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# THE MEAT PROCESSING INDUSTRIES OF SOME AFRICAN COUNTRIES/1

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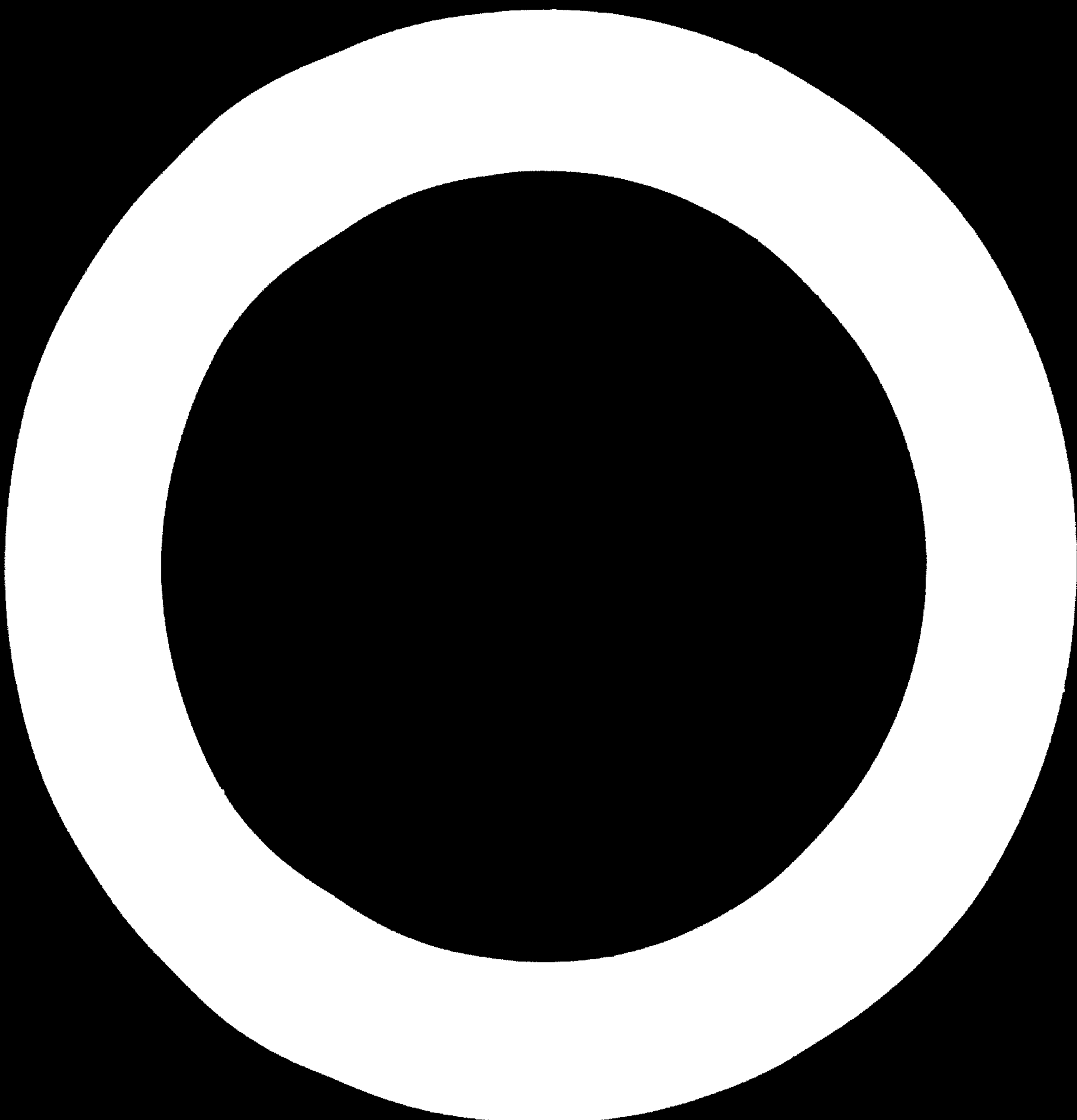

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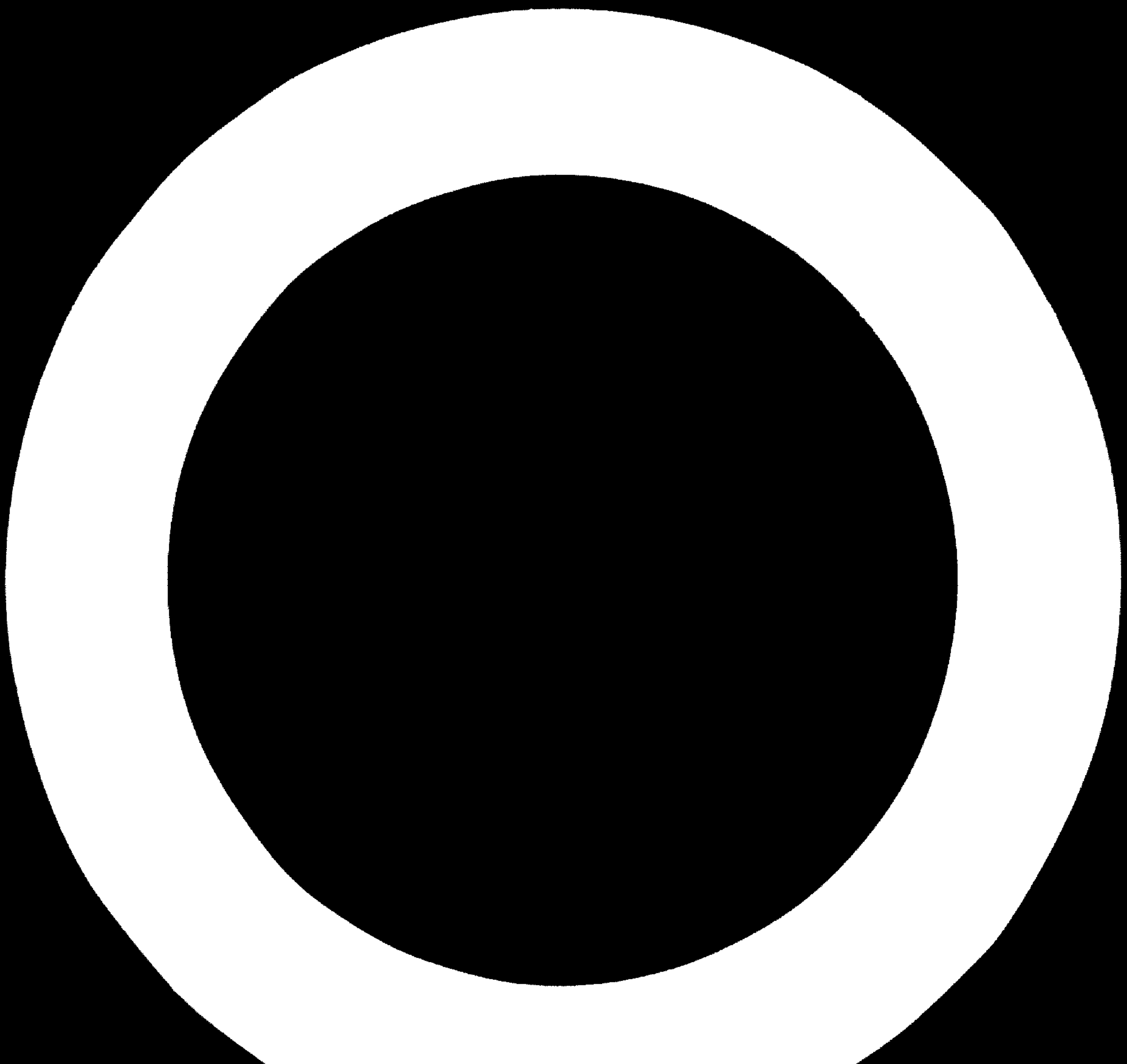

THE MEAT PROCESSING INDUSTRIES OF SOME AFRICAN COUNTRIES

INTRODUCTION

Agricultural development is a prerequisite for economic progress in any country, but notably so in the case of a developing continent such as Africa, where approximately 75% of the population (and more than 90% in some countries such as Tanzania) are engaged in agriculture (FAO Prod. Yearbook 1966). Agricultural development in Africa also implies improved livestock production, since livestock production for meat is an important facet of the agriculture of this continent.

According to FAO projections the production of meat in Africa will increase by 49% between 1970 and 1980 (from 3,313,000 metric tons to 4,942,000 metric tons), giving a rate of increase greater than the overall world rate, (FAO 1974). FAO have also projected a potential world meat deficiency of 2,156,000 metric tons by 1980. (This projection was made in 1970/71 and the situation has altered considerably since that time. This figure is probably too high but to the authors knowledge the projection has not yet been renewed). Thus the potential long term advantages in meat supply present an opportunity for Africa to improve the utilisation of her resources and hence increase meat production. The potential for earning foreign exchange is substantial while at the same time the supply of animal derived protein in the local diet could be increased. Before Africa's agricultural and therefore, meat production potential can be fully realised, general problems such as those concerned with the development of water resources, livestock disease control, and human factors determining and limiting land use, have to be overcome. These problems of course vary in their exact nature and intensity from country to country. Superimposed upon these problems are other problems more specific to individual countries and to meat processing industries in particular. This paper is concerned with the meat processing industries of four African countries, Botswana, Tanzania, Kenya and The Sudan, looking particularly at beef processing. An attempt is made to review the present state of the meat industries in these countries and to outline problems facing them. Factors specific to the meat processing industries, and those concerned with livestock production in general, are included, as problems affecting the livestock production also have serious effects on the meat processing industries.

