ENVIRONMENT AND THE PRODUCTION AND SUPPLY OF BEEF CATTLE IN UGANDA.

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A thesis submitted for the degree of Ph.D. in the Faculty of Science in the University of East Africa, 1968.

MAPS. The author wishes to apologise in advance for the very variable nature of the Xerox prints. Some maps, such as Annexe 1. lost a great deal of detail in reduction. To some extent it is unfortunate that the period of reproduction coincided with the transfer of the photographic section.

bution of various social and cultural attitudes and the regional differences in livestock type.

Section 3. The characteristics of the production and supply of beef cattle in Uganda are described in detail. Information is provided on the types and distribution of cattle markets in Uganda, the modes and volume of movement of slaughter stock from Ugandan and foreign sources and, the extreme variability and unreliability which characterises supplies from the traditional sector at the present time. To conclude section 3, a detailed case study of the cattle marketing system of Acholi district is presented.

Section 4. The fourth section analyses from the point of view of the human and physical environment the characteristics described in section 3. This fourth section restricts itself to the traditional sector only. Before commencing the analysis however, a series of 'Cattle Economies' are mapped and described. These are a series of regional

ABSTRACT

Section 1. The distribution of cattle in Uganda. The factors considered to be influential in explaining the present distribution of cattle are described and are:

a. The distribution of bovine and human disease.
b. The distribution and density of human population.
c. The various social attitudes and subsistence requirements related to cattle.

Section 2. The pastoral background is described and mapped in section 2. The description is brief and designed to fit later detailed regional studies into the national picture. Elements studied include the natural water resources, the distribution of bovine disease, the distribution of various social and cultural attitudes and the regional differences in livestock type.

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groupings which are significant to an understanding of the patterns of production and supply in the slaughter cattle trade. The 'Economies' are used as a framework upon which the later analyses are based. The four economies in the traditional sector are:

a. The Pastoralist (Zone 'A')
b. The Pastoralist-Cultivator (Zone 'B')
c. The Cultivator-Stock Keeper (Zone 'C')
d. The Low Stock Density Zone (Zone 'D')

Section 5. In this section attempts to develop the traditional sector are examined in relation to their impact upon production and supply. Two main development approaches are examined, both from the point of view of adjustment to the prevailing human and physical environment. The first line of development, 'Improvement', is the gradual introduction of developments into the existing framework of the traditional sector step-by-step. The second line of approach is 'Transformation' or the large scale capitalised development of areas where the local traditional methods of cattle raising and selling are by-passed. Each major ranching scheme in Uganda is examined in detail. The final chapter in the work examines a possible future pattern of supply when improvements have matured, the ranches are developed and the Soroti Canning Factory is operating.

MEMORANDUM

The groundwork for the study of Beef Production and Supply in Uganda was completed during a three-year preparatory course at Makerere involving studies into the 'Tropical African Environment', 'The Economics of Peasant Agriculture' and the 'History of East Africa from the mid-Nineteenth Century'. During the period of the one year course, visits were made to the Ankole area and to Karamoja.

Field work was commenced in July 1966 after all available original statistics and reports had been studied at the headquarters of the Ministry of Animal Industry, Game and Fisheries in Kampala. From the data collected preliminary drafts of basic maps such as the distribution of cattle were drawn and a programme of research formulated.

Between July 1966 and May 1967 all the districts of Uganda were visited at least once, and some such as Karamoja where a seasonal pattern prevails, twice or more. Other visits were made to the Aru area of the Republique Democratique du Congo and to Rwanda.

The organisation of work in the field centred first on the district Veterinary Office where material originating in Annual and Monthly Reports was discussed. From information gained at the Veterinary Centres visits were made to all pastoral developments designed for beef production. Interviews were conducted in English or Swahili. Data gathered in the field was then mapped or charted on the infrequent return visits to Kampala.

During the course of field work a small project was conducted with Dr. Brenda Turner of the University of Leicester. The project involved an assessment of the follow-up work on pastoral development in the tsetse cleared area of the southeast Bunyoro consolidation zone.

From June 1967 onwards the material collected was collated, analysed and finally put into written form. From the findings of the work the following publications arose:

Baker, P.R. "Environmental Influence on Cattle Marketing in Karamoja", Occasional Paper No.5, of the Department of Geography, Makerere U. College, 1967.

