the producers an opportunity to merchandise quality meat in an effective manner, as we recommend in Chapter V. For choice and

FAQ cuts, which by definition can only come from KMC, we recommend that, in addition to strip marking the carcass, butchers be issued and authorized to use KMC labels on the individual cuts showing that it is choice or FAQ. Enforcement would, of course, be necessary, and could be carried out in several ways, including checking for evidence of having purchased carcasses from KMC.

Needless to say, a system such as this would assist KMC in its efforts to compete with the private slaughterhouses.

For ungraded cuts, which must be assumed to be from standard grade carcasses, we recommend no price increase. The quality does not justify an increase and even with our recommended wholesale price increases for standard grade, there is ample margin for the butcher in standard cuts.

For bone in and bone out meat, we do recommend a simple 20 percent real price increase. Although this will hit the poorer sections of the population, we believe the price increase is both justified and essential. Again, it is only a partial catch up for the 25 percent real price reduction in recent years, and still leaves this type of meat relatively inexpensive in Kenya.

It may be that a one-time 20 percent increase, coupled with a further increase to compensate for the 1976 increase in the BPI, would be considered too much of an increase from a social and political point of view. If this is the case, the 20 percent real price increase could be programmed over a four year period, at 5 percent per year. If the producers were aware that this was coming, and would always be linked with an annual "index" increase, the supply effect could be almost the same as an immediate increase. However, for analysis purposes, we assume that there will be a one-time 20 percent increase.

#### (b) Wholesale Prices

The wholesale prices recommended are designed to make the butcher margins more rational and to give some incentive for the use of choice and FAQ carcasses in the cuts. For example, setting the wholesale price for choice hindquarters at Sh 11.20 per kg, with sirloins at Sh 17.50 and the prices of other cuts increased accordingly gives a margin on choice hindquarters of 11.2 percent compared with only 3.4 percent at present. The whole list of margins is shown below. Note that the margins on standard cuts are still much higher than for higher grades, but we cannot avoid this without a reduction in retail prices for standard cuts or a further increase in the wholesale prices for standard carcasses, both of which we want to avoid. In a year or two this situation could be corrected by holding the retail price of standard cuts steady as other grade cuts and carcasses increase in price.

**RETAIL MARGINS UNDER PROPOSED PRICES**

<u>Item</u>	<u>Wholesale</u>	<u>Retail</u>	<u>Margin</u>		<u>Current</u>
			<u>Sh</u>	<u>Percent</u>	
Choice Hindquarter	11.20	12.45	1.25	11.2	3.4
Choice Forequarter	8.90	9.90	1.00	11.2	-
FAQ Hindquarter	10.55	11.55	1.00	9.5	6.1
FAQ Forequarter	8.35	9.20	.85	10.2	36.9
Standard Hindquarter	7.60	10.50	2.90	38.2	66.7
Standard Forequarter	6.70	8.35	1.65	24.6	46.5

Source : Carcass yield by cuts from : Meat and Livestock Commission (Great Britain), Guidelines for Beef Carcass Improvement, Technical Bulletin No. 18, 1975. p. 5.

(c) Producer Prices

Producer prices must be such as to give KMC an acceptable margin, on the one hand, and to give acceptable returns to producers on the other. We believe our proposed producer prices, subject to annual increases as stated, will do this. For the reader's convenience, the proposed producer prices are repeated, as follows :

	<u>Present</u>	<u>Proposed</u>
Choice	7.10	8.25
FAQ	7.00	7.85
Standard	4.85	5.95
Commercial	4.25	4.75

From the point of view of KMC profitability, we have calculated that an average margin of Sh 1.20 per kg CDW (plus fifth quarter yields of Sh 0.86) are necessary for the KMC to break even on domestic operations at an annual throughput of about 175,000 head. To obtain a weighted average of Sh 1.20, using 1975 throughput by grade, we propose the following target margins :

Choice	1.80
FAQ	1.60
Standard	1.20
Commercial	1.00

Note that the Choice and FAQ margins are subject to being reduced by the feedlot bonus, now Sh 0.50 per kg CDW, which is the reason we have made these margins relatively high.

These margins are consistent with the producer and wholesale prices used. In other words, the average wholesale price for choice is Sh 10.05. Subtract Sh 1.80 and we have the proposed producer price of Sh 8.25.

From the point of view of KMC attracting animals, we believe the proposed prices, or price increases, will be very helpful. The relatively large increase in standard, about 23 percent, should greatly strengthen KMC's ability to compete for this grade.

For the ranches and feedlots, it is preferable to discuss the effectiveness of the proposed prices after discussing the proposed LMD ranch sales prices.

#### (d) LMD Ranch Sales Prices

We propose that LMD make a very modest increase in its sales prices to the ranches, between 6 and 8 percent. We believe some increase is desirable because we believe the present prices do not fully cover the quarantine costs involved in sales of immatures to the ranches. We believe the increase should be small, first because, with our recommendations regarding LMD buying prices, which in effect, call for no real increase in real prices this year, LMD does not need more than a small increase in selling prices. Further, since LMD will, according to our proposal, purchase cattle based on the previous year's KMC realization price, but actually receive, for animals taken directly to KMC, KMC's current realization price, which will always be higher, LMD should make a profit on animals taken direct to KMC. Secondly, one objective of our price recommendations is to improve the margins of the ranches (and feedlots), so we want to keep the immature buying price increase smaller than the ranches' selling price increase. The price recommended for larger animals, Sh 2.80 per kg, is equivalent to the KMC realization price for standard at recommended price (Sh 5.95).

Since LMD would be selling to the ranches at the KMC realization price for standard, which is the same price it could, in many cases, sell direct to KMC without quarantine costs and risks, LMD might be tempted to sell all animals which could be expected to grade standard direct to KMC. However, this would defeat a major part of LMD's purpose, and so it would have to be instructed to give priority to the requirements of the ranches and feedlots.

For the ranches, we believe that the proposed producer prices will be adequate, with other recommended management improvements, to make them viable. We have not attempted an elaborate modelling exercise to show this. Rather, we show it by comparing the results of our price recommendations, coupled with the decrease in average weights in each grade discussed in Section D, with the price recommendations contained in the IBRD In Depth Review Draft Report which were specifically designed to make the ranches viable.

This can most easily be done by comparing the revenue estimates made by the IBRD for two specific average weights of ranch-produced animals with the revenues under current average weights by grade and our proposed prices.

Weight of carcass	Revenue calculated by IBRD		Revenue using 1976 average weights	
	Existing prices	recommended prices	Existing prices	recommended prices
160 kg	5.16	7.30	6.16	7.00
180 kg	5.96	7.66	6.85	7.71

Based on these two weights, our recommended prices would have about the same revenue effect as the IBRD recommended prices, once the difference in average weights by grade is taken into account.

It is true that the IBRD recommended a very low LMD selling price for immatures, Sh 1.91 per kg. liveweight, equivalent to the value as commercial meat. However, since many LMD animals grade standard, this is not a realistic price. We believe our proposed prices are realistic. Although they are higher than those proposed and assumed by the IBRD, we believe that they still make the ranches viable, especially if management and other improvements recommended in section 5 above are implemented.

For the feedlots, the proposed increases in the producer price for standard and the proposed LMD selling prices will naturally increase animal purchase costs. On the other hand, our proposed increase in KMC FAQ prices and our relatively large proposed increase in choice should help considerably. The proposed opening of a significant differential between FAQ and choice (up from Sh 0.10 to Sh 0.40) should encourage the feedlots to return to the activity they do best, fattening ranch bred cattle from standard or FAQ to choice. With the very narrow current differential, this activity has almost disappeared, with a corresponding drop in the percentage of choice animals sold to KMC.

We perhaps should recognise that KMC currently has difficulty in getting more money for choice than for FAQ, either in the domestic or export markets. Thus, KMC would prefer a minimum FAQ-Choice differential. However, we believe our various merchandising and grading recommendations may solve this problem.

We believe that the proposed prices will, on balance, benefit the feedlots. However, we reiterate the point that an even more important recommendation to the viability of feedlots is that of finding ways to help the feedlots obtain feedstuffs at reasonable prices.

(a) LMD Buying Prices

By recommending a change in the method of calculating LMD producer prices, from "recent" KMC realization price to "previous year's" KMC realization price, less costs, we are recommending no real price increase this year. The basic element in the proposed system calling for an annual increase based on the BPI would also not apply, since the producer price is a derived price. However, in 1978 there would be a significant LMD buying price increase, reflecting the proposed increase in this year's KMC producer prices. This is a device for slightly holding down the LMD buying prices in order to give LMD an opportunity to hold down ranch prices, and in recognition of the fact that current LMD buying prices appear to be adequate. With the shift from trader purchasing to direct purchasing, the pastoralist producer has recently received a large effective price increase, and we believe that it is reasonable for him to wait until 1978 for the next one. And we believe that this pattern will support efforts to increase offtake from the North East.

(3) Export Prices

Export prices are clearly important to KMC, but they are largely beyond the control of the KMC or the Government. Still, it is often suggested that the producer price of FAQ and/or choice should be based on export parity prices. And the producer price or commercial grade should have some relationship to the export price of canned corned beef, since most of KMC's purchases of this grade are canned.

The current export price being obtained by KMC for fresh meat is Sh 9.00 per kg. This price must be compared with a proposed producer price for FAQ of Sh 7.85 per kg, a proposed wholesale price for FAQ averaging Sh 9.45 per kg, and a proposed wholesale price for FAQ hindquarters of Sh 10.55 per kg. Since most of the international demand seems to be for hindquarters, this price relationship means that KMC could only export at a considerable penalty. This situation certainly argues against the use of export parity prices alone for domestic pricing which, in any case, we would oppose.

For KMC, there are three possible "solutions" to the problem.

First, we believe that it is likely to solve itself. Present prices are very depressed. According to a November 1976 IBRD beef price projection, quoted in Chapter II B of this report, the international price index for beef, in constant dollars, is as follows.

1975	89
1976	69
1977	92
1978	112

This suggests that the price of beef should increase in 1977 by as much as 33 percent above 1976 prices, and 62 percent

by 1978. Applying these percentages to the present Sh 9.00 export price, we would have 12.00 in 1977 and 14.50 in 1978. These would be reasonable prices relative to proposed producer and wholesale prices.

Secondly, we believe that there is scope for improved export marketing by KMC, as described at some length in Chapter V. This includes selection of target markets and, for a small volume at least, special high quality exports to high priced markets. We believe that these activities will make the returns to KMC from exports more attractive than at present, even at present general export price levels.

Thirdly, we recommend that the Government give to KMC an export rebate similar to the rebate recently granted for canned corned beef and beef extract exports. We believe this is reasonable since chilled and frozen meat is a processed product. Should the rebate be 10 percent at current prices, it would increase KMC's return from Sh 9.00 to Sh 9.90 per kg, FAQ. This would still be less than the proposed wholesale price for FAQ hindquarters, but the gap would be narrowed.

With regard to canned corned beef, as noted elsewhere, the product is made from commercial grade carcasses with some standard and trim from the higher grades. We have proposed a very modest increase in the producer price of commercial. With the relatively favorable current price of about Sh 150.00 (US\$ 18.00) ex factory per case (24 x 12 oz), and the recently approved 10 percent export rebate, we believe that the canning operation will remain profitable with reasonable throughput. In Chapter II we explain our view that, in spite of frequently expressed opinions that the demand for the product is decreasing, we believe that it will remain strong. Further, we believe markets other than the United Kingdom can and should be explored, and could provide greater profits.

#### d. Recommended Extent of Price Controls

The above price recommendations were made on the assumption that all prices would be controlled. However, all prices are not controlled even today and we believe that some diminution in the degree of control would be desirable.

We believe that the previous recommendation, made by the Ministry of Agriculture in late 1976, that the FAQ, Choice and Prime grades be freed, is basically valid and we support it. But we would limit decontrol to the wholesale and retail prices. In more detail, this would mean the following.

For retail prices, the prices on FAQ and choice cuts would be freed from control. Butchers could charge what they liked for these cuts, although competition would presumably tie prices to KMC prices. However, ungraded cuts, presumably made from standard carcasses, would remain price controlled. This would also give the opportunity to the price control mechanism to control the use of the designation choice and prime on the cuts. Retail prices for bone-in and bone-out meat would remain controlled.

For wholesale prices, all PAQ, choice and prime would be decontrolled. Since all of these items except PAQ for quarters are already free, this would be a small, but important, change. Decontrol to this level would match the decontrol at the retail level and allow the free play of market forces for the high quality cuts. Of course, KMC, as the grade setter and the wholesale price setter, would continue to guide prices on all grades.

With regard to KMC producer prices, we see no point in decontrol. The present control prices are minimum prices which KMC must pay and we believe these minimum prices are an important incentive to production. In a limited way, they constitute a guaranteed minimum return. There is, of course, no reason why KMC cannot pay more than these minima, and KMC in fact does do so now through the feedlot bonus.

LMD buying and selling prices are not now controlled in the strict sense, but are set by LMD with approval of the Ministry of Agriculture. We see no reason to change this arrangement.

e. Supply Impact of Price Policy Recommendations

We believe that the price policy changes proposed here, which would result in generally higher prices and wider margins for most elements in the production system, would be good for the general health of the industry. There would also be a significant supply impact.

Our recommendations regarding LMD buying prices should have no specific supply impact. We believe the proposed prices are adequate to maximize LMD purchases and pastoral offtake rates, given the other restraints under which the program operates.

With regard to LMD selling prices and KMC producer prices, which in combination are very important to the high potential area producers, the ranches and the feedlots, we believe our recommendations would have a specific supply impact.

For the ranches, we estimated that present price policies would result in a reduction in ranch output of 3,200 tons of meat per year by 1990. The proposed prices should allow for this loss to be recovered and should add an additional 10,000 a.u. to be marketed per year by 1990. This means the supply effect of the proposed prices would be 1,600 tons of meat from the ranches by 1990, over and above the 16,000 tons additional output accounted for by the ranch development program under our recommended policies described in section 5 above.

For the feedlots, we believe that the proposed prices will be adequate to support the modest increases in throughput projected in section 6 above, based on recommended policies, but would not assign any further supply impact to prices in

The proposed price policy should have a significant supply impact on output in the high potential areas. As we stated in section 7 above, on the high potential areas, a great deal can be done to enhance the output of meat per hectare of land devoted to this activity. If our proposed recommendations are adopted, we have estimated a supply impact of 26,000 tons of meat annually by 1990. We also stated in section 7 that the necessary investments to achieve these gains required attractive prices. Thus it may be that the supply impact of our price recommendations, as they pertain to the high potential areas, have already been counted. However, we believe it would be reasonable to allocate a further 5,000 tons of supply impact to the proposed prices per se.

The KMC would clearly benefit from the improved prices, and would be able to play a more active role in the industry than at present. However, we would assign no specific supply impact to this.

The total additional supply impact from the proposed prices is, therefore, 6,600 tons of meat. We should repeat, however, that price policy is also a key element in making many of the other recommendations effective in producing their estimated supply impacts.

#### 9. Planning and Policy Formulation

We recommend that there be established an entity, which might be called the Livestock and Meat Marketing Authority, which would have the following functions :

- Formulate policies for the livestock and meat industry in Kenya.
- Supervise the regulation of the livestock and meat industry.

We would recommend that the Authority come under the jurisdiction of the Ministry of Agriculture, and have a senior civil servant as the Chairman. The Authority would be made up of senior representatives of all concerned bodies, such as the Ministry of Agriculture and the several units therein which deal with livestock and meat, the Ministry of Finance and Planning, the inspectorate of concerned statutory boards, the Kenya External Trade Authority, producers and their representatives, abattoir operators including the KMC, butchers and consumer organisations.

We would think that the Authority should have a very small staff of its own and be able to draw upon member agencies, such as the Economic Planning Division of the Ministry of Agriculture, for additional staff as needed.

The Authority would be the focal point for working out all major policies in the livestock and meat industry, such as those discussed in the sub-sections above.

The advantage of such an Authority would be that it would be a mechanism for the orderly consideration of policy issues facing the industry and for the communication between various interests which we have found to be weak. The Authority's recommendations, with supporting research, would be presented by the Minister of Agriculture or other appropriate senior official to the Cabinet for approval.

We are aware that recommendations similar to this have been made in the past. However, we consider the notion valid and urge that it be considered again.

#### 10. Aggregate Impact on Supply of Proposed Policies

We have estimated that the proposed policies, described in sub-sections 1 through 9 above, will have a significant impact on the supply of meat by 1990. The listing of supply impact from the various policy recommendations is as follows. Policies with no specific supply impact are not listed.

TABLE III-15

#### SUPPLY IMPACT OF PROPOSED POLICIES

<u>Policy Area</u>	<u>Tons of Meat</u>	
	<u>Positive</u>	<u>Negative</u>
Animal Health	22,940	-
Range Development	5,412	-
Ranch Development	16,000	-
Transportation	5,000	-
Feedlots	1,800	-
High Potential Areas	26,000	-
Price - Ranches	1,600	-
- High Potential	5,000	-
Sheep and Goat policies	<u>27,000</u>	<u>13,500</u>
Total	110,752	13,500
Beef	83,752	13,500
Sheep and Goat	27,000	-
Net increase		
Beef	70,252	
Sheep and Goat	<u>27,000</u>	
	97,252	

In discussing individual policy areas and our recommendations, we have attempted to separate policy effects even in cases where one area overlaps with another, as in the case of rangeland development and improved marketing through LMD. In reality, of course, improvements in one area serve to reinforce improvements in another. Therefore, to the extent possible the livestock program must be carried out as an integrated package. Should one area, such as animal health, be neglected, it is quite

probable that the supply impact would be more serious than suggested by our estimates.

#### G. Revised Supply Projections Assuming Recommended Policies

We have estimated that a total of 97,252 tons of meat, over and above the 165,000 tons in our basic projections, would be produced in Kenya by 1990 if the recommendations set out in Section F are followed.

The total projection would be as follows, in 000 tons.

	<u>Beef</u>	<u>Sheep and Goat meat</u>	<u>Total</u>
1975	143	66	209
1990 Basic Proj.	111	54	165
Supply Impact	70	27	97
1990 Revised Projection	181	81	262

This is a significant increase, amounting to 25 percent between 1975 and 1990, or an average annual increase of a little less than two percent. It will still mean a decrease in per capita consumption in Kenya from 1975 levels and further mean that, if there are to be exports, a positive program involving further, small, reductions in per capita consumption will be required.

As in Section E above, we have attempted to allocate the individual supply impacts among the regions of the country to produce an estimate of production by region by 1990 assuming revised policies.

The results are on the following page.

TABLE III-16

DISTRIBUTION OF SUPPLY IMPACT BY REGION  
TONS OF BEEF, SHEEP AND GOAT MEAT

Region	Basic pro- jections	Animal Health	Range Develop- ment	Ranch Develop- ment	Trans- portation	Feed- lots	High potential Areas	P r i c e		Sheep & Goat		Revised pro- jections
								Ranch	H.P.	Sheep & Goats	Beef	
Northern	26,000	2,800	5,412	300	3,000					7,000	-3,500	41,012
Southern	9,000	1,500		4,000	2,000			500		1,000	- 500	17,500
Coastal	7,000	2,500		7,500			300	1,000	100	1,000	- 500	18,900
Eastern	34,000	4,000		2,500			5,600	100	1,000	7,500	-3,750	50,950
Central	19,000	3,500				600	4,800		800	2,000	-1,000	29,700
Kenya	25,000	4,200				600	7,200		1,400	3,000	-1,500	39,900
Western	9,000	1,200				600	2,400		500	500	- 250	13,950
Rift A	20,000	2,240		1,700			4,000		800	2,500	-1,250	29,990
Rift B	16,000	1,000					1,700		400	2,500	-1,250	20,350
<b>Total</b>	<b>165,000</b>	<b>22,940</b>	<b>5,412</b>	<b>16,000</b>	<b>5,000</b>	<b>1,800</b>	<b>26,000</b>	<b>1,600</b>	<b>5,000</b>	<b>27,000</b>	<b>-13,500</b>	<b>262,252</b>

## N. Conclusions : Supply and Demand in 1990

In Chapter IX we made extensive projections regarding demand for beef and sheep and goat meat. In Sections E and G above, we completed our projections for supply based on current and recommended policies including price policies. In Table III-17 below, we put the two projections together, using four of the many possible combinations of assumptions which could be selected. This table suggests that, based on present policies, there will be a very large gap indeed between quantity demanded and quantity supplied. If our recommended policies are adopted, including a real price increase, the deficit is very much narrowed. In the case of one set of assumptions, that of a 20 percent price increase coupled with an annual real price increase of one percent from 1980, and no increase in real rural incomes, there would be a surplus of meat in 1990. This clearly suggests the directions in which we believe the industry should go, although it is hoped that real rural incomes will in fact increase.

TABLE III-17

1990 DEMAND AND SUPPLY PROJECTIONS COMPARED  
(STABLE INCOMES ASSUMPTION)  
TONS

A. PRESENT POLICIES/NO PRICE CHANGE

Demand	
Beef	248,000
Sheep/Goat (Meat and Offals)	<u>107,000</u>
Total	355,000
Supply	
Beef	117,100
Sheep/Goat (Meat and Offals)	<u>54,000</u>
Total	171,100
Deficit	
Beef	130,900
Sheep/Goat (Meat and Offals)	<u>53,000</u>
Total	183,900

B. RECOMMENDED POLICIES/20% REAL PRICE INCREASE  
(Beef and Sheep/Goat Meat and Offals)

Demand	
Beef	194,000
Sheep/Goat (Meat and Offals)	<u>84,000</u>
Total	278,000

	181,000
Beef/Goat (Meat and Offals)	<u>81,000</u>
Total	262,000
Deficit	
Beef	13,000
Sheep/Goat (Meat and Offals)	<u>3,000</u>
Total	16,000

**C. RECOMMENDED POLICIES/20% REAL PRICE INCREASE  
(Beef only)**

Demand	
Beef	194,000
Sheep/Goat (Meat and Offals)	<u>134,000</u>
Total	328,000
Supply	
Beef	181,000
Sheep/Goat (Meat and Offals)	<u>81,000</u>
Total	262,000
Deficit	
Beef	13,000
Sheep/Goats (Meat and Offals)	<u>53,000</u>
Total	66,000

**D. RECOMMENDED POLICIES/20% PLUS 1% ANNUAL  
PRICE INCREASE (Beef and Sheep/Goat Meat and Offal)**

Demand	
Beef	170,000
Sheep/Goat (Meat and Offals)	<u>73,000</u>
Total	243,000
Supply	
Beef	181,000
Sheep/Goat (Meat and Offals)	<u>81,000</u>
Total	262,000 (a)
Deficit	
Beef	(11,000)
Sheep/Goat (Meat and Offals)	<u>(8,000)</u>
Total	(19,000)

could be higher.

**CHAPTER III**

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**ANNEXES**

**ESTIMATES OF THE SUPPLY OF CATTLE,  
SHEEP AND GOATS, 1970 AND 1975**

**A. Approaches to Estimation of Output**

Previous estimates of the output of domestic herbivores in Kenya have been based on one or both of the following sets of data

- Records indicative of output such as the number of hides and skins, numbers of cattle moving between districts with Veterinary Department permits, the number of head slaughtered by KMC etc.
- Detailed estimates of the size and structure of livestock populations and the output from each age and sex group within the population.

**1. First Approach - Indicative Records**

**a. Hides and Skins**

Records such as hides and skins statistics were mainly used by Spinks (1966), and Aldington and Wilson (1968). Aldington and Wilson also checked and adjusted their output estimates by reference to estimates of livestock populations and the rate of offtake as a percentage of herd size.

The number of hides received by licensed buyers of hides and skins is usually taken to represent the number of cattle that were consumed. It is assumed that the small number of hides that come from cattle that were not consumed is equal to the number of cattle that were consumed without the hide reaching the traders (Aldington and Wilson p.9). This assumption may be seriously violated in a few districts due to either :

- Consumption occurring far from the hide buying places and the hide is either used or lost rather than sold. This situation may lead to under-estimation of output in some pastoral areas.
- The hide is sold directly to tanneries etc. in a green or 'fresh' condition. The number of green hides and skins sold around Nairobi appears to be understated. A recent court case supported our view that records of these hides were incomplete. Thus we increased the number of hides and skins reported for Central Province by an estimate of unrecorded output.

Hides statistics include very few of the calves culled before reaching one year of age. Thus consumption based on hides figures is underestimated. Poberdy (1970) estimated that calves provided 11,700 tons of meat. However, it was argued in Chapter II that hides omitted from the hides statistics, such as many of the calf hides, do not represent output that is available for sale. If we are to achieve a semblance of completeness with crude estimates of omission from the statistics, we might only distort the results without adding anything to the assessment of the commercially available supply of cattle, sheep and goats.

Movement of hides and skins across international boundaries could also distort the estimates. However, in Districts such as Mandera the thorough report of the Hides and Skins Improvement Officers showed the numbers of pieces imported separately from those of Kenyan origin. Another problem is the fluctuation in numbers of hides and skins from one year to the next. Here we have followed Aldington and Wilson's approach and assembled data for a series of years (Figures III-1 and 2). We have not, however, aimed to produce a figure representative of the 'normal' state of affairs but simply endeavored to avoid using very distorted data.

#### b. Net Exports from a District

The record component of output is the net exports of cattle from a district. Livestock movement between districts have to be authorised by the Department of Veterinary Services in both the exporting and importing districts. Thus there should be a complete record of all inter-district movements. However, many reports only showed exports of cattle from the district without showing the number imported. Thus considerable efforts were needed to estimate the number and origin of imports from other districts as in the case of Laikipia or imports from other countries into N.E. Province etc. It was also suggested to us that of late there has been an increase in unauthorised movement of stock. This problem is mainly considered in the section on Animal Health (Chapter III D.2.c and F.3) but clearly an increase in unauthorised movement also weakens output statistics. This problem has been met, in part, by grouping adjoining districts into somewhat homogeneous livestock production regions as detailed in section B below.

#### c. Average Weights

Having obtained an estimate of the total offtake or number of cattle produced by a district, its equivalent in meat output requires an estimate of the average weight of cattle produced and their yield of meat. Aldington and Wilson produced estimates of the cold dressed weights of carcasses likely to be derived from cattle in each district. This data shows the relationships between the weights of cattle from different districts. However, the general level of weights in a particular year may differ from those used by Aldington and Wilson. Yet practically the only guide to the level of cattle weights, at present, is data on cattle slaughtered by the

## 2. Second Approach - Herd Structure

The second approach to estimating cattle output based on the structure of cattle herds was used by K. Meyn (1970). Meyn's approach involved the estimates of the following:

- Size of the cattle population.
- Proportion of each sex and age group within the population.
- Cow fertility.
- The mortality of cattle in each age group.
- The weight of meat from cattle that are either consumed or exported from the district.

Meyn's estimates of herd structure and performance have been found to be most useful in other parts of this report. His figures also have the merit of including output from calves etc. which is excluded from estimates based on recorded output. However, the herd structure approach to output estimation seems to require more assumptions than estimates based on output records, while still being dependent on such crucial assumptions as the weight of meat yielded by each beast. Thus for our estimates of the output of cattle, sheep and goats we adopted the first approach based on records of hides, skins and cattle movements.

### B. Division of Kenya into Livestock Production Regions

In this section we discuss our reasons for grouping the Districts of Kenya into three major Farming regions as depicted in the Map in Chapter II.

In analysing statistics on Kenya's diverse areas of livestock production it is advantageous to group districts according to their agricultural type rather than by Provinces. Peberdy (1970) and Meyn (1970) used four groupings and similar groupings were adopted in this study.

All those districts where there was very little cultivation, such as all the districts in North Eastern Province, were placed into one group. The ten districts in this group are very largely devoted to livestock production -- most of it pastoral involving large scale migration of cattle between districts. The mobility of cattle and other livestock in these areas raises problems in analysing production. First, it is difficult to count the livestock populations -- the only figures for most of these districts are derived from aerial surveys by Watson in the late 1960s and rinderpest vaccination campaigns. Furthermore, as there is only a loose connection between the livestock herds and flocks and the administrative unit of a district, what statistics are available

are prone to distortions. Thus all eight of the districts covered by these livestock movements in the North and East of Kenya, have been grouped together so as to minimise the distortions due to livestock migration.<sup>1</sup> The remaining districts of Kajiado and Narok are also at present pastoral but are cut off from the rest of the group and are thus treated separately. These two districts, and particularly Narok, are also exceptional in having a higher proportion of land in ecological zones II, III and IV than the districts of the North and East. Furthermore, being close to Nairobi, they can be an important informal source of meat.

The predominantly large scale mixed farming districts have been grouped together. Included in this group are four districts : Laikipia, Nakuru, Trans Nzoia and Uasin Gishu. Nyandarua is no longer part of this group as most of the cattle there are now on smaller farms. Statistically these four large scale farming districts are similar in only being covered by the Large Farm Survey. Furthermore, the pattern of cattle production often involves buying cattle from other districts and selling them for slaughter at higher weights.

All the other districts form a large and populous group. Most of the agricultural population in these districts is engaged in small scale cultivation. All the districts in the group were covered by the Integrated Rural Survey, 1974-75.

#### C. Estimation of Cattle Output 1970

There are a number of estimates of the cattle population of Kenya in 1970 which differ from data in the Statistical Abstract. We have compared these estimates with each other and with figures for output to provide a final set of figures for use in this report (Annex Table III-1.1). Some adjustments were also made to our data on hides in the light of earlier and subsequent figures. The biggest adjustment was to increase the number of hides from Nakuru from 23,000 to 30,000. Net exports were also adjusted to take account of unreported movements of livestock. The size of these adjustments may be seen by comparing column (3) and column (4) of Annex Table III-1.2.

Estimation of the weights of cattle used in the calculation has a major bearing on the results. Our aim was to provide figures showing the output of edible food produced by slaughtering a beast. Thus output includes not only meat from the carcass but also edible offals such as cheek meat, liver and tripes. In cattle the weight of offals is approximately equal to the weight of bones in the carcass, thus figures for output of meat and offal per head are equivalent to the average cold dressed weight of carcasses. Therefore, figures for the total output of food and carcasses are also the same.

1. The districts included in the Northern Region of Kenya are Lamu, Tana River, Garissa, Wajir, Mandera, Marsabit, Turkana, Samburu and West Pokot.