Slaughtering and packaging beef for export is a rapidly growing business in spite of recent temporary setbacks in world trade. Between 1961 and 1972 world beef exports had doubled from 1.5 million to more than 3 million metric tons. Cattle based meat accounts for about two thirds of African meat output (Mittendorf and Wilson, 1961). Beef is also the only meat which developing countries export in large quantities. Beef exports are an important source of employment, government revenue and foreign exchange for many of these countries (Simpson and Farris 1975).

Of the four contries chosen for this study, Kenya, Tanzania and The Sudan are amongst the 10 most important producers of cattle in Africa (FAO, 1974). While Kenya and Botswana are amongst those countries where the modern sector is relatively important in livestock production, Tanzania and The Sudan are amongst those where the traditional sectors are predominant.

Botswana, Kenya and Tanzania are amoung the main meat exporting countries of Africa.

The term meat processing is extended in this paper to include the slaughter and dressing of meat animals and all subsequent stages in the treatment of the meat. The data presented in this paper was collected from various government bodies in Botswana, Tanzania, Kenya and the Sudan, which were visited in August and September 1975.

## SUMMARY


Livestock production for meat is important facet of agriculture on the African continent. The processing of meat as a fresh, chilled, frozen or canned product, is of considerable importance in many African countries, both as a source of animal protein for local populations, and as an export commodity which provides foreign exchange earnings.

This survey describes the meat processing industries of four African countries, Botswana, Kenya, Tanzania and The Sudan and the various problems confronting the meat industries in these countries are discussed. The survey is of necessity brief due to the very limited time available for the collection, collation, and presentation of data. The main emphasis is on beef processing, although the processing of other kinds of meat is also mentioned.

Kenya, Tanzania and the Sudan are amongst the ten most important producers of cattle in Africa, while Botswana, Kenya and Tanzania are among the main meat exporting African countries. The meat processing industries of all four countries suffer indirectly, to varying degrees, from the adverse effects on the livestock of pre-slaughter factors such as poor management nutrition, disease, and climate. Low rainfall is one of the most important of these factors. The transport of livestock to processing centres presents problems, particularly in The Sudan. In Botswana there is a need for the development of transport systems for meat exports, especially to other African countries.

Each country under study has large numbers of local rural abattoirs, with very low throughputs and few or no modern facilitities, and one or two large abattoir factories with modern facilities usually situated near large urban centres. In Tanzania and The Sudan more modern abattoirs, some for export purposes, are being constructed. Sudan especially has an urgent need for these facilities, and all four countries have a need for improved local slaughtering, meat storage and transport facilities.

Kenya and Tanzania process beef as far as the canning stage (the major product in each case being corned beef), Botswana produces chilled and frozen boneless beef in addition to carcass meat, while The Sudan at present produces only chilled carcass meat. In the latter two countries both mutton and goat meat is an important export commodity.

The meat export industries of Kenya and Tanzania, which relied heavily on European markets, have suffered badly due to the recent world beef surplus (which includes corned beef). Botswana was able to divert more of its exports to South Africa while The Sudan was fortunate in having reliable markets in the Middle East.

The expanding markets of the Middle East offer particularly good prospects for future beef exporting enterprises. Expanding African markets offer considerable scope for future intra African trade.

## CHAPTER I BOTSWANA

### A. THE COUNTRY, LIVESTOCK PRODUCTION AND MARKETING

Most of Botswana is flat, desert or semi-desert and shortage of water is the biggest hinderance to agricultural development, the potential for which is considerable. There are 232.2 cattle units per 100 people and 2.37 cattle units per square kilometer in Botswana. This semi-arid country is sparsely populated both by humans (80% of whom live in the East where the rainfall is highest) and animals. It is, however, a relatively important cattle country having by far the greatest number of animals per inhabitant on the African continent.

The cattle population of Botswana is approximately 2,300,000 and that of goats and sheep, is 674,000 and 306,000 respectively (FAO, 1972). About 50% of the cattle in Botswana are owned by traditional tribal farmers, and the other 50% are owned by freehold farmers. Cattle are of the Bos Indicus type, the major breeds being Africaander, Tswana and Tuli. Some exotic breeds such as Simmental and Brahman, are being introduced. Most of the cattle are range grazed with a very small proportion being fattened on feed lots.

Approximately 90% of the cattle slaughtered in Botswana are handled by the Botswana Meat Commission (BMC) which gives a commercial offtake of approximately 7%. Animals are sold by Co-operatives and producers to the BMC, over the period 1971/1974 the proportion of cattle supplied to BMC annually by the Co-operatives has increased from 6% (10,000 head) to 13% (24,000 head), and between January and July 1975 the Co-operatives supplied 15.4% (19,300 head) (BOYD 1975). The Co-operatives play an important role in helping traditional farmers in the tribal areas to market their livestock more efficiently and help to circumvent speculation. The Botswana Livestock Development Scheme (BLDS) is a subsidiary of BMC, which has been set up to provide a more ready market for the tribal areas by establishing a large finishing ranch at Makalamabedi, which is now operational. Two others are planned to begin operation in Eastern Botswana in 1975.

The BMC buys its livestock on a quota system. Quotas are issued to producers and are not transferrable. However, application for grossly inflated numbers of animals for slaughter are received, which hamper the BMC in its efforts to allocate quotas in the best interests of producers. It appears that registered suppliers continue to apply for more cattle than they have got, with the object of obtaining a quota each month for all the cattle they wish to slaughter.
Speculators buy from producers who have not managed to obtain quotas. Some idea of the magnitude of the problem can be seen from the following figures for 1974.

Applications received (421,312): quota allocated (216,198 i.e. 51.5% approved). Number of head actually delivered (186,641 or 86% of the allocation and approximately 44% of the original applications).

The BMC is a non-profit making organisation, and any surplus is paid back to producers in the form of a bonus.

B. THE MEAT PROCESSING

All commercial slaughter in Botswana, which amounts to approximately 90% of the total national slaughter, is carried out by the BMC. This organisation is a statutory body, set up in 1965 to slaughter, process and market meat. The BMC has a large modern abattoir at Lobatse which produces frozen and chilled boneless meat for export in addition to carcass meat. The Lobatse abattoir receives water from the Nuane dam. Although rainfall has so far been adequate in the catchment area of this dam, a pipeline has been built linking the abattoir to the more distant and larger Gaberone dam, in case of future need.

Approximately 70% of the animals slaughtered by BMC are brought in by rail, 20% on the hoof, and the rest by road transport. Damage occurs during transit and an estimated 16,000 kg of beef (approximately 80 carcasses) were condemned in 1974 because of bruising. Although this is proportionately a small loss it represents an unnecessary waste. Much of the worst bruising occurred with the cattle which were brought in by road transport. The poor condition of the roads contributed to this, but bad driving, poor supervision of animals and bad design of trucks are equally to blame.

There has been a gradual increase in the annual throughput of cattle from 476 head per day in 1969 to 769 head per day in 1974 (Table 1). A peak occurred in 1973 giving a mean daily throughput of 965 head and a total annual throughput of 209,143 head of cattle. This was due to the drought conditions prevailing over most of the country. Tremendous pressure was placed on the plant which on some days slaughtered 1,200 head of cattle in addition to small stock. A shut down occurred in October for maintenance and repairs which reduced the killing days in 1973 to 217 as opposed to 227 in 1972. In 1974 throughput was restricted by veterinary authorities to 750 head of cattle a day, with a maximum processing speed of 80 carcasses an hour. It was considered that the plant was overloaded and operating beyond its capacity for most of 1973. It was also considered that overcrowding had occurred in the deboning areas by-products area and chilling rooms, with particularly heavy pressure on engineering and maintenance departments. The by-products department was operating for 24 hours a day, 7 days a week for long periods during 1973.

Modernisation is now taking place which includes the construction of a new freezer tunnel, carcass chiller block, and by-products plant. When the latter is completed it will facilitate the handling of animals found dead on arrival. When modernisation is complete throughputs of the order of 1,000 head of cattle will be possible without overloading the facilities. The severe drought conditions of 1973 also affected the weights of beef carcasses passing through the abattoir (Table 1). The mean cold dressed carcass weight (CDW) of 194 kg was the lowest since 1966, when similar climatic conditions prevailed. Conversely the very good rains in 1972 contributed to a very high mean carcass weight for beef of 207 kg, with the highest monthly mean reaching 214 kg. The proportion of cattle falling into the higher grades (super, prime, 1A and 1B) declined to 26.9% in 1973 as compared with 34.3% in 1972 and 33.7% in 1974 (Table 1).

In 1969 the Lobatse abattoir slaughtered more goats than sheep and this trend has continued up to 1974 when the number of goats slaughtered rose dramatically to 43,756 (Table 1). The throughputs of both sheep and goats dropped sharply in 1973. The Commission were not in a position to cope with them due to the record numbers of beef animals being processed, although there was a rising demand for goat meat and mutton in South Africa. Unlike those of the beef animals, the mean carcass weight of the sheep and goats showed no marked decline 1973.

Cattle are stunned by captive bolt pistol and are fed on to a moving line system, for bleeding and dressing, alternately from 2 continuously operating stunning pens. The dressed carcass generally reaches the cold store within 1 hour of the animal being stunned. Sheep and goats are stunned with electric tongs and are bled and dressed on a separate static line system.