Baker, P.R. "The Distribution of Cattle in Uganda", East African Geographical Review, no.6 pp.63/75, 1968.

Baker, P.R. "The Government and the Pastoralists", Transition, 36. 1968.

Turner, B.J. and Baker P.R. "Tsetse Clearance and Livestock Development, a case study from Uganda", 'Geography' Volume 3, part 3, pp.249-259, 1968.

Information was also provided to:

The F.A.O. Livestock team in Tanzania,

The U.D.C. for the report on beef prices in Uganda submitted to the World Bank.

The British High Commission.

ACKNOWLEDGEMENTS

The origins of this study lie with the African Studies Programme at Makerere under whose auspices I was first enabled to come to Africa to pursue original field work. The money made available under the Rockerfeller grant and the use of the African Studies Land Rover were basic to the early research programme. My special thanks are due to Dr. Merrick Posnansky, the director of African Studies, who assisted me personally and exhaustively with every difficulty.

The transfer from M.A. to Ph.D. was enabled by a generous two-year grant from the Goldsmiths' Company in London. Without the kindly cooperation of the Company in general, and its secretary Mr. Walter Prideaux, in particular, the extension of the research and its eventual completion would have been quite impossible.

During the course of field work and writing, careful attention and advice was always forthcoming from my supervisors Mr. B.W. Langlands and Dr. A. O'Connor. Their patient and helpful advice in preparing field work and later, reading manuscripts was greatly appreciated. Especial thanks are due to Mr. Langlands who bore the whole burden after the departure of Dr. O'Connor for a lecturing post in London in early 1966. It was Mr. Langlands also, who was responsible for encouraging me to write part of the work in monograph form, and his liberal permission to use draughting facilities was of considerable importance at an early stage of the work. The departure of Professor S. J. K. Baker after his retirement in late 1966 was greatly

regretted, as he had always afforded me unrestricted attention and had provided a valuable guiding hand at many stages.

The officers of the Veterinary Department were unfailingly cooperative both in the field and at the central statistical office in Kampala. At Head quarters special thanks are due to Mr. Gabriel Binaisa, the Deputy Commissioner who at the outset gave permission for this work. Thanks are also due to Mr. Steven Onyait who provided access to statistics and offered valuable and authoritative advice and, to Mr. Lubega who hunted out the files without complaint.

On the practical side, the cooperation of Mr. J.C. Sebunnya has helped in the preparation of some of the maps, and in the correction of those I drew myself. Lastly, my appreciation must be recalled for the work expended by Mrs. A. S. Wood who typed the final draft of the thesis.

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LIST OF MAPS.

LIST OF GRAPHS.

INTRODUCTION

Aim of the Study: The aim of this work is to attempt an analysis of a branch of the pastoral economy of Uganda against an understanding of the 'environment', By 'environment' it is understood that for the subjective purposes of this thesis the term implies the total assemblage of significant human and physical factors which, interacting, produce the regional variations in production and supply. In this sense, the study appears as a geographical analysis of ecological and economic problems.

Several stages were basic to the preparation of this study and an explanation of these will illuminate the aim and highlight the merits of 'environmental analysis'. As the work involves the interpretation of a set of production and supply characteristics over space and time the first stage is the presentation of the production and supply data, where possible in map form.

The production and marketing patterns thus distinguished need to be interpreted by reference to a whole range of influential factors, some known at the outset others becoming evident in the field. Any problem in the pastoral sector may be considered as being the end product of a series of locally interacting variables such as climate, pasture type, cultural attitudes, historical factors, etc... Data on these factors needs to be gathered locally if a balanced appraisal either in one region or region by region is to be made. At this stage there is no substitute for

a widespread programme of field study. Recorded qualitative or quantitative data simply are not available on many of the variables, and are often discontinuous, unreliable or scanty when they are available.

Once data has been gathered the third and fourth stages are designed to ensure its use in a balanced appraisal and analysis. These are the stages of collation and correlation. Data is, wherever possible, mapped and spatially related to other data on other variables. In this way, it is hoped significant functional relationships will emerge for different areas, functional relationships which will provide an explanation of the patterns of production and supply. A fifth stage is extremely valuable though not always possible, and that is the checking out of findings in a second course of field study.