ANNEX TABLE XII-1.1

## ESTIMATES OF CATTLE POPULATION 1970. '000 HEAD

	S O U R C E									
	Statistical Abstract				February (1970)	Maga (1970)			This Report	
	Large Farm	Small Farm	Pastoral Areas	Total		Grade Dairy	Yebu/ Beef	Total (b)	1970	1975
<b>Range Regions</b>										
T. River	-	..	-	9.0 <sup>a</sup>	9.0	-	10	10 <sup>(c)</sup>	9	40
N.E. Province	-	..	435.0	435.0	594.0	-	600	170 <sup>(c)</sup>	139	130
Isiolo	-	-	182.0	182.0	150.0	-	180	600 <sup>(d)</sup>	435	230
Marsabit	-	-	196.0	196.0	280.0	-	200	180 <sup>(d)</sup>	180	140
Turkana	-	-	110.0	110.0	180.0	-	220	200 <sup>(d)</sup>	200	140
Sambaru	-	-	348.0	348.0	395.0	-	450	220 <sup>(c)</sup>	110	110
W. Pokot	-	..	-	150.0 <sup>a</sup>	130.1	1	150	450 <sup>(d)</sup>	348	320
<b>Total Northern R</b>	-	..	1271.0	1569.0 <sup>a</sup>	1877.1	1	1980	1980	1571	1250
Marek	-	-	649.0	649.0	648.0	-	650	650 <sup>(d)</sup>	649	400
Kajiado	-	-	687.0	687.0	687.0	1	690	690 <sup>(d)</sup>	687	330
<b>Total Southern R</b>	-	-	1336.0	1336.0	1335.0	1	1340	1340	1336	730
<b>Total Range Regions</b>	-	..	2607.0	2905.0 <sup>a</sup>	3212.1	2	3320	3320	2907	1980
<b>Small Farm Regions</b>										
Kilifi	5.2	42.3	-	47.5	81.1	4	40	40	48	
Ruaha	1.1	175.4	-	176.5	108.0	2	210	210	210	
Taita	0.5	41.9	-	42.4	40.0	1	40	40	42	
<b>Total Coastal R</b>	6.8	259.6	-	266.4	229.1	7	290	290	300	370
Mchakos	48.4	640.4	-	688.8	282.6	15	340	350 <sup>(a)</sup>	350	450
Kitui	-	701.2	-	701.2	427.2	-	430	430 <sup>(d)</sup>	430	950
Embu	-	55.6	-	55.6	52.7	3	80	80	87	80
Moru	10.3	213.5	-	223.8	226.4	11	230	240	223	43
<b>Total Eastern R</b>	58.7	1610.7	-	1669.4	989.7	29	1080	1100	1080	1523
<b>Central Province</b>	101.5	482.7	-	584.2	405.0	277	180	460 <sup>(2)</sup>	482	1081
Nandi	14.4	324.8	-	339.2	211.4	29	290	320	339	
Kericho	28.1	968.3	-	996.4	386.5	54	650	700 <sup>(g)</sup>	450	
E. Marakwet	-	145.6	-	145.6	191.7	9	260	270	146	
Baringo	-	..	-	210.0 <sup>a</sup>	156.2	10	190	200	210	
<b>Total Rift A</b>	42.5	1438.7	-	1691.2	945.8	102	1390	1490	1145	1106
<b>Nyanza Province</b>	1.9	1232.5	-	1234.4	874.2	22	1120	1140	1478 <sup>(b)</sup>	2327
<b>Western Province</b>	1.6	754.2	-	755.8	485.0	36	590	630	756	760
<b>Total Small Farm Regions</b>	213.0	5518.8	-	6201.4	3927.8	473	4650	5110	5251	7167
<b>Large Farm Regions</b>										
Nakuru	173.5	-	-	173.5	174.3	71	110	180	174	160
Trans Nzoia	116.3	-	-	116.3	100.2	65	50	120	116	110
Uasin Gishu	103.5	-	-	103.5	122.2	64	70	130	104	110
Laikipia	163.6	-	-	163.6	170.1 <sup>(a)</sup>	20	180	200	164	170
<b>Total Rift B</b>	556.9	-	-	556.9	566.8	220	410	630	558	550
<b>Grand Total</b>	769.9	5518.8	2607.0	9663.0	7706.7	695	8380	9060	8716	9697

\* Estimated.

.. No data supplied.

(a) Includes 36,000 from Makogodo.

(b) Totals do not add horizontally.

(c) J.P. 15 Vaccination figures 1970.

(d) Watson, R.M., Aerial Surveys 1968-70.

(e) Estimated on basis of rinderpest inoculations and Watson's figures for Kitui.

(f) Ministry of Agriculture, Central Province Census 1970.

(g) Director of Veterinary Services.

(h) The cattle population in S. Nyanza District seems to have been underestimated, judging by the level of disease and has been raised from 486,000 to 730,000.

CATTLE AND MEAT OUTPUT 1970

Regions and Districts	Cattle population 000 head	Hides and Skins District slaughter 000	Net exports 000 head	Total offtake (2)+(4) 000 head	Carcass weight kg. CWT per head	Meat from District slaughter (2) x (5) 000 mt	Meat equivalent of net exports (4) x (5) 000 mt	Total meat equivalent (7) + (8) 000 mt
	(1)	(2)	(3) (4)	(5)	(6)	(7)	(8)	(9)
<b>Range Regions</b>								
Lana	9	1	40 1	2	100	0.1	0.1	0.2
Tana River	130	1	.. 10*	11	100	0.1	1.0	1.1
N.E. Province	435	9+	69 25	34	100	0.9	2.5	3.4
Isiolo	180	7	21 10	17	111	0.8	1.1	1.9
Murambit	200	6	4 10	14	122	0.7	1.2	1.9
Turkana	110	4*	.. 6	10	108	0.4	0.6	1.0
Sambara	348	8+	6 20	28	122	1.0	2.4	3.4
W. Pokot	150	5+	6 13	18	111	0.6	1.4	2.0
<b>Total Northern R.</b>	<b>1,571</b>	<b>41</b>	<b>146 95</b>	<b>136</b>		<b>4.6</b>	<b>10.3</b>	<b>14.9</b>
Marak	649	30	2 10	40	100	3.0	1.0	4.0
Fujiado	687	18	25 25	43	100	1.8	2.5	4.3
<b>Total Southern R.</b>	<b>1,336</b>	<b>48</b>	<b>27 35</b>	<b>83</b>		<b>4.8</b>	<b>3.5</b>	<b>8.3</b>
<b>Total Range Regions</b>	<b>2,907</b>	<b>89</b>	<b>173 130</b>	<b>219</b>		<b>9.4</b>	<b>13.8</b>	<b>23.2</b>
<b>Small Farm Regions</b>								
Kilifi	48	29	6 -23	6	100	2.9	-2.3	0.6
Mwali	210	8	1 13	21	100	0.8	1.3	2.1
Taita	42	6	-1 -1	5	100	0.6	-0.1	0.5
<b>Total Coastal R.</b>	<b>300</b>	<b>43</b>	<b>6 -11</b>	<b>32</b>		<b>4.3</b>	<b>-1.1</b>	<b>3.2</b>
Machakos	350	41	10 10	51	122	5.0	1.2	6.2
Kitui	430	15	8 8	23	105	1.6	0.8	2.4
Ebubu	87	12	2 2	14	111	1.3	0.2	1.5
Maru	223	21	- -	21	117	2.5	-	2.5
<b>Total Eastern R.</b>	<b>1,090</b>	<b>89</b>	<b>20 20</b>	<b>109</b>		<b>10.4</b>	<b>2.2</b>	<b>12.6</b>
Central Province	482	71	-14 -14	57	154	10.9	-2.2	8.7
Nandi	339	10	9 24	34	117	1.2	2.8	4.0
Kericho	450	50+	.. 7*	57	117	5.9	0.8	6.7
E. Marakwet	146	6+	6 6	12	111	0.7	0.7	1.4
Baringo	210	10+	15 15	25	111	1.1	1.7	2.8
<b>Total Rift A</b>	<b>1,145</b>	<b>76</b>	<b>30 52</b>	<b>120</b>		<b>8.9</b>	<b>6.0</b>	<b>14.9</b>
Nyanza Province	1,478	146	9 9	155	111	16.2	1.0	17.2
Western Province	756	156	-18 -25	131	111	17.3	-2.8	14.5
<b>Total Small Farm Regions</b>	<b>5,251</b>	<b>581</b>	<b>33 31</b>	<b>612</b>		<b>68.0</b>	<b>3.1</b>	<b>71.1</b>
<b>Large Farm Region</b>								
Nakuru	174	30*	28 15	45	178	5.3	2.7	8.0
Trans Nzoia	116	7*	.. 11	13	151	1.1	1.7	2.8
Uasin Gishu	104	15	26 16	31	155	2.3	2.5	4.8
Laikipia	164	3	44 29	32	167	0.5	4.8	5.3
<b>Total (Rift B)</b>	<b>558</b>	<b>55</b>	<b>98 71</b>	<b>121</b>		<b>9.2</b>	<b>11.7</b>	<b>20.9</b>
<b>Grand Total</b>	<b>8,716</b>	<b>725</b>	<b>304 232</b>	<b>957</b>	<b>120</b>	<b>86.6</b>	<b>28.6</b>	<b>115.2</b>

\* Estimated

.. No data supplied

Col. (1) Annex Table III-1.1.

Col. (2) Reports of Hides and Skins Improvement Officers.  
+ Number raised to allow for domestic usage.

Col. (3) Provincial and District Reports on stock movements augmented by data from the Kenya Meat Commission.  
Negative figures denote net imports.

Col. (4) Column (3) adjusted to take account of:

(1) exports that do not originate in the district.

(2) unreported movement of cattle such as movement into Laikipia from adjoining districts.

Col. (6) Carcass weights based on Aldington and Wilson (1968) Table 2.1 but raised as discussed in the text.

Our first estimates were based on Aldington and Wilson's weight factors adjusted to cold dressed weight. However, it is clear from Annex Table III-1.3 that weights of carcasses in 1975 were considerably below those in 1970. The question was whether to raise the weights for 1970 or lower those for 1975. It was found that using Aldington and Wilson's weight factors, the average cold dressed weight of carcasses in 1970 came to 108.5 kg -- only slightly above the weight of commercial grade carcasses in that year. However, cattle slaughtered in the districts are likely to include those that would grade as standard and some cattle even heavier than is normal for standard grade. Thus there seemed to be a case for using weights in 1970 11.1% higher than Aldington and Wilson's while using their original weights for 1975. Aldington and Wilson suggested that their weight factors might be on the low side (p. 9). Higher weights have been used by Peberdy (1970 p.24) and subsequent authors estimating beef output in 1970.

An estimate of the supply balance sheet was drawn up to check the consistency of the figures for supplies and their utilisation (Annex Table III-1.4). In the balance sheet it is estimated that imports of livestock were equivalent in meat to the smaller number of heavier cattle that were exported to Uganda etc. It also appears that the high level of KMC supplies to the domestic market in 1970 provided most of the meat required to supply Nairobi and Mombasa in a year of depressed urban beef consumption.

ANNEX TABLE III-1.3

AVERAGE COLD DRESSED WEIGHTS OF CARCASSES REPORTED BY K.M.C. (KG)

Carcass Grade	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Baby Beef	224	229	226	225	-	-	-	-	-	-	-
First/Prime	253	253	265	246	218	237	249	256	243	244	239
GAQ/Choice	229	237	246	242	242	226	226	229	226	215	203
FAQ	200	205	215	221	222	209	197	207	205	199	184
Third/Standard	154	152	156	155	154	146	153	155	143	126	122
Fourth/Commercial	114	109	120	111	108	104	103	103	94	93	87
Manufacturing	106 <sup>a</sup>	100 <sup>a</sup>	109	103	99	95	100	102	80	89	71
Reject		150	124	132	136	111	127	104	117	95	NA
Overall Average (Weighted)	147	142	158	145	140	132	143	148	126	125	NA

a. A weighted average of Manufacturing "A" and "B".

b. Athi River only.

Source : KMC Annual Reports.

## ANNEX TABLE III-1.4

## BEEF SUPPLY BALANCE SHEET, 1970

<u>Row</u>	<u>Items</u>	<u>Beef CDW 000 mt</u>
	<u>Supply</u>	
(1)	Recorded Kenyan output	115.3
(2)	Imports (unofficial, approx. 54,000 head)	5.4
(3)	Supply	<u>120.7</u>
	<u>Utilization of supply</u>	
(4)	Slaughtered within district of production	86.6
(5)	Meat equivalent, Cattle supplied directly to Nairobi and Mombasa	1.1
(6)	KMC procurement	27.5
	<u>Exports of livestock</u>	
(7)	Official (9,706 head)	1.4
(8)	Unofficial (approx. 30,000 head)	<u>4.0</u>
	Total	<u>120.7</u>

## Sources :

- Row (1) Annex Table III-1.2, col.(9)  
 Row (2) Meyn (1970) p.23  
 Row (4) Annex Table III-1.2, col.(7)  
 Row (5) A residual but related to Annex Table III-1.2 col.(8) minus KMC Procurement.  
 Row (6) KMC Annual Reports.  
 Row (7) Trade Statistics  
 Row (8) Meyn (1970) o.23

Our estimated output of 115,000 tons in 1970 is compared with other estimates in Annex Table III-1.5 below.

**ANNEX TABLE III-1.5**

**COMPARISON OF ESTIMATES OF CATTLE OUTPUT 1970**

<u>Sources</u>	<u>Offtake OOO head</u>	<u>C.D.W. kg. per head</u>	<u>Output OOO mt</u>
This study	957	120	115
Peberdy (1970 p.24)	1,464	93.6	137.1
(Calves)	(432)	(27.2)	(11.7)
(Cattle)	(1,032)	(121.5)	(125.4)
UNECA (1972)	912.7	150	136.9
Meyn (1970)	1,712	101	173.9
(Calves)	(497)		

Meyn : Offtake - Appendix 3, Table 5-9  
 Output - Appendix 3, Table 12

Our estimate is consistent with Peberdy (1970) when figures for calves and unrecorded hides etc. are excluded so as to come closer to the 'commercial supply'. The UNECA report of 1972 assumed that carcass weights were 30 kg higher than those used here or those used by Peberdy, thus resulting in a higher level of output. Meyn's figures for the number of cattle produced in 1970 are probably higher than ours due to

- Inclusion of calves, which also depressed the average weight per head.
- Inclusion of cattle in the output which are part of losses in remote areas and for which even the hides are not marketed.
- Other differences arising from his methodology based on herd structure

**D. Estimation of Cattle Output 1975**

Our estimates of cattle output in 1975 were based on the same sources as those for 1970, supplemented by early results from the Integrated Rural Survey I. The figures for the weight of edible tissue per head of offtake, equivalent to carcass CDW, were 10 percent lower than those used for 1970 as stated in discussion of Annex Table III-1.3 above. Lower carcass weights were also to be expected in 1975 after several dry years and reduced forage supplies in many rangeland areas. Our estimates of output in Annex Table III-1.6 are related to utilization in Annex Table III-1.7. Data from this balance sheet were then transferred to tables in Chapter II on the pattern of procurement.

ANNEX TABLE III-1,6

## CATTLE AND BEEF OUTPUT 1975

Regions and Districts	Cattle population 000 head	Hides from District slaughter 000	Net exports 000 head		Total offtake (2) + (4) 000 head	Carcase weight kg. CW per head	Meat from District slaughter (2) x (6) 000 mt	Meat equivalent of net Exports (4) x (6) 000 mt	Total meat equivalent (7) + (8) 000 mt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
<b>Large Regions</b>									
Lana	40	2	20	3	5	90	.18	.27	.45
Trans River	120	4	7	7	11	90	.36	.63	.99
N.E. Province	230	4	28	23	27	90	.36	2.07	2.43
Isiolo	140	5	9	9	14	100	.50	.90	1.40
Marsabit	140	3	4	8	11	110	.33	.88	1.21
Turkana	110	4*	-	6	10	95	.38	.57	.95
Subura	320	17	8	16	33	110	1.67	1.76	3.63
W. Pokot	150	4*	5	6	10	100	.60	.60	1.00
<b>Total Northern R.</b>	<b>1,250</b>	<b>43</b>	<b>81</b>	<b>78</b>	<b>121</b>	<b>100</b>	<b>4.38</b>	<b>7.68</b>	<b>12.06</b>
Morot	400	11							
Najiyado	330	30							
<b>Total Southern R.</b>	<b>730</b>	<b>61</b>	<b>16</b>	<b>19</b>	<b>80</b>	<b>90</b>	<b>5.49</b>	<b>1.71</b>	<b>7.20</b>
<b>Small Farm Regions</b>									
Kilifi		29	-4	-4	23	90	2.61	-.54	2.07
Wale		14	2	2	16	90	1.26	.18	1.44
Taita		6	2	10	16	90	.54	.90	1.44
<b>Total Coastal R.</b>	<b>370</b>	<b>49</b>	<b>-2</b>	<b>6</b>	<b>55</b>	<b>90</b>	<b>4.41</b>	<b>.54</b>	<b>4.95</b>
Nakusko	450(a)	65	15	15	80	110	7.15	1.65	8.80
Ritui	950(a)	40	7	7	47	95	3.80	.67	4.47
Ebu	80(a)	24	-	-	24	100	2.40	0	2.40
Maru	43(a)	32	-	-	32	105	3.36	0	3.36
<b>Total Eastern R.</b>	<b>1,523</b>	<b>161</b>	<b>22</b>	<b>22</b>	<b>183</b>		<b>16.71</b>	<b>2.32</b>	<b>19.03</b>
<b>Central Province</b>	<b>1,061</b>	<b>130+</b>	<b>-3</b>	<b>9</b>	<b>139</b>	<b>139</b>	<b>18.07</b>	<b>1.25</b>	<b>19.32</b>
Nandi		5	24	28	33	105	.53	2.94	3.47
Kericho		97	7	13	110	105	10.19	1.37	11.56
E. Marakwet		6	5	10	16	100	.60	1.00	1.60
Baringo		12	5	10	22	100	1.20	1.00	2.20
<b>Total Rift A</b>	<b>1,106</b>	<b>120</b>	<b>41</b>	<b>61</b>	<b>161</b>		<b>12.52</b>	<b>6.31</b>	<b>18.83</b>
<b>Nyanza Province</b>	<b>2,327</b>	<b>268</b>	<b>-4</b>	<b>-4</b>	<b>264</b>	<b>100</b>	<b>26.80</b>	<b>-.50</b>	<b>26.40</b>
<b>Western Province</b>	<b>760</b>	<b>144</b>	<b>-15</b>	<b>-15</b>	<b>129</b>	<b>100</b>	<b>14.40</b>	<b>-1.50</b>	<b>12.90</b>
<b>Total Small Farm Regions</b>	<b>7,167</b>	<b>872</b>	<b>39</b>	<b>79</b>	<b>951</b>	<b>105.75</b>	<b>92.90</b>	<b>8.52</b>	<b>101.43</b>
<b>Large Farm Region</b>							(b)		
Nakuru	160	24	12	12	36	160	3.84	2.40	6.24
Trans Nzoia	110	17	13	13	30	136	2.31	2.30	4.61
Uasin Gishu	110	13	28	14	27	140	1.82	2.10	3.92
Laiskips	170	20	55	20	40	150	3.00	4.00	7.00
<b>Total (Rift B)</b>	<b>550</b>	<b>74</b>	<b>118</b>	<b>59</b>	<b>133</b>		<b>10.97</b>	<b>10.80</b>	<b>21.77</b>
<b>Grand Total</b>	<b>9,697</b>	<b>1,050</b>	<b>254</b>	<b>235</b>	<b>1,285</b>	<b>111</b>	<b>113.75</b>	<b>28.71</b>	<b>142.46</b>

\* Estimated figure.

Col. (1) Cattle population.

Northern Region : Abstract of Statistics, Estimates of Livestock Numbers 1970, and latest rinderpest vaccination records for North Eastern Province.

Southern Region : Population estimated by aerial count.

Small Farm Regions : Preliminary results from the Integrated Rural Survey I plus the provisional results from the Large Farm Survey 1975. District data for Eastern Region from the 1975 Report of the Provincial Animal Husbandry Officer (a).

Large Farm Region : provisional results of 1975 Large Farm Survey.

Col. (2) Hides from District Slaughter.

Reports of Hides and Skins Improvement Officers. + Figure increased by 20,000 to allow for unrecorded sales of worn hides direct to factories.

Col. (3) Net Exports of Livestock.

Provincial and District Reports on stock movements, augmented by data from Kenya Meat Commission.

Col. (4) Negative figures for net imports.

Col. (3) adjusted to take account of (1) 'Reports' that do not originate in the District, (ii) Unreported movement of Cattle such as movement into Laikipia from adjoining districts.

Col. (6) Carcase Weight.

Based mainly on Aldington and Wilson (1968), Table 2.1.

Col. (9) (b) Figures raised to take account of weight gained by stock passing through farms in these Districts.

## BEEF SUPPLY BALANCE SHEET, 1970

<u>Row</u>	<u>Items</u>	<u>Beef COW 000 mt</u>
	<u>Supply</u>	
(1)	Recorded Kenyan output	142.5
(2)	Imports (unofficial approx. 19,000 head)	<u>2.4</u>
(3)	Supply	<u>144.9</u>
	<u>Utilization of supply</u>	
(4)	Slaughtered within district of production	113.8
(5)	Meat equivalent, Cattle supplied directly to Nairobi and Mombasa	14.1
(6)	KMC procurement	16.7
	<u>Exports of livestock</u>	
(7)	Official (2,704 head)	<u>0.3</u>
	Total	<u>144.9</u>

## Sources :

- Row (1) Annex Table III-1.6, col. (9), Supply 1975
- Row (2) Estimated from data on cattle movements Annex Table III-1.6, col. (3).
- Row (4) Annex Table III-1.6, col. (7).
- Row (5) A residual but related to net exports of Districts plus international movement of cattle minus KMC procurement.
- Row (6) KMC Annual Reports
- Row (7) Trade Statistics

## 2. Estimation of Sheep and Goat Output

Sheep and goat output was estimated from records of sales and livestock movements in the same way as we constructed estimates of cattle output. We were fortunate to receive considerable assistance from data collected by the FAO Sheep and Goat Development Project and the advice of its leader Dr. E.W. Allonby. Early results of the project's production surveys provided very useful estimates of the rate of offtake and weights of sheep and goats in various districts. These results were sometimes used in districts with similar flocks to one of the districts for which survey estimates had been prepared. Examination of the separate data for sheep and for goats showed sufficient similarity in their rates of offtake and weights at various ages, to justify amalgamating the data with due regard to the emphasis to be given to goats as given by Figure 6 in the FAO report by Allonby (1975) 'Investigation of Small Stock Diseases in Kenya'.

Owen's studies of the anatomical composition of sheep and goats showed that at least 70 percent of their liveweight is edible tissue. Thus to pursue our aim of estimating food output from livestock, we have taken the food output of a slaughtered sheep or goat to be 70 percent of its liveweight. As a result our figures for output are higher than those based on the weight of carcasses produced, as a carcass is only about 46 percent of liveweight. However, one set of data may be converted to the other using the figures above, carcass cold dressed weight is 65.7 percent of our estimate of the weight of meat and offal.

Our estimates of output in 1970 (Annex Table III-1.8) are then related to utilization of output in Annex Table III-1.9. Our estimate of the output of sheep and goat meat in 1970 of 27,337 tons CDW is a bit higher than that in UNECA (1972) of 21,600 (p.22).

ANNEX TABLE III-1.2  
SHEEP AND GOAT OUTPUT 1970

Regions and Districts	Estimated population 000 head	Skins from District slaughter 000	Net exports (000 head)	Net off-take (2)+(3) 000 head	Meat and offal per head kg	Meat and offal from District slaughter (2) x (5) kg	Meat and offal equivalent of net exports (3) x (5) kg	Meat output Meat equivalent (6) + (7) kg
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Rango Regions</b>								
Lana	5	2	1	3	29	88	29	87
Tana River	88	3	5	8	29	87	149	232
N.E. Province	1,000(a)	100+	90	190	29	2,900	1,490	4,390
Isiolo	200(a)	15	9	24	29	300	180	480
Marsabit	508	148	21	169	29	4,122	608	4,901
Turkana	625	46	25	71	19	874	475	1,349
Siaya	243	34	-	34	21	714	-	714
W. Pokot	158	8	7	15	19	152	133	285
<b>Total Northern Region</b>	<b>2,827</b>	<b>356</b>	<b>118</b>	<b>474</b>		<b>9,377</b>	<b>3,021</b>	<b>12,398</b>
Marak	484	49	37(c)	86	20	980	740	1,720
Kajiado	371	17	40*	57	20	340	800	1,140
<b>Total Southern Region</b>	<b>855</b>	<b>66</b>	<b>77</b>	<b>143</b>		<b>1,320</b>	<b>1,540</b>	<b>2,860</b>
<b>Total Rango Regions</b>	<b>3,682</b>	<b>422</b>	<b>195</b>	<b>617</b>		<b>10,697</b>	<b>4,561</b>	<b>15,258</b>
<b>Small Farm R.</b>								
Kilifi	70	42	-1	41	19	798	-19	779
Mwali	288	22	-	22	19	418	-	418
Taita	5	9	-1	8	19	171	-19	152
<b>Total Coastal Region</b>	<b>363</b>	<b>73</b>	<b>-2</b>	<b>71</b>		<b>1,387</b>	<b>-38</b>	<b>1,349</b>
Machakos	616	166	15	181	19	3,154	285	3,439
Kitui	505	59	3	62	22	1,299	64	1,364
Mbu	111	27	1	28	18	486	18	504
Maru	375	88	1	89	20	1,780	20	1,780
<b>Total Eastern Region</b>	<b>1,607</b>	<b>340</b>	<b>20</b>	<b>360</b>		<b>6,698</b>	<b>389</b>	<b>7,087</b>
Central Prov.	697	156(b)	-27	109	22	3,432	-594	2,838
Mandi	136	31	10(d)	41	21	851	210	861
Mericho	590	47	20*	67	21	987	420	1,407
E. Marsabit	175	12	3	15	22	264	66	330
Baringo	692	132	25	157	19	2,508	475	2,983
<b>Total Rift A</b>	<b>3,553</b>	<b>222</b>	<b>58</b>	<b>280</b>		<b>4,410</b>	<b>1,171</b>	<b>5,581</b>
Nyanza Prov.	1,000(a)	203	3	206	19	3,957	57	3,914
Western Prov.	203	33	1	34	19	627	19	646
<b>Total Small Farm Regions</b>	<b>5,423</b>	<b>1,027</b>	<b>53</b>	<b>1,080</b>		<b>20,411</b>	<b>1,004</b>	<b>21,415</b>
<b>Large Farm R.</b>								
Muluru	156	37	25(c)	62	31	1,147	775	1,922
Trans Nzoia	9	1	1*	2	31	31	31	62
Uasin Gishu	120(a)	40	12(d)	52	31	1,240	372	1,612
Lakipsa	150(a)	14	29	43	31	434	899	1,333
<b>Total Rift B</b>	<b>435</b>	<b>92</b>	<b>67</b>	<b>159</b>		<b>2,852</b>	<b>2,077</b>	<b>4,929</b>
<b>Grand Total</b>	<b>9,540</b>	<b>1,541</b>	<b>315</b>	<b>1,836</b>	<b>22.7</b>	<b>33,960</b>	<b>7,642</b>	<b>41,602</b>
<b>Meat only, CW</b>					<b>14.9</b>	<b>22,315</b>	<b>5,021</b>	<b>27,337</b>

\* Estimated.

† Figure includes an additional unrecorded production of 7,000 skins.

Col. (1) Estimated population.

Annual Abstract of Statistics: Estimates of Livestock numbers by Districts, 1970, except (a) Figures derived from output figure, Col. (5) divided by the estimated off-take per head of population. The resulting estimates were then compared with data from Spinks (1964).

Col. (2) Skins from District Slaughter.

Reports of Hides and Skins Improvement Officers. (b) Figure increased by 20,000 to cover unrecorded export of skins.

Col. (3) Net Reports of livestock.

Annual and District Reports giving stock movements. Negative figures denote net imports.

Corrections: (c) 20,000 head attributed to Marak instead of Muluru.

(d) 10,000 head attributed to Mandi instead of Uasin Gishu.

Col. (4) Net off-take per head.

Estimated from the surveys of live animals of sheep and goats.

Col. (5) Meat and offal per head.

Estimated from the surveys of live animals of sheep and goats.

## ANNEX TABLE III-1.9

## SHEEP AND GOAT SUPPLY AND DISPOSITION IN 1970

<u>Row</u>		<u>Meat and offal mt</u>	<u>Meat alone mt CPW</u>
	<u>Supply</u>		
(1)	Recorded output	41,602	27,337
	<u>Disposition of Supply</u>		
(2)	Slaughter within district of production	33,960	22,315
(3)	Meat and offal from stock supplied directly to Nairobi and Mombasa	5,462	3,590
(4)	KMC procurement	<u>2,180</u>	<u>1,432</u>
	Total	<u>41,602</u>	<u>27,337</u>

## Sources :

Annex Table III-1.8 and Annual Report of KMC 1970.

The output of sheep and goat meat in 1975, Annex Table III-1.10 was estimated by the same methods as we used for 1970. The only information on changes in the weight of meat per head of stock slaughtered comes from the small proportion of sheep and goats slaughtered by KMC. Data on carcass weights from KMC do not show any notable decline from 1970 to 1975. It is also known that sheep and especially goats are less affected by dry seasons than cattle. Thus we used the same average weights per head for 1975 as we used for 1970.

TABLE III-1.4  
SHEEP AND GOAT OUTPUT 1975

Region and District	Estimated Sheep and Goat population 000	Sheep from District slaughter 000	Net Exports 000 head	Total off-take (2)+(3) 000 head	Meat and offal per head kg	Sheep slaughter (2) x (5) kg	Meat and offal (3) x (5) kg	Meat output 000 kg
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Large Regions</b>								
Lana	-	7	-	7	29	203	-	203
Tana River	90	-	-	90	29	2,610	1,973	7,076
N.E. Province	1,470	178	68	244	29	1,830	230	2,080
Isiolo	670	90	11	101	29	2,146	261	2,407
Marsabit	530	74	9*	83	29	2,406	241	2,140
Taraba	500†	20*	40*	60*	19	380	780	1,140
Samburu	338	50	4	54	21	1,090	84	1,134
W. Pokot	120*	12*	5*	17	19	228	79	323
<b>Total Northern Region</b>	<b>3,678</b>	<b>429</b>	<b>137</b>	<b>566</b>		<b>10,911</b>	<b>3,392</b>	<b>14,303</b>
Marek	480	29	-	29	20	580	-	580
Majiako	370	99	-	99	20	1,980	-	1,980
<b>Total Southern Region</b>	<b>850</b>	<b>128</b>	<b>-</b>	<b>128</b>		<b>2,960</b>	<b>-</b>	<b>2,960</b>
<b>Total Range Regions</b>	<b>4,528</b>	<b>557</b>	<b>137</b>	<b>694</b>		<b>13,471</b>	<b>3,392</b>	<b>16,863</b>
<b>Small Farm R.</b>								
Kilifi		123	-4	119	19	2,337	-78	2,261
Namis		9	1	10	19	171	19	190
Taita		11	-	11	19	209	-	209
<b>Total Coastal Region</b>	<b>744</b>	<b>143</b>	<b>-3</b>	<b>140</b>		<b>2,717</b>	<b>-57</b>	<b>2,660</b>
Machakos	666(a)	324	32	356	19	6,156	608	6,764
Kitui	700	195	14	209	22	4,290	308	4,598
Isiolo	113	102	-	102	18	1,836	-	1,836
Maru	600	70	-	70	20	1,400	-	1,400
<b>Total Eastern Region</b>	<b>1,879</b>	<b>691</b>	<b>46</b>	<b>737</b>		<b>13,682</b>	<b>916</b>	<b>14,598</b>
Central Prov.	1,211	232(b)	-25	207	22	5,104	-590	4,554
Mandi		11	1	12	21	231	21	252
Kericho		149	1	150	21	3,129	21	3,150
E. Marakwet		20	3	23	22	440	66	506
Baringo		121	5	126	19	2,299	95	2,394
<b>Total Rift A</b>	<b>949</b>	<b>301</b>	<b>10</b>	<b>311</b>		<b>6,099</b>	<b>203</b>	<b>6,302</b>
Myanza Prov.	1,718	484	-30	454	19	9,196	-570	8,626
Western Prov.	245	98	-	98	19	1,862	-	1,862
<b>Total Small Farm Regions</b>	<b>6,746</b>	<b>1,949</b>	<b>-2</b>	<b>1,947</b>		<b>38,680</b>	<b>-58</b>	<b>38,602</b>
<b>Large Farm R.</b>								
Makuru	200	54	26	80	31	2,430	806	3,236
Trans Maai	45	18	-	18	31	558	-	558
Uasin Gishu	113	40	5	45	31	1,395	155	1,550
Lalikipia	208	59	24	83	31	2,573	744	3,317
<b>Total (Rift B)</b>	<b>566</b>	<b>171</b>	<b>55</b>	<b>226</b>		<b>7,006</b>	<b>1,706</b>	<b>8,711</b>
<b>Grand Total</b>	<b>11,840</b>	<b>2,677</b>	<b>190</b>	<b>2,867</b>	<b>22.4</b>	<b>59,137</b>	<b>5,039</b>	<b>64,176</b>
<b>Meat only CM</b>					<b>14.7</b>	<b>38,859</b>	<b>3,311</b>	<b>42,170</b>

\* Estimated

† Slightly increased to take into account domestic consumption.