The capacity of the deboning section increased from 300 carcasses a day to 900 carcasses a day after the installation of new freezing tunnel in 1974. The normal throughput level, however, is approximately 700 carcasses a day. The deboning operations are carried out on a moving line system. Deboned beef for chilling is vacuum packed using appropriate plastic wrapping material and then sent through shrink tunnels. The beef for chilling is taken from hind quarter cuts, consisting of rump, strip loin, fillet, topside, silverside and thick flank. Deboned frozen meat is taken from the forequarter cuts and wrapped in polythene bags, packed in cardboard boxes and blast frozen. Normally, it takes 12 hours for the beef to reach an internal temperature of -14°C to -18°C.

Since 1970 most of the beef has been sold as boneless chilled or frozen beef (Table 2). This has been exported to South Africa, The European Economic Community, Switzerland, Hong Kong, Austria, Zambia, Zaire, Ghana and Malawi over the past five years.

In South Africa the demand for beef has remained high, unlike the situation occurring in the rest of the world. Prices there have increased allowing the BMC not only to increase the number of animals slaughtered but to realize satisfactory returns. In recent years an increasing proportion of Botswana carcass beef exports have gone to South Africa, reaching a level of 100% in 1974 (Table 2). The sales of boneless beef to South Africa rose sharply in 1974 to 43.7% of the total exported. Because of the shortage of refrigerated rail trucks, road transport is used extensively for the export of beef to South Africa, and to the EEC via Capetown in South Africa. Up until 1973 the United Kingdom imported most of Botswana deboned beef both in the chilled and frozen state. Particularly large quantities were in fact sent to the UK in that year. In 1974, however, exports to both UK and other EEC countries were at first severly restricted, and then banned totally due to the large surplus of beef existing in European cold stores. Imports have been resumed to the UK this year. Attempts are being made to diversify the export market which has not been easy, due to increasing competition from other beef producing countries, especially for the Middle Eastern markets. These problems are compounded by other difficulties, such as the shortage of refrigerated shipping space, and lack of transportation to Zambian and Zaire markets.

The price of beef sold by the BMC has increased steadily since 1969, trebling its level by 1974 (Table 3). However, the price of goat meat which was lower than that of beef in 1969 was higher than the latter in 1974. The price of mutton has also risen and was just a little lower than that of beef in 1974.

The total quantity of offals processed has increased gradually since 1969. (Table 4). The ratio of offal produce per head of cattle passing through the abattoir decreased in 1971 and 1973, the reduction in 1973 reflects the inability of the over-stretched by-products plant to cope with the increase in throughput of the abattoir.

Prices of most by-products have shown an increase over the period 1969 to 1974, although the prices of both blood meal and carcass meal show signs of levelling off, while that of bone meal dropped. Ox gall and tail hair were marketed in 1974 for the first time, and showed very high return per kg. Horns have increased in value for the whole period since 1969. The price of hides dropped in 1974 but the price of goat and sheep skins continued to rise.

C. SUMMARY

The importance of rainfall levels in Botswana are reflected in the effects of the high rainfall in 1972 and low rainfall in 1973 on the carcass weights of the cattle slaughtered. In the drought year of 1973, the percentage of high grade cattle slaughtered was much lower, and more cattle than normal were sent to Lobatse, which had to operate at a level above its normal capacity, putting severe strains on the factory. Modernisation is being carried out and should greatly improve the capacity of the abattoir. Most of the livestock are delivered to Lobatse and much of the beef exported from Lobatse on a railway system which is not owned or run by Bot[illegible] This has created difficulties in that the amount of livestock truc[illegible]nd refrigerated trucks available are limited. Although Botswana's meat exports were affected by the European surplus of beef, a continuing high demand from South Africa provided Botswana with an alternative and nearby market when times were particularly difficult.

D TABULATED DATA



TABLE I BOTSWANA MEAT COMMISSION LIVESTOCK THROUGHPUT (HEAD) AND MEAN COLD DRESSED CARCASS WEIGHTS (kg)

| YEAR | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|
| CATTLE | 93,074 | 127,317 | 167,180 | 156,510 | 209,143 | 186,041 |
| % SUPER AND PRIME GRADES | 4.3 | 4.7 | 4.7 | 7.5 | 6.6 | 8.1 |
| % 1A AND IB GRADES | 28.4 | 25.3 | 22.7 | 26.8 | 20.3 | 25.6 |
| % 2nd, 3rd 4th GRADES | 56.7 | 61.1 | 64.4 | 57.5 | 64.6 | 57.7 |
| DETAINED | 9.2 | 8.0 | 7.3 | 7.4 | 7.0 | 7.0 |
| CONDEMNED | 1.4 | 0.9 | 0.9 | 0.8 | 1.5 | 1.6 |
| BEEF MEAN CARCASS WTS | 228 | 209 | 197 | 207 | 194 | 202 |
| SHEEP | 17,587 | 7,[illegible]27 | 16,625 | 8,096 | 4,240 | 14,989 |
| SHEEP MEAN CARCASS WTS | 19 | 15.5 | 16 | 16 | 15 | 15 |
| GOATS | 17,573 | 26,359 | 25,244 | 14,838 | 4,467 | 13,756 |
| GOATS CARCASS WTS | 20 | 17.7 | 18 | 15 | 16 | 16 |
| TOTAL BEEF (HEAD) EXPORTED | 91,786 | 126,164 | 165,669 | 155,151 | 206,477 | 183,148 |
| EXPORTS AS % OF TOTAL | 98.6 | 99.1 | 99.1 | 99.1 | 98.6 | 98.4 |

SOURCE, BOTSWANA MEAT COMMISSION, LOBATSE

TABLE 2 MEAT OUTPUT BY BOTSWANA MEAT COMMISSION (X1000 Kg) AND EXPORTS

| YEAR | 1969 | 1970 | 1971 | 1972 | 1975 | 1974 |
|---|---|---|---|---|---|---|
| CARCASS BEEF | 66,638 | 55,[illegible]19 | 59,961 | 51,969 | 32,215 | 68,330 |
| % OF TOTAL OUTPUT | 72.6 | 43.9 | 36.2 | 33.5 | 15.6 | 37.3 |
| DEBONED BEEF | 25,158 | 70,745 | 105,708 | 103,708 | 174,262 | 114,818 |
| % OF TOTAL OUTPUT | 27.4 | 56.1 | 63.8 | 66.5 | 84.4 | 62.7 |
| TOTAL CARCASS MEAT EXPORTED | 9,140 | 8,363 | 8,017 | 8,142 | 5,702 | 13,803 |
| % SOUTH AFRICA | 60.2 | 70.8 | 67.9 | 75.7 | 91.3 | 100 |
| % TO OTHER AFRICAN MARKETS | 39.8 | 29.2 | 32.1 | 24.3 | 8.7 | 0 |
| TOTAL BONELESS | 3,913 | 10,405 | 12,837 | 15,471 | 23,448 | 17,774 |
| % UK | 56.4 | 77.5 | 55.4 | 69.0 | 76.9 | 30.6 |
| % SOUTH AFRICA | 13.8 | 9.1 | 16.9 | 4.7 | 2.5 | 43.7 |
| % OTHERS | 3.7 | 6.2 | 20.3 | 12.0 | 6.8 | 7.5 |

SOURCE, BOTSWANA MEAT COMMISSION, LOBATSE

TABLE 3 MEAN PRICES OBTAINED PER MEAT SOLD BY BOTSWANA MEAT COMMISSION (RAND/Kg)

| YEAR | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|
| BEEF | 0.31 | 0.31 | 0.31 | 0.35 | 0.49 | 0.67 |
| MUTTON LAMB | 0.22 | 0.27 | 0.27 | 0.22 | 0.36 | 0.62 |
| GOAT | 0.28 | 0.18 | 0.18 | 0.27 | 0.46 | 0.79 |

SOURCE BOTSWANA MEAT COMMISSION, LOBATSE

TABLE 4 PRODUCTION (100 Kg) AND SALES (RANDS/Kg) OF BY-PRODUCTS BOTSWANA MEAT COMMISSION

| YEAR | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|
| Red Offal (Total) | 866 | 1126 | 1266 | 1609 | 1698 | 1844 |
| Rough Offal (Total) | 1682 | 1636 | 1848 | 1973 | 2405 | 2974 |
| Carcase Meal | 1186(R0.08) | 1967(R0.08) | 2606(R0.09) | 2480(R0.08) | 3202(R0.14) | 2980(R0.18) |
| Blood Meal | 328(R0.09) | 386(R0.12) | 360(R0.14) | 500(R0.14) | 302(R0.22) | 465(R0.25) |
| Bone Meal | 757(R0.05) | 1610(R0.05) | 2009(R0.06) | 2125(R0.[illegible]) | 2122(R0.04) | 2125(R0.05) |
| Hoof Meal | 7(R0.08) | 79(R0.09) | 100(R0.12) | 60(R0.12) | 85(R0.15) | 55(R0.25) |
| Horns | 95(R0.25) | 88(R0.35) | 71(R0.33) | 85(R0.32) | 35(R0.50) | 120(R0.66) |
| Tallow | 1313(R0.11) | 2101(R0.12) | 2272(R0.16) | 2156(R0.16) | 2968(R0.20) | 2795(R0.32) |
| Ox Gall | - | - | - | - | - | 49(R3.74) |
| Tail Hair | - | - | - | - | - | 71(R1.25) |
| Hides (Kg) | 2680(R0.19) | 3186(R0.18) | 3070(R0.21) | 3119(R0.27) | 3972(R0.39) | 3952(R0.37) |
| Sheep & Goat Skins (Nos1000) and prices per skin | 29(R1.19) | 23(R1.16) | 26(R1.20) | 15(R1.65) | 10(R2.05) | 95(R2.08) |
| Total Offal (1000 Kg) | 9990 | 12709 | 13184 | 15154 | 17645 | 18807 |
| Ratio of Offal Produced (Kg) per head of cattle | 101 | 101 | 79 | 97 | 84 | 97 |

SOURCE BOTSWANA MEAT COMMISSION

## CHAPTER II KENYA

### A. THE COUNTRY, LIVESTOCK PRODUCTION AND MARKETING

Kenya is a country of striking geographic and climatic diversity, more than three quarters of which is arid or semi-arid, particularly the north. Rainfall is highest in the coastal regions and central highlands, where it reaches levels of over 1,000 mm. per year, and lowest on the arid plains. Kenya has a very high human population density and 35% of the population occupies 10% of the area with consequent high pressure on agricultural land. Over four-fifths of Kenya is suitable for livestock production, with most of the cattle population occurring in the Central and Rift Valley provinces. There are 74.7 cattle units per 100 people and 12.36 cattle units per square kilometer (Hoffmeyr 1968). Like Tanzania, Kenya has large and very densely populated livestock areas and lies within the region of Africa which has the greatest concentration of stock diseases.