As a result of findings in the field and also for the purposes of logical presentation, the thesis is presented in the following form:

a) The Variables and their distribution, i.e. the 'Pastoral Environment'.
b) The Patterns of Production and Supply,
c) An Analysis of these Patterns for the Traditional Sector: This part of the study is based on a framework of 'cattle economies' or regions characterised by a distinctive grouping of functional relationships.
d) An environmental analysis of the Improvement and Transformation of this traditional sector.

By using an integrated analysis, such as a geographical study of this sort provides, some of the difficulties of working in an underdeveloped economy are reduced. Undue

reliance on unreliable, scarce or discontinuous information or statistics is countered by data collection and checking in the field. Overemphasis on one factor is checked by a field examination of all factors and, allowance is made for the fact that some models developed in sophisticated developed economies may not apply in the newly emergent countries. In Uganda, where both physical circumstances and human attitudes change, often suddenly, from one part of the country to another, there are dangers in a single factor analysis and planning or the extrapolation of data from a small area to apply to the whole. In the past such studies were common (1) and the merits of the present form of approach may be measured by its growing acceptance (2) (3) and the shortcomings of earlier approaches to pastoral problems, shortcomings which will become evident in the course of this work.

The Beef Sector in Uganda

The livestock industry in Uganda has, until recently, been officially regarded as taking very much of an economic second place to cash crop agriculture in the primary production sector. This is partly a result of the favourable climatic situation, for three quarters of the land area of Uganda is assured of receiving a reliable total of 30" of rainfall annually. This is considered by many to be the limit of secure agriculture (4). The desire, early in the Country's history, to dispense with the grant-in- aid and establish a working base to the economy led to a concentration first on cotton and later on coffee. At the time of writing, cotton and coffee account for more than 80 percent of the export trade of Uganda by value. Livestock products on the other hand account for only 2 percent of the export receipts and 4.2 percent (£7,439,000) of the Gross Domestic Product, or

1/10th of the value of cash agriculture. This compares with 9.3 percent and 12 percent respectively for the neighbouring territory of Kenya. In terms of value in 1966 Uganda exported 27,595 centals (5) of meat valued at £271,482 whilst Kenya exported 191,690 valued at £2,993,846.

The comparison of Kenyan with Ugandan figures is illuminating also in that it illustrates the lower unit value of the Ugandan product, which fetches 50 percent less on the world market. This reflects the poor quality of the Ugandan product at the present time. Although cattle are kept under a wide range of traditional systems varying from nomadism to tethering on a smallholding, the overall level of production is universally low. The low level of production is not fully appreciated until compared with the potential, for 'it has been estimated that under good management, the potential carrying capacity of the savanna country varies from 2 to 5 acres per beast. Thus on 40,000 sq. miles of savanna, there should be sufficient grazing for 7,000,000 cattle' (6). This figure of 7,000,000 represents over twice the entire cattle population of Uganda. Further, the liveweight of local animals can be considerably improved with scientific feeding. For unimproved Ugandan stock normally weighing 583 lbs. weights of 930 lbs. have been achieved through the improvement of pastures alone.(7). In addition, trials have shown that the length of the maturing time for Ugandan animals can be cut to a half, the calving percentage raised by 20 - 30 percent, the mortality from East Coast Fever reduced from 25 percent of the national herd to 5 percent,

the calving age reduced and the interval between calving shortened. The scope for development in all spheres of production is enormous.

Producing more animals per unit area and per annum is, by itself, only part of the present problem. Increasing the number of animals does not necessarily lead to an increase in marketed surplus. At present the marketing system does not draw effectively enough on the present national herd to provide an adequate supply to the main consuming areas. In 1966, an estimated one third of the total cattle offtake was marketed (8), the remainder dying or being consumed by their owners. Of this figure of one third, less than one quarter was put through the local government organised marketing network upon which the urban andprocessing sectors depend. The remaining cattle are handled at village level. Domestic supplies are not only low but extremely variable from season to season and from year to year. This variability is a characteristic of most beef economies in Africa as Hill has shown for Ghana (9) and Ferguson for Nigeria (10). As a consequence of the variability large numbers of animals have to be imported into Uganda from Kenya and Tanzania. The inability of the traditional sources to supply better quality meat also leads to the import of high grade meat requirements from the Kenya Meat Commission in Eldoret.