Col. (1) Sheep and Goat population.

Large Regions: estimates based on recorded output of skins plus net exports divided by survey estimates of off-take per head of population provided by Dr. E.W. Allfrey - partly reported in his FAO report (1975) already cited.

Small Farm Regions: Integrated Rural Survey I (preliminary results) plus Large Farm Survey 1975 (preliminary results).

(a) District data from the 1975 Report of Provincial Animal Husbandry Officers.

Large Farm Region: Large Farm Survey 1975 (preliminary results) increased to take account of births on small farms so that total off-take is at the expected 1.9-2.1 or 0.4 head per head of 20-25 and 20-25 in each district.

Col. (2) Skins from District Slaughter.

Reports of skins and skins Department Officers. On figures increased by 60,000 to correct misreporting of 1975.

Col. (3) Net exports of livestock.

Provincial and District Reports giving stock movements.

Col. (4) Total off-take per head.

Calculated from Col. (2) for Table for 1975 (1976).

## METHODOLOGY USED FOR DETERMINING LAND AVAILABILITY, USE AND CARRYING CAPACITY

This Annex discusses the derivation of Table III-3 which gives our estimates of land availability, land use, and stock carrying capacity in 1975 and 1990. We have provided a methodology flow chart on the following page. The annex covers the several primary sources used, a number of adjustment or conversion factors used and the actual steps in the preparation of the table.

### 1. Primary Data Sources

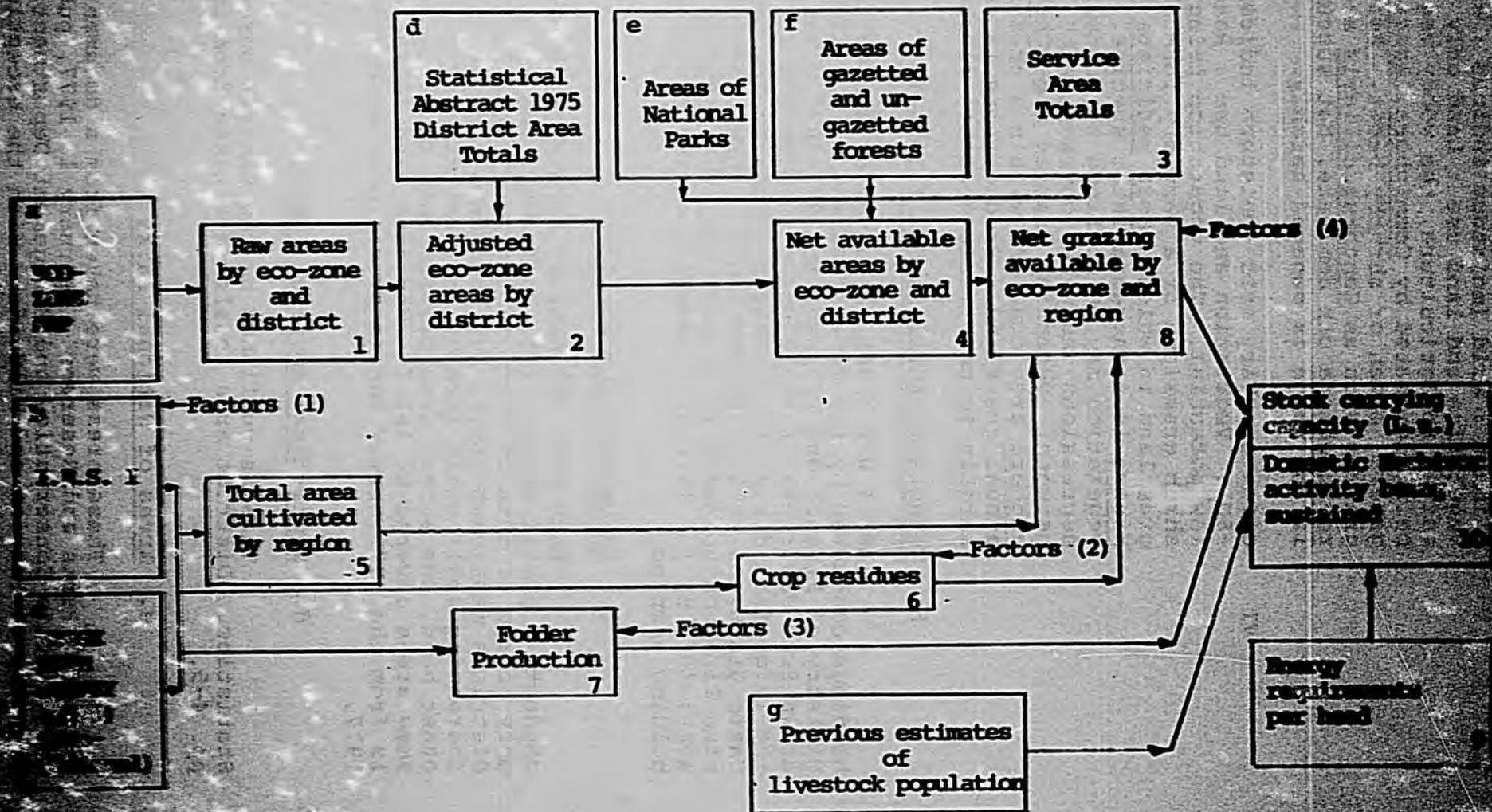
#### a. Ecological Zone Map

This map was originally published in an article entitled "A Classification of East African Rangeland" by Pratt, Greenway and Gwynne in the Journal of Applied Ecology, November 1966 (pp. 309-393). Modifications designed to account for recent shifts in eco-zone boundaries to incorporate more recent field data were carried out by Dr. Michael Gwynne, now of the Kenya Rangeland Ecological Monitoring Unit (KREMU). The six eco-zones are as follows :

- I Afro-Alpine moorland and grassland at high altitude above the forest line of limited range-use and low range potential. (Climate indefinite and governed by altitude not water supply.)
- II Climate : Humid to dry sub-humid (moisture index not less than 10). Vegetation and land use : Forests and derived grassland and bushland, with or without natural glades. The potential is for forestry and intensive agriculture. (Ground-water forests may occur under a climate drier than sub-humid.)
- III Climate : Dry sub-humid to semi-arid (moisture indices: -10 to -30). Vegetation and land use : Land not of forest potential, carrying a variable vegetation cover (moist woodland, bushland or savanna), the trees characteristically broadleaved (e.g. combretum) and the larger shrubs mostly evergreen. The Agricultural potential is high, soil and topography permitting.
- IV Climate : semi-arid (moisture indices : -30 to -40). Vegetation and land use : Land of marginal agriculture potential, carrying natural vegetation, dry forms of woodland and savanna (often an Acacia - Thurbergia association) or equivalent bushland.

ANNEX FIGURE III-2.1

METHODOLOGY FLOW CHART, STOCK CARRYING CAPACITY, LIVESTOCK PRODUCTION



V Climate : Arid (moisture indices : -40 to -50).  
Vegetation and land use : Land only locally  
suited to Agriculture, the woody vegetation  
being dominated by Commiphora, Acacia and allied  
genera, often of shrubby habit. Perennial  
grasses such as Cenchrus ciliaris and Chloris  
roxburghiana can dominate, but succumb readily  
if the range is managed harshly.

VI Climate : Very arid (moisture indices : -50 to  
-60). Vegetation and land use : Rangeland of  
low potential. The vegetation being dwarf  
shrub grassland or a very dry form of bushed  
grassland in which Acacia reficiens subspecies  
Misera is a characteristic species. The  
vegetation may be confined to runnels,  
depressions and water courses, with barren land  
between. Perennial grasses e.g. Chrysopogon  
aucheri are localised within a predominantly  
annual grassland. Productivity is confined  
largely to unreliable seasonal flushes.

b. Integrated Rural Survey I (IRS I)

IRS I was a sample survey of agricultural  
holdings conducted by the Central Bureau of Statistics of the  
Ministry of Finance and Planning in 1974-1975. The sample was  
drawn from districts of small scale farming and it excluded  
the large farm districts of Nakuru, Trans Nzoia, Laikipia and  
Uasin Gishu, as well as predominantly range districts. The  
size limit on holdings to be included in the survey was twenty  
acres (8.1 ha.). This was, however, above the largest size of  
holding sampled.

c. Large Farm Survey (1975)

Each year the Central Bureau of Statistics  
conducts a postal census of large farms. The L.F.S. is the  
only source of data on farms in the four large scale farming  
districts mentioned above, but it does not cover the  
increasing small scale farming in these districts. On the  
other hand, the survey does provide data on large farms in  
some areas covered by IRS I. The data used in Table III-3  
is from the 1975 survey and is provisional as of February 10,  
1977.

d. Statistical Abstract, 1975.

This is published by the Central Bureau of  
Statistics. District area totals were taken from table 5,  
pp. 4-5.

e. Areas of National Parks

These areas were taken from a document called  
"National Parks and Reserves", February 1, 1977, published by  
the Wildlife Conservation and Management Department of the  
Ministry of Tourism and Wildlife. With the exception of

Tsavo Road and Railway National Reserves, reserves were not excluded from grazing land since, under existing definitions, they are available for local grazing.

f. Areas of Gazetted and Ungazetted Forests

These areas were obtained from the Forest Department Headquarters of the Ministry of Natural Resources and include changes up to January 1, 1977.

g. Previous Estimates of Livestock Population

See the table and discussion on cattle and beef output elsewhere in Chapter III.

2. Factors

We have developed a number of factors for converting raw data to the form needed for subsequent analysis. The more important of these factors are as follows.

a. Cultivated Area

Total cultivated area, maize area etc. were measured twice during the crop year 1974/5 covered by IRS I. The first was called "original" and the second "subsequent". Sometimes the same area was measured twice. Thus the area of land coming under cultivation in the year would often be larger than either the original measurement or the subsequent measurement but smaller than their sum. The likelihood of double counting is greatest in areas having bi-modal rainfall distribution and where the interval between harvest of the first crop and the planting of the second is long enough for farmers to prepare a second crop on all or part of the land used for the original crop, thus planting two crops per year on the same land (i.e. a double crop). Thus a judgment had to be made on

- The likelihood of double cropping.
- An estimation of its magnitude.

In making this judgment, the study team referred to

- "Crop Calendar for Kenya", Central Bureau of Statistics.
- Rainfall data, "Kenya Atlas".
- Labor requirements for harvesting and land preparation for maize.

In the following table, Annex Table III-2.1, the value 0.1 was assigned as a weight to a high likelihood of double cropping, and 0.7 to a low likelihood. A second set of weights was used in Annex Table I, namely the appropriate fraction of holdings in the particular area to the total in the region. The weighted regional totals are determined by the following

ANNEX TABLE III-2.1

## APPLICATION OF FACTORS TO I.R.S. DATA

REGION/ PROVINCE		IRS MEASURED AREA 000 HA. (ORIGINAL/SUBSEQUENT)	DISTRICT	LIKELIHOOD OF DOUBLE CROPPING	WEIGHTING FACTOR	WEIGHTED REGION TOTAL
COASTAL	Total	111.6/ 65.0	( Kilifi	High	0.1 x 0.5 )	137.6
	Maize	60.1/ 60.1	( Kwale	Low	0.7 x 0.5 )	
			( Taita	No Holdings	Not signif) (.40)	
INTERIOR	Total	434.0/354.8	( Embu	High	0.1 x 0.1 )	597.2
	Maize	267.6/227.3	( Kitui	Low	0.7 x 0.2 )	
			( Meru	High	0.1 x 0.3 )	
			( Machakos	Low	0.7 x 0.4 ) (.46)	
CENTRAL	Total	296.7/224.8	( Nyeri	Low	0.7 x 0.2 )	373.1
	Maize	178.8/180.1	( Muranga	High	0.1 x 0.3 )	
			( Kirinyaga	Low	0.7 x 0.1 )	
			( Kiambu	High	0.1 x 0.3 )	
			( Nyandarua	Low	0.7 x 0.1 ) (.34)	
WEST PROVINCE A	Total	74.3/ 68.9	( Nandi	Low	0.7 x 0.2 )	101.9
	Maize	67.2/ 61.4	( Kericho	High	0.1 x 0.5 )	
			( Baringo	Low	0.7 x 0.2 )	
			( E. Mara	Low	0.7 x 0.1 ) (.40)	
NORTHERN	Total	232.4/264.1	( Homa Bay	Low	0.7 x 0.3 )	385.0
	Maize	125.8/216.4	( Kisii	High	0.1 x 0.3 )	
			( Kisumu	Low	0.7 x 0.2 )	
			( Siaya	Low	0.7 x 0.2 ) (.52)	
SOUTHERN	Total	132.9/247	( Kakamega	High	0.1 x 0.6 )	292.2
	Maize	71.4/182.2	( Bungoma	Low	0.7 x 0.3 )	
			( Busia	Low	0.7 x 0.1 ) (.34)	

multiplication 1.

(subsequent x weighting factor) + original

In Annex Table I, total cultivation is the top figure in columns 2 and 6, while the maize area alone is given in the lower figures.

b. Crop Residue Factors

In view of the fact that cattle eat crop residues, such as maize stover and straw from cereals, an allowance was made based on the following calculation :

$$\text{Livestock units supported} = \frac{(\text{Large Farm Cereal Area} + \text{Small Farm Maize Area}) \text{ Ha.}}{10 \text{ Ha./Livestock Unit}}$$

c. Fodder and Grazing Paddocks

In order to convert the area of fodder and paddocks taken from the Large Farm Survey and IRS I to a stock carrying capacity, it is necessary to allocate sufficient hectareage to each livestock unit relevant to the eco-zone. The following factors were used :

Zone II	0.3 Ha/L.u.
Zone III	0.5 Ha/L.u.
Zone IV	2.0 Ha/L.u.

These figures were taken from investigations conducted on fodder fed to improved cattle at Kitale and the apparent performance of these areas of intensive forage production.

d. Stock Carrying Capacity

The following factors were used for unimproved grazing land.

Zone II	0.6 Ha/L.u.
Zone III	1.0 Ha/L.u.
Zone IV	4.0 Ha/L.u.
Zone V	12.0 Ha/L.u.
Zone VI	42.0 Ha/L.u.

These figures were based on those put forward by D.J. Pratt in "Rangeland Development in Kenya", Annals of Arid Zone, September 1968, pp. 177-208, and modified in the case of Zones II and III by current work at Kitale and the apparent performance of land in the intensively farmed regions such as Central Province.

In the case of Nyansa and Western, "subsequent" and "original" were exchanged in the calculation.

### 3. Derivation of Tables

In this discussion, numbers in parenthesis refer to the methodology flow chart.

Using the eco-zone map, the Cartographic Section of the Range Management Division (Ministry of Agriculture), assisted by the Study Team, measured the areas of each eco-zone in each district using a planimeter. These raw areas (1) were then balanced and adjusted (2) to agree with district land totals as given by the Statistical Abstract (1975). In consultation with the Central Bureau of Statistics, service land (3) (including building areas, roads and paths) was estimated at 0.15 ha. per rural holding. Further data on numbers of holdings was obtained from IRS I.

Net available areas by eco-zone and district (4) were calculated by subtracting the areas of national parks, gazetted and ungazetted forests and service land from the adjusted eco-zone areas by district. Net grazing available (8) is the net available area (4) less total area cultivated (5). In making this calculation, 20 percent of each zone was assumed to be unavailable for cultivation as an allowance for hilltops, wet valley bottoms, rock etc. In the case of very hilly districts (such as those in Central Province), this figure was increased to 30 percent. If Zone II was not large enough to accommodate total cultivated area (up to the 80 percent or 70 percent maximum), the spillover was allocated to Zone III and so on.

Stock carrying capacity is derived from the net grazing area by eco-zone translated into livestock units (L.u.) capacity by using the appropriate hectares per L.u. factors (see Factors, d.). At this point, the contribution of crop residues (6) and fodder production (7) are added in to make the final figure. Note that 50 percent of the allowance for hilltops etc. in each eco-zone was assumed to be available for fodder production required according to the total fodder production figure (7).

Estimates of the level of domestic herbivore activity being sustained in each region were derived from estimates of the numbers of cattle, sheep and goats given in Table III. The grazing needs of these stock were assessed by calculating their energy requirements for body maintenance and production in terms of metabolisable energy (9). These calculations were made for typical herds of : small East African Zebu cattle, grade dairy cattle, and flocks of Red Masai and Blackhead Persian sheep. The metabolisable energy allowance for each weight of animal and every level of production were derived from : Energy Allowance and Feeding Systems for Ruminants, Technical Bulletin 33, Ministry of Agriculture, Fisheries and Food, London, 1975. It was also estimated that the 450 kg. cow and calf Livestock Unit (L.u.) would require 60 megajoules of metabolisable energy per day. In the same way it was estimated that the Kenya Stock Unit (KSU) would require 65 percent of this metabolisable energy per day and was thus equivalent to 0.65 L.u. The average energy requirement per

head in a typical herd of small East African Sabe cattle was found to be 29.4 megajoules or 0.45 L.u. Similarly, it was estimated that a typical herd of grade cattle had an average food requirement equivalent to 0.60 L.u. per head. The grazing demand of sheep and goat flocks depended on :

- Their predominant breed - whether large animals like Blackhead Persian sheep or small like Red Masai.
- The balance in the flock between sheep and goats. The greater the importance of goats in browse areas, the lower the likely dependence on grazing and the lower the average L.u. per head for the flock.

The Livestock unit per head of sheep and goat flocks was estimated to be in the range of 0.08 and 0.10.

#### 4. Projections to 1990

Using our 1990 and 1975 human population estimates, set out in Chapter II, the projected population increase was calculated by region. Next, agricultural land requirements per additional person were developed and applied. The rates used are listed below :

<u>Region/Province</u>	<u>Ha. Land per Person</u>		
	<u>Zone II</u>	<u>Zone III</u>	<u>Zone IV</u>
Southern	0.20	...	...
Coast	0.27	0.30	...
Eastern	0.20	0.25	0.60
Central	0.20	0.25	0.60
Nyanza	0.12	0.20	...
Western	0.16	0.20	...
Rift A	0.20	0.25	...
Rift B	0.20	0.25	0.60
People not in Agricultural Households	0.10	0.12	...

The figures are based on data from Kitale and analysis of the district by district data for 1970. Use of these coefficients takes account of the fall in output per hectare as cultivation is extended into less and less productive land. Thus in areas of food crop self sufficiency, each additional person in agriculture requires more than the average amount of land used per person in their area. However, where large areas of land in a region are used for producing food for sale outside the region, the average area per person is above the marginal rate, as in the Rift B Region. A similar effect is produced by the presence of large scale farming geared to non-food crops.

With the population increment calculated and the requirements for agricultural land for each additional person given, the 1975 areas of cultivated land in each region were increased

as required to accommodate population increase up to the maximum percentage of each eco-zone in each region available for crops (80 percent of the net available land or 70 percent in very hilly districts as discussed above). In this way, total cultivated area was calculated as the 1975 total plus the increments to 1990. 1990 crop residues were arrived at by assuming the same ratio to total cultivated land as in 1975. In projecting fodder production the population growth factor to 1990 was used.

In cases where net available land in the region was less than the area indicated by the projected population, the excess (i.e. the food deficit) was transferred to the Rift B (large scale farming) and Southern Regions. Land required to produce food for the increase in urban populations was also sought in these regions. The net increment transferred to Rift B was in fact larger than could be accommodated by Zone II and III in Rift B. Zone IV was not considered appropriate so the excess which could not be found in Rift B was transferred to the Southern Region.

The projected population of the Northern Region does not increase between 1975 and 1990 owing to the livestock population constraints and the close dependence of human population on livestock numbers. We assume that the natural population increase will migrate to other regions and adjusted our projections accordingly.

As noted above, the livestock populations, in L.u.s, for 1975, shown in the next to last column of Table III- 3 are based on our own estimates of actual population in 1975. For the 1990 projections, we have simply retained the 1975 ratio of livestock population to carrying capacity as appears to have existed in 1975. This is in accordance with the purpose of Table III- 3 which, as discussed in the body of Chapter III, is to provide a projection of supply based on existing production technology and project land availability. These are our basic projections, to which we add or subtract on the basis of the supply impact of present or recommended policies.

In equation terms, livestock population by region in 1990 would be :

$$1990 \text{ Livestock units} = 1990 \text{ stock carrying cap.} \times \left( \frac{1975 \text{ l.u.}}{1975 \text{ s.c.c.}} \right)$$

##### 5. Meat Output

1975 figures for Cattle and Sheep and Goat meat output are taken from Annex Table III-1.8 & 10. In calculating 1990 projections, total meat output per livestock unit recorded (1975) was calculated for each region and assumed to be constant to 1990. Total meat output (1990) was thus calculated as this constant per region multiplied by the regional 1990 livestock unit projections. The ratio between Cattle and Sheep and Goats for each region respectively was taken as the same as that existing in 1975.

NET AVAILABLE AREAS IN K.A. BY ECOZONES AND DISTRICTS

		E C O Z O N E S						
		I	II	III	IV	V	VI	Total
<b>Malindi</b>								
Gross (a)	-	296,000	56,000	-	-	-	-	352,000
Forest (b)	-	26,833	10,788	-	-	-	-	37,621
Parks (c)	-	200	-	-	-	-	-	200
Service (d)	-	19,000	3,500	-	-	-	-	22,500
Net (e)	-	248,367	41,712	-	-	-	-	290,079
<b>Bungoma</b>								
Gross	6,000	68,000	213,000	-	-	-	-	307,000
Forest	-	23,784	23,784	-	-	-	-	47,568
Parks	-	-	-	-	-	-	-	-
Service	-	2,500	7,400	-	-	-	-	9,900
Net	6,000	61,716	181,816	-	-	-	-	249,532
<b>Busia</b>								
Gross	-	122,000	41,000	-	-	-	-	163,000
Forest	-	-	-	-	-	-	-	-
Parks	-	-	-	-	-	-	-	-
Service	-	4,600	1,200	-	-	-	-	5,800
Net	-	117,400	39,800	-	-	-	-	157,200
<b>Total</b>								
Net	6,000	427,483	263,328	-	-	-	-	696,811

(a) Gross area by Ecozone and District are planimeter measured areas from the ecological zone map by Pratt, Greenway and Gwynne, revised by Gwynne of the Kenya Rangeland Ecological Monitoring Unit.

(b) Forest areas (gazetted and ungazetted) were obtained from the Forest Department and allotted to Ecozones by superimposing an overlay of the Ecozone map.

(c) Parks areas were obtained from the Conservation Unit of the Parks Department. Does not include Reserves.

(d) An estimate of .15 hectares per holding was obtained in consultation with Central Bureau of Statistics. This figure was multiplied by 1975 estimated population and divided by 6.1 people/holding. It represents an allowance for non agricultural uses of land on small holdings, rural roads and paths.

Net = Gross - I(b+c+d) above.

	I	II	III	IV	V	VI	VII
<b>Uasin</b>							
Gross	19,000	235,000	58,000	15,000	-	-	307,000
Forest	-	95,535	1,459	-	-	-	96,994
Parks	19,000	17,922	-	-	-	-	36,922
Service	-	8,700	1,600	400	-	-	10,700
Net	ϕ	112,843	54,941	15,400	-	-	183,384
<b>Muranga</b>							
Gross	-	155,000	90,000	3,000	-	-	248,000
Forest	-	747	-	-	-	-	747
Parks	-	3,750	-	-	-	-	3,750
Service	-	9,000	4,000	400	-	-	13,400
Net	-	141,503	86,000	2,600	-	-	230,103
<b>Kirinyaga</b>							
Gross	7,000	71,000	59,000	7,000	-	-	144,000
Forest	-	18,071	12,744	-	-	-	30,815
Parks	7,000	721	-	-	-	-	7,721
Service	-	3,500	3,000	100	-	-	6,600
Net	ϕ	48,708	43,256	6,900	-	-	98,864
<b>Kianbu</b>							
Gross	-	161,000	59,000	23,000	2,000	-	245,000
Forest	-	43,388	-	-	-	-	43,388
Parks	-	-	-	-	-	-	-
Service	-	8,000	4,000	1,800	-	-	13,800
Net	-	109,612	55,000	21,200	2,000	-	187,812
<b>Nyandarua</b>							
Gross	43,000	288,000	22,000	-	-	-	353,000
Forest	-	70,882	-	-	-	-	70,882
Parks	43,000	6,250	-	-	-	-	49,250
Service	-	4,000	1,100	-	-	-	5,100
Net	ϕ	206,868	20,900	-	-	-	227,768
<b>Total</b>							
Net		619,534	260,097	46,300	2,000	-	927,931
<b>NYANZA PROVINCE</b>							
<b>Homa Bay</b>							
Gross	-	8,000	563,000	-	-	-	571,000
Forest	-	6,014	12,140	-	-	-	18,154
Parks	-	-	-	-	-	-	-
Service	-	200	18,300	-	-	-	18,500
Net	-	1,786	532,560	-	-	-	534,346
<b>Nisii</b>							
Gross	-	102,000	118,000	-	-	-	220,000
Forest	-	-	-	-	-	-	-
Parks	-	-	-	-	-	-	-
Service	-	8,000	10,000	-	-	-	18,000
Net	-	94,000	107,000	-	-	-	201,000

	-	15,000	192,000	-	-	-	207,000
Forest	-	-	2,121	-	-	-	2,121
Parks	-	-	-	-	-	-	-
Service	-	1,400	9,000	-	-	-	10,400
Net	-	14,600	199,879	-	-	-	214,479
<b>Siaya</b>							
Gross	-	94,000	158,000	-	-	-	252,000
Forest	-	-	941	-	-	-	941
Parks	-	-	-	-	-	-	-
Service	-	3,800	7,000	-	-	-	10,800
Net	-	90,200	159,059	-	-	-	249,259
<b>Total</b>							
Net	-	200,586	970,698	-	-	-	1,171,284
<b>COAST PROVINCE</b>							
<b> Kilifi</b>							
Gross	-	163,000	565,000	242,000	271,000	-	1,241,000
Forest	-	41,764	11,267	-	-	-	53,031
Parks	-	-	-	-	-	-	-
Service	-	4,000	4,800	-	-	-	8,800
Net	-	117,236	548,933	242,000	271,000	-	1,179,169
<b> Kwale</b>							
Gross	-	125,000	218,000	370,000	113,000	-	826,000
Forest	-	24,160	16,107	-	-	-	40,267
Parks	-	-	-	-	-	-	-
Service	-	3,100	3,000	-	-	-	6,100
Net	-	97,740	198,893	370,000	113,000	-	779,633
<b> Lamu</b>							
Gross	-	121,000	279,000	228,000	23,000	-	651,000
Forest	-	13,236	13,236	27,983	-	-	54,455
Parks	-	-	-	-	-	-	-
Service	-	200	-	-	-	-	200
Net	-	107,564	265,764	200,017	23,000	-	596,345
<b> Taita</b>							
Gross	-	38,000	7,000	103,000	1,548,000	-	1,696,000
Forest	-	2,825	-	2,825	5,852	-	11,502
Parks	-	-	-	-	861,500	-	861,500
Service	-	400	-	-	-	-	400
Net	-	34,775	7,000	100,175	680,648	-	822,598
<b> Tana River</b>							
Gross	-	320,000	104,000	139,000	3,593,000	-	4,156,000
Forests	-	-	-	-	-	-	-
Parks	-	-	-	-	587,350	-	587,350
Service	-	-	-	-	-	-	-
Net	-	320,000	104,000	139,000	3,005,650	-	3,678,650
<b>Total</b>							
Net	-	750,315	1,124,590	1,041,182	1,000,298	-	3,916,385

	I	II	III	IV	V	VI	VII
<b>Gross</b>	-	44,000	192,000	422,000	780,000	-	1418,000
<b>Forest</b>	-	-	7,945	7,945	5,850	-	21,740
<b>Parks</b>	-	-	1,643	-	-	-	1,643
<b>Service</b>	-	8,000	2,500	5,000	5,000	-	20,500
<b>Net</b>	-	36,000	179,713	409,055	749,150	-	1373,918
<b>Kitui</b>							
<b>Gross</b>	-	-	96,000	161,000	2859,000	-	3116,000
<b>Forest</b>	-	-	4,137	5,715	27,105	-	36,957
<b>Parks</b>	-	-	-	-	632,350	-	632,350
<b>Service</b>	-	-	5,600	3,500	1,000	-	10,100
<b>Net</b>	-	-	86,263	151,785	2198,545	-	2436,593
<b>Embu</b>							
<b>Gross</b>	2,000	39,000	44,000	27,000	159,000	-	271,000
<b>Forest</b>	-	31,924	2,104	-	1,004	-	35,032
<b>Parks</b>	2,000	1,082	-	-	-	-	3,182
<b>Service</b>	-	500	3,000	1,000	200	-	4,700
<b>Net</b>	ø	5,494	38,396	26,000	157,796	-	227,686
<b>Meru</b>							
<b>Gross</b>	15,000	263,000	95,000	81,000	538,000	-	992,000
<b>Forest</b>	-	115,580	4,655	18,621	4,655	-	143,511
<b>Parks</b>	15,000	32,453	-	-	87,044	-	134,497
<b>Service</b>	-	9,500	6,000	2,000	-	-	17,500
<b>Net</b>	ø	105,467	84,345	60,379	446,301	-	696,492
<b>Isiolo</b>							
<b>Gross</b>	-	-	-	-	1177,000	1384,000	2561,000
<b>Forest</b>	-	-	-	-	-	-	-
<b>Parks</b>	-	-	-	-	-	-	-
<b>Service</b>	-	-	-	-	-	-	-
<b>Net</b>	-	-	-	-	1177,000	1384,000	2561,000
<b>Marsabit</b>							
<b>Gross</b>	-	31,000	-	147,000	1723,000	5372,000	7273,000
<b>Forest</b>	-	22,865	-	27,958	10,187	-	61,010
<b>Parks</b>	-	-	-	-	-	-	-
<b>Service</b>	-	-	-	-	-	-	-
<b>Net</b>	-	8,135	-	119,042	1712,813	5372,000	7211,990
<b>Total</b>							
<b>Net</b>	ø	155,096	388,716	766,261	6441,605	6756,000	14507,673
<b>NORTH EASTERN PROVINCE</b>							
<b>Garissa</b>							
<b>Gross</b>	-	17,000	3,000	534,000	3595,000	244,000	4393,000
<b>Forest</b>	-	-	-	-	-	-	-
<b>Parks</b>	-	-	-	-	-	-	-
<b>Service</b>	-	500	2,000	534,000	3595,000	244,000	4393,000
<b>Net</b>	-	16,500	2,000	534,000	3595,000	244,000	4393,000

	I	II	III	IV	V	VI	VII
<b>Ngari</b>							
Gross	-	37,000	-	-	450,000	1003,000	1480,000
Forest	-	-	-	-	-	-	-
Parks	-	-	-	-	-	-	-
Services	-	500	-	-	-	-	500
Net	-	36,500	-	-	450,000	1003,000	1480,500
<b>Mandera</b>							
Gross	-	-	-	-	45,000	2602,000	2647,000
Forest	-	-	-	-	-	-	-
Parks	-	-	-	-	-	-	-
Services	-	-	-	-	-	-	-
Net	-	-	-	-	45,000	2602,000	2647,000
<b>Total</b>							
Net	-	53,000	3,000	534,000	8220,000	3879,000	12689,000
<b><u>RIFT VALLEY</u></b>							
<b><u>PROVINCE</u></b>							
<b>Narok</b>							
Gross	-	745,000	381,000	646,000	79,000	-	1851,000
Forest	-	75,456	-	-	-	-	75,456
Parks	-	-	-	-	-	-	-
Services	-	-	-	-	-	-	-
Net	-	669,544	381,000	646,000	79,000	-	1775,544
<b>Kajiado</b>							
Gross	-	21,000	21,000	744,000	1310,000	-	2096,000
Forest	-	1,241	-	-	-	-	1,241
Parks	-	-	-	-	39,206	-	39,206
Services	-	-	-	-	-	-	-
Net	-	19,759	21,000	744,000	1270,794	-	2055,553
<b>Nakuru</b>							
Gross	-	318,000	123,000	263,000	-	-	704,000
Forest	-	76,398	-	-	-	-	76,398
Parks	-	-	-	5,763	-	-	5,763
Services	-	4,000	2,000	600	-	-	6,600
Net	-	237,602	121,000	256,637	-	-	615,239
<b>Nandi</b>							
Gross	-	146,000	129,000	-	-	-	275,000
Forest	-	35,261	1,000	-	-	-	36,261
Parks	-	-	-	-	-	-	-
Service	-	4,000	2,200	-	-	-	6,600
Net	-	106,739	125,800	-	-	-	232,539
<b>Naricho</b>							
Gross	-	295,000	194,000	-	-	-	489,000
Forest	-	144,985	-	-	-	-	144,985
Parks	-	-	-	-	-	-	-
Service	-	8,900	5,000	-	-	-	13,900
Net	-	141,115	189,000	-	-	-	330,115



	I	II	III	IV	V	VI	VII
<b>Estimated</b>							
<b>Costs</b>	-	100,000	100,000	497,000	107,000	-	97,000
<b>Percent</b>	-	-	58,907	15,095	-	-	71,895
<b>Fixed</b>	-	-	-	-	-	-	-
<b>Service</b>	-	900	900	100	-	-	1,000
<b>Net</b>	-	187,100	120,893	481,805	107,000	-	886,790
<b>Total</b>							
<b>Net</b>	830	1849,652	1386,250	3384,341	7283,504	2286,432	18191,009
<b>National</b>							
<b>Net</b>	6,830	3695,056	4396,679	5782,094	26040,407	12921,432	52843,108

ANNEX II - 4

**CALCULATION OF IMPACT OF FMD OUTBREAK ON  
MEAT OUTPUT - 2,000 ANIMAL UNITS**

This annex reproduces in tabular form our calculations of the supply impact of a single outbreak of FMD. It is based on data given in the report by the Ministry of Agriculture, Economic Planning Unit (M. Constable) entitled Draft Evaluation of the Proposed Phase One Extension of the Foot and Mouth Disease Control Program, 1970.