The cattle population was estimated by FAO (1972) to be 9,200,000 and that of sheep and goats 3,339,000 and ,000,000 respectively. The total Kenyan offtake for cattle is approximately 9% and approximately 30% for sheep and goats. The Kenya Meat Commission's offtake is approximately 2% of the total cattle numbers in Kenya representing between 14% and 24% of total Kenya offtake (Table 1). Cattle production is based on the East African Zebu and improved Boran, while a wide variety of exotic breeds (forming a small proportion of the total) are produced on large ranches. About 9% of the commercial slaughter stock in Kenya comes from traditional pastoralists in the range areas, who are usually nomadic or semi-nomadic. The rest of the cattle comes from commercial ranches, which rely heavily on the range areas for the production of immature stock for fattening.

Kenya currently has a disease-free zone containing more than half a million head of cattle, 376,000 of these being beef animals. A feed lot system was introduced in 1969 to improve the percentage of good quality cattle being produced, a factor which is important to the beef export trade. The system worked well during the first few years, when the price of good quality cattle was sufficient to provide financial incentive for farmers. Over the past 2 years, however, the price differential between the grades of cattle has not been sufficient to encourage the development of the system. This together with the inflationary rise in the cost of foodstuffs has caused the reduction in the number of feed lot enterprises.

The Livestock Marketing Division of the Ministry of Agriculture, undertakes to purchase livestock, mostly from settlement areas, and sell them to local butchers, Kenya Meat Commission (KMC) or at auctions. The majority of slaughter stock are still purchased by private traders for sale to KMC direct or to butchers. As a result of this there have been marketing problems especially in the North East province. In recent years there have been reports of cattle movements into Somalia where there are good markets. The extend of this trade is not known.

B. THE MEAT PROCESSING INDUSTRY

All large scale commercial slaughtering in Kenya is carried out by the KMC. This is a statutory institution set up for the slaughter, processing and marketing of meat. The KMC originally had four abattoirs, Athi River, Mombasa, Ngong and Nakuru. Two of these (Athi River and Mombasa) are large modern abattoirs, with the former carrying out meat processing as far as the canning stage. Ngong and Nakuru abattoirs have maximum throughputs of less than 30 head of cattle a day, and were handed over to municipal authorities in March and June respectively of this year.

The Athi River abattoir is a modern meat export factory which was extensively modernised in 1974, and is capable of a throughput of 750 head of cattle a day.

Animals slaughtered at Athi River arrive by a number of routes and originate mainly from the central area of Kenya. Over 60% arrive by rail while the rest are brought in by road and on the hoof. The throughputs for the year 1970 to 1974 are shown in Table 1.

Beef animals are stunned with a captive bolt pistol and dressing operations are carried out on a modern moving line system. All canning of beef in Kenya is carried out at Athi River, and most of it is processed as corned beef. The normal throughput levels are about 3,000 12 oz cans per hour. Throughput has varied in the past from 9,000 to 16,000 cans per day. Production of corned beef fell by 50% in 1973 but despite this, 27% of all beef carcasses processed by the KMC were used in its production (Table 2). The figures for 1974 are not yet available. An interesting feature of the figures given in Table 2 is the increasing percentage of sundries, (cuts etc.) that are included in the manufactured corned beef, and also the increase in the number of cans produced per 100 kg of cold dressed weight in 1973. Corned beef is exported mainly to the United Kingdom.

Mombasa abattoir is also a modern meat factory, modernised in 1974 (which amounted to almost complete rebuilding). The throughputs are relatively low, around 250 head of cattle per day. The cattle are brought in mainly from the Eastern and North-Eastern provinces on the hoof. Most of the cattle are trekked to Lamu where there are holding areas designed to accommodate 500 head. Cattle may be trekked for up to 6 months but controlled grazing along the route ensures that the live weight losses are kept to a minimum. From Lamu the cattle are taken by boat to the Mombasa abattoir. The yearly throughput for this abattoir is given in Table 1.

In 1973 and 1974 there was a decline in the number of cattle slaughtered by the KMC. The number of high grade cattle (fair average quality and above) accounted for 29.7% of all cattle slaughtered during 1973 as compared with 20.6% in 1974, and approximately 3% of the KMC cattle throughput was condemned in 1974 compared with 1.9% in 1973. (Table 1). The mean carcase weight of the cattle slaughtered by the KMC showed a marked increase in 1973 but no figures are available for 1974. The increase in number of high grade cattle with heavier carcasses from 1971 to 1973, was undoubtedly due to the introduction of the feed lot system. The reduction in the proportion of high grade cattle processed and the increase in the proportion of condemnations in 1974, can be attributed partly in the decline in the number of feed lots in the past 2 years, mentioned earlier. Another contributing factor was the drought in 1973/74. The KMC handles a small proportion of the sheep and goats slaughtered in Kenya, representing less than 1% of the total.

Although it occupies a critical position in the beef industry of Kenya, the KMC processes less than 20% of all beef produced (Table 1). Its operations are governed by the producer and wholesale price prescribed by the Government, and fixed annually. The producer prices fall within a narrow range, and have been implicated in the decline in throughput of the abattoirs, due to the lack of financial incentive for commercial beef production. The Government set up a range of wholesale prices, and the KMC sells at the minimum level in accordance with the policy of paying minimum prices to producers. KMC competitors are not bound by such price restraints. Consumer prices are difficult to control, since a considerable supply of beef for the home market does not pass through the Government and KMC system. In recent years, about 50% of the KMC beef production has been sold on the domestic market, and the other half exported. Corned beef is exported to the UK, fresh chilled carcass meat has been sold to Switzerland, and frozen boneless beef to Greece and Austria. Other export markets for beef are the Middle East, Hongkong and Zambia.

The high prices obtained for corned beef up to 2 years ago, helped to support the low price of beef on the domestic market. In relation to earnings, the price of domestic beef is one of the lowest in the world (Ministry of Agriculture 1975).

The 1974 exports of chilled and frozen beef declined from the levels achieved in 1972/73, as a result of the reduced total throughput, and the decline in the proportion of suitably high grade cattle. In 1973 10% went to the domestic market, 77.5% was used for canning and 14.5% exported as fresh chilled and frozen beef. (Table 2). From hides and skins records the total marketable amount of meat is in excess of 120,000,000 kg per annum in Kenya. The percentage of the total beef slaughtered by the KMC has declined steadily in the past 3 years, and there is every indication that it will continue to drop in 1975. The number of cattle slaughtered by the KMC abattoirs during the period January to June 1975 was 58,107 as compared to 83,304 for the same period in 1974, representing a decline in throughput of 30% whereas total slaughterings in the country showed no fall in the same period. At Athi River the throughput has dropped to between 250 and 450 head of cattle per day during the first six months of 1975, (Gray 1975). This represents an operational level of 33% to 60% of total capacity. The low throughputs during 1974 and the first six months of this year, are partly due to extension and modernisation work which has been conducted on the two main abattoirs, and the loss of the two smaller ones. Other major reasons are the pricing systems already referred to, and the world recession in beef sales. The latter has seriously affected the corned beef trade, which has in effect supported the fresh meat processing operations of KMC.

Both Athi River and Mombasa abattoirs have modern by-products processing facilities, which produce a variety of commodities including blood, meat, hoof and horn, bone and liver meal. Although the prices of most by-products showed a steady increase between 1971 and 1973 the volume processed by KMC declined (Table 3). Figures for 1974 could not be obtained. While hoof and horn meal is mainly exported, meat and bone meal are sold on the home market, where there is a big demand from livestock producers. Most of the cattle hides produced are wet salted with relatively small proportion being sold as green or shade dried hides. Over 50% of the wet salted cattle hides and wool-on skins are exported while hair sheepskins and goatskins are sold on the local market.

## C. SUMMARY

The problems being experienced by the Kenya Meat Industry are in the main part related to livestock production and marketing difficulties, and the world wide decline in demand for beef products.

Irregular marketing of livestock from the traditional pastoralists coupled with low prices paid to commercial producers have led to decreased throughputs. The lack of sufficient price differentials in the beef grading system, has not encouraged the development of feed lot systems, which have played a vital role in supplying high grade beef for the export trade. Over grazing and disease have reduced the quality of many of the animals marketed from the traditional tribal areas.

The corned beef industry is experiencing difficulties due to the low current world demand for corned beef, and concomitant international surplus of this commodity.