At present, the traditional sources provide approximately 145,000,000 lbs. of beef per annum (11) against an estimated level of consumption of 158,000,000 lbs. The deficit is made up by imports. It is estimated that by 1970 consumption will have risen to 185,000,000 lbs.

and production to 167,000,000 lbs. leaving a deficit amounting to 40,000 carcase equivalents.

In the last five years the pastoral sector in Uganda has entered a phase of rapid development. In 1963, there was in Uganda one ranch totalling 30,000 acres and producing a variable total of 500-800 animals per annum. By 1966, over 178,000 acres was in a state of active development and cleared for ranching. A total of 422,000 acres was scheduled for development and work was in varying states of progress on all the major schemes. Four extensive schemes were added to the original one. In Soroti, the foundations had been laid for a modern canning and freezing plant provided under Yugoslavian aid. In Kampala, a firm of meat canners had been established at a new abbattoir under the Uganda Development Corporation in 1961/62. By 1966, also a small trade in meat was established between Uganda and the ports of the Congo (Kinshasa), the Middle East, the Netherlands and Germany. The export of cattle appears strange in view of the need to import so many stock into Uganda to meet domestic requirements.

The rapid pace of development in the large scale commercialised sector has been paralleled by extensive efforts in the traditional sector at the small farmer/herder level. As an example, the percentage of cattle sprayed against ticks in Uganda rose from 5 in 1965 to 12 in 1966. The sudden and dramatic revitalisation and stimulation of the pastoral sector arises partly out of a need and a desire to diversify the national and regional economies of Uganda.

The unhealthy dependence of Uganda upon two primary agricultural exports for its foreign revenue and for much of its development finances is precarious, and the need for diversification of the primary sector has been felt for some time. By diversifying, the effects of a fall in world prices for coffee or cotton may not be felt too drastically in Uganda. In 1961, a World Bank Mission visiting Uganda reported: 'In our view the development of the livestock industry offers the best promise of diversification' (12). An attempt is also being made to diversify and develop the regional, as well as national, economy of the country. The main cash crop areas of Uganda developed around the northern shore of Lake Victoria and development became concentrated in this area whilst the peripheral parts of the country fell further behind. Since independence (9th October, 1962), the Government of Uganda has made an effort to bring new lines of development to the neglected parts in the west and north as part of a diversification programme. It was decided that some of these areas should be the foci of large scale ranching and meat processing enterprises. Whether or not these areas were suited to ranching or processing was unfortunately often considered only after the location decisions had been made.

Apart from diversification other factors encouraged the rapid transformation of the pastoral sector. The dependence of towns of the scale of Kampala, Jinja and Mbale on traditional variable sources of low grade meat supplies has long been considered unsatisfactory. As the population of these townships grows so grows the

demand for meat. Also the rising income in Uganda is encouraging the consumption of higher grades of beef which the country cannot provide from the traditional sector at present. At the same time, problems of mismanagement, inadequate disease control and social constraints hold down the quantity and quality of animals produced in the traditional sector and is encouraging the misuse of rangelands and a considerable underutilisation of the natural pastures. Although urban Uganda has depended for over thirty years on the system of local government markets and unimproved herds to provide cattle from the areas of cattle surplus, the dependence is being reduced as far as possible and the productive capacity of the Uganda rangeland is being considerably reassessed.

NOTES

1. Work on the preparation of several of the major ranching schemes was, for instance, largely of a cost/benefit analysis nature only.
2. See F.A.O. preliminary survey for the livestock field, Dar-es-Salaam, 1968.
3. See also Nayeh Z, 'The Need for Integrated Range Research in East Africa.' Tropical Agriculture Vol.43 No.2 pp.91-98, 1966.
4. This is the limit suggested in the East African Royal Commission Report, HMSO. Cmd.9475 1956.
5. Centals are the units used for quoting international trade figures, 1 cental = 100 lbs.
6. F.A.O. East African Livestock Survey (draft) cyclo-styled 1966.
7. Stobbs T.H. Serere Agricultural Research Station, pers. comm. 1966.
8. See Section III for an evaluation of these figures.
9. Hill P. 'The Northern Ghanian Cattle Trade' Centre for Research on Economic Dev. Univ. of Michigan, date?
10. Ferguson D.S., 'The Nigerian Beef Industry' Agricultural Studies No.9, Columbia University 1967.
11. International Bank for Reconstruction and Development. Report to the Uganda Development Corporation No.P.10 introduction 1966.
12. International Bank for Reconstruction and Development, 'The Economic Development of Uganda', Govt. Printer Entebbe, 1961. P.161.