The supply impact is carried out over three years, including the year of the outbreak, and is calculated to result in a minimal 10 percent reduction in meat supplies over the period.

The basic effects of FMD, on which the calculations were based, are as follows :

- Twenty percent of all pregnant cows abort. We estimate that 60 percent of all cows are pregnant during the outbreak.
- Five percent of all cows are made sterile. We assume that these are culled.
- Ten percent of cows have their calving interval increased from 19 months to 22 months, i.e. a 16% reduction in the number of calves from 10 percent of the cows not in calf at the time of the outbreak.
- Three percent of calves die from FMD. We then estimate the calf mortality rate rises from 30 percent to 33 percent.
- All cattle in the herd which are slaughtered in the year of the disease suffer a weight loss of approximately 26 kg liveweight.

The table shows the following :

Total 3 year output :	63,338 kg.
Average for one year :	21,112 kg.
Normal output :	23,469 kg.
Loss in one year	2,357 kg. = 10%

Comparison of Meat Output (a) Assumed to be 100% of Live Weight  
 1,000 Head Year

	Situation before the disease				Situation in Year of Disease			
	Rate	Number	Yield of Meat (kg) kg/head	Total Meat's Output	Rate	Number	Yield of Meat (kg) kg/head	Total Meat's Output
<b>Females</b>								
Calves % of cows	36.7	(279)			29.3	(223)		
Mortality % of calves	30	-84	-		33	-74	-	
Calves < 1 yr		195				149		
Mortality	12	-23	-		12	-18	-	
Heifers 1-2 yr		172				172		
Mortality	12	-21	28	588	12	-21	23	483
Heifers 2-3 yr		151				151		
Mortality		- 5	42	210	3.3	- 5	37	185
Offtake		-17	84	1,512		-	74	-
Enter Cow herd		+129				+146		
Cow mortality	12	-91	58	5,278	12	-91	50	4,550
Cow offtake	5	-38	115	4,370	(c)	-30	100	3,000
Cows sterile						-25	100	2,500
Cow herd (static)		760				760		
<b>Total Females</b>		<b>1,278</b>						
<b>Males</b>								
Calves % of cows	33.3	(253)			26.7	(203)		
Mortality % of calves	30	-76	-		33	-67	-	
Offtake % of calves	8	-20	18	360		-	-	
Calves < 1 yr		157				136		
Mortality	12	-19	-		12	-16	-	
Males 1-2 yr		138				138		
Mortality	12	-17	28	476	12	-17	23	391
Offtake	6	- 8	56	448	6	- 8	46	368
Males 2-3 yr		113				113		
Mortality	12	-14	42	588	12	-14	37	518
Offtake	20	-22	84	1,848	20	-22	74	1,628
Males enter								
Adult group		+77				+77		
Adult Mortality	10	-31	51	1,581	10	-31	46	1,426
Adult Offtake		-46	135	6,610		-46	125	5,750
Males in								
Adult group		314				314		
<b>Total herd</b>		<b>2,000</b>		<b>23,464</b>		<b>2,000</b>		<b>20,794</b>

(a) It is assumed that only half the meat from mortalities is used.  
 (b) F&D causes loss of 8 months liveweight gain = 243 days x 1 kg/day = 243 kg = 10.4 kg CDW.  
 (c) Cow offtake reduced to maintain cow herd and raised in following year.

	1954-55				1955-56			
	%	Number	Head of Cows (a) 12/Year	Total Head	%	Number	Head of Cows (a) 12/Year	Total Head
<b>Females</b>								
Calves % of cows	36.7	(279)			36.7	(279)		
Mortality % of calves	30	-64	-		30	-64	-	
Calves < 1 yr Mortality	12	195 -23	-		12	195 -23	-	
Heifers 1-2 yr Mortality	12	131 -16	28	448	12	172 -21	28	588
Heifers 2-3 yr Mortality	3.3	151 -5	42	210		115 -4	42	168
Offtake		-				-		
Enter Cow herd		+146				+111		
Cow mortality	12	-91	58	5,278		-91	58	5,278
Cow offtake		-42	115	4,830		-20	115	2,300
Cows sterile		-13	115	1,495		-		
Cow herd (static)		760				760		
<b>Males</b>								
Calves % of cows	33.3	(253)			33.3	(253)		
Mortality % of calves	30	-76	-		30	-76	-	
Offtake % of calves	8	-20	18	360	8	-20	18	360
Calves < 1 yr Mortality	12	157 -19	-			157 -19	-	
Males 1-2 yr Mortality	12	120 -14	28	392		138 -17	28	476
Offtake		-				-8	55	448
Males 2-3 yr Mortality		113 -14	42	588		106 -13	42	546
Offtake		-22	84	1,848		-16	84	1,344
Males enter Adult group		+77				+77		
Adult Mortality		-31	51	1,581		-31	51	1,581
Adult Offtake		-46	135	6,210		-46	135	6,210
Males in Adult group		314				314		
<b>Total herd</b>		<b>1,941</b>		<b>23,240</b>		<b>2,034</b>		<b>19,299</b>

(a) It is assumed that only half the meat from north sexes is used.

## SUMMARY OF RESEARCH PROGRAM RELATED TO LIVESTOCK

A. Government Research Programs1. Ministry of Agriculture (MoA)

MoA research is coordinated by the Scientific Research Division who have 23 research stations in the country. Those with livestock related programs are listed below together with a summary of their principal research activities.

a. National Agricultural Research Station - Kitale

- Pasture and fodder evaluation for dairy and beef cattle.

b. Katumani Agricultural Research Station - Machakos

- A sheep flock and Zebu cattle herd is maintained there. However their cross breeding program is now inactive.

c. Nyandarua Agricultural Research Station - Ol Joro Orok

- A field station for the UNDP/FAO Sheep and Goat Development Project.
- Cross breeding between native and Corriedale sheep.

d. Grassland Research Station - Molo

- Pasture evaluation using Hampshire Down and Romney sheep.
- A field station for the UNDP/FAO Sheep and Goat Development Project.

e. National Animal Husbandry Research Station - Naivasha

- The main center for animal research and the headquarters for the UNDP/FAO Sheep and Goat Development Project.
- A cross breeding program involving Simmental, Sahiwal, Boran, Freisan.
- A behavioral study of Boran and Sahiwal suckling pure and cross bred calves.
- Progeny testing for A.I. purposes and stud sales of Sahiwal to individual and private ranches. Progeny testing done by the Livestock Recording Center.

**f. East Research Station - Laikipia**

- Feed trials for feedlot operations.
- Limited breeding work concerning feedlot operations.

**g. Kiboko Range Research Station - Makindu**

- Past research has concentrated in four areas namely ecology, wildlife, cattle, sheep and goats.
- Ecology research includes investigation of range grasses, grass clipping, conversion of bush to grass.
- Wildlife research on zebra and eland diets.
- Cattle research on rotational breeding and the effect of livestock on range environment.
- Sheep and Goat research on disease control and production improvement measures.

**h. Buchuma Range Research Station - Mackinnon Road**

- Research activities are seriously affected by persistent drought conditions and the land area available.
- Work has been done in the following subject areas - ecology and grazing management, sheep and goats, cattle.
- Specific research has included changes in vegetation following selective bush control, effect of cattle/goat grazing and burning on mixed woodland vegetation, Dorper and Blackhead Persian sheep under range conditions, goat cross breeding, and meat production potentials, rotational breeding effects on rate of gain of indigenous cattle, optimal time for disposal of range produced steers.

**i. Animal Husbandry Research Station - Mariakani**

- The dairy research here will soon be supplemented by a poultry program.

**j. Livestock Recording Center - Naivasha**

## **2. Ministry of Tourism and Wildlife (MTW)**

Although not directly concerned with livestock, the MTW is vitally interested in grazing conditions especially in National Parks and on game migration routes.

The Kenya Rangeland Ecological Monitoring Unit (KREMU) seeks to provide broad scale ecological data on which to base range management plans. Specifically it is interested in changes in animal distribution with season and changes in primary production with rainfall. The project began in 1976.

## **B. East African Community (EAC)**

### **1. The East African Agricultural and Forestry Research Organisation (EAAFRO)**

This is funded by the EAC with its headquarters at Muguga, north of Nairobi. Their Animal Production division, which does research relevant to this study, is staffed by eight research officers. Staffing is made difficult by low salary scales, the demand for Tanzanian and Ugandan researchers in their own countries, and the current political climate within the EAC.

Current research is entirely associated with Boran and Zebu in marginal areas. Activities fall into three areas of investigation - plant introduction, silage production and evaluation of existing vegetation.

- Plant introduction - the division has a 1600 hectare station at Athi River (Ecozone 4) where 30 to 40 varieties of grasses and legumes for reseedling and oversowing are being evaluated.
- Silage production - in cooperation with the Beef Research Station at Lanet, crop husbandry trials are being undertaken on various crops to determine their suitability for silage production in Ecozone 4.
- Evaluation of existing vegetation - using cutting experiments, researchers are attempting to develop a predictive model to relate rainfall regime, grass and soil type to the probability of forage production and the resultant effect on breeding and meat production.

### **2. The East African Veterinary Research Organisation (EAVRO)**

This is also funded by the EAC and has its headquarters at Muguga together with EAAFRO.

## **C. International Organisations**

### **1. The International Center for Insect Physiology and Ecology (ICIPE)**

This organisation concentrates (as its name says) on the physiological and ecological aspects of insect life and the implications this reveals for insect control. In this respect their research may be thought of as innovative as opposed to directly productive. Of direct concern to the meat industry is their research into tsetse fly and tick -- both very important livestock disease vectors.

### **2. The International Laboratory for Research on Animal Diseases (ILRAD)**

ILRAD is supported by the Consultant Group on International Agricultural Research, a consortium of donor countries and agencies. ILRAD's emphasis is on trypanosomiasis and theileriosis (East Coast Fever). The center is scheduled to be at full operating strength by mid 1978 although the research program on both diseases has started.

### **3. The International Development Research Center (IDRC)**

This is a Canadian Government sponsored research organisation based in Ottawa which seeks to support research by indigenous scientists into local problems. In Kenya they are supporting trypanosomiasis and East Coast Fever investigations and the EAC (see Section B). At the Commonwealth Institute of Biological Control in Curepe, Trinidad, a related program in tsetse fly control is being assisted and is coordinated with efforts in Kenya.

## **D. Organisation for African Unity (OAU)**

The Interafrican Bureau for Animal Diseases performs a coordinating function among member states in information distribution. At the request of members it also helps to identify projects and to find suitable funding agencies. Currently it is involved with three projects in various states, including a survey of food and feed for beef, distribution of disease resistant animals and rangelands development on border areas.

**CHAPTER IV**

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**PROCESSING**

## CHAPTER IV

### PROCESSING

Although the Terms of Reference for this study indicated that several subjects should be discussed under this heading, we are limiting it to a discussion of slaughter facilities and our recommendations on the subject. Material on KMC has been included in Chapter V on marketing, and material on stock routes and other matters has been included in Chapter III, since it is required there to make an input into our supply projections.

This Chapter, then, has two sections. Section A is a description of the present situation and existing slaughter facilities, prepared by the study team's Abattoir Specialist and Section B provides our recommendations about expansion and new facilities.

#### A. Present Situation

##### 1. Capacity

##### a. Modern Slaughterhouses

There are three modern slaughterhouses in Kenya. Two are owned and operated by the Kenya Meat Commission (KMC), one at Athi River near Nairobi, and the other at Mombasa. The third, currently under construction by a private group and called Halal Meat Products, is expected to open in April 1977.

Based on observation and discussions with appropriate managers, the daily (eight-nine hour) capacity of these plants is as follows :

	<u>Cattle</u>	<u>Smallstock</u>
KMC Athi River	700 head <sup>1.</sup>	1,000 head
KMC Mombasa	400 " <sup>2.</sup>	240 "
Halal	300 "	180 "
	<hr/> 1,400 " <hr/>	<hr/> 1,420 " <hr/>

1. Management at Athi River uses this figure, based on approximately 75 head per hour, nine hours. The Study Team slaughterhouse specialist feels the design capacity of the plant is 1,000 head per eight hour day, or 125 head per hour. To be conservative, the 700 head per day figure is used.
2. The figure of 400 head per day is based on a line capacity of 50 head per hour. However, at Mombasa itself there is cooling capacity for only 300 head per day, which means that most statements of Mombasa capacity show 300 per day rather than 400. There is additional cooling capacity available for Mombasa use at Nakuru, five hours away. This justifies the statement, in our view, that the total daily capacity at Mombasa is 400 head.

Using a year of 260 days, and retaining the approximately eight hour, single shift day, the total annual capacity of these three plants comes to the following :

	<u>Cattle</u>	<u>Smallstock</u>
KMC Athi River	182,000	260,000
KMC Mombasa	104,000	62,400
Halal	<u>78,000</u>	<u>46,800</u>
	<u>364,000</u>	<u>369,200</u>

There is, of course, no reason to limit production to only eight-nine hours per day. In rush periods, as during the recent drought, Athi River works overtime and recently produced at the rate of 1,200 head of cattle per day. If justified, a second shift could be added at Athi River, since cooling capacity is adequate for considerably more than 1,200 per day; we estimate over 2,800, although using this much clearly requires good management. Halal and Mombasa cannot easily go into extensive overtime or two shifts because of current cooling room capacity limitations. But adding a second shift to Athi River would bring the theoretical capacity of the modern sector to 2,100 head a day or 546,000 per year if the plants were fully utilized the year round.

#### b. Local Slaughterhouses

As far as we have been able to determine, there are no comprehensive data available on the number of local slaughterhouses or their capacity. The Department of Veterinary Services has in the past been concerned only with the KMC plants (and Uplands Bacon Factory), but in 1974 the Department was assigned responsibility for all plants in Kenya. To date, the Department has actually taken over responsibility only for plants in some of the major centers, such as Nairobi, Mombasa, Nakuru, Eldoret, Kisumu, Kitale, Thika and Nyeri. Take over of all the rest was scheduled for January 1977. This means the Department has records of only a few of the local slaughterhouses and a review of those records suggests that they are incomplete.<sup>1</sup>

1. For example, the 1975 Annual Report of the Department of Veterinary Services, Coast Province, which of course includes Mombasa, reports on inspections at only two local abattoirs ("slaughter slabs"), Mariakani and Vipingo. The report notes the presence of other "illegal" slabs sending meat into Mombasa. As a matter of interest, reported 1975 throughput is Mariakani 3,560 cattle (5 condemned), 2,905 smallstock (8 condemned); Vipingo 2,980 cattle (2 condemned) and 1,855 smallstock (2 condemned). This compares with KMC Mombasa in the same report, cattle 25,695 (486.5 condemned) and 1,478 smallstock (27 condemned). The condemnation rate is much higher at KMC. However, KMC is less selective or the inspection is more thorough. The main point, however, is that the Department's coverage and reporting on local slaughterhouses is incomplete.

Other central agencies of the Government do not appear to have complete records on local slaughterhouses either, which is not surprising considering their small size, low investment and overall type of operation. A conventional figure for the number of such slaughterhouses is 200 with a "capacity" of 500,000 head per year, for an average of 25 per day. This figure appears high. However, we do not consider the matter important because of the flexibility of these slaughterhouses to expand or contract "capacity" and the ease of entry or withdrawal from the business. In other words, they can be expected to be able to handle any number of animals available.

There is also considerable farm slaughter in Kenya. The "Daly Report" estimated that 40 percent of total slaughter was on-farm, based on discussions with Ministry of Agriculture personnel. We found no one to dispute the estimate.

## 2. Description of Facilities-Modern

### a. KMC Athi River

The plant at Athi River was visited by the Slaughterhouse Specialist on several occasions. He found the plant to be generally quite satisfactory. The slaughter floor equipment is modern and up-to-date. The floor layout is compact and efficient. A powered conveyor chain pushes the carcasses, hanging on trolleys, spaced at regular intervals, past the various dressing stations, where air powered, mechanical skinning knives are in extensive use. The conveyor passes over a moving top Viscera Inspection Table where the carcasses are eviscerated.

Hides, Inedible Byproducts, Edible Offal and Heads are dropped to the floors below for processing and work-up. Up-to-date equipment for "fresh" cleaning of casings is installed. Production efficiency at the time observed was 70 cattle per hour with 88 workers on the slaughter floor. Chill rooms in use include five new rooms with a capacity of 337 cattle each, 4 rebuilt rooms with a capacity of 160 cattle each and 3 rooms to be rebuilt with a capacity of 160 cattle each for a total of 2,805. The freezer has a capacity of 100 m.t. and the holding freezer a capacity of 1,000 m.t.

The Canning Department has a capacity of 72,000 12 oz cans per 8½ hour day, the bulk of which are packed for export. Up-to-date manufacturing equipment is monitored by a quality control technician. Volumetric can fillers are used with constant check weighing for 'over and under' weight. A check and record of the can seal is made every 15 minutes. Modern equipment was in use for concentrating Meat Extract.

Operations were, by observation, very orderly and efficient, except for the slaughtering and boning departments. The operators appeared to know their job well and to coordinate their work with that of other workers in the department. This was true, not only in the Canning Department,

but in the Offal Work up, Offal Packing and Strapping, Casings cleaning, and Byproduct sections. The smooth operation and high degree of efficiency of these departments was a credit to the production and supervisory staff.

**b. KMC Mombasa**

As noted above, the KMC plant at Mombasa has a maximum slaughter capacity of 400 head of cattle per 8 hour day and 240 head of smallstock per 8 hour day. (This smallstock capacity could be increased to 320 per 8 hour day with the installation of a double hook conveyor chain at an approximate cost of Ksh 90,000.)

Cattle are received by truck and by ship. A lead-in chute extends from the unloading ramp at the end of the jetty to the livestock holding pens. The lead-in chute to the stunning pen is equipped with water sprays for washing the cattle and with a foot bath.

A powered chain conveys the cattle past the dressing stations and over the moving top Viscera Inspection Table for evisceration. Heads, Edible Offal, Hides and Inedible Byproducts are dropped to the floors below for work-up and processing. Casings are not saved but are sold locally.

Production efficiency was observed to be very good; 21 men on the line were slaughtering and dressing 50 cattle per hour for a 'line' production efficiency of 1.9 cattle per hour. This is above the average 1.7 cattle per hour in line efficiency of 25 U.S.A. plants studied.<sup>1</sup> A total of 41 workers were employed in combined 'line' and 'support' (head trimming, offal and viscera work-up) operations for a line and support efficiency of 1.2 cattle per man per hour.

Chilled carcasses were boned, or more properly, the meat was stripped from the skeleton (hanging on trolleys rolling on an overhead gravity rail) and dropped into a trough below. Production efficiency, with a total of 21 men boning 50 cattle per hour, was 2.38 cattle per man per hour, which is very high but explained by the fact that the operation is carried out only to provide meat for the canning operation at Athi River, so it is a very simple operation. The meat is hung by plastic straps, suspended on trolleys and transported to the cold storage at Makupa for transshipment to Athi River.

Two chill rooms are installed with a capacity of 150 cattle each. The cold storage plant at Makupa has a capacity in 11 rooms of 10 m.t. freezing or 25 m.t. storage per room.

A high degree of efficiency was observed in all departments: Slaughtering, Head and Offal work-up, Boning, Byproducts, Hide take-up. The plant at Mombasa would compare

favorably with the better plants of comparable size in the U.S.A.

### c. Halal

The new Halal Meat Products plant being constructed at Ngong will have a slaughter capacity of 20 to 30 cattle per hour and 10 to 20 smallstock per hour, and a chill room capacity of 300 cattle. Freezers and Frozen Storage Rooms are also included. The plant is designed for Moslem ritual slaughter and to EEC standards except for the lack of a separate facility for the slaughter of suspect animals. It is expected that the plant will be in operation by April 1977.

Based on the plans and a view of the construction in progress, this plant would be a "show place" in any country in the world with its extensive use of tile on the walls throughout the operating departments, the room arrangement for efficient product flow and the installation of efficient, up-to-date processing equipment.

## 3. Description of Facilities-Local

### a. Typical Existing Plants

With the assistance and in the company of officials of the Department of Veterinary Services, visits were made to two local slaughterhouses in the Nairobi area. These were said to be typical of the local slaughterhouses in municipal areas which are now operating under the supervision of the Department of Veterinary Services. Both of the plants visited are involved with custom slaughter; one with a reported capacity of 35 head a day and the other with a reported capacity of 50 head a day. In discussing capacities in this way, it is important to realize that operators must pay the Department of Veterinary Services a fee per head slaughtered for the inspection service, and are also subject to taxes. There is an obvious incentive to understate capacity and actual throughput.

At the plants visited, cattle are stuck, bled and partially sided before being hoisted for performance of the final operations. Heads are inspected by the Department of Veterinary Services' lay inspector on the floor. Dressed sides and quarters are transferred to unrefrigerated rooms for immediate distribution to retail outlets. Condemned products are reportedly buried; none were observed. The only refrigeration installed is in a small, locked room in which "retained" product is held before being released for human consumption.

Distribution is by small "pick-up" trucks with a rust proof metal lined, superimposed, closed body. The delivery trucks are thoroughly cleaned and inspected by the plant lay veterinary inspector before being loaded. The Viscera, Hoofs and Feet are picked up by local residents for local consumption.

Department of Veterinary Services inspection of the carcasses and offal appeared to be thorough and complete, at least during the visit. However, the facilities would not meet even the most lax of sanitary standards.

In spite of the rather poor conditions observed, the construction of new abattoirs is apparently under the control of the Ministry of Agriculture through the Veterinary Department. An "Application for Approval to Construct an Abattoir under the Meat Control Act" must be submitted to the head of the Veterinary Department along with a letter of approval to the project from the local authority.

The Application for Approval to Construct gives complete information about the proposed project: location; number and species of animals to be slaughtered and the source of supply; amount and availability of potable water to be used; financial structure of the project.

This procedure may result in some improvement in the local abattoirs even without the planned new municipal abattoirs discussed below.

#### b. Planned New Plants

We understand that there are extensive plans for a system of more sophisticated municipal slaughterhouses for the larger centers throughout the Country. The intention is to have some 50 plants each with a capacity of 40 to 50 cattle per day. These plants will presumably replace many of the existing local slaughterhouses of the type described above, a process which, according to the Department of Veterinary Services officials, will be assisted by stronger efforts to require the local slaughterhouses to conform to more stringent sanitary requirements. It is estimated that the new plants will be installed over the next 10 years.

According to plan, these plants will have proper and adequate stunning, landing and bleeding areas. Floors and walls will be faced with impervious materials, hot water will be supplied for cleanup as well as for hand wash, lavatories and knife and saw sterilizers.

We believe that these municipal plants will serve a needed function in the livestock economy of Kenya. The producer will receive payment without delay; the time between actual slaughter and delivery to the retailer (or pick up by the producers) will be minimal (less than one day); almost all of the animal will be used for human consumption; and the municipal slaughtering plant will be conveniently located for the small producer.

#### B. Recommendations

In view of the existing capacity of the modern plants compared with the apparent requirements, and the plans for municipal slaughterhouses, we do not recommend the construction of any new large scale slaughterhouses.

**the further expansion of the existing slaughterhouses, at this time. The reasons are :**

- **The present single shift capacity of the modern plants (including Halal) of 1,400 head of cattle per day or 364,000 per year, is already in excess of apparent requirements for modern slaughter. KMC's highest annual slaughter since 1971 was about 210,000 head and the 1975 figure was about 134,000. Even with the various improvements proposed elsewhere in this report, and by many others, there is unlikely to be a strain on this capacity for some time to come.**
- **While it is true that seasonal requirements, in the dry weather, can sharply increase the short term capacity requirements, much can be done with overtime (as KMC demonstrated in the autumn of 1976) and even more with two shifts at Athi River. Although it might be theoretically possible to run two shifts at 1,000 head per day each at Athi River, we feel the practical limit is 750 per shift and the ideal figure would be two shifts of 600 each. This would permit expanded operations with practically no increase in staffing.**
- **Should it develop that additional capacity is required, we imagine that it will be in Coast Province as a result of ranch and feedlot development and improved transport from the North East. The Mombasa Plant should then be expanded, probably by adding additional chill room space, blast freezing facilities, and facilities for expanding slaughter of smallstock as well as cattle. It would probably be desirable to add a canning line as well.<sup>1</sup> We estimate that 48 months lead time is necessary for a major expansion or a**

1. **We understand that, as a result of a visit by a leading Arab financier in December 1976, the KMC is seriously considering the addition of a canning line in Mombasa which would cost \$5 million. KMC is making its own feasibility study. Frankly, we believe this is premature and not justified on the basis of (1) the condition and present utilization of the canning line at Athi River, and (2) the current demand for canned corned beef. Even a project built with a soft Arab loan costs money.**

new plant : 20 months for planning and engineering, four months for submission and acceptance of offers and 24 months for construction. We do not believe that availabilities will increase so rapidly that 48 months lead time will be a problem.

- Should further capacity be required eventually, consideration might be given to a new plant at a location such as Archer's Post. The primary purpose would be for processing smallstock produced in the North East, but the plant might also have 40 head per hour gravity rail system for slaughtering cattle in drought periods.

**CHAPTER V**

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**MARKETING**

## CHAPTER V

### MARKETING

This chapter provides our analysis and recommendations on domestic and export marketing of meat. It is, of course, tied in with material in other chapters of the report, such as demand (Chapter II), price policy (Chapter III) and KMC's operations and management (Chapter VI).

There are three sections to Chapter V : A - Export Market - Domestic Market Trade Offs, B - Domestic Marketing and C - Export Marketing.

#### A. Export Market-Domestic Market Trade Offs

Under current supply and demand conditions, the export of meat performs two very useful functions, in addition to providing Kenya with much needed foreign exchange. Export of canned corned beef provides an important outlet for commercial grade beef which might be difficult to dispose of on the local market, as well as fat and trim from higher quality carcasses. Export of chilled and frozen meat provides an outlet, normally at very favorable prices, for high quality carcasses which may be in excess of local market demand. Of course, in the past year or two, with export prices depressed and local production costs increasing, export of high quality meat has been less profitable.

Taking all the costs, including indirect costs such as those involving the selectivity of some export markets, which leaves KMC with large numbers of forequarters or other parts which are difficult to dispose of locally, export has been taking place at a loss.

In the short term, that is the next few years, we believe that export beef prices will recover and that KMC will be able to export at a profit again. If the recommendations designed to improve export marketing in subsequent sections of this chapter are adopted, this should enhance the potential level of exports and their profitability, as will the recommended export rebate. During this period, exports should continue at a relatively high level and continue to clear the market of surpluses in specific grades, and earn valuable foreign exchange.

Within a few years, however, it appears that domestic meat demand will overtake supply, especially of beef. Our projections indicate this, as do projections of other authorities. When that happens, any exports will be at the expense of a reduction, or a further reduction, in

per capita meat consumption in Kenya. The question then is whether the Government should make a special effort to continue exports under these conditions.

We believe that the Government should do so. However, we would recommend, as we do in more detail in section C below, that under these conditions, it is very important for exports to earn the maximum possible return per ton. This means export of high quality sides or cuts to special high quality markets, and canned corned beef to markets which pay the highest possible price.

Exports have an impact on domestic prices under these conditions. In fact, any change in the level of exports will affect domestic prices, which is part of the domestic market-export market trade off. We have made a calculation to illustrate the trade off. We have assumed an increase in exports in 1980 by 11,000 tons of meat. Applying projected consumption figures, population, income, urban and rural demand and other factors, and assuming our recommended retail price increase of 20 percent in real terms, we calculate that such an increase in exports would mean an 8.5 percent decrease in domestic supply and a six percent increase in real domestic prices.

Should Kenya be in a position of no export surplus at current prices, an export program which resulted in an export of 11,000 tons would have a similar effect. Of course, any changes in the conditions or assumptions would change the price effect, but prices would certainly go up.