D TABULATED DATA

TABLE 1 CATTLE SLAUGHTER DATA F

IN KENYA (X 1000 HEAD)

| Year | 1970 | 1971 |
|---|---|---|
| Total for Kenya | - | 88 |
| % Offtake | - | 9.6 |
| K M C Total | 197 | 210 |
| % Offtake | 2.3 | 2.3 |
| % of total slaughters | - | 24 |
| Athi River | 127 | 137 |
| % K M C Total | 64 | 65 |
| Mombasa | 55 | 58 |
| % K M C Total | 28 | 28 |
| Nakuru | 5.5 | 6.3 |
| % K M C Total | 3 | 3 |
| Ngong | 8.9 | 9.3 |
| % K M C Total | 5 | 4 |
| Total K MC % FAQ Grade and above | 15.2 | 16. |
| Total KMC % Standard Commercial and Manufacturing grades | 83 | 82.2 |
| Total KMC % Rejects & Condemned carcasses | 1.6 | 1.8 |
| Total KMC Mean CDW* | 140 | 132 |

* C.D.W. Carcass Dead Weight

SOURCE , KENYA MEAT C

AGRICULTURE

. FOR THE M??T INDUSTRY
D) AND GRADE

| 971 | 1972 | 1973 | 1974 |
|---|---|---|---|
| 88? | 834? | 1035 | 1153 |
| 9.6 | 9.1 | 11.3 | 12.5 |
| 210 | 199 | 154 | 160 |
| 2.3 | 2.2 | 1.7 | 1.7 |
| 24 | 24? | 15 | 14 |
| 137 | 110 | 117 | 116 |
| 65 | 71 | 76 | 73 |
| 58 | 44 | 21 | 27 |
| 28 | 22 | 14 | 17 |
| .3 | 6.8 | 7.8 | 10.2 |
| 3 | 3 | 5 | 5 |
| .3 | 8.2 | 8.3 | 6.7 |
| 4 | 4 | 5 | 4 |
| .0 | 23.2 | 29.5 | 20.6 |
| .2 | 75.2 | 68.4 | 76.3 |
| .8 | 1.6 | 2.1 | 3.1 |
| 32 | 143 | 148 | - |

T COMMISSION & MINISTRY OF

TABLE 2 MEAT PROCESSING FIGURES

| Year | 1969 | 1970 |
|---|---|---|
| No of cans (x1000) | 11,134 | 10,661 |
| Canned (Kg x 1000) | 3,787 | 3,687 |
| Carcass (Kg x 1000) | 10,304 | 10,235 |
| Cans/100kg C.D.W.* | 108 | 104 |
| % Top Grades canned | 3.1 | 3.1 |
| % 3+4th Grades canned | 84.9 | 83.5 |
| % Manufacturing Grades canned | 8.8 | 8.1 |
| % Sundries canned | 3.2 | 5.3 |
| % All grades Canned | 37 | 37.5 |
| Beef Extract (Kg x 1000) | 150 | 144 |
| TOTAL MEAT MARKETED BY KMC (kg x1000) | 27,524 | 20,395 |
| Carcass Meat Exported (Kg x 1000) | - | - |
| Exported Carcass Meat as % of KMC total | - | - |

* C.D.W. Carcass Dead Weight

SOURCE, KENYA MEAT CO

…S FOR KMC FOR PERIOD 1969-1974

| 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|
| 10,844 | 11,888 | 6,903 | - |
| 3,687 | 4,042 | 2,347 | - |
| 10,422 | 11,683 | 6,234 | - |
| 104 | 102 | 111 | - |
| 3.0 | 5.0 | 3.0 | - |
| 83.8 | 76.2 | 76.1 | - |
| 6.3 | 5.9 | 4.4 | - |
| 6.9 | 12.0 | 15 | - |
| 38.4 | 36.3 | 27.4 | - |
| 140 | 153 | 94 | - |
| 27,316 | 28,217 | 22,968 | 22,546 |
| - | 3,745 | 3,351 | 3,021 |
| - | 13.3 | 14.6 | 13.4 |

…OMMISSION, NAIROBI

TABLE 3 PRODUCTION AND SALES OF BY-PRODUCTS (1969–73)
IN KG AND KENYA SHILLINGS PER KG RESPECTIVELY

| Year | 1969 | 1970 | 1971 | 1972 | 1973 |
|---|---|---|---|---|---|
| Commodity | | | | | |
| Edible Fats and Tallows | 17,55(7.9SH) | 1,672(9.6SH) | 1,868(10.2SH) | 2,101(10.5SH) | 1,793(10.7SH) |
| Meat Meal | 3,631(3.1SH) | 3,803(3.1SH)) | 4,094(4SH) | 3,325(5.1SH) | 3,021(4.2SH) |
| Liver Meal | 42(7SH) | 20(7.6SH) | 14(9.3SH) | 5(9.4SH) | 2(9.9SH) |
| Hoof and Horn Meal | 79(3.2SH) | 66(3.5SH) | 78(4.8SH) | 70(3.9SH) | 57(4.8SH) |
| Blood Meal | 202(4.9SH) | 189(5.2SH) | 140(8.4SH) | 247(7.7SH) | 157(7.9SH) |

SOURCE KENYA MEAT COMMISSION, NAIROBI

CHAPTER III TANZANIA

A. THE COUNTRY, LIVESTOCK PRODUCTION AND MARKETING

The United Republic of Tanzania has very densely populated livestock regions with more than three-quarters of the cattle population being kept in the highlands of the North West, in the higher rainfall areas. Similarly the human population spread is uneven. According to Hoffmeyr (1968) there are approximately 81.9 cattle units for every 100 people and 9.34 cattle units/km$^2$ in Tanzania. This country is in the region of Africa where producers have to contend with the greatest concentration of livestock diseases, particularly in the low lying, hot, humid areas where conditions are very favourable for ticks, tsetse flies and internal parasites.

The cattle population of Tanzania has been estimated at 13,400,000 and the sheep and goat populations to be 2,750,000 and 4,455,000 respectively (FAO Production Yearbook, 1972). The total current offtake of cattle, which is the aggregated numbers of animals which are extracted from the herd either by slaughtering or exporting to other countries, or by natural deaths, has been estimated at 1,185,000 animals/year (FAO,1973). This is about 9% of the national herd, compared to a commercial offtake of some 400,000 animals (including shipment to some neighbouring countries) representing some 3% of the national herd. According to Tanzania Hides and Skins Ltd., roughly 25% - 30% of total dry hides purchased in the country came from animals which have died of natural causes, which amounts to some 200,000 to 250,000 beasts. This would appear to indicate underutilisation of existing resources.

The bulk of the cattle slaughtered in Tanzania (99%) are E. African Zebu. This is a small, late maturing animal which is slaughtered at an average age of 4 yrs (range 1½ - 5 years). Cattle are produced in Tanzania mainly by traditional farmers, a relatively small proportion coming from commercial ranchers. The ranches are mainly owned by the National Ranching Company (NARCO) which is a subsidiary of the Livestock Industry Development Authority (LIDA). NARCO has 150,000 head of cattle on its ranches and The Sisal Cooperation, a government body, has 40,000 head. LIDA is an independent organization with a board of directors who are responsible to the Ministry of Agriculture. Plans are in hand to increase the number of ranch produced cattle and to institute feedlot finishing in Tanzania.

Officially all animals are marketed by the Livestock Marketing Company, also a subsidiary of LIDA, although there is invariably a certain amount of private buying and selling. The marketing system has been extended recently with more markets being established at a rural level. The Masai are also selling more cattle than was previously the case. (Newhouse, 1975).

Cattle are transported mainly by rail, (approx 90%) or by lorry, to Dar es Salaam for commercial slaughtering at the Tanganyika Packers factory. They can be trekked up to 300 miles along stock routes (up to 25 miles/day) before reaching the railway system.

The losses suffered in transit are large, and account for approximately 18% of the cattle purchased which is equivalent to 15,375 head/yr (Newhouse, 1975). Additionally, the average loss in liveweight of beef between purchase and delivery in Dar es Salaam, is about 15%. The former factor, particularly, represents a great loss of resources in terms of processed meat. The sale of cattle is encouraged in the wet season (April to August) when the animals are in relatively good condition but during the drought of 1974 more animals were sold in September-February. The Masai on the northern borders were mostly affected and 30,000 cattle were purchased from them alone during this period. Conversely when climatic conditions are relatively more favourable the volume of commercial slaughtering drops, due to the increased difficulty in purchasing cattle.

B. THE MEAT PROCESSING INDUSTRY

The largest abattoir factory in Tanzania, and the only one which processes meat beyond the fresh or fresh chilled meat stage, is the Tanganyika Packers factory at Dar es Salaam. In 1975 the Packers were completely taken over by the Tanzanian government and the factory is now controlled by the Meat Processing Company, a subsidiary of LIDA. The new abattoirs at Mbeya and Shinyanga will also come under this company. There are 60 registered local abattoirs in Tanzania, mainly at district headquarters and those at major settlements (1966 figure MLEDA 1975) Conwa [illegible] (25 head/day) and Sumbawanga are larger than the other local abattoirs and export fresh meat to Zambia. New abattoirs being constructed at Shinyanga and Mbeya are expected to have throughputs of 33,000 and 15,000 head of cattle respectively per year for export, consisting mainly of boned chilled meat for Zambia.