SECTION I

Chapter 1

THE DISTRIBUTION OF CATTLE

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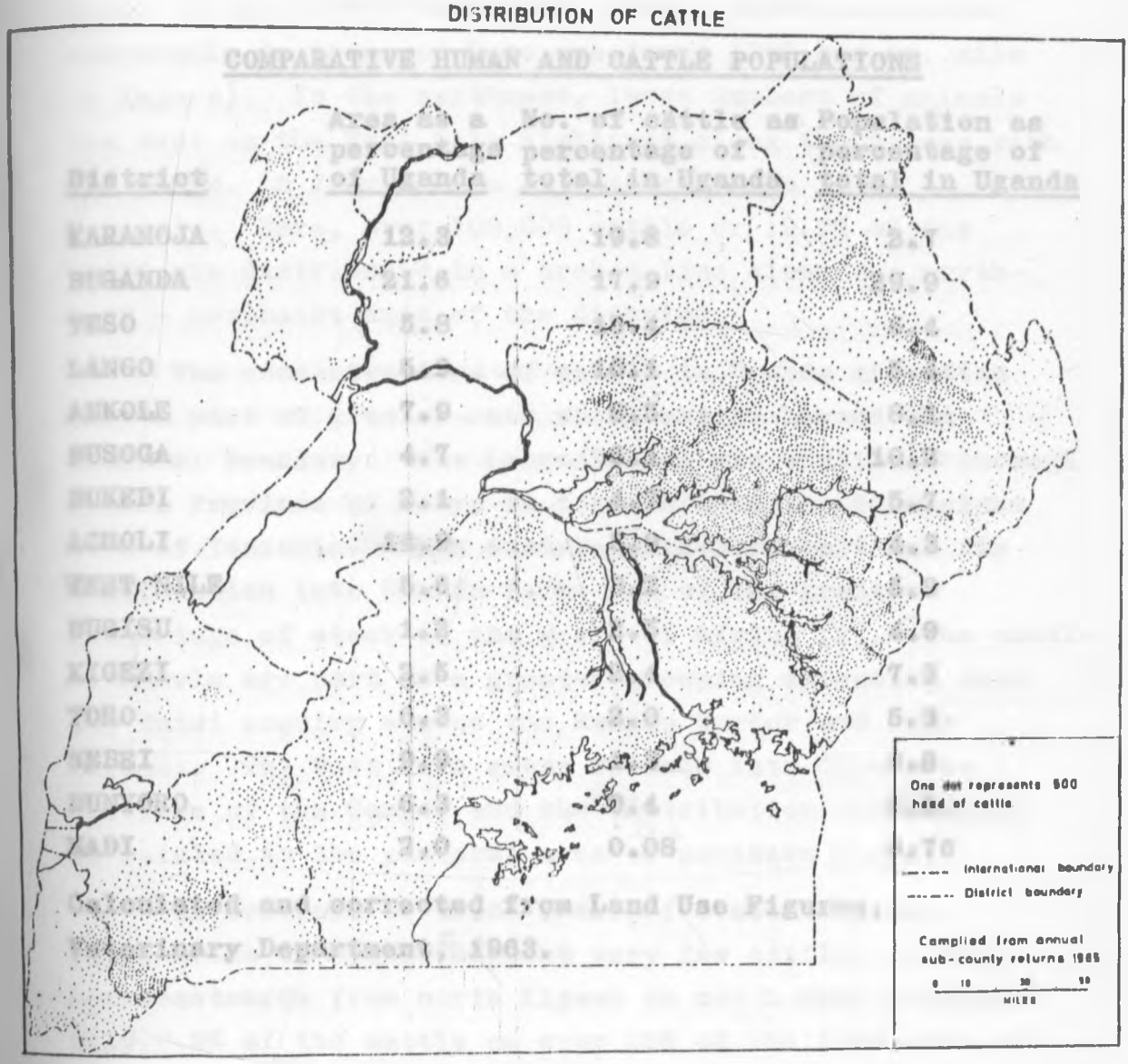
THE DISTRIBUTION OF CATTLE IN UGANDA