## B. Domestic Marketing

Domestic marketing of meat in Kenya is handled at the wholesale level by the KMC and by private slaughterhouses, and by a wide range of retailers at the retail level. The KMC supplies a relatively small proportion of the total local demand and is widely considered to be uncompetitive with the local slaughterhouses. In the first sub-section below, we examine KMC competitive position vis-a-vis the private plants and find that, under present conditions in Kenya, and in the KMC, KMC is very uncompetitive indeed. The second major sub-section below deals with several special KMC issues such as health standards, grading practices and custom slaughter.

### 1. Competitive Ability to Attract Livestock

#### a. General Comparison

A review of KMC's present methods suggest strongly that KMC is not very competitive with the local slaughterhouses in purchase of livestock. The main points follow :

- KMC purchases livestock on a CDW basis and generally pays the minimum prices fixed by the Government. Higher prices are paid for high grade cattle purchased from feedlot operators. Exceptions are also made on rare occasions when high grade cattle are required for export orders. However, almost 98 percent of the purchases are on CDW basis at minimum prices.

Private slaughterers do not operate on a fixed price policy. They buy liveweight cattle at market prices, which are ever changing.

- KMC has a very unaggressive policy on procuring livestock in the numbers and quality required, at different times. Except for high grades which are purchased from established commercial ranchers, receipts of cattle are not planned. More than 75 percent of the cattle are purchased from pastoralists who bring in cattle at their convenience and KMC accepts whatever is brought in. KMC has, therefore, little or no control over its daily throughput. Very wide fluctuations have been recorded in KMC's daily throughput.

On the other hand, private slaughterers appear generally to be able to obtain the required number of cattle, at required times, and in required quality by their following an aggressive policy of going

out to the owners and purchasing selected livestock.

- KMC pays producers/owners after slaughter and grading. The payment is based on dressed weight, grade and veterinary report on whether the meat is passed for immediate consumption, or must be retained and processed further before it can be released for human consumption. A very small payment is made for meat found to be heavily infested with C. Bovis and has to be destroyed immediately.
- KMC sells to butchers and institutions at the highest selling prices fixed by the Government for each grade.

Private slaughterers, although price controlled, are not effectively controlled as their meat is not graded. Generally, private slaughterers are able to vary prices depending on market conditions.

The flexibility available to private slaughterers on buying and selling prices, coupled with immediate cash payment offered on live cattle to producers, puts them in an extremely advantageous position against KMC. Livestock is continuously diverted away from KMC and KMC is left to accept what is not attractive to the private operators.

#### b. Cost Comparison

The above points of comparison are rather general. It is also clear that KMC's operating costs are much higher than the private slaughterhouses. Since this is the case, the private slaughterhouse operator can afford to live on a narrower margin or differential between cost of animals and price of meat sold. Thus, he can pay higher prices. Of course, he must make a profit and KMC, being a parastatal organisation, does not have to make a profit. This can narrow the difference in what the two can afford to pay.

In order to analyse the basic competitive situation, we have compared the production costs of KMC and the private slaughterhouse. These are very different organisations, in size and nature of operations, so the comparison requires extensive adjustments in KMC accounts. We have assumed that KMC operates only on the domestic market and only sells carcasses, to make KMC comparable with the local slaughterhouse. KMC accounts have been adjusted to reflect this. We have taken 1975 throughput data and used late 1976 prices.

Schedule V-1 is a set of proforma accounts of KMC operations prepared by the Study accountant on these assumptions. It shows KMC operating on a gross margin of Sh 1.50 per kg. CDW, the difference between the weighted average purchase price of Sh 5.26 per kg. CDW and a sales price

of Sh 1.70. This Sh 1.50, plus a fifth quarter yield of Sh .86 per kg. CDW, or a total of Sh 2.36, is to cover operating costs and profit, if any.

Operating costs are calculated to be : variable, Sh .65, fixed costs including permanent staff, Sh 1.13 and head office expenses including interest Sh .64, for a total of Sh 2.43 and a loss of Sh .06 per kg CDW. Back up data are provided in Schedule V-2, which gives detailed derivation of the purchases and sales on the assumptions stated. Schedule V-3 shows the derivation of the Sh 1.50 margin used in this calculation. It will be seen to be a weighted average margin, again based on 1975 grade proportions and late 1976 prices.

The reader is warned that the pro forma statement in Schedule V-1 is not the same as KMC's actual statement for 1975, because of the assumptions which have been made.

The Terms of Reference made reference to the effect of alleged overstaffing on KMC's competitiveness. Therefore, we have prepared another pro forma (Schedule V-4) based on a reduction of 400 permanent staff members. This figure is consistent with our views on KMC's excess staffing present in the KMC Management Study, Chapter VI. The reduction of 400 individuals changes the pro forma results from a loss of Sh .06 to a profit of Sh .26 per kg. CDW, an improvement of Sh .32.

These figures must be compared with similar figures for a typical private slaughterhouse. To obtain such figures, we visited five private slaughterhouses, near Nairobi and in other centers, and attempted to obtain operating cost data. As might be expected, this proved difficult, since owners had little data and were reluctant to provide what they had. However, by persistent questioning and cross checking, we were able to develop a typical pro forma statement. It is reproduced as Schedule V-5.

The schedule shows the private slaughterhouse owner operating on a margin of Sh 1.00 per kg. CDW as opposed to KMC's Sh 1.50. He recovers Sh .70 from the fifth quarter (vs. KMC's Sh .86, with considerable processing costs) and so has Sh 1.70 to work with. His operating costs per kg. CDW are only Sh .48 per kg. CDW (vs. KMC's Sh 2.42) which gives him a profit of Sh 1.22 per kg. CDW, or Sh .22 above the gross margin. That is, his recovery from the fifth quarter more than covers his operating cost.

If we were to assume that both KMC and the private slaughterhouse operated on the same gross margin, and made the same profit, then, based on the calculated/estimated operating costs, the private slaughterhouses could offer Sh 1.78 per kg. CDW more to producers than could KMC. To reiterate, this is made up of a difference in profit from the pro formas of Sh 1.26 (profit of Sh 1.22 vs. loss of Sh .06) plus the Sh .50 difference in gross margin assumed on the pro formas.

It is obvious that the private slaughterhouse and its offer to producers Sh 1.75 per kg. CDW (equivalent to about Sh .75 per kg. liveweight) does not. First, the gross margin difference in the pro forma is reasonable, thus reducing the possible payment differential by Sh .50 to Sh 1.25. Then, the owner of the private slaughterhouse would certainly take a profit, which would reduce the differential still more.

## 2. Break Even Analysis for KMC

We have carried out analysis of KMC's break even level of throughput at various gross margins between the cost of animals and the price of meat. This analysis is based on the same pro forma calculations above, which means it is break even analysis assuming 100 percent domestic carcass sales, and using 1975 throughput and late 1976 prices as a starting point.

Schedule V-6 provides the basic analysis. It shows that, with a gross margin of Sh 1.50, which obtained at the end of 1976, the break even point should have been at a little more than 137,000 head, or slightly more than the actual 1975 throughput. This is almost exactly 50 percent of KMC's assumed capacity of 275,000 head. Had the Sh .50 per kg. CDW price increase announced in late 1976, but not implemented, actually been implemented, the break even point would have increased to more than 189,000 head, or 69 percent of capacity. Break even points are also calculated on the basis of the stipulated decrease in employment of 400.

Obviously, KMC's actual break even point in 1975 was far above 137,000 head. This difference can be attributed to many factors, such as not getting full published prices, canning losses, losses in the export side of the business, etc.

Schedule V-7 shows the gross margins required for break even at various levels of throughput. It shows, for example, that KMC could break even with a gross margin of only Sh .75 per kg. CDW, or half the present levels, if it could operate at 100 percent of capacity. Crudely, then, KMC could increase its purchase prices by Sh .75 per kg. for all grades and, if that would attract 275,000 head, KMC would still break even, even with KMC's relatively high costs.

The matter of high costs is discussed in more detail in the KMC Management Study, Chapter VI. However, a review of these pro forma schedules does indicate, we believe, the importance of certain cost items, such as interest, other headquarters costs and personnel costs. KMC could never hope to operate at the cost levels of the existing small private slaughterhouses, if only because of the much higher sanitary standards required of KMC. However, KMC could certainly be more competitive with the private slaughterhouses should changes be made which are discussed below and in Chapter VI.

**SCHEDULE 2-1**

**KMC PPO FARM PROFIT AND LOSS ACCOUNT  
 ASSUMING ALL MEAT SOLD IN DOMESTIC MARKET IN CANADA FROM  
 1975 EXPENSES LATE 1976 PRICES OF MEAT**

	KE	KE	Kah per kg, CIW
<b><u>Sales</u></b> 16.6 million kgs.		5,597,935	6.76
<b><u>Purchases of Livestock</u></b> 16.6 million kgs.	4,358,000		5.26
Less : 5th Quarter yields	(712,301)		(0.86)
<b><u>Net Cost of Goods Sold</u></b>		3,645,699	4.40
<b><u>Variable Costs</u></b>			
Transport on Livestock	270,014		
Electricity and Fuel Oil	100,131		
Processing & Packing Materials	107,026		
Staff overtime, bonus & casuals	57,442	534,613	0.65
<b><u>Fixed Factory Costs, Distribution etc.</u></b>			
Salaries, wages, clothing, rations etc.	687,395		
Depreciation	66,904		
Repairs & renewals	97,561		
Management & Technical Fees	33,487		
Vehicle Expenses inc. Dep.	58,883		
Hire of transport	16,864		
Livestock husbandry expenses	16,463		
Rent and Rates	17,965		
Printing and Stationery	15,469		
Postages, Telephones etc.	16,332		
Machine rentals	10,102		
Cleaning materials	27,851		
All other expenses	130,126		
	1,195,402		
Less : Allocation to Canning	260,066	935,336	1.13
<b><u>Head Office Expenses</u></b>			
Salaries and Wages, etc.	158,639		
Bad Debts	15,039		
Electronic Data Processing	19,111		
Insurances	22,055		
Postages, Telephones etc.	22,786		
Rents, Rates & Taxes	12,676		
Repairs & Renewals	11,517		
Hire of Transport	12,118		
Interest on loans	220,362		
All other expenses	36,786	531,089	0.64
<b><u>Total Purchases and Expenses</u></b>		5,646,737	5.82
<b><u>Profit/(Loss)</u></b>		(48,802)	(0.06)

1975 Livestock throughput has been ignored, although  
 187,275 kg. were processed during 1975.

**SCHEDULE 9-2**

**PURCHASES OF LIVESTOCK  
1975 THROUGHPUT AT LATE 1976 PRICES**

<u>Beef Grades</u>	<u>Number of Head</u>	<u>Av.wt. kg.</u>	<u>Total wt 000 kg</u>	<u>Sh per kg.</u>	<u>Value Sh 000</u>
Prime	22	244	5.4	7.20	38.9
Choice	10,176	215	2,187.8	7.10	15,533.4
FAQ - Passed	15,537	199	3,091.8	7.00	21,642.6
- Retained	1,997	199	397.4	6.30	2,503.6
Standard - Passed	28,462	126	3,586.2	4.85	17,393.1
- Retained	6,406	126	807.1	4.45	3,591.6
Commercial - Passed	50,947	93	4,738.0	4.25	20,136.5
- Retained	15,258	93	1,419.0	3.90	5,534.1
Manufact. - Passed	1,928	89	171.6	2.45	420.4
- Retained	1,678	89	149.3	2.45	365.8
<hr/>					
	132,411	125	16,553.6	5.26	87,160.0

= KE 4,358,000  
=====

**SALES OF MEAT  
ASSUMING TOTAL BEEF SOLD IN CARCASS FORM  
IN DOMESTIC MARKET AT LATE 1976 PRICES, 1975 THROUGHPUT**

Prime - Hindquarter*	2.8	10.25	28.7
- Forequarter*	2.6	8.55	22.2
Choice - Hq	1,137.6	10.15	11,546.6
- Fq	1,050.2	8.45	8,874.2
FAQ - Hq	1,814.4	9.90	17,962.6
- Fq	1,674.8	6.10	10,216.3
Standard - Hq	2,284.5	6.30	14,392.4
- Fq	2,108.8	5.70	12,020.2
Commercial - Hq	3,201.6	6.00	19,209.6
- Fq	2,955.4	5.50	16,254.7
Manufacturing - Hq*	166.9	4.70	784.4
- Fq*	154.0	4.20	646.8
<hr/>			
	16,553.6	6.76	111,958.7

= KE 5,597,935  
=====

\* Estimated butcher prices. Manufacturing grade is not normally sold in domestic markets.

Notes : 1. Feedlots producers are paid a premium on their supplies - Sh .60 per kg. on Prime and Choice and Sh .50 on FAQ (Passed) grade. Since the volume is very small this has been ignored.

2. KMC sells to institutions and others directly at higher prices but for same reason has not

SCHEDULE V-3

KMC PRICE DIFFERENTIALS - PRODUCER PRICES VERSUS SELLING PRICES, LATE 1976  
Sh per kg.

Beef Grade	Grade and Passed or retained	Type Quarter	Producer Price	Selling Price		Differential
				Quarter	Average**	
Prime	Passed	Fore )	7.20	8.55*)	9.43	2.23
		Hind )		10.25*)		
Choice	Passed	Fore )	7.10	8.45 )	9.34	2.24
		Hind )		10.15 )		
FAQ	Passed	Fore )	7.00	6.10 )	8.08	1.08
		Hind )		9.90 )		
	Retained	Fore )	6.30	6.10 )	8.08	1.78
		Hind )		9.90 )		
Standard	Passed	Fore )	4.85	5.70 )	6.02	1.17
		Hind )		6.30 )		
	Retained	Fore )	4.45	5.70 )	6.02	1.57
		Hind )		6.30 )		
Commercial	Passed	Fore )	4.25	5.50 )	5.76	1.51
		Hind )		6.00 )		
	Retained	Fore )	3.90	5.50 )	5.76	1.86
		Hind )		6.00 )		
Manufacturing	Passed & Retained	Fore )	2.45	4.20*)	4.46	2.01
		Hind )		4.70*)		
Average of all grades (weighted)			5.265		6.763	1.498

\* Estimated

\*\* Based on 52/48 Hindquarter/Forequarter ratio

SCHEDULE 1-1

**KMC PRO FORMA PROFIT AND LOSS ACCOUNT  
 ASSUMING ALL MEAT SOLD IN DOMESTIC MARKET IN CANADA WITH  
 1975 EXPENSES, BUT ADJUSTED ASSUMING REDUCTION OF STAFF  
 BY 400 EMPLOYEES. LATE 1976 PRICES OF MEAT**

	KE	KE	Ksh per kg. CDW
<u>Sales</u> 16.6 million kgs		5,597,935	6.76
<u>Purchases of Livestock</u>			
16.6 million kgs	4,358,000		5.26
Less : 5th Quarter yields	(712,301)		(0.86)
<u>Net Cost of Goods Sold</u>		3,645,699	4.40
<u>Variable Costs</u>			
Transport on Livestock	270,014		
Electricity and Fuel Oil	100,131		
Processing & Packing Materials	107,026		
Staff overtime, bonus & casuals	31,642	508,813	0.62
<u>Fixed Factory Costs,</u>			
<u>Distribution etc.</u>			
Salaries, wages, clothing, rations etc.	440,720		
Depreciation	66,904		
Repairs & renewals	97,561		
Management & Technical Fees	33,487		
Vehicle expenses inc. Dep.	58,883		
Hire of transport	16,864		
Livestock husbandry expenses	16,463		
Rents and Rates	17,965		
Printing and Stationery	15,469		
Postages, Telephones etc.	16,332		
Machine rentals	10,102		
Cleaning materials	27,851		
All other expenses	130,126		
	948,727		
Less : Allocation to canning	208,743	739,984	0.89
<u>Head Office Expenses</u>			
Salaries and Wages, etc.	116,448		
Bad Debts	15,039		
Electronic Data Processing	19,111		
Insurances	22,055		
Postages, Telephones etc.	22,786		
Rents, Rates & Taxes	12,676		
Repairs & Renewals	11,517		
Hire of Transport	12,118		
Interest on loans	220,362		
All other expenses	36,786	488,898	0.59
<u>Total Purchases and Expenses</u>		5,383,395	6.30
<u>Profit/(Loss)</u>		214,540	0.26

**SCHEDULE 7-3**

**TYPICAL PRIVATE SLAUGHTERHOUSE  
 PFC FORM: PROFIT AND LOSS ACCOUNT  
 ASSUMING ALL MEAT SOLD IN DOMESTIC MARKET IN CARCASS FORM**

	KE	KE	Ksh per kg. CDW
<b><u>Sales</u></b> 897,000 kgs @ 6.00 per kg		<u>269,100</u>	6.00
<b><u>Purchases of Livestock</u></b>			
7,800 head @ Sh 575.00* per head (average CDW - 115 kgs)	224,250		5.00
Less : 5th Quarter yields 7,800 head @ Sh 80.00 per head	<u>31,200</u>	193,050	0.70
<b><u>Direct Costs</u></b>			
Wages - killing fees paid at agreed rate of Sh 32.50 per head	12,675		
Inspection fees (veterinary) @ Sh 6.00 per head	2,340		
Slaughter fees to County Council @ Sh 2.00 per head	780		
Electricity and Water	312		
Consumables	<u>525</u>	16,632	0.37
<b><u>Fixed Costs and Overheads</u></b>			
Depreciation	875		
Short Life Tools	250		
Trading Licences, etc.	10		
Postages, Stationery and Office Supplies	50		
Salaries and Wages	3,200		
Misc. Expenses and Transport	<u>400</u>	4,785	0.11
<b>Head Office Costs</b>		<u>N11</u>	
<b>Total Cost</b>		<u>214,467</u>	4.78
<b>Profit/(Loss)</b>		<u>54,633</u>	1.22

\* Price included transport

SCHEDULE V-6

KMC BREAK EVEN POINTS

Price Levels and Price Differentials Between Buying and Selling			Fixed Overheads	Contrib. per animal*	Break Even Point and Capacity
Buying - Producer Prices	Selling - Wholesale Butcher Prices	Diff. Sh per kg.	Condition	Sh Millions	Head \$
1 Same as at late 1976 av. Sh 5.265 per kg	Same as at late 1976 av. Sh 6.763 per kg	1.498	At 1975 level app. 1,400 employees	29.33	213.75 137,209 50
2 An increase of sh .50 per kg. on all grades as ordered by Govt. Av. Sh 5.765 per kg.	"	0.998	"	29.33	155.00 189,216 69
3 Same as at late 1976 av. Sh 5.265 per kg.	"	1.498	At 1975 level but employees reduced to app. 1,000	24.58	213.75 114,983 42
4 An increase of sh .50 per kg. on all grades as ordered by Govt. Av. Sh 5.765 per kg.	"	0.998	"	24.58	155.00 158,565 58

Live weight 125 kg per head. Direct processing cost, less 5th Quarter yields is \$1.44 per kg.

Capacity estimated at 275,000 head per year.

SCHEDULE V-7

KMC BREAK EVEN CHART  
 PRICE DIFFERENTIALS REQUIRED AT VARYING LEVELS OF THROUGHPUT

	(1975)						
Throughput (000's head of cattle	132.4	150.0	175.0	200.0	225.0	250.0	275.0
Percentage of plant capacity based on estimated capacity of 275,000 head a year	48.2	54.6	63.6	72.7	81.8	90.9	100.0
Price differential required between buying and selling prices to break even Sh per kg. (based on 1975 level of fixed expenses)	1.56	1.37	1.18	1.03	0.92	0.82	0.75

Differential at late 1976 was Sh 1.498 per kg.

Average CDW per head estimated at 125 kg.

### 3. Policies to Optimize KMC's Operations

The Terms of Reference for the study ask us to consider a number of policies which might improve or optimize KMC's operations. In view of the discussion of KMC's competitive ability to attract livestock and the breakeven analysis for KMC in the two sections just above, it seems clear that KMC should work to increase throughput and decrease costs if it is to optimize its operations. In the sub-sections which follow, we cover a number of specific points requested in the Terms of Reference : price policies, subsidies, health standards, grading practices and custom slaughtering. We should also point out that, in Chapter VI, we report the results of our management study of the KMC and make a great many recommendations.

#### a. Price Policy

Price policy is discussed in considerable detail in Chapter III. Basically, we recommend that KMC producer prices remain controlled but that they increase by varying percentages in order to make KMC more competitive in purchasing animals, especially standard grade, and to provide an incentive for increased output. We recommend that wholesale prices be increased as well, by a slightly lower proportion on average than producer prices, with the objective of giving KMC a weighted average margin of about Sh. 1.20 per kg. CDW. Retail prices should be increased in a similar way. For wholesale and retail prices, we recommend that prices be decontrolled for FAQ grades and above.

The objective of these price recommendations, from the point of view of KMC, is to help KMC increase the throughput of animals in order to make a margin which is lower than that required in 1975 but adequate for a slight profit at a throughput of 180,000 head, which we consider a reasonable, minimum long term target.

#### b. Subsidies

On the basis of our analysis, two possible subsidies might be considered for KMC : an export rebate and a subsidy to compensate for KMC's service as a buyer of last resort of any animal offered.

##### (1) Export Rebate

Although we have not found it explicitly stated anywhere, we believe that the Government wishes to at least maintain exports of meat at a minimum level, even at the cost of reduced per capita consumption in Kenya. We agree with this policy; Kenya needs foreign exchange. However, in a market economy such as Kenya's with the exporting enterprise under some pressure to operate commercially and be profitable, it may be difficult to maintain exports in the face of declining per capita output and rising domestic prices. Whether this in fact occurs depends in large part on international prices, which are expected to increase but over

which Kenya has little control

Therefore, to help ensure a minimum level of exports, we recommend that the Government provide KMC with an export rebate for fresh meat, similar to that provided for canned corned beef. The level might be the same 10 percent provided for canned corned beef, or some other level appropriate to the export rebate system.

This recommendation is discussed in more detail under price policies in Chapter III.

(2) Buyer of Last Resort Subsidy

As a buyer of last resort, KMC is forced to accept certain inefficiencies in its operations which it could avoid if it were free to purchase or reject animals at will. The major result is an uneven throughput which either requires KMC to maintain a plant and staffing higher than would be the case if throughput were more even, or to pay considerable amounts for overtime and casual labor.

At the time of large scale distress sales of pastoral cattle in late 1976, we considered proposing a subsidy payment on each such animal that the KMC was required to accept, since the cattle were very poor in quality. However, on the basis of KMC's preliminary figures for 1976, these large scale purchases resulted in a very high throughput for the year, lower unit costs and profits. Thus, this approach to subsidy does not seem feasible.

We must conclude that the development of a feasible formula for such a subsidy requires more work, and we are not prepared to make a specific recommendation. It may be that if KMC follows the various other recommendations made in this report, including those in the Management Study, Chapter VI, and if our price recommendations are accepted, KMC can operate at a reasonable profit level without an additional subsidy, even though, in theory, such a subsidy could be justified.

## **c. Inspection and Health Standards**

One of the advantages the private slaughterhouses have over the KMC is the lower health standards they follow and the lower level of health inspection they are subject to. For this study, health and inspection standards in the two KMC plants and two of the better private slaughterhouses were evaluated by the Team Veterinarian.

### **(1) KMC Facilities**

The KMC plants have been the subject of meat and hygiene inspection by the Department of Veterinary Services for a number of years. A review of the current situation indicates that the level of sanitation at the plants remains very good and the inspection procedures are very thorough by international standards. Observed cooperation between the Meat Inspection Service and KMC management is of a high order. At both plants, there is ample hot water and live steam for cleaning purposes. The meat and hygiene inspection covers sanitation and hygiene in the plant itself and both ante-mortem and post-mortem inspection of each animal.

The thorough nature of the inspection program is illustrated by the results. For example, in 1974, the inspection service recorded a C. bovis (measles) infestation rate of 23 percent and there were more than 1,000 condemnations (21 or more cysts) at Athi River, .7 percent of the kill. Liver flukes were found in 38 percent of the beef livers resulting in condemnations of the livers. Total carcass condemnations from all causes, including emaciation and dropsy, C. bovis and severe bruising, came to 3,311, 2.8 percent of the kill. Parenthetically, these figures also serve to illustrate the seriousness of the measles problem in Kenya.

### **(2) Private Slaughterhouses**

The small local abattoirs have a much lower standard of sanitation than the KMC plants. The facilities examined were overcrowded. There were no head racks or wooden tables on which to carry out the work or health inspections. Floors were dirty and hot water was lacking for cleaning. The only refrigeration was a small freezer for storage of carcasses having one to five measles cysts, in order to hold them 10 days to kill the cysts before sale. Hot meat was loaded directly into metal lined pick up trucks for rapid delivery to customers. Although these trucks should be thoroughly cleaned each day, at least one observed had clearly not been cleaned at the end of the previous day. The Team Veterinarian and Abattoir Specialist concluded that there was no way that these plants could be brought up to reasonable sanitary standards. As such, they are considered a public health problem.

The two plants visited are under regular inspection by inspectors from the Department of Veterinary Services. Prior

to 1974, the DVS inspected only the KMC plants, but in that year the Service was assigned responsibility for meat inspection throughout Kenya. Through the end of 1976, the Service had assumed responsibility only in the major towns including Nairobi, Mombasa, Nakuru, Eldoret, Kisumu, Kitale, Thika and Nyeri. It is planned that the Service expand to cover the entire country in 1977, although with a current staffing of 15 veterinarians and 56 lay inspectors, this might be difficult.

In any case, in spite of the low level of sanitation in these private plants, regular inspections are carried out. However, because of the conditions, and because of the fact that inspections are by lay inspectors with, apparently, rare supervision by a veterinarian, the inspections do not appear to be as thorough as at the KMC. Regarding conditions, it was observed that head inspections were being carried out on the floor in one plant because there were no tables or head racks for the purpose. Further, although examinations for measles are carried out, and mildly infested carcasses can be stored in the freezer to kill the cysts according to regulations, there is no practical way to divert carcasses with 6 to 20 cysts to heat processing and canning as can be done at the KMC. Since the alternative is condemnation and complete loss, there is a very large incentive to evade the regulations and put the carcasses on the market, with or without the freezing treatment.

Additional evidence that inspections are less thorough at non-KMC plants is in the lower condemnation rates recorded by DVS in such plants. Data for Coast Province was quoted in Chapter IV and is repeated here. In 1975, DVS reported a cattle carcass condemnation rate at KMC Mombasa of 1.9 percent while the two private slaughterhouses at which inspections were reported had condemnation rates of .14 and .07 percent respectively. There may be several reasons for the rather wide difference, including better buying or intake on the part of the private plants, but one cannot escape the conclusion that the inspection standards must be lower.

We believe that the lower sanitation standards and, perhaps, less thorough health inspections constitute both a public health problem and a distinct competitive advantage for the private plants and can only assume that the standards at the private plants under DVS inspection are considerably higher than at non-inspected plants outside of the main areas or those operating illegally within the main areas.

Both of these problems may be eased by the planned development of municipal slaughterhouses in many centers throughout the country. These facilities, while not up to KMC standards, will have considerably higher sanitation standards than the existing plants, which they will replace in whole or in part.

#### 4. Grading Practices

As a step to both make KMC more competitive and to improve overall domestic marketing of beef, the Study Team of Reference ask us to prepare a beef grading and pricing structure relating live weight and grades to carcass value. The price aspects of the matter are dealt with under pricing policy and we believe that a specific plan must be carried out by the DVS and the KMC on the basis of some research. Here we discuss our basic ideas on both carcass grading as it is now practised by the DVS and KMC, and more importantly on live grading of both matures and immatures. We indicate the approach we believe should be followed in setting up a live grading system and the ways in which KMC should use it. Some of the more detailed material for this sub-section is provided in Annex V-1.

##### (1) Carcass Grading

Basically, we believe that the existing carcass grading system (a copy of which is given in Annex V-1) is sound. We would make three suggestions.

First, we believe the prime grade should be dropped. There are currently so few carcasses which qualify that there is no way to make a merchandising effort based on prime. This recommendation has been often made.

Secondly, for some grades there is a maximum CDW. We understand that this is really used as a stand-in for maximum age. We would suggest using the maximum age standard itself to downgrade the tough meat. If CDW minima were substituted for CDW maxima, it would encourage rapid fattening and the production of relatively youthful, relatively heavy animals. This maximum CDW weight requirement has been one factor in the downward trend of average carcass weights processed by KMC.

Finally, we propose an arrangement for modifying the handling of the question of maximum fat cover on grades FAQ and above. We understand that, at the moment, relatively few carcasses are downgraded for exceeding the limits, but this could change. We believe that, rather than downgrade, a discount for excess fat should be instituted. The method would be a dual grading system.

For FAQ and above, when the excess fat cover is not wanted it would be a simple matter to have a dual grading system. The dual grades (two grades on each carcass) would indicate :

- Eating quality -- Though Prime, Choice and FAQ carcasses differ somewhat in conformation (meat yield) the main reason for their existence is to classify carcasses by tenderness and other measures of eating quality, for the fresh/frozen market. In a dual grading

system, each of these grades would have its base price, regardless of fat cover. Then, the base price of an individual carcass in any of the above grades could be adjusted for:

- Wastefulness -- The base price of each carcass would be adjusted downward (if excess tallow is not desired, and to the extent that excess tallow is not desired) by a few cents per kilo (CDW) for each 10 mm. of fat cover above 15 or 20 mm. The discount should be roughly proportional (inversely) to the size of the carcass, if added sophistication seems worthwhile.

The advantage of such a dual grading system is that meat of top eating quality but just needing some trimming of excess fat by the retailer or by the hotel or restaurant, can then go to the higher-value use. It is downgraded slightly for wastefulness, but not for eating quality.

The dual grades would be especially useful within the plant when FAQ or Choice beef is sold in the form of cut beef rather than carcasses. The producer's price could be discounted for the excess fat in the carcass; fat which the plant would have to remove to produce standard-trim cuts. Thus:

- not penalizing the cut beef department for having to take overfat carcasses, and
- making more top-grade beef available.

A rather dramatic illustration of the need for dual grades was pointed out by Mr. John Olewe, Chief Grader, Veterinary Department, stationed at Athi River. He stated that, although it does not happen very often, an otherwise Choice Grade carcass must be downgraded by two (not one) grades if fat thickness exceeds 20 mm. The reason is that FAQ also has a 20 mm. maximum fat cover requirement. This is unfortunate, because the relatively young and tender beef, after a bit of trimming, would be highly desired by high-income consumers.

Furthermore, when KMC gets more involved in the cut beef trade they could badly need Choice grade cuts from these carcasses.

These otherwise Choice grade carcasses should remain in the Choice grade and then discounted a bit for being overly fat.

We would also like to add a word about relationships between prices paid by KMC for each grade and the ultimate

value of the carcass to KMC. Obviously, the two should be closely linked. With controlled prices, the link would be rather inflexible even if prices are set to make the basic, or average link valid. The following is a statement of the appropriate approach to maintaining a flexible linkage should price controls be lifted.

It should be the responsibility of the KMC Marketing Department to see that prices and price differences accurately reflect values and value differences between grades and between grade-weight classes. Changing conditions of supply or demand, or changes in end uses of composite market value, to KMC, of a grade-weight class.

Any time the value of one of the end products of a carcass class changes, all that is necessary is to multiply the price or value for each cut (per kilo) times the percentage that cut is of the carcass. If the percentages total 100, the sum of the above products will equal the carcass value per kilo. Then, adding byproduct values and subtracting a figure for plant costs and profit yields an estimate of the amount KMC can pay for that carcass.

Various combinations may need to be worked to find the most profitable way to allocate the different parts of a carcass if alternative cutting methods are a possibility.