Approximately 220 cattle are slaughtered daily at the Packers factory for fresh meat (mostly for the Dar es Salaam market), and also about 350 head/day for canned beef production (giving a mean daily throughput of 570 head). Sheep and goats are not usually slaughtered at the factory. The factory is capable of slaughtering just over 1000 beef animals/day, working a double shift; normally slaughter is carried out at night when it is cooler. At certain times there has been acute difficulty in purchasing cattle and the throughput has dropped considerably. Cattle are slaughtered according to Islamic requirements, and are first electrically stunned. Stunning is effected by touching the animals (previously sprayed with water) with a 1" thick conduit pipe with a wooden handle through which 110 volts are passed. The circuit is completed through the metal floor of the stunning pen. Dressing of the carcasses takes place on an overhead rail system.

The slaughter of beef animals has fluctuated between 115,000 and 202,000 per annum in the period 1969-1974 (Table 1), a large number of cattle came on to the market in 1974 due to the drought. The proportion of animals slaughtered by the Packers of the total slaughtered in the country, has varied from 30% to 13 over the period 1969-1975. Live-weights, carcass weights, and dressing out percentages have all shown a steady decline over this period (Table 2). Insufficient and deteriorating pasture development and management has been put forward as a reason for this decline.

Also linked to this is the low proportion of higher grade carcasses passing through the abattoir (first quality, good average quality and fair average quality). The proportion of these carcasses has fallen from 2.97% of the total throughput in 1969, to 0.75% of the total throughput in 1974 (Table 3). The majority of beef animals (over 80%) passing through the Packers factory fall into the local average quality grade. First grade carcasses are derived from steers or maiden heifers of not more than four years of age. The maximum dressed weight must not exceed 295 kg and the minimum dressed weight must not be lower than 180 kg. Good average quality carcasses are derived from steers and heifers of not more than 5 years of age with a minimum dressed weight of 135 kg. Fair average carcasses are taken from steers or heifers, with no restriction on age, and a minimum dressed carcass weight of 125 kg. Attention is paid to the general conformation, fat cover and distribution in placing carcasses in these grades. There are no restrictions on age or sex for beef carcasses falling into the local manufacturing grade. This grade includes carcasses which have been released from detention by the meat inspectors. The reject grade includes carcasses which are not fit for either fresh meat consumption or first grade canning. There are three categories within this grade; manufacturing (dead or worm cysts), pet food (medication and live worm cysts) and fertilizer or meat meal (septic symptoms or tuberculosis).

The large proportion of old, low grade zebu cattle passing through the abattoir can cause problems in the production of corned beef. This product should have a minimum fat content of about 1[illegible] and usually has a fat content of 15%. The fat contents reached when processing zebu meat is sometimes below 10%. This problem is usually overcome by retaining fat from fatter carcasses ([illegible]ralyk, 1973).

Corned beef is packed in cases containing 48 x 7 oz cans - 9.53kg or 24 x 12 oz cans - 8.17kg. Other forms of canned meat are Hot Packs consisting of steak and kidney, savoury mince, braised steak and beef and beans. Hot Packs are also sold in two sizes large 24 x 16oz - 10.89kg and small 24 x 8oz - 5.44kg. Oxtail and beans and ox tongue are sold in cases of 24 x 16oz - 10.89kg. Most of the canned beef is produced as Corned beef (Table [illegible]).

The quantities of bone meal, meat meal and pet foods produced in 1974 were much higher than in previous years (Table [illegible]). This corresponds with the high level of condemnations in that year already referred to. The particularly poor condition of the cattle during 1974 was to a large extent due to the drought. In the period 1969-1975 prices for both meat products and offal products have risen steadily. The market prices of offal products have almost doubled in most cases including that of meat extract. The Packers have depended mainly on corned beef sales for their profits rather than on the sale of fresh meat (Nathco, 1975).

In 1974 one of the major export outlets was lost due to inadequate standards of hygiene. The factory is now being remodelled to overcome this difficulty and when completed, production of corned beef should run at 360,000 cases/year. At present the international market price for corned beef is low (approximately $11 - $12 per case) due to the surplus of beef existing in many countries. This international price is well below the break even price for the production of Tanzanian corned beef. Although production of corned beef in Tanzania is continuing at a normal rate, considerable quantities are going into storage. The current international price is expected to remain low until mid 1976 when most of the world stocks should have run down (Newhouse, 1975).

## C SUMMARY

The problems being experienced by the Tanzanian meat processing industries are partly due to livestock production and marketing problems and partly due to the world beef surplus. The difficulty in persuading the traditional farming sector, particularly the Masai, to sell their surplus cattle has been mentioned. When throughputs are reduced through lack of available cattle the cost of processing meat increases.

Disease and poor pasture conditions severely reduce the quality of the animals that are marketed so that a great many are lost, and a high proportion of those which do reach the factory are of poor quality. The canned meat industry, however, is experiencing particular difficulties due to the low price of corned beef brought about by the international surplus, and factory remodelling during inflationary times.

[illegible] TABULATED DATA

TABLE 1 [illegible] CATTLE [illegible] ANIMALS IN TANZANIA (1[illegible] [illegible])

| Year | [illegible] | 1[illegible]7 | [illegible]71 | 1[illegible]7 | [illegible] | 197[illegible] | Aug 15 1975 |
|---|---|---|---|---|---|---|---|
| Total | - | [illegible] | [illegible] | [illegible]* | [illegible]* | - | - |
| Regions | - | [illegible]7 | 31[illegible] | [illegible] | [illegible]5 | - | - |
| Packers | 1[illegible] | | [illegible]7 | [illegible] | [illegible]15 | [illegible] | 77 |
| Packers [illegible] of total | - | [illegible] | [illegible] | [illegible] | [illegible] | - | - |

* Out of the 1[illegible] regions, 6 in 1972 [illegible] 5 in 1973 have not submitted their slaughter figures. [illegible] were estimated by [illegible] the numbers slaughtered [illegible] annual [illegible] figure [illegible] of the cattle populations of the [illegible] in the [illegible] the figures [illegible] obtained.

TABLE 2 [illegible] LIVEWEIGHTS, [illegible] CARCASS WEIGHTS AND DRESSING OUT PERCENT [illegible] BEEF [illegible] PROCESSED AT THE TANGANYIKA PACKERS [illegible]

| Year | 1[illegible] | 1970 | 1971 | 1972 | 197[illegible] | 1974 | Aug 15 1975 |
|---|---|---|---|---|---|---|---|
| Liveweight up Country Wt (kg) | [illegible]7[illegible] | [illegible]71 | [illegible] | 26[illegible] | [illegible]5 | 22[illegible] | 207 |
| Factory Liveweight (kg) | 231 | 2[illegible] | [illegible]26 | 221 | 20[illegible] | 191 | 1[illegible] |
| Hot carcass weight (kg) | 116 | 1[illegible] | 116 | 11[illegible] | 10[illegible] | 94 | [illegible] |
| D.O. % * | 5[illegible].2[illegible] | 51.3[illegible] | 51.96 | 51.13 | 5[illegible] | [illegible]9.21 | [illegible].44 |

*Estimated as $\frac{\text{Hot Carcass Wt}}{\text{Liveweight}} \times 1[illegible]$

TABLE 3 CATTLE PROCESSED BY TANGANYIKA PACKERS FACTORY FOR FRESH AND CANNED MEAT

| Year | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | Aug 1975 |
|---|---|---|---|---|---|---|---|
| Fresh (x1000 head) | 5[illegible] ([illegible]) | 6[illegible](52[illegible]) | [illegible]3(6[illegible]) | [illegible]([illegible]) | [illegible]([illegible]) | 9[illegible]([illegible]6) | [illegible]1 |
| Canned (x1000 head) | 11[illegible](6[illegible]) | 52([illegible]) | [illegible]([illegible]) | [illegible](9[illegible]) | [illegible]([illegible]) | 10[illegible](9[illegible]) | [illegible] |
| 1st Quality (%) | - | - | [illegible].11 | [illegible].17 | .3[illegible] | [illegible].[illegible]2 | |
| Good Av Qual (%) | - | - | 1.1[illegible] | [illegible].76 | .63 | 0.1[illegible] | |
| Fair Av Qual (%) | - | - | 1.7[illegible] | [illegible].7[illegible] | 0.62 | 0.63 | |
| Low Av Qual (%) | - | - | [illegible]7.3[illegible] | [illegible]4.25 | [illegible].04 | [illegible].63 | |
| Condemned (x100 Head) | - | - | 13 | 25 | 1[illegible] | 34 | |
| Condemned | - | 6.3 | 9.7 | 14.13 | 8.9 | 16.62 | |

SOURCE TANGANYIKA PACKERS, DAR ES SALAAM

TABLE [illegible] PRODUCTION BY TANGANYIKA PACKERS

| Year | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | Aug 15 1975 |
|---|---|---|---|---|---|---|---|
| Total | | | | | | | |
| Fresh (Kg x1000) | 6230 | 7575 | [illegible] | [illegible] | 9918 | 8613 | 3997 |
| Corned Beef (Kg x 1000) | - | - | 2500 | 1659 | 933 | 3797 | - |
| Total Canned (Kg x 1000) | - | - | 2721 | [illegible] | 978 | 3929 | - |
| Bone Meal (Kg x 1000) | - | - | 866 | 1156 | 396 | 1261 | - |
| Meat Meal (Kg x 1000) | - | - | 555 | 711 | 531 | 877 | - |
| Sides (Kg) | - | - | 21 | 2 | 2 | 3 | - |
| Gall Stones (Kg) | - | - | - | 6 | 6 | 4 | - |
| Tallow (Kg) | - | - | 202 | 298 | 161 | 177 | - |
| Hoof and Horn Meal (Kg) | - | - | 85 | 95 | 61 | 28 | - |
| Oxtail and Bones (x1000kg) | - | - | 13 | [illegible] | 13 | 7 | - |
| Ox Tongue (x1000kg) | - | - | 26 | 31 | 13 | 18 | - |
| Fat Food Solid (x 1000 kg) | - | - | 22 | 36 | 21 | 43 | - |
| Beef ext (Kg) | - | - | 130 | 179 | 49 | 168 | - |

SOURCE TANGANYIKA PACKERS, DAR ES SALAAM

## CHAPTER IV. THE SUDAN

### A. THE COUNTRY, LIVESTOCK PRODUCTION AND MARKETING

The Democratic Republic of The Sudan is the largest state in Africa. In the South the rainy season lasts up to 8 months with 1500 mm rainfall, while north of Khartoum conditions are extremely dry, having a short rainy season in August having only 50 mm of rainfall. The Sudan lies in the Sahel strip the great savannah region of Africa. The population of The Sudan is small in relation to the size of the country with 50% of the people living in 15% of the area.