The distribution of cattle in Uganda shows marked regional contrasts (Map 1). Heavy concentrations border areas almost devoid of cattle. Although disease excludes cattle from approximately one sixth of the land area of Uganda, the pattern over the remaining five sixths cannot be explained by reference to physical factors alone. Over southern Uganda differing cultural attitudes to cattle strongly influence the distribution, whilst to the north, the distribution of cattle reflects most strongly the pattern of human population. In parts of the country seasonal changes occur, and marked changes of a more long term nature have been recorded.

The greatest concentration of cattle lies in an arc along the northern shore of the Kyoga-Mpologoma river and swamp system. This arc occupies much of Lango, Teso and Bukedi districts and a small extension occupies the Kyoga shoreline of north Buruli. This concentration contains nearly one third of the estimated total cattle population of Uganda (3,682,325), (1) though it covers only one tenth of the land area (Table 1). High densities of cattle occur, often in excess of 150 head per square mile, and rising to over 200 per square mile in parts of Teso and central Bugisu. Three other concentrations exist. In the southwest over 200,000 animals are grouped in a triangle with its apex at Mbarara and its base along the Ankole-Kigezi border from southern Kajara to southern


DISTRIBUTION OF CATTLE
One dot represents 500 head of cattle
International boundary
District boundary
Compiled from annual sub-county returns 1965
0 10 30 50
MILES

Map 1.

Table 1.

COMPARATIVE HUMAN AND CATTLE POPULATIONS

District	Area as a percentage of Uganda	No. of cattle as percentage of total in Uganda	Population as percentage of total in Uganda
KARAMOJA	12.3	19.8	2.7
BUGANDA	21.6	17.9	29.9
TESO	5.8	15.4	6.4
LANGO	5.9	10.1	5.4
ANKOLE	7.9	8.5	8.1
BUSOGA	4.7	6.1	10.2
BUKEDI	2.1	4.7	5.7
ACHOLI	14.9	3.9	4.3
WEST NILE	5.6	3.2	5.9
BUGISU	1.2	2.5	4.9
KIGEZI	2.5	2.4	7.3
TORO	6.3	2.0	5.3
SEBEI	9.9	1.3	0.8
BUNYORO	6.3	0.4	1.8
MADI	2.0	0.08	0.75

Calculated and corrected from Land Use Figures, Veterinary Department, 1963.

Ruzhumbura. Half the livestock in this concentration are found in the Kajara/Ruzhumbura strip, where densities comparable to those of Teso are found (209 per sq. mile in Kajara). In the northwest, large numbers of animals are kept on the West Nile highlands along the border with the Congo. A fourth area of concentration is in Karamoja. Here, over 700,000 cattle or 19.8% of the total are distributed in a broken line along the northwest - southeast axis of the district.

The concentrations of cattle in Uganda are often only a part of greater ones which extend beyond the national boundary. The Lango/Bukedi arc continues through Nyanza Province of Kenya to terminate in the Sukumaland area of Tanzania. This eastern lakeshore belt and its continuation into Uganda forms one of the greatest gatherings of stock in the whole of Africa (2). The cattle of Ankole are part of a greater grouping extending into the Tutsi country across the Rwanda border and into Burundi. The West Nile group extends into Orientale Province of the Congo, and the distribution in Karamoja is related to the pastoral area of northern Kenya.

In contrast to these areas of concentration, large areas of Uganda support very few cattle. A belt northeastwards from north Kigezi to north Madi carries only 3.2% of the cattle on over 22% of the land area of Uganda. This belt occupies most of Toro, Bunyoro, and Madi districts and a broad strip along the Nile in Lango, Acholi and West Nile. Densities are exceedingly