This approach puts the responsibility for prices of each grade of carcass, and relationships between them, where it belongs, with the Marketing Department.

## (2) Live Grades - Mature Animals

It is possible to have live grading systems for both mature and immature cattle. Here we discuss live grades for mature cattle.

### (a) Reasons for Live Grades

We believe that live grading is necessary to make KMC more competitive with private abattoirs and butchers in purchasing cattle. We are aware that this has been tried before, and that there are those in the industry who do not believe it is necessary, but we believe the fact that KMC has been getting progressively fewer and poorer cattle is in part attributable to its practice of using only carcass grades and of paying only after such grading. The competition, which is able to "grade" and pay on the spot has a clear advantage with many suppliers.

### (b) Problems with Live Grades

One problem is that live grading is less accurate than carcass grading. That is granted. But many, if not most, producers prefer to sell on a live basis and if KMC does not accommodate them, someone else will.

Another problem is that buyers of live cattle require more skill and knowledge and training. Even if slaughter cattle auctions are used so that grades do not have to be explicitly and formally and openly used, the KMC and other packer buyers at the auction must be able to "grade" (evaluate) the animals they buy, predicting the weight and quality of carcasses that the animals will produce.

The third problem is that the presence or absence of "Measles" is not apparent in live animals but causes devaluation when later discovered in the carcasses. However, KMC has complete data on the extent of downgrading due to measles and can "insure" itself by bidding down on live cattle by an easily-computed amount to cover this anticipated loss. We understand that about 20 percent of the 1975 kill was downgraded by one or more grades because of measles. It is also understood that the incidence of measles is lower in the lower grades, and in certain areas of the country. This means that the "insurance" discount does not have to be uniform and that allowances can be made for factors that might increase or decrease the probability of getting an infected animal.

(c) Applying Live Grading to Mature Cattle

We recommend that the same grades be used on live mature animals as on carcasses, since the objective is to make KMC more competitive by moving the grading and buying operation, from the point of view of the seller, up to the live animal and possibly field location stage. Therefore, the live grading would be by the KMC buyer and not by the Veterinary Service, since the official grading for merchandising purposes would still be on the carcass. The KMC buyer would simply try, using the system described below, to come up with the same grades on the live animal as the DVS grader does on the eventual carcass.

Clearly, if the buyer is able to do this with some degree of consistency, and assuming that KMC maintains up to date records of carcass yields by grade, the live animal price for each grade can easily be tied to carcass value.

Of course, there remains the problem of live weights. If the buyer is working at a place where there is no weighbridge, and if the objective is to purchase on the spot for competitive reasons, the buyer will have to estimate the weight at the same time that he is live grading. This, of course, increases the possibility of error, but the graders' training program would be designed to minimize this as well as grading errors.

There may be times when official live grades are required, for export of live animals for example. In such cases, it will be necessary for the live grading to be done by DVS graders, who would have to undergo the same training as the KMC buyers.

In discussion with KMC, it is clear that there are times when there is no shortage of cattle and therefore no need to go out and seek them. In such times, KMC need only to revert temporarily to its carcass-only grading system.

(d) Establishing Live Grading System

Our recommended approach for establishing a live grading system is as follows. A committee or group for the purpose should be established including representatives from the grading service of the DVS, KMC and LMD. A large number of live, mature cattle in a range of weights and conditions; and from several different sources (range fed, ranch finished, feedlots etc.) should be selected, photographed from each side and rear, and described, on paper, from the point of view of several standard characteristics. Perhaps tentative grades could also be assigned. Then the animals would be slaughtered at KMC, their carcass graded in the normal manner and their carcass yield determined. The results would be used, by the committee, for comparison with the photographs and written descriptions. A set of modified written descriptions, and a representative set of photographs (indicating live weights as well) would then be used for the guidance of the live graders. We have included some sample photographic charts used for this purpose prepared by the USDA in Annex V-1.

(e) Selecting, Training and Monitoring the Graders

It is relatively easy to apply a good set of carcass grade standards. Fat thickness can be measured. Muscle thickness, or cross-sectional area of a cut muscle can be measured. The carcass weight can be measured to a fraction of a kilo, erasing all doubt about the amount of water and feed in the digestive system, or state of pregnancy -- or making it irrelevant.

No matter how realistic, relevant, and well-written the specifications for grade standards for live animals may be, the grade standards are only as good as the grader selection program, the grader training program, and the in-service training program for working graders. Each link is important, and the weakest one will set the upper level for the accuracy of the grading system.

Live grading is not just a matter of intelligence and knowledge. It is an art requiring abilities that can only be discovered, or found lacking, in a person after giving him some training and experience. It is important therefore, that the persons selected as grader trainees understand that, although they need to be good at simple mathematics, they are going to an art school. Not everyone is an artist, and one doesn't know until he is given a fair chance.

It follows that trainees should be free to return to other work without prejudice if they do not master the art side of

the job. It is this writer's opinion that there are charifours and clerks who could be developed into graders who could do better than many Ph.D's in Animal Science. And that is the way it should be. Different talents are required.

Carefully-controlled tests are needed to determine the presence or absence of this "gift" for being able to see from the outside of an animal what it is like on the inside; and accurately estimate what the carcass weight, meat quality, conformation etc., will be. These same tests must also be applied regularly to working graders to help them keep their "sights set" and to ensure that all graders will be reasonably close together when they independently evaluate an individual animal.

Thus, the selection and training of graders must be given considerable attention and kept flexible. Trainees should be selected mainly on the basis of apparent motivation, basic familiarity with cattle, ability at arithmetic and overall performance in whatever previous work or studies carried out. A training program built around a minimum of formal training on methodology and a maximum of practical experience should be designed and operated. Thus the trainees would, in an organised fashion, view, grade and estimate live weight on large numbers of cattle which would subsequently be slaughtered and the results compared. This is, of course, similar to the approach used in establishing the grade standards in the first place. Thus it follows that

- The first set of trainees might participate in the standard setting work, and
- The results of the training programs might be material for periodic modification of the standards themselves.

In any case, those trainees who exhibit skill in the work, which means that their live weights, live grades, estimates of carcass yield, yield of export cuts or other factors cluster around the actual data, should be appointed.

It will of course be important to monitor frequently the actual performance of live graders, both to help them keep their "sights" in and to guard against any consistent bias.

Annex V-1 provides a detailed discussion of one element of grader training and monitoring.

### (3) Live Grades - Immature Animals

It would be possible to develop live grades for immatures based on factors such as inherent quality type, condition or potential for various purposes such as backgrounding, feedlot or direct slaughter. Such a system would be rather complex and would not be very useful for

several reasons, among which is the fact that L&D must buy  
immatures without knowing their eventual disposition.  
Therefore, we do not recommend instituting grades for  
immatures and feel that L&D's present plans to purchase by  
weight only are satisfactory.

#### e. Custom Slaughtering

It has been suggested that KMC add custom  
slaughtering to its activities as a means of increasing  
throughput, and we were asked to consider the possibility.

It should be noted that many of the private slaughter-  
houses already engage in custom slaughter. Further, the  
planned new municipal slaughterhouses will also do custom  
slaughter. Therefore, should KMC decide to enter this  
activity, it would be in direct competition with these  
slaughterhouses. It is true that KMC already must compete  
with these private plants, and has several disadvantages in so  
doing, as discussed in detail above. However, in its existing  
business, KMC has some advantages, including large scale and  
the related economies, and a high degree of quality and  
health control which is an advantage in some markets. We  
doubt whether either of these, or any other KMC advantage,  
would be of significance in custom slaughter.

In competing with private slaughterhouses in custom  
slaughter, KMC would have the following disadvantages :

- The private plants are able to sell heads,  
feet, and viscera for human consumption,  
while KMC does, and would have to continue  
to divert most of these items into the  
inedible byproducts department for a  
lower return.
- With a small throughput, the local  
slaughterhouse can easily keep track of  
each custom slaughtered carcass. At  
KMC's scale, this would be more  
complicated and expensive.
- The small local slaughterhouses are  
convenient to the cattle owner needing  
custom slaughter, and to his customers.  
KMC plants are not.
- The local private slaughterhouses,  
being hot meat operations, can custom  
slaughter virtually while the customer  
waits. KMC's procedures require  
chilling and therefore delay.
- Generally, KMC is not geared to custom  
slaughter and any attempt to add this  
activity on to the main activity would  
seriously complicate KMC's procedures.

Any attempt to be more competitive by cutting corners would compromise KMC's standards.

Therefore, we do not recommend that KMC enter into this type of business as a way to increase throughput.

#### 4. Drought Year Marketing Assistance to Pastoral People

This subject is clearly of special interest in 1976 because, as a result of the drought, there has been great stress in the pastoral areas. The result has been unusually extensive overgrazing and distress sales of cattle to KMC.

In considering this problem, it is well to remember that in most of the pastoral areas, a "normal" year consists of perhaps seven or eight months without rain and four or five months of spasmodic rain distributed into two seasons, a short wet season and a long wet season. However, during these wet seasons, rain does not fall in adequate amounts over all of the pastoral lands, but rather on some of the lands with variation from year to year. Thus, in a good year, there is enough rain in enough areas so that the herds, by considerable "nomading" can reach grass and water and by so doing produce enough milk for the population and increase herd size. But, even with an active livestock development project to provide drinking water to bring more grassland into production in good years, there is always the threat of less rain than usual (drought) which will force a reduction in herd size.

Faced with the need to reduce herd size, it is obviously better to reduce herd size rapidly to minimize overgrazing and to allow the animals to be sold and slaughtered in the best possible condition, before grass and water shortages severely affect their condition. The objective would be to reduce herd size down toward, or to, the basic breeding stock. If even this herd size is excessive, we would suggest that, rather than further reductions, which carry severe social implications as well as making it difficult to build up herd size when the rains return, a program of supplying supplemental feed be followed. But the supplemental feed should be provided only when herd size is reduced to basic breeding stock.

In order to help reduce herd size under drought conditions, marketing assistance is needed.

##### a. Field Abattoirs

It has been suggested that field abattoirs, presumably operated by KMC, be used to go out into the pastoral areas during drought periods and purchase and slaughter on the spot. One possible prototype is available in Kenya and was examined by members of the Study Team. Owned by the Kenya Wildlife Management Project, the abattoir is built on a York Trailer, 8 ft. wide, 36 ft. long and 12.5 ft. high. The steel sides are divided in half (horizontally) and hinged to form an extension roof and floor when opened outwards.

A sectional annex is attached to the rear of the trailer to accommodate beheading and skinning. When being transported, the annex is dismantled and carried in the truck. Equipment consists of a jet pressurized water pump, two water heaters, a one ton capacity electric hoist, two mechanical debiders and a splitting saw. Potable water is carried in a 10,500 litre tank mounted on a 15 ft. wheelbase. This unit has a capacity of 50 animals per day and would cost an estimated Ksh 1 million.1.

A review of the economics of this approach indicates that it is not a cost effective way of coping with the problem of drought year marketing. The units would be idle for large parts of the year even in drought years, and presumably totally inactive in good years. In order to make an appreciable contribution to the marketing problem, several units would be needed, with the attendant high investment costs.

b. Improved Purchasing and Transportation Program

Rather than consider field or mobile abattoirs, we believe that an improved program of purchasing pastoral cattle in the drought periods and transporting them by truck to KMC or to other sales areas is to be preferred. This is in accordance with current policy and LMD effort and also is parallel to normal year activity. In drought years, more cattle must be handled.

These matters are discussed in more detail in Chapter III, but we reiterate here that the two main ingredients are (1) an active buying effort by LMD supported by adequate motorised transport, which is becoming available and (2) an adequate, incentive price supported ultimately by a KMC buying price and policy which supports LMD's efforts. As we recommend in Chapter VI, KMC should not be required to absorb this subsidy price on its own, but should receive a direct subsidy from the Government for handling such cattle at a loss. We might add that, if LMD can purchase the cattle early, before excessive deterioration has set in, the required subsidy can be reduced.

## C. Export Marketing

In this section of the Report, we provide a discussion of competitive sources of supply in potential markets and Kenya's comparative advantages with respect to those markets. We discuss steps to improve Kenya's competitive position in those markets and specific target markets on which Kenya might concentrate. We make a range of marketing recommendations aimed mostly at export markets but with implications for domestic marketing as well. Finally, we cover the matter of export slaughterhouses, and conclude that, for the present and foreseeable future, the existing slaughterhouses are adequate and no new facilities need be built. In all of this discussion, we assume that the export surplus will remain rather limited and that the main objective will be to obtain the optimum returns from the limited amounts of meat which are exported.

### 1. Kenya's Competition

Since Kenya's export pattern, especially for fresh, chilled and frozen beef, has been and is widespread, it faces competition from most major meat exporting countries. In the European market, the main suppliers are Eastern Europe, Argentina, Australia and New Zealand. The Middle East is very heavily supplied by Australia and New Zealand. African markets are satisfied by a wide variety of suppliers, including many in Europe, especially for high quality, well packaged products.

In Europe, Kenya would appear to have little comparative advantage in fresh, chilled and frozen meat products. Other countries have a well established name, a high volume, extensive marketing experience, no questions about health standards and even a transportation cost advantage, because of shipping rates and volumes.

To illustrate the point about volumes, below are Australia's shipments to selected destinations by volume (net shipped weight), in 1973 and 1975. These years are selected because 1973 was a relatively high year and 1975 a relatively low one, because of EEC restrictions and other problems. Note, however, that the exports to the Middle East have increased sharply between 1973 and 1975.

TABLE 7-8

**AUSTRALIAN CHILLED AND FROZEN MEAT EXPORTS  
TO SELECTED COUNTRIES ('000 tons)**

<u>Destination</u>	<u>1973</u>	<u>1975</u>
U.K.	155.7	40.2
Other EEC	17.6	7.8
Greece	24.5	5.5
Other W. Europe	14.4	11.0
E. Europe	3.5	10.1
Iran	5.6	13.9 1.
Kuwait & Gulf	10.1	14.6 2.
Other Middle East	1.6	11.0 3.

1. Of which 13,000 tons mutton and lamb
2. Of which 10,900 tons mutton and lamb
3. Of which only 2,400 tons mutton and lamb.  
Mostly beef to Egypt (8,300 tons).

In some African countries, Kenya would appear to have a better chance. Trade is less well established and so name and volume experience are less important. Lower quality, tougher meat is acceptable, if not preferred. In some cases, there is a transportation advantage. Interestingly, Nigeria, which is a considerable distance from Kenya, offers a good transportation advantage because all shipments must come by air as a result of port congestion. Kenya is closer by air than the major competitors. In certain African countries, especially Nigeria, the psychological attractions of intra-African trade appear to be significant.

For the Middle East, the large projected import volumes, as noted in Chapter II, are in sheep and goat meat. Kenya has no significant tonnage to export. Even if it did, competition from other East African countries with closer ties (Sudan, Somalia) and especially from Australia and New Zealand would be very strong for large volumes.

To illustrate the strength of the Australian competition, the Australian Meat Board carries out the following activities, among others, to promote sales in the Middle East. The Board maintains an office in the Middle East (Iran) with full communications facilities including telex, to promote sales on a continuing basis, arrange transportation, clear bottlenecks and the like. From time to time, the Board sends experts to Middle Eastern countries to help solve distribution or other problems. For example, in 1975, the Board's Director of Publicity Services spent three weeks in Iran helping the local Board Representative identify distribution problems with frozen and chilled meat. This was followed by a three month visit by a technical specialist. A variety of written promotional material is supplied, all in Farsi, Persian, or Arabic. This includes in-store promotional

material, a lamb cutting chart based on local, rather than Australian, practice and a meat recipe book. Total promotional expenditures for the Middle East in 1974/5 were A\$ 77,000, second only to Japan and Asia where the Board spent A\$ 397,000. These expenditures and emphasis are clearly aimed not at existing levels of exports but at much larger levels expected in the future.

It would seem impossible for Kenya to compete directly, head to head, with the major exporters such as Australia. The fact that total Australian meat exports in 1975 were about 575,000 tons (of which 475,000 tons were beef and veal and most of the rest mutton and lamb), which constituted less than half of the Country's production, means that Australia, and the other major exporters, can afford high level promotional and marketing campaigns and dominate markets almost at will.

On the other hand, although Australia exports mostly beef and veal, most of her exports to the Middle East (except Egypt) are mutton and lamb. Beef and veal exports are relatively minor. Thus, there are opportunities for Kenya to export relatively small quantities of beef to the Middle East by picking specific areas and customers overlooked by the major exporters, or too small for their attention.

## 2. Steps to Improve Kenya's Competitive Advantage

We do not believe there is a great deal which can or should be done to improve Kenya's overall competitive position in the export markets. This does not mean that there are not things which should be done to maximize Kenya's exports and the yield from those exports; these are discussed in the sub-section below. However, with regard to overall competitive position, we believe that Kenya's potential volume of exports is so low compared with the major competition, that broad steps, such as price cutting, are not indicated.

With regard to price, it is frequently stated by KMC and others that Kenya's export selling prices in various markets are high. Currently it is said that the Australians are underselling Kenya by 25 percent in the Middle East, and that some sales are being lost for this reason. No doubt some sales are lost. On the other hand, there is no one price for meat, or even a specific type of meat; prices fluctuate and depend on supply and demand situations of the moment. In situations in which the major competition is interested and willing to quote low prices, Kenya will not be competitive and should not, in our opinion, attempt to be, since this would mean subsidised exports. But we are certain that there have been, and will continue to be, situations in which Kenya can make competitive offers, all factors considered, without cutting prices.

We believe this to be the case even at the present exchange rate for the Kenya shilling, which is generally believed to be overvalued. Putting the shilling at its "true" value would, of course, make Kenya's meat exports more price

competitive, and this might be a worthwhile approach should price become a more important factor than at present. At the moment, however, we believe that such a step is not necessary.

Canned corned beef presents a special case. This is a relatively homogeneous product and most of Kenya's exports go to a single destination, the U.K. Prices are set through overall supply and demand, and do fluctuate sharply. The current price of \$18 per case of 24 12 oz tins is near the top of recent fluctuations and considered by KMC to be profitable. As long as Kenya depends almost exclusively on this market, prices will be dictated. In order to get away from this limitation, it will be necessary to promote other markets for the product, probably elsewhere in Africa. For example, Nigeria is a very large market in which meat distribution and storage is a problem. Tinned beef, prepared to suit Nigerian tastes, might go very well and at attractive prices.

### 3. Target Markets

In recent years, KMC has handled its export marketing mainly by responding to orders and requests for quotations. It has been a passive approach. Further, exports have gone to a great variety of countries, and over the past several years there have been sharp changes in destinations, as markets are gained for a year or two and then lost. This is, we believe, largely a result of the passive marketing approach followed, which leaves Kenya as a residual supplier. This arrangement does not contribute to building up long term relationships and stable markets.

We believe that it would be preferable for KMC to select a few targets for active promotion and special attention. These would form the core of the fresh, chilled and frozen export program and hopefully would continue to do so indefinitely. The KMC should continue, of course, to respond to other requests and fill orders when possible, but the special attention, including filling orders exactly and as a first priority, should be concentrated on a few markets. This approach is appropriate to the probable limited overall volume of exports and the size and strength of the export marketing staff, which is unlikely ever to be large enough to be effective in handling the existing, scattergun approach. We suggest the following may be good targets for non-tinned meat: Nigeria, Greece, Egypt, South Yemen and the Middle East in general.

Nigeria is attractive because it is a growing market which should be particularly open to an African source. Since air shipment is required no matter what the source, Kenya has a definite cost advantage which it lacks almost everywhere else. We expect that a limited volume of high quality, well presented beef could be supplied and a larger volume of ordinary quality carcasses or cuts. KMC is currently pushing the Nigerian market. We recommend that greater concentration be placed on this market opportunity. As noted above, an effort might be made to sell tinned beef in Nigeria as well.

Greece, among the European countries, has been a significant market in the past and should be again. Sales to Greece avoid various EEC restrictions and the market accepts KMC's relatively tough meat.

Egypt has not been a purchaser of Kenya meat in the past, but we believe it should be. It is a market in which Kenya might well be able to compete with Australia and Europe, because of distance and the fact that Egypt is interested in beef rather than lamb, unlike other Middle Eastern countries.

South Yemen is not a major market on the world scene and, according to projections in Chapter II, is not likely to become one. The projections show imports of only 3,000 tons in 1980 and only 5,000 tons in 1990. This small market might not attract strong interest from the major exporters and therefore a major promotional effort by Kenya, maintained over the long term, could give a strong long term position in the market. Estimated KMC sales of 1,820 tons in 1976 indicate that initial steps to enter the market have been taken. The objective should be to give the market enough attention to retain this level of sales in the future, and thus avoid a sudden loss of sales which has happened in other markets.

The oil-rich countries in the Middle East offer other possibilities. As has been stressed, these countries are mainly interested in sheep and goat meat. Kenya has in the past exported little sheep and goat meat. Elsewhere in this Report we discuss priorities between cattle and smallstock production and we are certain that the output of sheep and goat meat can and will increase in Kenya more rapidly than beef. We believe that, even if output does increase, Kenya would have difficulty exporting sheep and goat meat to the Middle Eastern countries, unless there were firm business relationships established, such as those we assume will operate between Halal and Middle Eastern customers. For the rest, we believe that export of sheep and goats live offers a better prospect for Kenya, assuming the production is available. This idea is strengthened by widespread reports of plans to construct slaughterhouses in Middle Eastern countries, such as Saudi Arabia, designed to operate on imported live animals.

Currently, export of live animals from Kenya is effectively prohibited, in that a licence is required and they are reportedly impossible, or nearly impossible, to obtain. This is in accordance with the objective of maximizing value added within Kenya and supporting the KMC. However, while this is valid, it is also true that exports of raw wheat, raw maize, raw soybeans, etc., have kept the U.S. balance of payments more or less in order in recent years, in the face of the rising cost of oil imports.

It is recommended that, for the sake of the producer, live slaughter animal exports be allowed. If a producer, or a producer group, can get a better price for slaughter animals exported alive, the opportunity should not be denied.

them. This is an important point, because of the vast Arab market which prefers locally-slaughtered animals. For example, an Iranian businessman has enquired about the availability of hundreds of thousands of live sheep annually from Kenya. The current answer is that they cannot be provided.

Incidentally, it is also recommended that live breeding livestock exports again be allowed. Recently, excellent beef breeding cattle have gone to slaughter in Kenya because of the inability of the sellers to find interested buyers locally. This was a waste and it is possible that some foreign exchange could have been obtained.

We see no reason for embargoes on slaughter or breeding animals if that is what Kenya's potential customers want. They can go elsewhere if they cannot get what they want in Kenya.

The second possibility in the oil-rich countries of the Middle East is high quality, well presented beef for the large expatriate communities. The tonnages possible are not extremely large, but can be significant and the high quality involved can bring very considerable value added per unit. In fact, in a situation where the tonnages available for export are almost certain to be limited, this high quality, high value export concept would seem to be the most suitable. Even if other exports had to be eliminated because of local requirements, it would seem justified to continue to make these high quality exports. The approach which is being considered for these exports, and which we support, is discussed in the following sub-section on marketing recommendations.

We believe that a small list of targets such as the one presented should, if actively pursued and given priority attention, result in stable, profitable exports. For other markets, we would suggest that enquiries be answered and that efforts be made to fill orders, but that markets outside of the target list not be actively pursued. If KMC is unable to fill all commitments, those with the target markets should have priority. Care should be taken to avoid making unfillable commitments with the other markets.

#### 4. Export Marketing Recommendations

We have developed a number of export marketing recommendations which, we believe, would lead to an export program which would yield the maximum return to Kenya from whatever amount of meat is available for export. A number of these recommendations relate to both domestic and export marketing and have been mentioned above. We handle them in this way because the two activities are closely related.

##### a. A Marketing Concept

We believe that a most important step for KMC would be to adopt what might be called a "marketing concept".

This means that marketing comes first, and that all other activities, including purchasing and production, be geared to marketing. The objective would be to produce what the Marketing Department can sell most effectively and profitably. The Marketing Director 1. should be first among equals, and receive full cooperation from the Livestock (purchasing) Manager, the Production Manager and others. This would include cooperation and assistance from the Production Manager for the development of new products and packaging, and from the Livestock Manager in gearing his purchasing to what is believed to be needed for sales.

Under this concept, customer satisfaction, whether overseas or domestic, would come first. This includes efforts to determine what the customer wants and then to provide it. It includes at least a minimum advertising effort, at home and abroad, to entice customers to try the products. There have been examples of KMC putting products on the domestic market, such as a tinned meat with rice combination, and then not supporting it with advertising so it failed to sell. It may seem that this is an obvious recommendation, and perhaps it is, but KMC does not operate in this way at present. The priorities are reversed, with purchasing apparently most important, and marketing least. Therefore, implementing this recommendation will require a major adjustment.

b. Merchandising Meat, Domestic and Foreign

As indicated in our comments about a marketing concept, we believe that KMC must merchandise its products if it hopes to obtain an optimum return. At present, with low controlled prices, it is perhaps difficult to justify a merchandising program in the domestic market, since KMC cannot recover the costs through higher prices for high quality, merchandised meat. With price controls removed on at least the higher grades, it will become feasible to consider active domestic merchandising. In order to implement an active merchandising program, we recommend the following.

(1) A Qualified Marketing Director should be Provided

The present Marketing Department is headed by a Sales Manager and two assistants, three relatively young men who show great promise but who have been in their jobs for a very short time and are inexperienced in meat marketing. In addition to their inexperience, they are short handed; the KMC is not overstaffed in this area. Under present conditions, they are prevented from active, effective merchandising on the domestic market by the price controls, and lack the numerical strength and experience to do effective,

1. The present title is Sales Manager. We are recommending, below, the appointment of a high level Marketing Director to head the entire Marketing function. One could go further and propose that livestock purchasing be taken over by the Marketing Director as well, in order to ensure control.

active merchandising in the export market. This is why the export marketing must consist mainly in reacting to orders, and since the Marketing Department is not in a position of power, as we recommend above, they cannot even be certain of being able to fulfil the commitments they do make in response to enquiries and orders.

Therefore, we propose that an experienced, qualified Marketing Director be appointed to work with the present Kenyan staff to add manpower, and experience in the international meat business. To be effective, the Marketing Director must be, in some way, first among the divisional managers and be in a position to have a strong influence on purchasing, production and other elements of KMC operations. A more detailed discussion of this position is provided in the KMC management study, Chapter VI, which includes a detailed position description. This is one of three senior, specialist appointments recommended in Chapter VI.

We do not believe that the planned financing by the FAO of a special export marketing project for high quality beef satisfies this recommendation, although we strongly support the project. As we understand it, FAO will finance the services of a specialist for one year to work with KMC to develop markets for high quality beef mostly in the Middle East. The terms of reference include working along the whole system, from procurement through special contracts with the feedlots, to coordination with the production line to ensure special, proper handling, to the actual marketing administration.

We do not believe this project satisfies the need we have identified for the following reasons :

- The project is for one year only. We believe that the specialist, who has had many years in Kenya with the Beef Industry Development Project, can do an effective job in one year within his terms of reference, but for our purposes a longer period would be necessary.
- The project is exclusively export oriented. KMC requires extensive help in both export and domestic marketing. It is true that a program of merchandising high quality meat on the domestic market is impractical while prices are controlled, but we hope, and assume, that at least the top three grades will be decontrolled to permit this.
- Most important, the project is designed to be, essentially, outside of the main KMC operations. We believe that marketing improvements are required

throughout KMC's operations and that the Marketing Director should have direct line responsibility.

Therefore, we recommend that the Marketing Director, along with the other two senior staff recommended and discussed in Chapter VI, should be appointed whether or not the FAO project goes ahead as planned. Should an overall Marketing Director be appointed, we believe he would make more effective the work of the FAO-provided specialist. In any case, close coordination will be required.

## (2) KMC Should Develop New Products

We would like to suggest several new products and approaches. Many of these are to be included, at least in part, in the proposed FAO-assisted program.

KMC should seriously consider producing for the export market, and for the high quality domestic market if prices permit, aged primal cuts (round, loin end, short loin and rib). The cattle used for this purpose would have to be young, well bred feedlot stock. The cuts should be packaged in oxygen impermeable "shrink-wrap" film to minimize shrink and discoloration. The ageing should take place in a 2° cooler, and KMC's Athi River plant can easily supply such a cooler for the purpose.

A related requirement is for KMC to be able to compute rapidly the range and variety of products which can be made from the carcasses in the pipeline in order to be able to react quickly to changes in market requirements. However, since a proper marketing program for the high quality cuts, which depend on special carcasses produced by the feedlots, presumably under contract, should also be based on sales contracts, it should not be necessary to change the mix very often. Still, an ability to accommodate customer requests for changes can be a great advantage in obtaining and holding contracts.

KMC must also exercise some imagination on the utilization of lower quality cuts which sometimes remain when the higher quality cuts are exported. For example, recently, large sales of hind quarters to Libya left the KMC with forequarters which could not be sold. There are ways in which forequarters can be processed into rolled roasts and other types of boned meat, but this requires close cooperation and imagination on the part of Marketing and Production Departments.

Another possibility involves the Choice grade. Generally KMC's Choice grade is only equivalent to U.S. "Good" rather than "Choice". But it may be that there are a significant number of Choice carcasses which, although Choice from other points of view, have enough marbling to qualify as U.S. Choice. This means better eating quality. Marbling is not so evaluated because additional cutting to expose the eye muscle of the tenth rib is required. In a study of 2,000 beef carcasses in 1973, the UNDP/FAO Meat Industry Development

Project determined very low mean marbling scores for Choice carcasses (the mean was between .8 and .9 for Choice, as opposed to 2.6 to 2.9 for those few carcasses graded Prime, which requires marbling). Should this situation change and it be determined that a reasonable number of carcasses which cannot qualify for prime for other reasons do have enough marbling to affect eating quality, these carcasses might be the basis of a merchandising program. Again, an adequate price must be available.

There are further opportunities to develop new tinned products as well. There is nothing in the agreement with Brooke Bond which prevents KMC from developing new products and new labels. We have suggested Nigeria as a target for tinned beef and that a special product could be designed for Nigerian tastes. We also understand that there has been at least one request, from Iran, for a lower quality/lower cost tinned product which was turned down by KMC. We do not have enough information to comment on this particular decision, but believe that it illustrates that there are definite possibilities. As comfortable as the U.K. market may be for KMC, there are other possibilities for other products.

#### c. Target Markets and Brokers

We reiterate the recommendation in the subsection above regarding target markets. A few countries should be selected and promoted. For markets which are not subject to the special export program described above, we suggest consideration be given to locating and using a good meat broker. A good broker can assist with market testing and new product development as well as with normal transactions. Should a market become large enough and regular enough, the KMC might take it over directly again, with a representative in the country.

#### d. Work More Closely with the Kenya External Trade Authority

The Kenya External Trade Authority potentially should be able to provide considerable assistance to the KMC in its export program. Unfortunately, although the two have worked together in the recent past, as in the meat promotion mission to the Middle East about one year ago, there appears to be a lack of communication at this time. KETA is said to be reluctant to devote further effort to meat exports because it is felt that KMC does not follow up on opportunities. This is unfortunate, because potentially KETA could augment the limited resources of KMC in export marketing, especially since there is ITC assistance available to KETA.