The cattle population of the Sudan has been estimated at 14,700,000 and that of sheep and goats 14,800,000 and 10,150,000 respectively (FAO Production year book, 1972). There are approximately 50.9 cattle units per 100 people and 2.83 cattle units per km$^2$ (Hoffmeyr, 1968). The vast majority of cattle and livestock are in the tribal areas. The cattle are all of the zebu type which includes the longhorned Nilotic cattle of the Sanga group and the Baggaras, Taposa, Mongalla and Butana zebus. The livestock are kept under nomadic or semi nomadic systems of management (OSSENT, 1965). A very small proportion of the cattle in The Sudan are kept on feedlots, and these cattle are mostly intended for export as live animals.

The approximate total offtake for slaughter cattle in The Sudan is 2.2%. These figures can only be estimated from figures collected from regional abattoirs and slaughter slabs. The offtake by Omdurman abattoir is approximately 0.4%. The average slaughter age for cattle is three to four years while some are slaughtered up to ten years of age. The majority of slaughter cattle are entire males.

Most of the livestock are brought to the Commercial Slaughterhouse at Omdurman on the hoof and some by rail. They can be trekked for up to 1000 km.

B. THE MEAT PROCESSING INDUSTRY

The only large commercial abattoir currently operating in The Sudan is the Omdurman abattoir near Khartoum. This abattoir provides meat both for export and internal consumption. There are 126 registered abattoirs and slaughter slabs in the Sudan which mainly belong to the Municipalities.

The Omdurman abattoir is under the control of the Animal Resources Division of the Ministry of Agriculture, and began to export meat in 1964. It is the only abattoir in The Sudan at present which has any cold storage facility. There are no freezing storage facilicities or boning operations. The annual throughput of cattle at Omdurman has varied between 30,360 head and 66,277 head from 1969 to 1975 (Table 1). During the 1974 drought the throughput dropped because the nomads took their cattle south, where conditions were relatively better. The lowest throughput occurs during August when the rains inhibit livestock transport. Omdurman abattoir handles about 23% of the cattle, 30% of the sheep, and 9% of the goats slaughtered in The Sudan. Slaughter takes place at night when it is cooler and usually finishes by about 5 a.m. The meat is taken by the retail butchers by 6 a.m. and is sold throughout the day. Only meat for export is chilled. The abattoir is built on one level and has large open ventilation spaces in the walls. Cattle are driven into the killing room where they are stunned with heavy blows on the head and neck (with an iron pipe). They are dealt with in groups of one or two dozen, and bleeding takes place on the floor. Flaying is carried out by hand and started in a cradle. Subsequent dressing is carried out on static rail system. Sheep and goats are shackled to a moving line in a separate slaughter area, and are bled without stunning, while suspended.

Camels slaughtered at Omdurman abattoir are effectively restrained by ropes and are bled without stunning, in a sitting position.

Neither liveweights nor carcass weights have been recorded at the Omdurman abattoir (or at production areas) in the past, although there are plans to do so. Carcasses are weighed by retail butchers but these weights are not collected by any government agency.

Bone and meat meal are produced at the Omdurman abattoir and sold to The Sudan poultry industry. Gallstones when found are sold privately by the abattoir workers to dealers who export them to the Far East.

A modern abattoir is being constructed at Kadero with Danish assistance. A livestock quarantine area has been developed near the abattoir site which can hold [illegible] cattle and [illegible] sheep. The abattoir is expected to begin operation in 1976 and will have a throughput capacity of 500 cattle and 2000 sheep/day working two shifts. The abattoir will have two levels. The upper floor will contain the goat and sheep slaughter hall, a freezing tunnel, eight 7 ton capacity chilling rooms, and a 25 ton cold store. The lower floor will have the cattle slaughter hall, a [illegible] ton capacity cold store, and a 80 ton capacity freezer store. There will be a separate by-products building nearby. Frozen and chilled meat will be taken by air to Libya, Kuwait, Egypt, Lebanon, The Gulf States, The Peoples Republic of the Congo, and Zaire. A second modern abattoir is being constructed at Port Sudan, and a third one is proposed for Nyala in Western Sudan.

Since 1969, a gradually decreasing proportion of the cattle slaughtered in The Sudan have passed through the Omdurman abattoir (Table 1). The proportion of cattle and sheep slaughtered at Omdurman in July 1974 to June 1975 (19.[illegible]% and 23.7% respectively), showed a marked decrease over those slaughtered during the previous year. (23.3% and 38.1 respectively). This was mainly due to the 1974 drought, the effects of which were masked to a certain extent by the figures being presented on an annual July to June basis (Table 1).

The number of camels passing through the abattoir in 1974-75 (439. head) showed a very dramatic drop compared to the number passing through in 1973-74 (1,067 head).

Live cattle, sheep and goats are exported to the Middle East through Port Sudan. The price for cattle has doubled since 1964, and increased by 1½ times for sheep and goats. Producer prices in Southern and Northern Kordofan Province and Southern Darfur Provinces have doubled for cattle sheep and goats between 1969 and 1975 (Table 2).

Beef is sold mainly as chilled hindquarters, with some sold as chilled half carcasses to the Middle East. While the export price of beef has risen steadily since 1964 it is still much lower than that for mutton, which has increased threefold over the same period (Table 2). In 1974 export prices were 0.34 Sudanese £/Kilo for beef, and 0.[illegible]8 Sudanese £/Kg for mutton and goat meat. From Table 2 it can be seen that proportionately much more mutton is produced than goat meat. The export of both the live animals and meat was stopped by the Government in 1974, in an attempt to reduce increasing local prices. Local prices for meat have remained high nevertheless, and in Khartoum at present they are approximately 0.65 Sudanese£/kg for beef and 0.75 Sudanese £/kg for mutton and goat meat.

Some years ago an attempt,which unfortunately failed was made to develop a meat processing factory at Kosti (Abdalla, 1972). This plant was designed to operate at an annual slaughter rate of 80,000 head of cattle and slaughtering was to take place over an 8-month period (Sept - March) The products of the factory were corned beef, meat, blood and bone meal extract tallow and wet salted hides. The corned beef was intended for export mainly to the United Kingdom. The factory was opened in 1952 and closed in 1957 due to continual financial loss. The highest throughput achieved was 30,000 head/year in 1953-54 declining to 12,000 head in 1956-57. The reasons for the failure are numerous but one of the main ones was the high price of slaughter stock. The policy of purchasing animals on a weight basis was not suitable at the time, the nomads did not bring their cattle in to marketing and weighing centres in sufficient numbers. The principal merchants purchased on a head basis paying extremely high prices to producers and the factory could not compete (Abdulla, 1972).

C. SUMMARY

In the livestock sector there is an urgent need for improved communications and transport. Improved stunning methods need to be investigated and implemented for the new export abattoirs, and also the existing abattoir at Omdurman.Research and development, related to the Sudan meat industry, already initiated, needs to be extended so that the industry can be developed on a basis of sound technical expertise relevant to The Sudan. In connection with this there is an urgent need for the collection of slaughter data on the animals passing through the large abattoirs. Finally a sound marketing policy needs to be worked out in relation to changing world market conditions, a task which is not easy for any country.