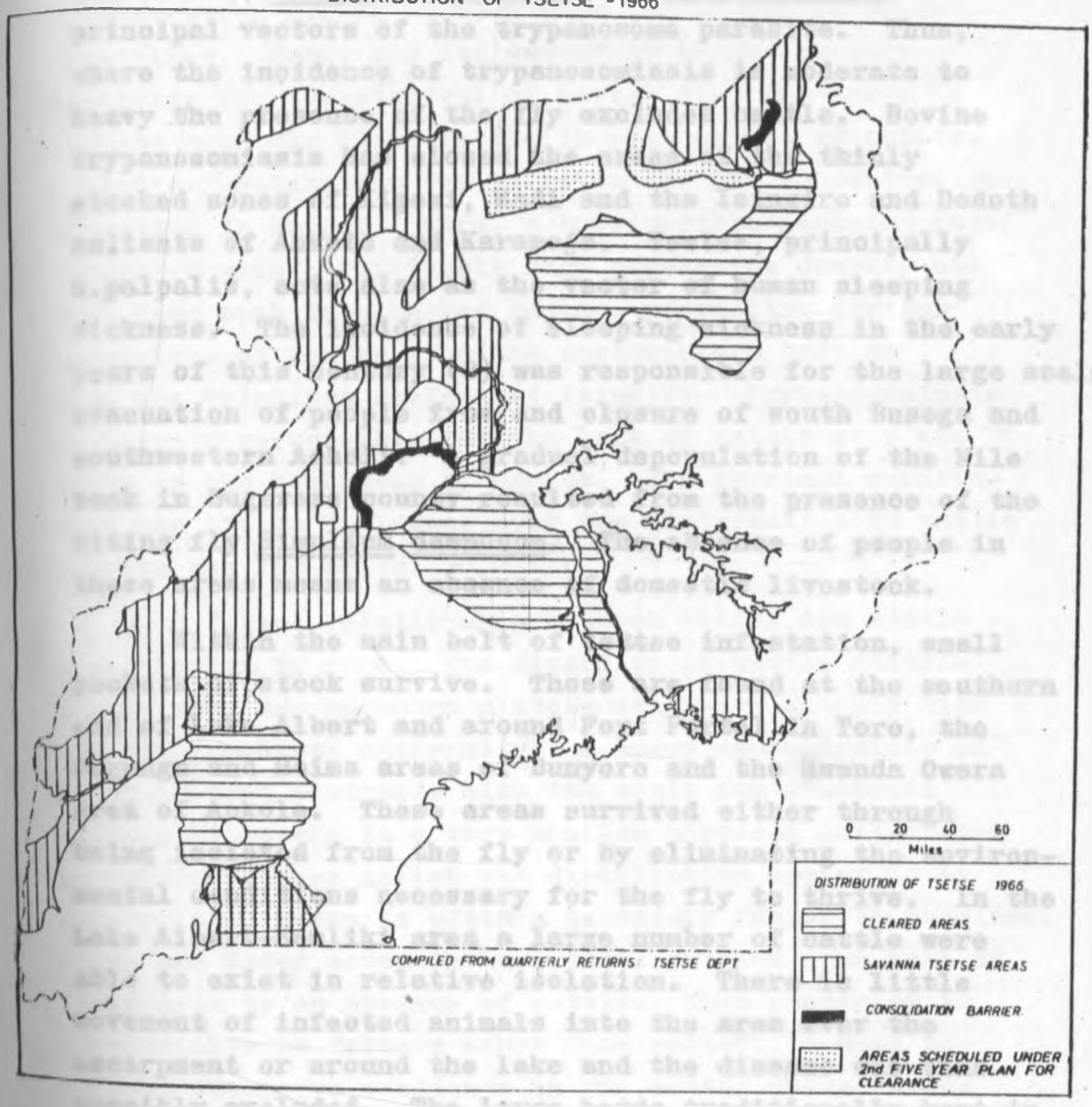
low, often falling below 10 cattle per square mile. The district of Bunyoro supports less than 0.08% of the cattle of Uganda on an area comparable to that of Teso. (15.4%) Smaller areas characterised by low stock numbers are found in southern Ankole (Isingiro) and in south Busoga along the shore of Lake Victoria extending along the Nile banks into Bugerere county (E. Mengo). In Karamoja a small cattle population is a feature of the areas between the principal tribes. A further area is that of Mt.Elgon between 7,000 and 9,000 feet. The district of Acholi occupies nearly fifteen per cent of the total land area but has only four per cent of the cattle. Although not as thinly stocked and conspicuously empty as parts of Bunyoro, it warrants inclusion in this category.