#### 5. Export Slaughterhouses

We do not recommend the construction of additional export slaughterhouses. The reasons are the following:

• The existing KMC slaughterhouses at Athi River and Nombasa are perfectly adequate.

for present and exported exports. They are adequate from a technical point of view, including level of sanitation, and from the point of view of capacity. There appear to be two possible areas of inadequacy : they do not meet EEC requirements for separate handling of suspect carcasses and they are not both within the Specific Disease Free Zone (Athi River is, Mombasa is not). Neither of these is very important, considering the recommended target markets.

- The Halal meat plant, under construction, is also expected to be of excellent export quality. Assuming it has or will receive an export licence (we have conflicting information on that point), it will absorb a portion of the exportable animals and, generally, increase Kenya's export slaughter capacity. We recommend that it be permitted to export, since, otherwise, it will have to sell on the domestic market where the competition for KMC will be more serious.
- Should the high quality export program be very successful and generate a high level of sales, it may require some improvements or expansions in the existing plants. These would be in specific areas, such as ageing facilities, rather than in overall capacity. These would be relatively modest investments, much less than would be required for new plants.

**CHAPTER V**

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**ANNEX**

## GRADING

**A. Introduction**

This Annex provides additional material on grading. First, we provide an illustrative example of an exercise for use in selection, training and monitoring of graders. At the end of the Annex can be found a reproduction of the KMC carcass grade standards and photographic charts of cattle used by USDA as part of its live grading system.

**B. Illustrative Procedure to Improve Accuracy of Graders**

Figure 1 is from work done by Michael Creek at Lanet. It was used as the basis for the following grader training example. In this hypothetical example, two graders are asked to look at 11 feedlot-finished cattle and estimate the percentage yield of export cuts. They could as well be asked to estimate the carcass grade of each animal. In this case, each grade would have been numbered consecutively from highest to lowest, and the numbers used in exactly the same way as the percentages are used in the following example.

After the exercise, the export cuts from the 11 carcasses would be kept separate by carcass number, and carcass weight and export cuts weights would be recorded.

Annex Table V-1 gives the results of this hypothetical exercise. Grader No. 1 averaged coming within 1.3 percentage points on the 11 animals in his estimating of export cuts percentages. Grader No. 2, on the average, estimated the lot's export cuts percentage yield exactly, doing better than grader No. 1 on the average.

On closer examination, looking at data on each individual carcass (which must be done for each individual grader), we see that although grader No. 1 was off more on the average, he was more skilful in lining the carcasses up in order of cut yield.

Thus, we note that grader No. 2 appeared to accidentally and randomly guess on each animal. There is no apparent relation between his guess and the actual cut out yield.

Grader No. 1, on the other hand, though biased a bit, did an excellent job of lining the live cattle up in order of cut yield. He can do the job. He must just reset his sights a bit.

Two rules in training and evaluating graders could be :

- Do not worry about the bias -- it can be corrected

ANNEX TABLE V-1.1

HYPOTHETICAL EXAMPLE OF A TEST OF PERFORMANCE OF  
TWO GRADERS ESTIMATING YIELD OF TRIMMED EXPORT CUTS  
AS A PERCENTAGE OF COLD DRESSED WEIGHT, ON INDIVIDUAL LIVE ANIMALS

Animal Number	Actual Percent Export Cuts of Carcass Wt.	Grader No. 1		Grader No. 2			
		Estimate	Estimated Minus Actual		Estimate	Estimated Minus Actual	
			Difference	Difference Squared		Difference	Difference Squared
1	35	37	+ 2	4	32	- 3	9
2	29	29	0	0	32	+ 3	9
3	32	32	0	0	32	0	0
4	27	28	+ 1	1	28	+ 1	1
5	26	26	0	0	32	+ 6	36
6	25	27	+ 2	4	28	+ 3	9
7	31	33	+ 2	4	30	- 1	1
8	33	36	+ 3	9	28	- 5	25
9	30	31	+ 1	1	28	- 2	4
10	28	30	+ 2	4	30	+ 2	4
11	34	35	+ 1	1	30	- 4	16
<b>Total</b>	<b>330</b>	<b>344</b>	<b>14</b>	<b>28</b>	<b>330</b>	<b>0</b>	<b>114</b>
<b>Av.</b>	<b>30</b>	<b>31.3</b>	<b>+ 1.3</b>	<b>-</b>	<b>30</b>	<b>0</b>	<b>-</b>

- Be concerned about the scatter of a grader's estimates around the actual figures.

Have each grader fix up a table like Table V-11 for each training exercise. A statistical formula should be used for computing the scatter in order to give graders a score each time -- and in order to be able to rank them in a contest. Much of the work for computing the scatter, or the variance of the differences between individual estimates and actuals for each grader has already been done in Table V-11

Starting with that :

Take the sum of the individual squared differences	Subtract	The sum of all differences, <u>quantity squared</u> * number of animals *
Number of animals minus 1		

\* means "divided by"

For grader No. 1 :

$$\frac{28 - (14)^2/11}{10} = 1.02 = \text{"Scatter"}$$

For grader No. 2 :

$$\frac{114 - (0)^2/11}{10} = 11.40 = \text{"Scatter"}$$

The numbers to be squared etc. are usually small enough that the graders can do their own calculating with pencil and paper.

Twenty animals would be a better number than 11 for statistical tests, but with fewer animals at a time, it is easier to recall each live animal when looking at its carcass or cuts. This writer has usually used 20 animals and their carcasses per test of two or more graders.

Graders should also go through this exact same exercise repeatedly to learn to estimate dressing percent (carcass weight as a percentage of live weight). The plant would need to supply live weight on each animal in the test, and carcass weight. Dressing percent would be estimated by the graders while viewing the live animals and they would check their bias and scatter just as explained above. The procedures outlined herein should also be used to sharpen trainees' ability to estimate live weight. Many tests or exercises could be run with the data on one set of cattle.

**C. Current HAC Carcass Grades**

On the following two pages are reproduced the current HAC grade specifications. They are discussed in the main report. See Figure 2.

**D. Photographic Charts, US Live Slaughter Cattle and Beef Carcass Grades**

To illustrate a possible way of implementing part of the recommended approach to live grading, we are including these Charts, as Figures 3 and 4.

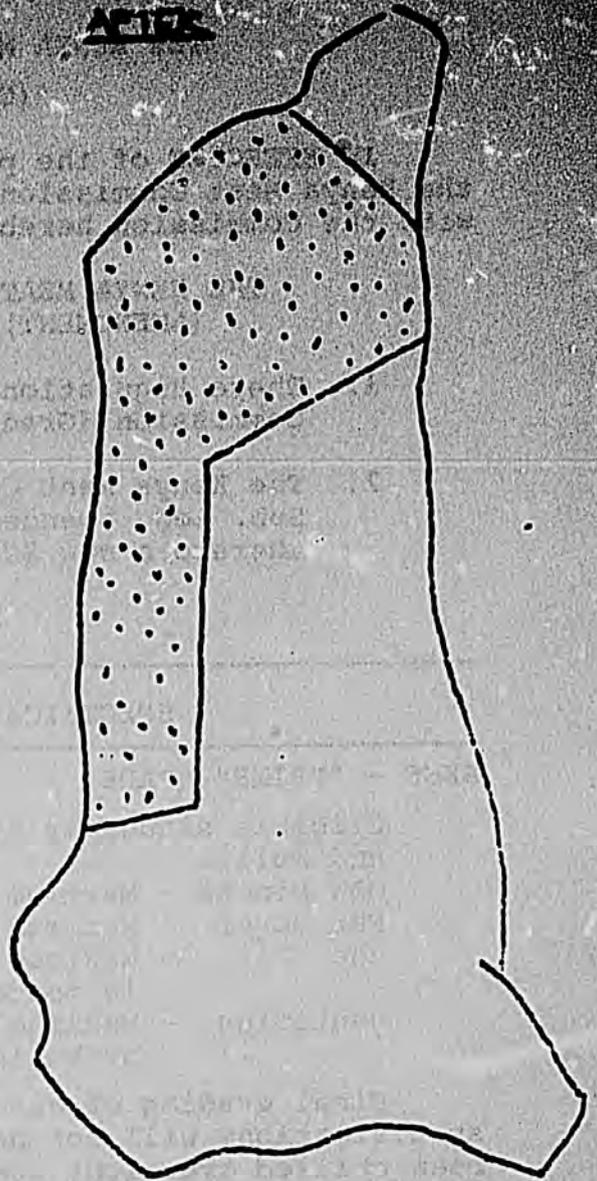
Figure 3 shows illustrative pictures of some of the U.S. Department of Agriculture quality grades. Figure 4 shows an example of an animal from each USDA yield grade. Yield grade No. 1 is all muscle with very little fat cover. A yield grade 5 carcass has an extreme amount of excess fat, which has a very low value in the U.S. All five of the pictured yield grades are assumed to be USDA Choice as far as quality grade is concerned.

Either steers or heifers can qualify for the Prime and Choice grade, etc., and for any yield grade. Steers and heifers differ considerably in value but rather than include sex condition in the grades, it is added to the grade in describing an animal or carcass, i.e., "Choice Heifer".

**CARCASS RESULTS FROM BULLOCKS AT  
INTENSIVE FINISHING.**

**BEFORE**

**AFTER**



**SLAUGHTER DATA:**

**LIVEWEIGHT**  
**CDW**  
**GRADE**

257 kg  
121.0 kg  
**STANDARD**

327 kg  
170.0 kg  
**FAQ**

**CARCASS DISSECTION:**

**Bone** 25.4 kg  
**Edible Tissue** 95.6 kg

26.4 kg  
93.0 kg

**Export Cuts  
(dotted)**

50.6 kg (20%)

**LEGAL NOTICE NO. 278**

**THE KENYA MEAT COMMISSION ACT**

(Cap. 363)

IN EXERCISE of the powers conferred by section 24 (2) of the Kenya Meat Commission Act, the Minister, after consultation with the Commission hereby makes the following Regulations :-

**THE KENYA MEAT COMMISSION (GRADING)  
(AMENDMENT) REGULATIONS, 1974**

1. These Regulations may be cited as the Kenya Meat Commission (Grading) (Amendment) Regulations, 1974.
2. The Kenya Meat Commission (Grading) Regulations, are Sub. Leg. amended by substituting for the Schedule thereto a new Schedule as follows -

**SCHEDULE**

SPECIFICATION OF GRADES	GRADE MARK
<p><b>BEEF - "PRIME" GRADE</b></p> <p>Eligible slaughter stock-steers, maiden heifers and bulls.</p> <p>CDW Limits - Maximum 320 kilos.</p> <p>Fat cover - Maximum 15 mm.</p> <p>Age - Maximum 30 months, in case of bulls 18 months.</p> <p>Dentition - Maximum 4 incisors (2 pairs) in case of bulls 2 incisors (1 pair).</p> <p>Final grading of carcasses meeting the above specifications will not be done until after they have been chilled overnight and quartered between the 10th and 11th rib for inspection of the rib eye muscle.</p> <p>"PRIME" Grade beef shall be derived from carcasses with very good conformation and shall be well finished. The fat covering shall be evenly and moderately distributed over the entire carcass. The fat shall be a white/creamy colour and of firm consistency. The rib eye muscle shall be well rounded with a bright cherry red colour and a moderate amount of marbling. The lean muscular meat shall have a fine texture.</p> <p>The carcass must be free of blemishes other than statutory excisions. Carcasses retained for measles are excluded from this grade.</p>	<p><b>KMC PRIME</b></p>

SPECIFICATION OF GRADES	GRADE NAME
<p><b>BEEF - "CHOICE" GRADE</b></p> <p>Eligible slaughter stock - steers, heifers and bulls.</p> <p>CDW Limits - Maximum 320 kilos.</p> <p>Fat cover - Maximum 20 mm.</p> <p>Age - Maximum 42 months, in case of bulls maximum 18 months.</p> <p>Dentition - Maximum 6 incisors (3 pairs), in case of bulls 2 incisors (1 pair)</p> <p>"CHOICE" Grade beef shall be derived from well proportioned and well fleshed carcasses with evenly distributed fat. The hindquarters shall be free from blemishes but superficial blemishes shall be allowed in the forequarters. Carcasses retained for measles are excluded from this grade.</p>	<p>KMC CHOICE</p>
<p><b>BEEF - "FAQ" GRADE</b></p> <p>Eligible slaughter stock - steers, heifers, cows and bulls.</p> <p>CDW Limits - No limit.</p> <p>Fat cover - Maximum 20 mm.</p> <p>Age - No limit, except 18 months for bulls.</p> <p>Dentition - No limit, except 2 incisors (1 pair) for bulls.</p> <p>"FAQ" Grade beef shall be derived from fairly well proportioned and fairly well fleshed carcasses with fairly evenly distributed fat not excessively yellow or oily. Quarters shall be free from extensive and penetrating blemishes.</p>	<p>KMC FAQ</p>
<p><b>BEEF - "STANDARD" GRADE</b></p> <p>Eligible slaughter stock - All.</p> <p>CDW Limits - No limit.</p> <p>Fat cover - No limit.</p> <p>Dentition - No limit.</p> <p>"STANDARD" Grade beef shall be derived from carcasses with some covering of fat. Carcasses having extensive and penetrating blemishes affecting the prime cuts shall not be included in this grade.</p>	<p>KMC STAN- DARD</p>

SPECIFICATION OF GRADES	GRADE MARK
<p><b>BEEF - "COMMERCIAL" GRADE</b></p> <p>Eligible slaughter stock - 5 All.            CDW Limits - No limit.            Fat cover - No limit.            Age - No limit.</p> <p>"COMMERCIAL" Grade beef shall be derived from plain carcasses of steers, heifers, cows or bulls. This grade shall include beef from higher grades which are severely blemished.</p>	<p><b>KMC COMM- ERCIAL</b></p>

**BEEF - "MANUFACTURING" GRADE**

At an abattoir where manufacturing facilities exist, "MANUFACTURING" Grade beef shall be derived from beef carcasses so severely and extensively blemished as to be unfit for resale as fresh meat and from beef carcasses of such inferior quality as to be unfit for resale as fresh meat and from beef carcasses containing between 6 and 20 measles cysts.

**BEEF - "REJECTED" GRADE**

At an abattoir where no manufacturing facilities exist (Nakuru and Ngong), "REJECT" Grade beef shall be derived either from carcasses so severely and extensively blemished as to be unfit for resale as fresh meat or from beef carcasses of such inferior quality as to be unfit for resale as fresh meat. Beef of this grade shall include carcasses which at the discretion of an authorised meat inspector have to be cooked or boiled due to measles being present in the meat.

Made this 25th day of October, 1974.

**J.J.M. NYAGAH**

**MINISTER FOR AGRICULTURE**

# SLAUGHTER GRADES U.S. GRADES (QUALITY)

**PRIME** —



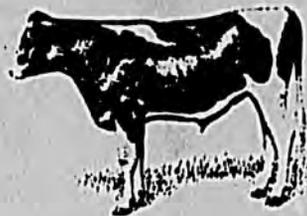
**CHOICE** —



**GOOD** —



**STANDARD** —



**UTILITY** —



COMMERCIAL, CUTTER, AND  
CANNER GRADES ARE OMITTED

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UNITED STATES STANDARDS  
FOR GRADES ARE AVAILABLE  
ON REQUEST

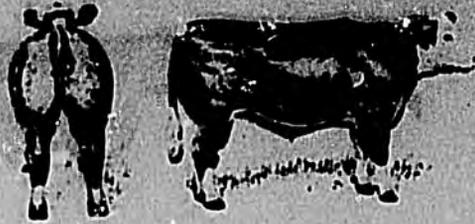
UNITED STATES DEPARTMENT OF AGRICULTURE  
CONSUMER AND MARKETING SERVICE  
LIVESTOCK DIVISION  
WASHINGTON, D.C.



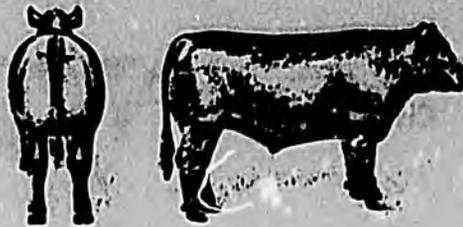
AUGUST 1960

**U.S. GRADING  
(YIELD)**

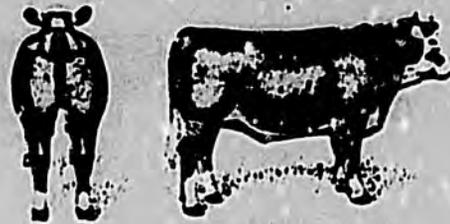
**YIELD GRADE 1 —**



**YIELD GRADE 2 —**



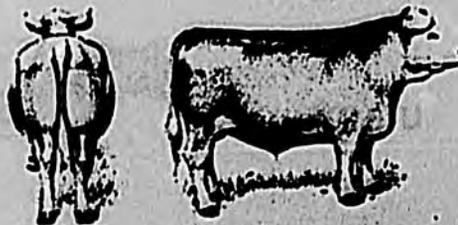
**YIELD GRADE 3 —**



**YIELD GRADE 4 —**



**YIELD GRADE 5 —**



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LIVESTOCK DIVISION  
WASHINGTON, D.C.



AUGUST 1953

**CHAPTER VI**

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**KMC MANAGEMENT STUDY**

## CHAPTER VI

### KMC MANAGEMENT STUDY

#### A. Introduction

The Kenya Meat Commission is a parastatal organisation run by a Board of Commissioners under the Ministry of Agriculture. It is engaged in the purchase, slaughter and processing of cattle and smallstock other than pigs. It markets meat products and by-products on the local and overseas markets. Recently it has concentrated on exports, leaving local sales increasingly to competitors.

In addition to these activities KMC has also been used as an instrument of government policy in regulating the livestock and meat industry.

KMC's head office is in Nairobi; there are abattoirs at Athi River, Mombasa and Nakuru. There is a depot in Nairobi.

Over recent years the annual turnover of KMC has fluctuated between £ 7 million and 11 million; it has fixed assets of the order of £ 3.5 million. It employs about 1,400 people. At Annex VI-1 is a table "KMC Performance 1971 to 1976" summarising the scale of KMC operations over the last 6 years. It is expected that KMC will show a profit for 1976. This profit is largely attributable to the accident of an unusually high throughput caused by a prolonged drought in the second half of the year; this expected result may not signify a change in the declining fortunes of KMC.

After this introduction there are seven further sections in this chapter, lettered and with contents as follows :

- B. Aims and role of KMC : Discusses the KMC Act, KMC's present role, and its proposed role.
- C. The controlling Authority : Functioning of an organisation to set policies for the livestock and meat industry.
- D. Line Functions : Operations, marketing and finance.
- E. Personnel and staffing levels : Establishments, personnel procedures.
- F. Management and accounting information and its processing : The information presented to the Board, organisation of records, the computer.
- G. Offices in Nairobi : Cost, effects, changes.
- H. List of Recommendations.

Throughout this chapter major recommendations are indicated and shown with ● .

## B. ~~Role and~~ Role of KMC

In this section the Act of Parliament establishing KMC is discussed, its present activities are looked at, its activities are contrasted to competitors', major recommendations are made affecting the role of KMC and a suggested aim for KMC is outlined.

The Kenya Meat Commission was established by Act of Parliament (Cap. 363) in 1950 "to purchase cattle and smallstock and to acquire, establish and operate abattoirs, meat works, cold storage concerns and refrigerating works for the purpose of slaughtering cattle and smallstock, processing by-products, preparing hides and chilling, freezing, canning and storing beef, mutton, poultry and other meat foods for export or for consumption within Kenya, and to confer exclusive rights upon the said Commission and for other purposes incidental thereto and connected therewith".

The Act went on to give KMC powers to regulate the operation of the meat industry in Kenya. It was required to be involved in the licensing of abattoirs, meat works etc.

KMC is thus a parastatal organisation which was brought into being as an agent of government policy on the meat and livestock industry. It was probably also intended as an agent of the large private producers in Kenya with the aim of providing a guaranteed market and price for their produce.

The Act provided considerable protection for KMC both in the domestic and in the export markets. In the domestic market the protection which KMC once enjoyed has virtually disappeared, licences having been granted to enable large numbers of operators to compete -- and to compete in such a way that KMC has been placed at a considerable disadvantage. This is brought about to some extent by the strictly controlled meat grading system which is operated in KMC and by the controlled prices at which it must buy and sell.

In the local market KMC concentrates on Nairobi, Mombasa and Nakuru. Its total share of these markets is estimated by KMC Sales Department as :

Nairobi	25%
Mombasa & Coast	20% (including ships)
Nakuru	20%
Elsewhere	minimal

Considering the size of its operations, KMC holds a disproportionately small percentage of the local Kenya market and is dependent for its existence on exports, mainly in the form of canned beef. Although various factors (political, operational and marketing) have at different times contributed to this situation it would seem that a very important single factor was the decision a few years ago, of KMC itself, to phase out of the local market and concentrate on export markets and the earning of foreign exchange.

Over the years and with the growth of a cash economy among the pastoral tribes, KMC has provided a guaranteed minimum price for low quality animals. In times of drought when it has been difficult or impossible to keep many of these animals alive KMC has acted as a buyer of last resort and in so doing has provided what has amounted to a national or social service which has perhaps been deserving of greater recognition than has been given.

In acting as a buyer of last resort in times of drought, KMC finds it has to use its operational capacity to the full as well as working considerable overtime. When a drought finishes it can find itself working at well below capacity for prolonged periods. So far it does not seem to have proved possible to procure an even throughput throughout the year so as to avoid carrying for long periods a wasteful excess of plant and manpower resources.

Throughout its existence KMC would appear to have been producer oriented in the way it has operated and in its Board composition -- over the years there has been a bias towards the appointment of distinguished politicians, government officials and producers. Experience in commercial and financial management does not seem to have been given the priority that might have been expected if KMC was to run as a viable commercial undertaking.

There are those who would like to see KMC operated as a profit making commercial enterprise, whilst others would prefer to see it providing as high a producer price as possible whilst accepting losses on the bulk of its meat sold on the local market.

In the past when KMC has had a good year the Board has tended until recently to vote for bonus payments to producers, these payments being in addition to the prices already paid. The creation or improvement of financial reserves by allocations from profits has not until recently appeared to receive any priority.

In purchasing livestock KMC is in competition with a rapidly increasing number of abattoir operators and local butchers, whose licences it is itself recommending. Local butchers supply the bulk of the local market; KMC supplies low quality meat for local use and for canning which goes mainly overseas. At the same time KMC endeavours to supply overseas markets and some local buyers with limited quantities of high quality fresh meat. KMC buys all livestock regardless of quality offered to it at minimum prices laid down by the Government. Its competitors on the other hand go out and choose the quality of animals they wish to buy and then negotiate a price.

KMC incurs annual expenditure of the order £1 million in paying the cost of transportation of livestock to its abattoirs. Its competitors do not incur this type of expense to anything like the same extent.

As a parastatal organisation KMC abides strictly by price control regulations; its competitors do not. The abstinence is operated to high cost international standards involving high overheads; its competitors have lower standards and overheads. Its salaries, wages and conditions of service are far above anything paid by its competitors.

In summary, it would appear that KMC's function as an agent of Government is incompatible with its viability.

- KMC should operate as a purely commercial, profit oriented organisation, not necessarily under the Ministry of Agriculture. To facilitate this KMC should be relieved of the role it is expected to play in the control and implementation of national livestock/meat industry policies.
- In order to make KMC viable the structure and composition of the Board should be altered to provide a commercial rather than a producer emphasis.
- A new body which could be known as the Livestock and Meat Industry Authority should be established. This Authority should be an instrument of the Ministry of Agriculture. It should perform the present regulatory role of KMC and in addition should assume wider powers in the control and direction of the livestock and meat industry.
- If politically acceptable, the possibility of selling KMC to the private sector should be investigated.

The primary aim of KMC in the new commercial role may be stated as follows :

"To market profitably a full range of meat (other than pork) products and by-products on the local and overseas markets."

Basic prerequisites to the achievement of this aim are :

A healthy and profitable national livestock industry.

Internationally acceptable standards of inspection and hygiene in all slaughtering and processing operations.

Sound pricing policies -- both purchasing and selling.

A high standard of professional management in the involving close coordination of purchasing, processing and marketing, as well as sound financial control, and also strict control of marketing departments.

## C. The Controlling Authority

A study of the regulation of the meat industry does not fall within the terms of reference of KMC management study. However, the necessity for removing the industry control function from KMC has been discussed, and a Livestock and Meat Industry Authority has been recommended to carry out this function. It is, however, appropriate here to outline a role for the Authority and to discuss its activities.

It is suggested that the purposes of the Authority be :

To formulate policies for the livestock and meat industries in Kenya.

To regulate the livestock and meat industry.

The Authority will not have operational functions within the industry such as

Livestock producer

Feedlot or background operator

Abattoir operator/meat packer

Meat wholesaler

Butcher/Meat retailer

Livestock trader or transporter.

The Authority may come under the control of the Minister of Agriculture. It may come under his direct control, or under a senior civil servant.

The Authority may be headed by a chairman. The most suitable person might be a senior civil servant in the Ministry of Agriculture, or a distinguished businessman. This is likely to be a demanding but part-time appointment.

The policy formulation function could well be achieved by people with appropriate expertise drafted to the Authority part-time, as members of panels or committees. These experts may be drawn from Government and non-government organisations such as

Ministry of Agriculture : Economic Planning Division, livestock production experts, Department of Veterinary Services.

Ministry of Finance and Planning : planning staff and Price Control.

Inspectorate of Statutory Boards.

Kenya External Trade Authority.

**Producers and their representatives e.g. KMC.**

**Abattoir operators.**

**Butchers.**

**Consumer organisations.**

The following are suggested as examples of areas where the Authority may become involved in the formulation of policy.

How large should the livestock population within Kenya be, what type of animals, what ages, produced in what areas, and by what methods?

What incentives can be used to attain this target animal population, how should producers be paid, what should offtake policies be?

What should be the pricing policies for wholesaling and retailing of meat? How should they be implemented? How should they dovetail with the rest of the agricultural sector?

Are the exports of meat and livestock areas which should be subject to government policy and continued high level monitoring (for example the quantity exported) and if so what should this policy be?

What should be the veterinary and health policies for the industry?

Which organisations should act as buyers of last resort in times of drought?

Is it essential to offer inducement to buyers of last resort; if so how should it be quantified and controlled?

Besides formulating policies, the Authority will also regulate sectors of the industry, such as abattoirs and butcheries. Under the aegis of the Authority, the Department of Veterinary Services may be encouraged to enforce more strict standards. This may prove a more workable method of control than the issue of licences.

#### **D. Line Functions**

In this section three line functions of KMC are examined : operations, marketing and finance. A re-grouping of functions and the appointment of three senior professional staff is recommended.

A great many of the present management team in KMC have not had the benefit of working under professional men for long enough. Most of them were moved up to their present positions when a number of senior people left KMC. Several of these managers appear to possess excellent technical skills. It would be a mistake to expect too much of them.

too fast and could be detrimental to their careers.

## 1. Operations

Each production unit operates independently of the other and reports directly to the Managing Commissioner. There is a Production Manager for Athi River, but as his title implies he has no influence upon production at Mombasa or Nakuru. The Managing Commissioner does not have the time to get involved in the detailed coordination of the production units, the number of which could always increase. He does not have the time to get involved in the vital and detailed coordination that is necessary between livestock purchase, production and marketing.

- A new post of Operations Director should be introduced. The following posts at present reporting to the Managing Commissioner should report to the Operations Director :

- Production Manager, Athi River
- Livestock Manager
- Chief Engineer
- Mombasa Manager
- Nakuru Manager

The Operations Director would be a professional meat industry man with long experience in the meat processing industry. He will probably have risen up through the fields of factory and production management and have gained experience in the coordination of livestock purchase and meat (canned and fresh) production. In consultation with the other senior departmental heads one of his main responsibilities will be the achievement of a steady level of throughput, to ensure the optimum use of the resources available.

At the present time the vast fluctuation in throughput militates against profitable operation. In times of drought the throughput at Athi River can rise to 1200 head of cattle per day, necessitating the working of considerable overtime and the employment of a large number of casual labor. Such periods can be followed by a drop in throughput to below 500 per day. At such times there is serious under-utilisation of plant and labor; unit costs become excessive. The same situation exists to a lesser extent in Mombasa where the maximum throughput capacity is 50 head of cattle per hour, working a 7 hour day.

If the right Operations Director is found and if he is given the necessary support, it should prove possible for KMC so to influence events in the livestock industry that a more constant throughput could be achieved than has proved possible in the past.

As is implied by the title, the Operations Director would be an executive director of the undertaking. Thus the post would acquire the benefit of the contribution of

experienced meat processing executive in the making of its policy decisions. A suggested Job Description for the Operations Director is given at Annex VI-2.

## 2. Marketing and Sales

The Marketing Department is responsible for sales within Kenya, the operation of a depot in Nairobi, and export sales. The department consists of 79 staff, 56 of whom run the Nairobi Depot, leaving 23 involved directly in sales and their administration, including shipping. It is headed by a Sales Manager, who reports directly to the Managing Commissioner.

In this section the level of activity of the Department is discussed, coordination with production is commented on and recommendations are made to re-direct the Department.

The present activities of the Marketing Department are almost entirely sales and their administration. The whole function is pitched at too low a level: the top level of activity, including for example the formulation of marketing strategy, is entirely missing. Little consideration is given to what KMC should be selling, how it should be presenting it, where it should be selling and what the market potential is. There is a complete lack of a realistic market plan. Sales tend to be made because a customer places an order, not as a result of active decisions by KMC on what to sell.

There is a lack of balance between sales and production. As an example of this, during 1976 stocks of fresh meat and canned corned beef built up at the main production plant at Athi River. Fresh meat reached a high point of 735 tons, which represents about 3.4 months production; cartons of corned beef reached 160,000 -- about 2.5 months production.

KMC appears to have little image in the local market. Its advertising is minimal, and it does not capitalise on latent goodwill towards an abattoir known to have high standards. Competition is likely to become more severe as Halal Meat Company starts operating in about April 1977.

- A Marketing Director should be appointed to re-direct and lead the entire marketing operation. He should formulate strategy and control market research and planning. He should also control the sales operation, through the Sales Manager.

A suggested Job Description for the post of Marketing Director is given at Annex VI-3.

There is little formal planning in the department. Apart from a budget figure available from the coming year's Profit Plan, there is no summary of expected sales over the next few months. The nearest to this is a list of export orders with approximate dates of expected shipment. There is no

As well as expected short term local sales. Future local and export sales requirements are at no point considered and discussed with Livestock and Production Departments.

- Weekly meetings should be set up between marketing and operations, at which short term production and sales plans should be agreed.
- A formal Sales/Production Plan should be discussed at each meeting. This should state by product what is expected to be produced and sold when, and should highlight anticipated differences between production and sales.
- A small Market Planning Section should be set up under the Marketing Director. The functions of this section should be
  - Preparation and updating of weekly and long term production/marketing plans
  - Collecting and custody of market information.

Throughout KMC the marketing thinking is "What can be done to prices to improve our margins?" Little thought is given to the concept of increasing throughput to lower unit costs.

- Use should be made of professional economists to guide KMC in its marketing strategy.

It is likely that this expertise could easily be made available when required either by the Ministry of Agriculture or by the Ministry of Finance and Planning.

The export sales effort of KMC is somewhat haphazard. With the exception of canned corned beef sales to the United Kingdom, no major sales penetration has been achieved in any one country. The sales of canned beef to U.K. would appear to be made now because they have been made in the past, not because this has been consciously identified as a profitable market. The volume of sales to U.K. appears to be determined by demand from existing customers, rather than by aggressive marketing policies by KMC.