TABLE 1 ANIMAL SLAUGHTERINGS AT OMDURMAN ABATTOIR AND LOCAL ABATTOIRS FOR 1967-1974 (June-July)

| Year | 1967-68 | 1968-69 | 1969-70 | 1970-71 | 1971-72 | 1972-73 | 1973-74 | 1974-75 |
|---|---|---|---|---|---|---|---|---|
| Total Cattle (Head x 1000) | 284 | 284 | 358 | 360 | 380 | 315 | 320 | - |
| Omdurman Cattle & Calves (Head x 1000) | - | - | 88 | 90 | 86 | 73 | 62 | 64 |
| Omdurman % Total | - | - | 24.6 | 25.1 | 22.7 | 23.3 | 19.3 | - |
| Total Sheep (Head x 1000) | 873 | 645 | 912 | 810 | 800 | 86[illegible] | 834 | - |
| Omdurman Sheep (Head x 1000) | - | - | 258 | 248 | 246 | 302 | 197 | 104 |
| Omdurman % Total | - | - | 28.3 | 30.7 | 30.7 | 38.1 | 23.7 | - |
| Total goats (Head x 1000) | 170 | 110 | 146 | 144 | 145 | 145 | 160 | 191 |
| Omdurman goats (Head x 1000) | - | - | 11 | 13 | 10 | 17 | 21 | 20 |
| Omdurman % Total | - | - | 7.6 | 9.2 | 6.8 | 10.7 | 11.1 | - |
| Omdurman Camels (Total number) | - | - | 1193 | 750 | 486 | 806 | 1067 | 439 |

SOURCE MINISTRY OF AGRICULTURE, KHARTOUM

TABLE 2 SUDAN MEAT (x1000 kg) AND LIVESTOCK (x1000 Heads) EXPORTS AND CORRESPONDING VALUES IN SUDANESE £ PER Kg/Head

| Year | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cattle | 12 | 10 | 17 | 9 | 8 | 9 | 21 | 21 | 14 | 17 | 25 |
| Value | 24 | 29 | 30 | 30 | 31 | 34 | 36 | 40 | 41 | 44 | 69 |
| Beef (Kg) | 39 | 92 | 68 | 11 | 9 | 796 | * | 319 | 2752 | 11826 | 91682 |
| Value | 0.18 | 0.18 | 0.15 | 0.16 | 0.13 | 0.37 | 0.22 | 0.30 | 0.26 | 0.31 | 0.34 |
| Sheep & Lambs | 92 | 337 | 163 | 219 | 211 | 225 | 174 | 122 | 160 | 206 | 291 |
| Value | 9 | 8 | 8 | 8 | 9 | 9 | 9 | 9 | 10 | 11 | 14 |
| Goats & Kids | - | - | - | - | 8 | 3 | 4 | 0.9 | 0.8 | 2 | 2 |
| Value | - | - | - | - | .8 | 6 | .5 | 4 | 9 | 10 | 12 |
| Mutton & Goat Meat (kg) | - | 0.21 | 0.23 | 0.34 | 0.22 | 0.21 | 0.26 | 0.24 | 0.38 | 0.44 | 0.69 |
| Camels | 26 | 33 | 61 | 48 | 54 | 55 | 19 | 51 | - | - | - |
| Value | 58 | 54 | 60 | 62 | 59 | 63 | - | 47 | - | - | - |

* Figure not available

SOURCE MINISTRY OF AGRICULTURE, KHARTOUM

DISCUSSION

Africa has a great potential in terms of meat production, but although it has a cattle population which is greater than the United States of America, it markets less than a quarter of the beef (FAO, 1974). Botswana, Kenya, Tanzania, and The Sudan all have large and valuable livestock reserves, particularly of cattle, while the other forms of livestock are considerably under-utilised. Although Botswana has the lowest total number of cattle, it also has the greatest number of cattle per head of the population, and therefore a large potential surplus for marketing. Conversely, The Sudan has the largest total number of cattle and the lowest number of cattle per head of the population, but has particularly good potential for increasing this ratio in its wetter, less-developed, southern region.

Amongst the many factors limiting the increased off-take and utilisation of livestock for meat, particularly in Kenya, Tanzania and The Sudan, is the importance of livestock as an investment and insurance against hard times, and their importance in social customs and tradition. This is exemplified by the Masai of Kenya and Tanzania who have large numbers of cattle kept under deteriorating pasture conditions. In these circumstances it is extremely difficult to bring about improvements in the quality of the animals, although some limited progress is being made in this direction. In Kenya and Tanzania, the large range of endemic diseases present a particular problem.

Rainfall in all of the four countries and particularly in Botswana, which is mainly arid, is a vitally important factor in the meat and livestock industries. Although a large proportion of Botswana is suitable for beef production, and the low numbers per acre provide a great potential for increase, lack of water is a serious impediment.

The meat processing industries in all four countries, some more than others, were affected by the prevailing drought conditions in the 1973/74 period. In Botswana and Tanzania, the drought led to increased throughput at the abattoirs, severely stretching the capacity of the meat factory in Botswana. In The Sudan, the throughput declined during this time, as most of the producers are nomads and large numbers of them took their cattle south, away from the processing centre. A reduction of high grade cattle passing through the abattoirs was experienced in Botswana, Tanzania and Kenya. Reduced carcass weights were also experienced in Tanzania and Botswana (no figures are available from Sudan, or for Kenya, 1974). In Kenya, a contributory factor to the lower [illegible] in 1974 was a declining amount of cattle obtained from feed lots, which demonstrates the importance of a modern farming sector in the Kenya meat processing and export industry. In Tanzania, large throughputs of lean and near emaciated animals have caused problems, in that the meat from some of these animals contained too low a proportion of fat for corned beef production.

A scarcity of carriers for transport and the poor development and cost of transport systems imposes limitations on the marketing of beef in African countries. In Sudan especially, a large part of the nomadic human and animal populations are in inaccessible areas. In the other three countries, great reliance is placed on the railway system, particularly in Tanzania and Botswana. Botswana has the added difficulty of its railway system being owned and run by another country. Although this undoubtedly saves capital investment and running costs, the amount of rolling stock available is limited. Large numbers of cattle are trekked for long distances in the four countries and the provision of stock routes and holding grounds with dipping and watering facilities are essential; these are reasonably well developed in Kenya and Tanzania.

In all of these countries, the main meat processing industries are located near the large urban centres, which are not where the largest concentrations of cattle occur. The fact that in Tanzania, 18% of the cattle are transported by rail die, and those that arrive lose an average of 15% of their live weight, gives some idea of the problems involved in rail transport.

Tanzania, like Botswana and Kenya, is very dependent upon rail transport for bringing cattle in from the producing areas to the processing centre. Clearly, transport systems need considerable development and improvement although the financial costs involved would be high.

The existence of modern meat processing industries in African countries is of vital importance in terms of foreign exchange earnings, notably in Botswana where beef is a major export commodity. Also, the demand for meat within Africa is increasing. The fast-growing urban centres, with developing concentrated mass markets, offer a particular challenge to meat processing industries to produce and market better processed and packaged meat. There are great opportunities for intra-African trade in meat products although transport problems arise in many cases. Zambia is one of Africa's main importers of meat, and although Botswana has sent meat to this country, it has experienced problems in the shortage of suitable transportation. Kenya has in the past been the largest source of meat for African markets (FAO, 1974). Of importance to the meat export industries of Kenya, Tanzania and Botswana was the difficult period experienced in world meat trading in 1974. From an apparent world shortage of beef two years ago, and constantly escalating beef prices, there has been a great reversal with massive surpluses of meat and falling prices, particularly in Europe which has been one of the most important beef importing areas. The reasons for this surplus are well documented, but it has demonstrated the danger to the economies of some African countries, where a highly developed industry is closely linked and dependent on a few foreign markets. Particularly hard hit were the meat processing export industries of Kenya and Tanzania, who for years had made substantial profits on their corned beef trade. Botswana was lucky in finding an alternative market in South Africa 'on its doorstep', and Sudan traded mostly with the Middle East which continued to take its exports. Intra-African trade should be developed and less reliance placed on traditional outside markets, it is likely that West Africa will provide ready markets for intra-African trade in the future. Intra-African trade in meat and meat products has so far not advanced rapidly because of a number of constraints. These include inadequate transport (of Botswana's meat exports to Zambia already referred to), a lack of trade contacts and insufficient marketing and processing facilities. Per capita consumption of meat in Africa is among the lowest in the world (UN Economic Commission For Africa Report, 1974). With concerted efforts livestock production could be increased and the processing costs reduced, thus enabling Africans to increase their protein intake.

In addition to the diversification of export markets, there is a need to diversify the type of meat produced. African countries have concentrated mainly on beef production, while there is a great demand for goat meat in the Middle Eastern Gulf states particularly, and for mutton in the Middle Eastern States, such as Saudi Arabia and Kuwait. While Sudan is exploiting this demand, Botswana responded to a lesser degree to the increasing demand for goat meat in South Africa. Goat meat is often preferred to beef in the rural areas of all four countries. In Sudan, and in parts of Tanzania, Kenya, and in Botswana, it is more expensive than beef, being twice as expensive as beef in Sudan. Bearing in mind the well documented production advantages of goats in the tropics, this under-developed resource should not be ignored. Less conventional animals such as game animals should not be ignored in certain areas, although they are unlikely to make a major impact on any meat industry.

A recent analysis (Simpson and Farrel 1975) suggested that a country shipping all of its beef products derived more financial benefit in terms of foreign exchange per animal slaughtered, from sales of extensively processed beef, such as cooked and corned beef, than from chilled quarters. The profitability on the corned beef industry for Kenya and Tanzania up to 1974 would appear to confirm this. Moreover, in times of world surpluses, corned beef is a relatively easy and cheaper product to store than fresh beef.

With the development of meat processing industries in African countries, there is need for continual appraisal and improvement of hygiene conditions, especially in the face of stringent conditions recently imposed by the major meat importing countries. In Sudan, particularly, there is urgent need for modern abattoirs, cold stores and freezing facilities. There is also a greater need for better marketing expertise in the countries concerned. Further processing of condemned meat and offal into pet food (as practiced in Tanzania) and other profitable by-product commodities, enhances the commercial viability of a meat processing industry. In Sudan carcass meal is used by the poultry industry, thereby saving importation of expensive feeding stuffs.

Although this paper has dealt mainly with meat exports, since the processing industries in the developing countries studied were mainly concerned with this, the importance of improved meat production and processing in urban and rural areas must not be overlooked. In all four countries at this level, there is a great need for more and improved local abattoirs, and for trained local personnel. This would enable the local populations to derive nutritional benefits, in terms of hygienically prepared meat, from increased offtakes from livestock populations.

There are many problems to be overcome concerning meat processing industries, some of which are common to all countries, others being more specific. In all cases, however, the development of a meat industry should be a fully integrated procedure at all levels, from rural to central processing, making full use of all livestock breeds and species available.

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