As far as the administration of sales is concerned, there is room for improvement in the issue of instructions to production centers, in particular Athi River. There is duplication with the Accounting Section of some aspects of reporting sales. There is no formalised reporting of sales activities by salesmen, and there would appear to be a number of errors in the taking and processing of orders for the local market.

At present the Sales Manager becomes involved in great detail in sales administration. Consequently there is insufficient pressure on sales staff.

- The duties of the Sales Manager should be re-defined with emphasis being placed on the motivation and control of the sales force and on the exploitation of sales opportunities.
- A separate post of Sales Administrator should be set up, reporting direct to the Sales Manager.
- The Sales Administrator should be responsible for the routine administration of local and export sales and for collating salesmen's reports.

Mombasa sales in carcass form on the local market have dropped from 4,425 tons in 1971 to 586 tons in 1976. As a consequence a large quantity of meat from animals slaughtered in Mombasa is transferred at KMC's expense to Nairobi for sale in Nairobi or for processing. The Mombasa abattoir, with its capacity of 50 head of cattle per hour working a 7 hour day and with its high standard of hygiene, is in an excellent position to sell a large quantity of its high quality production at the Coast. The Sales Department does not appear to have used this opportunity.

- Effective marketing support for sales at the Coast of the Mombasa production should be given by the Marketing Department.

This need not necessarily mean the establishment of a sales office in Mombasa.

### 3. Accounts and Finance

At present there is an Accounts Department which is headed by a Chief Accountant who reports direct to the Managing Commissioner. There is a staff of 121 of whom 46 are at Head Office; 42 of the 121 staff are management not unionisable.

In this section accounting activities are discussed briefly and the lack of planning is commented on.

The accounting functions in Head Office are tangled and there are no adequate job descriptions to enable it to be seen who is responsible for what. There appears to be overlapping of responsibility between two senior posts, the Assistant Chief Accountant and the Financial Accountant.

There is duplication of work between Head Office and Athi River. Examples of this are that some parallel records of stocks are up-dated at both places and some product cost calculations are done independently and unnecessarily at both places.

- The accounting functions should be carried out by clearly designated sections.
- Each of these sections should have a senior member of the accounts staff in charge of it, who should report directly to the Chief Accountant. Job descriptions for these senior staff should be drawn up.

Elsewhere it is recommended that Head Office be moved to Athi River. When this has taken place it will become possible to eliminate duplication between sections. The accounting sections are then likely to be :

Stocks and Cost Accounts	- preparation of stocks and sales data, reconciliations, costings.
Debtors Accounts	- handling of debtor information, reconciliation of debtors.
Treasury	- cashier's functions, bank accounts
Salaries and Wages	- calculation and payment for all staff
Machine accounting	- processing all machine accounting data
Management accounts	- monthly accounts and management reports.

There is an utter lack of standardisation of accounting policies and methods throughout KMC, even to the extent that different codes are used for the same products in different places. There is no accounting manual and there is not even an up to date list of account names. This non-standardisation and lack of written instructions makes KMC dependent on very junior staff knowing exactly what to do, means that there is inflexibility in the use of accounting staff and makes it difficult to get information out of the accounting system. Also, as a result of this non-standardisation many more staff are employed than need be.

- An accounting manual should be drawn up.

Besides these accounting functions the Chief Accountant is also responsible for the Computer, Internal Audit and Purchasing.

Nearly all the activities mentioned so far savor of historical accounting. No staff in the Accounting Department have the time and direction to look forward. The planning and projecting of the cash position, even two or three months ahead, is utterly inadequate. The whole balance of the department is distorted and the study of the sources and

- A post of Financial Director should be set up to formulate and control the implementation of finance policies.

The holder of this post should have recognised professional accountancy qualifications and at least ten years post-qualification experience, of which a substantial amount should have been in industry. He will act as a catalyst in the financial planning of KMC and will also, through the Chief Accountant, control the day to day accounting activities. A suggested job description for the Finance Director is included at Annex VI-4.

### B. Personnel and Staffing Levels

At the end of 1976 there were 1409 permanent employees in KMC; of these 164 were management and 1245 unionised. During 1976 wages, salaries, overtime and casual labor cost about £1.2 million.

In this section staffing levels and costs, the concept of establishments, how to reduce establishments, job descriptions and various personnel functions are discussed.

#### 1. Staff Levels and Costs

Production management estimate that 500 permanent unionised staff are needed to run Athi River. At 31 December 1976 the total employed there was 967 of whom 887 were unionised. With a permanent staff of about 500 reinforced by something varying up to 350 casuals, whose deployment would vary according to production priorities, KMC production staff estimates that a throughput of 700 head of cattle (500 low grade, 200 high grade) could be achieved per 9 hour day. This would mean all resources being used to full capacity for a period of 8½ hours productive work per man and no overtime payments.

Various personnel statistics over the last 6 years are summarised in the table at Annex VI-1; staffing levels and costs are shown, and may be compared to throughputs. There has been a steady increase in numbers of management staff, whilst the number of unionised staff has been reduced by about 200. The total wage and salary bill has increased steadily, whilst production, with the exception of 1976, has gone down.

Significant information relating to overtime and the employment of casual labor is given. In 1976 the throughput of cattle was 70 percent up on 1975. With no increase in permanent unionised labor this was handled at an overtime and casual cost of about £108,000 above 1975. The ability to perform at this level of throughput during 1976 has brought this (per head slaughtered) costs down considerably. This would confirm that there has been gross overstaffing in years of average throughput.

... the total number of permanent employees at the various levels could probably be reduced from the December 1976 figures by not less than 300 and possibly by as many as 500.

If it is assumed that an ultimate reduction in permanent staff across KMC of 400 could be made, then at 1976 wage rates, with the reduction concentrated on staff at the lowest level each costing Sh 685.00 per month, the annual saving would be of the order of £160,000. If future wage and salary increases are taken into account, and on the assumption that the wastage is spread across all unionised and management staff, the saving could be as high as £270,000 per year.

## 2. Establishments

At present there are no authorised or agreed establishments for the various departments and sections. A report is produced by the Personnel Department every month which states actual strengths but makes no attempt to state how many people should be employed. A consequence of this situation is that there are no guidelines as to how many people are required to perform a particular function and no one at senior level really knows how many people with what skills should be employed in the different departments. In an organisation as labor intensive as KMC this sort of basic detail is vital.

- Firm establishments for all departments should be set up and procedures should be installed for reviewing and controlling these. Once established they should only be varied with the authority of the Board.

## 3. Freeze

It is recognised that it would not be politically acceptable for KMC to declare redundancies on a big scale and so a large reduction could not be achieved in the form of a single redundancy exercise. However, the normal wastage rate in a year is considerably in excess of 100 people; if an effective recruitment freeze could be instituted it should prove possible to achieve reasonable reductions and thereby considerable savings over a comparatively short period. We were informed that there is at present a recruitment freeze in operation and has been throughout 1976. Personnel Department records show a total of 127 employees left KMC during 1976 and yet the total strength was actually increased by 14. During a year in which there was supposed to be a recruitment freeze 141 new employees were engaged.

• In addition, the recruitment of permanent staff at any level should be authorized only by the Managing Commissioner, where the skills being sought are not already available within the workforce.

#### 4. Job Descriptions

There is a lack of adequate job descriptions for nearly all senior posts. Unless jobs are properly defined there is very little chance that full use will be made of the human resources available.

- Job descriptions should be written where they do not exist and those in existence should in many cases be amended and up-dated.

#### 5. The Personnel Function

There is not a sufficient understanding within the top management of KMC of the role that should be played by the Personnel Manager and his assistants. In an organisation as labor intensive and as sophisticated as KMC the Personnel Department must do more than deal with trade union and welfare matters, maintain personnel records and statistics and handle personnel problems.

A professional Personnel Manager is not just a keeper of records who also handles disputes and welfare. He is a Human Resources Manager and he is the expert adviser to the top management on how to make the best use of the human resources in the organisation.

In any industry line managers will tend to over-insure in the hiring of staff and in the authorisation of overtime. If they are not subject to tight and closely monitored controls, expenditure in this area will often get out of proportion. Whilst the accounts department will see to it that the correct accounts are paid as authorised by the Personnel Department and/or the line managers, it should be the responsibility of the Personnel Manager in consultation with line management, to agree whether the expenditure is justified in the first place. A line manager may indent for staff within his agreed establishment or he must put up a case to the Personnel Manager seeking to justify an increase in his establishment.

The Personnel Department of KMC does not seem to be in a position to control the case of overtime payments or of casual labor. In the case of the latter it merely complies with requests.

They like managers in KMC do not have to be held responsible for their responsibility. The responsibility for this kind of employment aspect of a job should be taken by the Personnel Department. Whereas disciplinary policies and procedures should emanate from the Personnel Department and personnel officers should be closely associated with and advise on disciplinary action to be taken, it is nevertheless in the end the responsibility of line management to take whatever action is required or be seen by the employees to recommend that it be taken.

- The personnel function should be given the broadest scope to use the various professional skills and tools (proper recruitment procedures, manpower development plans, staff appraisal, job evaluation etc.) so as to ensure the optimum economic use of human resources within KMC. To give the personnel function due weight, it should be headed by a director.
- Recruitment policies and procedures should be reviewed and up-dated and provision made so that no member of the management can authorise any recruitment in excess of approved establishments.

The adoption of such a recruitment policy would relieve senior members of the management from pressures which may from time to time be exerted by influential politicians and others to place this or that person in a job when in fact no genuine vacancy exists.

In summary, there is gross and costly overstaffing and the personnel procedures are inadequate.

- Consideration should be given to the part-time engagement of an outside consultant for a period of about a year to assist in the implementation of these recommendations.

In any organisation setting up firm establishments and strict personnel procedures can be a very sensitive and difficult activity. The necessary objectivity is usually better achieved by people with no involvement in the day to day running of the organisation.

#### F. Management and Accounting Information and its Processing

The key information used at present for controlling KMC is represented in the monthly reports for the Board and Managing Commissioner; this is discussed here at 1. Various accounting machines are used to process and hold information; this is discussed at 2. At 3. the Board's small computer is discussed.

## 1. Information Used for Control by the Board

Monthly reports are prepared by the Chief Accountant, Production Manager at Athi River, Sales Manager, Livestock Manager, Mombasa Manager and the Personnel Manager. In this section information is discussed and its deficiencies are noted.

### a. Financial Information

The Financial Report from the Chief Accountant usually consists of about 10 pages. The first two pages summarise month and year to date profits, budget and actual, and last year actual. The information is duplicated in that it is presented both in a tabular form and in a text; statements of differences between actual and budget are given, but there are no explanations.

The third page analyses the profits into a mixture of locations and functions (e.g. "Athi River", "Nakuru", and "Cut Beef").

The fourth lists actual head of animals slaughtered at different locations during the month, broken down by animal type and quality. It contains no comparison to budget or plan.

The next four pages show differences between actual and budget for various but not all locations and functions. No explanations of variances are given, no comparison with throughput is made and no distinction is drawn between fixed and variable costs.

The next page gives a table of cash inflows, outflows and balances. There is no comparison to a plan, no explanation of what might be unusual movements, and no comments on the healthiness of the cash position.

The last sheet summarises capital expenditure for the year to date. It states for each capital project the amounts authorised, the amount spent, and the difference. It does not state actual percentage completion, it does not state the estimated final cost if different from the authorised amount and it gives no indication of payment timings. The whole report is historical; not only does it report historical information, in many instances it makes irrelevant comparisons with the previous year's activities.

The Financial Report as it now stands is a most unsuitable tool for guiding the Board and top management in their policy making. On the one hand it contains far too much detail in some areas and on the other completely omits information which is vital to decision making in an industry where quick and sensitive responses to changing conditions must be made frequently.

Its most serious omission is the utter lack of statement of how much money SAC is likely to have

management in the future. It is a liability of the  
Board and make any informed decisions about things  
such as levels of sales, livestock procurement, and  
capital investment, with no guide whatsoever about what  
will be available.

The Report contains no information whatsoever on the  
deployment of funds -- it does not show for example how much  
money is tied up in either debtors or in stocks.

The Financial Report contains much elementary arithmetic,  
but no explanations of why the results are as they are.

- The Financial Report should be completely  
altered so that it becomes more forward  
looking and becomes a Finance Report and  
Plan.
- It should give considerable prominence  
to cash position now and projected, and  
much of the detail presented at the  
moment should be omitted from the  
Report, as it is available from  
supporting records.

b. Production Information

There are two main reports, one from Athi River,  
the other from Mombasa. Unlike the Financial Report the  
Production Reports give data for only the month concerned, not  
for the year to date.

The Athi River report usually consists of three pages of  
production figures and two pages of text explanations. It  
contains information about the amount of meat received from  
Mombasa, but there is no consolidation of KMC's production at  
various plants. It goes into considerably more detail than  
the Mombasa Report. There is no standardisation of layout  
of reports from these two production centers.

The Athi River report contains half a page about export  
sales; this is inappropriate and out of place as the  
Production Manager is not responsible for sales. The Mombasa  
Report also contains information about sales; this may be  
appropriate, as the Mombasa Manager may have some sales  
responsibilities. It also contains half a page about  
shipments; this is much too detailed and is definitely the  
responsibility of the Sales Manager, not the Mombasa Manager.

It appears as if the Mombasa Manager is currently  
responsible for cattle procurement at Mombasa and his report  
gives notes on this. Similar information is not given on the  
Athi River Report.

The text of the Athi River Report comments on stock  
levels; these comments are difficult to assimilate, as they

are not related to other figures in the report.

Neither report contains any projections whatsoever, and are not therefore altogether suitable for basing decisions on.

It is recommended elsewhere that an Operations Department be set up to control and coordinate, country-wide, both livestock procurement and production.

- The production reports should be replaced by a consolidated Operations Report and Plan giving details of procurement and production. This should contain projections as well as historical data.

c. Sales Information

A Sales Progress Report normally consisting of 5 pages is produced by the Sales Manager. This starts with 2 pages of text which summarise local and export sales, and comments on performance. This text is not sufficiently forward looking and does not set sales in the contexts of production and livestock procurement.

Three sheets of sales figures for the month are given. The first lists by country the quantities and values of some but not all products exported, and is much too detailed. The next sheet summarises local sales, by a mixture of places and functions, but with no totals. The last sheet appears to summarise the sales value and cost of all export sales.

- The Sales Report should be much more forward looking, and should dovetail with Finance and Operations Reports.

d. Livestock Information

A Livestock Report of one page is produced. This is mainly figures, actual and budget, of head of animals, with a few lines of explanation.

The Livestock Report neither contains any projections for the next few months nor does it contain any comparisons with production or marketing requirements.

- The separate Livestock Report should be discontinued when the Operations Department is set up. Its contents should be included in the proposed Operations Report and Plan and it should, like the other reports, contain projections as well as historical data.

e. Personnel Information

A Personnel Report of about 8 pages is produced. The first four pages give details of how many permanent employees are employed where, and in what departments. These figures are broken into three groups; management, ununionisable on incremental scales, and unionisable on basic rates.

The last four pages give by day the number of casual employees used in various departments.

Whilst the report is much too detailed for consideration by top management and the Board, at the same time it omits a lot of vital information. The report states how many people are employed, but gives no comparison to how many should be employed ("Establishment" is used erroneously to mean "actual number employed").

No comparison with a target establishment is given. The policy purports to be to allow natural wastage to reduce the actual numbers. There is no indication of what effect this should have on the numbers employed.

No summary across KMC's different departments is given.

The four pages about casual employees are almost meaningless, because the number of man-days is not compared to any workload, and no cost is given on it.

- A Personnel Report and Plan should be produced. It should compare actual numbers to establishment, and should contain projections of actual and establishment. It should summarise by place and by department. It should not contain the voluminous detail about casuals.

f. Summary of comments on Information used by the Board

The reports produced by the different heads of departments contain too much detail, are not sufficiently forward looking, lack many vital parameters and are not sufficiently consolidated. The data should be brought together in one department, probably the Finance Department, and presented in a standardised format incorporating department heads' comments. A suggested front page of a "Monthly Management Report and Plan" is given at Annex VI-5. Detail would follow on supporting pages.

2. What Information is Held Where

KMC has a range of accounting machines at various locations, plus a small computer in Head Office. Various parts of various systems are on different machines. There is considerable duplication of records. Some records are centralised for some locations but not for others.

This information is held in a separate system of information bases.

There is an extremely complex flow of information between the various machine records. There is no sequential data base and it would appear as if information is frequently processed at too early a point in the information system.

With this cumbersome system it is necessary to employ a large number of staff (there are 121 staff in the Accounts Department). Meaningful information for management tends to be late and to some extent suspect. The situation is complicated by duplication between Head Office and Athi River.

- A comprehensive survey of the information system of KMC should be undertaken. This survey should define in detail the information needs and should define the data base.

### 3. The Computer

KMC uses an IBM System 3 Computer with a CPU capacity of 12K; it has a multipurpose card reader and a 300 line per minute printer. This is a relatively small computer. It is at present used for about 2 hours per day, that is only 50 hours per month out of the 176 it can be used for before extra charges are incurred. The present rental is £1,200 per month. With the low utilisation this gives a high cost for a small machine.

The following systems are on the computer :

- Payroll for unionisable staff only
- Expenses Analysis
- Stocks valuation
- Stores System.

Currently programs are being developed to produce Slaughter Statements.

KMC made a mistake in renting a computer as soon as it did; with hindsight it now appears as if the KMC could have got better value by using bureau facilities for longer while experience was accumulated of using a computer.

With the exception of the Stores System and of the Payroll (a standard package which could have been run more cheaply elsewhere) the current computer applications are trivial. For example, the Expense Analysis uses figures of expenditure summarised on other machines, subtracts these from budget figures and produces variances from budgets. For stocks, totals from a system not on the computer are punched, multiplied by a cost and summarised daily. In both of these systems, Expense Analysis and Stocks, the volumes of data handled by the computer are very small. Little attempt has been made yet to

... where the volume or complexity of data could be reduced by computerization -- for example in the sorting of accounts, or in data to produce accounts, or in controlling product costs, or at a more sophisticated level, modelling livestock purchasing, production and marketing programs.

The system currently being computerised, the Slaughter Statement, is a bigger job to tackle than the systems done so far. However, it is noted that there is in existence a well thought out mechanised system, using NCR 400's, which has been used successfully for the last 6 years. Whilst these machines have broken down in the past, there is now a stand-by machine available; however, the machine manufacturers have disclaimed liability for breakdowns and KMC is being forced to get this system onto the computer.

KMC needs guidance on making the best use of its computer; at the moment it is little more than an expensive toy.

- A professional survey of the computer operation should be undertaken to help KMC decide what systems should be computerised, how they should be computerised and when. This survey should take into account the manpower requirements of the department, the power of the computer and possible cost effective enhancements to the machine.
- Senior management of KMC should attend computer appreciation courses.

#### G. Offices in Nairobi

About 100 of the 1400 employees of KMC work at the Head Office in Nairobi; nearly half of these are accounts staff. 11,500 square feet are rented at Sadler House, at a cost of £22,000 per year.

The main center of activity of KMC is undoubtedly at Athi River, where there are about 950 employees. As a consequence of Head Office being remote from the main operation, there is considerable duplication of work, particularly in the accounting area. Additionally, senior staff very frequently have to visit Athi River, where many of the more important decisions are made. It has, for example, recently become a practice to have the regular management meetings at Athi River, not in Nairobi.

- KMC's Head Office should be transferred to Athi River.

To accommodate staff at Athi River an additional office with floor space of the order of 8,000 square feet is required. (The present office in Sadler House cannot be used efficiently, and a reduction in staff is needed.) The move to Athi River is likely, unfortunately, to prove unpopular with staff.

... However, the present split remains an expensive arrangement, which is more costly to KMC than the measurable payment of rent.

Some functions may require to be left in Nairobi -- for example the administration of Nairobi sales, and perhaps stores purchasing. These two functions are already operated from the Nairobi Depot, where, excluding Depot operations, there is considerable office accommodation, at the moment under-utilised.

The 1977 price for medium grade office buildings is about Sh 120.00 per square foot. (Medium grade is appropriate for Athi River -- 1.6 mm pvc paving, steel metal windows, bituminous felt roofing, no lifts.) The cost is likely to be of the order of £48,000. If no extra staff are housed at Athi River there will also be additional recurrent costs for staff transportation.

#### H. List of Recommendations

There follows a list of 33 recommendations for modifying the role and improving the operations of KMC. Some are clearly more important than others; some are in fact sub-recommendations of others or recommendations for implementing others. We believe all deserve consideration.

- KMC should operate as a purely commercial, profit oriented organisation, not necessarily under the Ministry of Agriculture and should be relieved of the role it is expected to play in the control and implementation of national livestock/meat industry policies.
- The composition of the Board should be altered to provide a commercial rather than a producer emphasis.
- A Livestock and Meat Industry Authority should be established which would control and direct the livestock and meat industry.
- If politically acceptable, the possibility of selling KMC to the private sector should be investigated.
- A new post of Operations Director should be introduced.
- A Marketing Director should be appointed to re-direct and lead the entire marketing operation.
- Short term production and sales plans should be agreed at weekly meetings between marketing and operations.

- There should be a formally approved Sales/Production Plan.
- A small Market Planning Section should be established.
- Use should be made of professional economists to guide KMC in its marketing strategy.
- The duties of the Sales Manager should be re-defined.
- A post of Sales Administrator should be set up and be responsible for routine administration of local and export sales.
- There should be more effective marketing effort for sales at the Coast.
- Accounting functions should be carried out by clearly designated sections.
- A senior member of the Accounts staff should head each section and should report directly to the Chief Accountant.
- An accounting manual should be drawn up.
- A post of Financial Director should be established.
- Firm establishments for all departments should be set up and procedures installed for reviewing and controlling these.
- An effective recruitment freeze should be instituted forthwith and remain in force until proper staffing levels have been established.
- Job descriptions should be written where they do not exist and those in existence should be up-dated.
- The personnel function should be given broader scope so as to ensure optimum use of human resources within KMC. To give the department the weight it warrants it should be headed by a director.
- Recruitment policies and procedures should be reviewed and up-dated.
- Consideration should be given to the part time engagement of an outside personnel consultant.

- The Financial Report should be revised so that it includes both historical data and becomes a Financial Report and Plan.
- The Financial Report should give considerable prominence to cash position now and projected and should omit much detail at present given.
- Production Reports should be replaced by a consolidated Operations Report and Plan giving details of procurement and production.
- The Sales Report should be much more forward looking and should dovetail with Finance and Operations Reports.
- The separate Livestock Report should be discontinued and instead should become part of the Operations Report and Plan.
- A monthly Personnel Report and Plan should be produced which should compare actual numbers employed against the establishment.
- A comprehensive survey of the information system of KMC should be undertaken.
- A professional survey of the computer operation should be undertaken to decide what systems should be computerised as well as how and when.
- Senior management should attend computer appreciation courses.
- KMC's Head Office should be transferred to Athi River

**CHAPTER VI**

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**ANNEXES**

Responsible to :

Managing Commissioner

Personnel Directly Supervised :

Production Manager, Achi River  
Chief Engineer  
Livestock Manager  
Mombasa Manager  
Nakuru Manager

Purpose of the Position :

To coordinate and direct livestock procurement and abattoir operation, so as to achieve the optimum throughput at each abattoir compatible with operational capacity and market requirements.

Tasks Personally Carried Out :

1. Formulate KMC's operational policies in conjunction with the management team.
2. Liaise regularly with the Marketing Director so as to keep yourself informed on all short, medium and long term market requirements.
3. Plan through the Livestock Manager the level and quality of livestock purchases so as to enable KMC to meet its marketing plan.
4. Plan and coordinate the production programs for all abattoirs so as to achieve optimum output consistent with operational capacity and market requirements.
5. Coordinate planned maintenance programs for all plant so as to ensure minimum dislocation of production whilst achieving maximum standards of plant efficiency and safety in all production units.
6. Prepare and implement staff development and training programs for the Operations Department, in consultation with the Personnel Manager.
7. In consultation with the Personnel Manager seek to achieve the optimum balance between numbers of permanent staff, overtime and casual labor.
8. As an executive director of KMC, advise the Board on operations policies and procedures necessary to ensure the achievement of the KMC's marketing plan.

**OPERATIONS DEPARTMENT FOR OPERATIONS DIRECTOR**

**Responsible to :** Managing Commissioner

**Personnel Directly Supervised :** Production Manager, Athi River  
Chief Engineer  
Livestock Manager  
Mombasa Manager  
Nakuru Manager

**Purpose of the Position :** To coordinate and direct livestock procurement and abattoir operation, so as to achieve the optimum throughput at each abattoir compatible with operational capacity and market requirements.

**Tasks Personally Carried Out :**

1. Formulate KMC's operational policies in conjunction with the management team.
2. Liaise regularly with the Marketing Director so as to keep yourself informed on all short, medium and long term market requirements.
3. Plan through the Livestock Manager the level and quality of livestock purchases so as to enable KMC to meet its marketing plan.
4. Plan and coordinate the production programs for all abattoirs so as to achieve optimum output consistent with operational capacity and market requirements.
5. Coordinate planned maintenance programs for all plant so as to ensure minimum dislocation of production whilst achieving maximum standards of plant efficiency and safety in all production units.
6. Prepare and implement staff development and training programs for the Operations Department, in consultation with the Personnel Manager.
7. In consultation with the Personnel Manager seek to achieve the optimum balance between numbers of permanent staff, overtime and casual labor.
8. As an executive director of KMC, advise the Board on operations policies and procedures necessary to ensure the achievement of the KMC's marketing plan.

13. Draw up and implement training programs for marketing staff, in consultation with the Personnel Manager.

Committee on Commodity Problems, Rome, July 1972

Director of Price Changes at the General Secretariat, Committee on Commodity Problems, Rome, July 1974

Investigation of Speculation Research Report, Technical Report, General Secretariat, Committee on Commodity Problems, Rome, February 1975

Mid Year Review of the World Economy, General Secretariat, Committee on Commodity Problems, Rome, July 1975

National Development Strategy, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Technical Staff Office, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Technical Report on the World Economy, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Technical Report on the World Economy, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Technical Report on the World Economy, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Technical Report on the World Economy, General Secretariat, Committee on Commodity Problems, Rome, July 1976

Review of the 250 Most Vulnerable for the Demand Programme for 1980, Committee on Commodity Problems, Rome, July 1977

Study and Development Project, General Secretariat, Committee on Commodity Problems, Rome, 1978

Study of Selected National Development Strategies, General Secretariat, Committee on Commodity Problems, Rome, 1978

Study of Selected National Development Strategies, General Secretariat, Committee on Commodity Problems, Rome, 1978

12. Draw up and implement training programs for marketing staff, in consultation with the Personnel Manager.

13. Draw up and implement training programs for marketing staff, in consultation with the Personnel Manager.

**MANAGEMENT REPORT AND PLAN**

July 1954

		July	July	Aug	Sept	Oct
		Month	Year to date			
<b>Profit</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Sales</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Intake purchased CDW '000 kg</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>CCB production '000 kg net</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Fresh meat production '000 kg</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Overdraft at month end</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Stocks at month end</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Debtors at month end</b>	actual	---	---	---	---	---
	budget	---	---	---	---	---
<b>Staff at month end</b>	actual	---	---	---	---	---
	estab- lishment	---	---	---	---	---

**Chief Executive's comments :**

**MONTHLY MANAGEMENT REPORT AND PLAN**

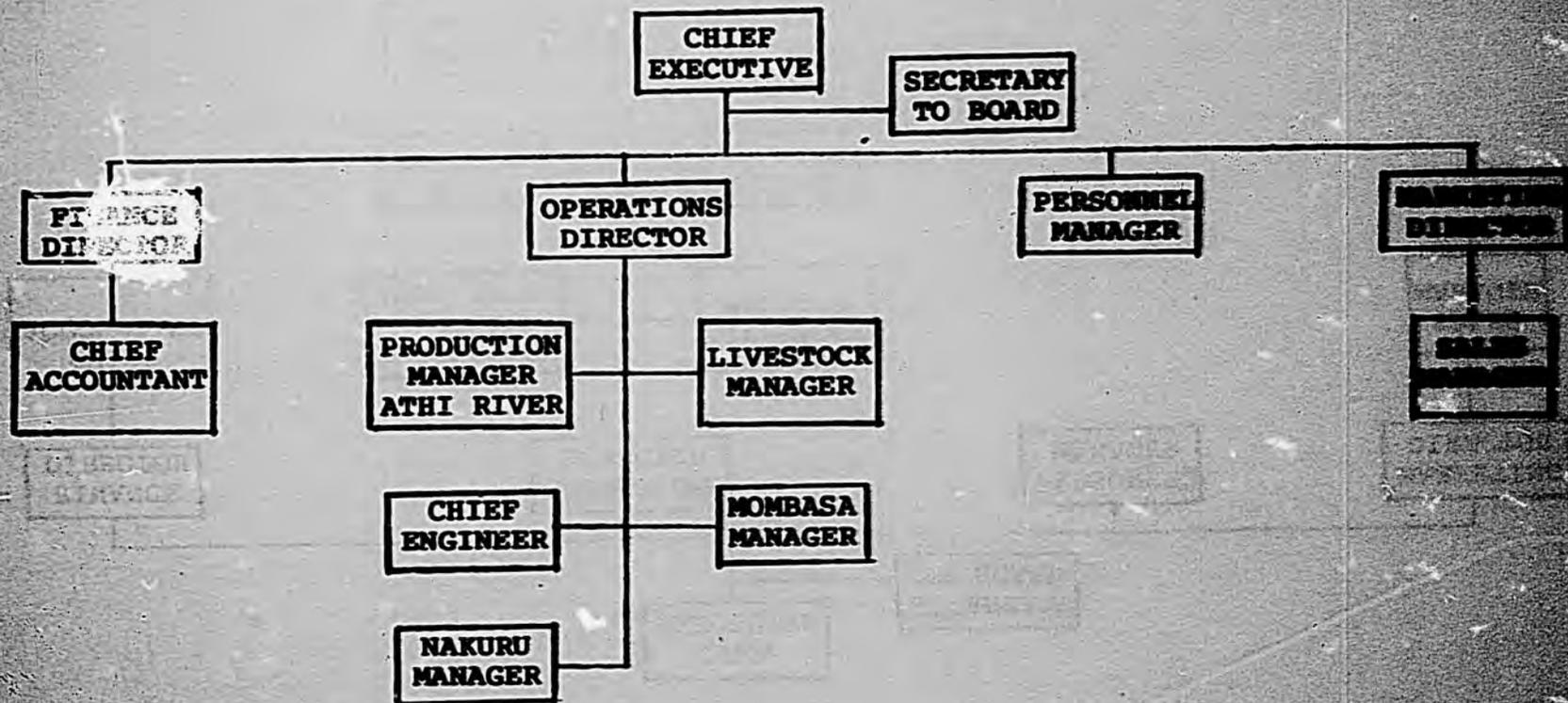
July 1953

		July	July	Aug	Sept	Oct
		Month	Year to date			
Profit	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Sales	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Intake purchased CDW '000 kg	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
CCB production '000 kg net	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Fresh meat production '000 kg	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Overdraft at month end	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Stocks at month end	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Debtors at month end	actual	~~~~~	~~~~~	---	---	---
	budget	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~
Staff at month end	actual	~~~~~	~~~~~	---	---	---
	estab- lishment	~~~~~	~~~~~	~~~~~	~~~~~	~~~~~

Chief Executive's comments :

ANNEX VI-7

PROPOSED ORGANISATION



This chart shows reporting relationships; it does not show seniority.  
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