Around the northern shore of Lake Victoria, cattle are evenly distributed in a crescent 50-100 miles broad. Densities of 50 to 80 head of cattle per square mile are intermediate between the two earlier extremes. Only small areas of south Busoga and Bugerere mentioned earlier are excluded from this arc.

FACTORS AFFECTING THE DISTRIBUTION OF CATTLE:

The thinly stocked areas, occupying over one third of Uganda, are often closely related to the incidence of fly-borne diseases. A close correspondence exists between the distribution of tsetse (Map 2) and the thinly stocked areas outside central and east Acholi. Although the distribution and influences of tsetse will be treated in greater detail both in the Pastoral Environment and Zonal Analysis sections, it is necessary to assess

DISTRIBUTION OF TSETSE -1966



Map 2.

the impact on cattle distribution briefly in this chapter. The tsetse, Glossina morsitans and G. pallidipes, are the principal vectors of the trypanosome parasite. Thus, where the incidence of trypanosomiasis is moderate to heavy the presence of the fly excludes cattle. Bovine trypanosomiasis has closed the areas of the thinly stocked zones of Kigezi, Madi and the Isingiro and Dodoth salients of Ankole and Karamoja. Tsetse, principally G.palpalis, acts also as the vector of human sleeping sickness. The incidence of sleeping sickness in the early years of this century (3) was responsible for the large scale evacuation of people from and closure of south Busoga and southwestern Acholi. A gradual depopulation of the Nile bank in Bugerere county resulted from the presence of the biting fly Simulium damnosum. The absence of people in these areas means an absence of domestic livestock.

Within the main belt of tsetse infestation, small pockets of stock survive. These are found at the southern end of Lake Albert and around Fort Portal in Toro, the Bugungu and Hoima areas of Bunyoro and the Rwanda Owera area of Ankole. These areas survived either through being isolated from the fly or by eliminating the environmental conditions necessary for the fly to thrive. In the Lake Albert-Semliki area a large number of cattle were able to exist in relative isolation. There is little movement of infected animals into the area over the escarpment or around the lake and the disease was thus possibly excluded. The large herds traditionally kept in this area also kept the bush to a minimum and prevented the development of a tsetse habitat. In the Rwanda Owera area of Nyabushozi (Ankole) a large number of stock were

concentrated, driven before the advancing fly. This concentration served to keep down the growth of bushy vegetation. Bush, and its attendant shade are very necessary for the survival of tsetse fly, and areas lacking bush may leave cattle in some degree of safety. A similar explanation can be given for the concentration of cattle in Kajara. Here, a considerable stocking rate connected with a relatively high population density has kept down bush to a marked degree, preventing serious incursions of tsetse from the northwestern belt or from the Orichinga salient of Isingiro. Trypanosomiasis is largely responsible for the lack of cattle over one sixth of the land area of Uganda. The physical environment has little influence over the distribution of cattle outside the fly belts.

A direct relationship between relief and cattle distribution is rare. The diversity of cattle distribution over the northern plateau contrasts sharply with the topographical uniformity. A heavy concentration of stock in Teso contrasts with the small and scattered numbers of cattle in a very similar physical environment in Acholi. Where relief and distribution appear to be interrelated there is often a secondary factor to consider. Elgon and Kadam mountains are distinguished over part of their area by an absence of cattle. This emptiness is attributable to factors other than relief. A need to protect extensive woodlands in the wetter upland areas has encouraged the gazetting of forest reserves. Cattle are then excluded by law. Both Elgon and Kadam are Central Government Forest Reserves and this, rather than topography accounts for the lack of stock. Evidence of this is provided

in times of raiding and conflict. At these times, the people of Sebei hurry their animals upwards through the woodlands and beyond to escape police or enemy detection. Only in the highest and most inhospitable parts of Uganda are relief and altitude directly influential in excluding cattle. Along the escarpment overlooking Turkana and on the higher parts of the Ruwenzori range, cattle are precluded by the terrain.

Climate, as well as relief, exercises very little direct influence on cattle distribution in Uganda. Of climatic factors, rainfall reliability, is however considered by some to be an influential factor in delimiting pastoralist and cultivator 'economies' or ways of life.

Mean annual temperature and mean annual rainfall have little relation to the presence or absence of cattle in any part of Uganda. Large numbers of cattle are concentrated in both Lango and Matheniko (Karamoja) areas, with mean annual rainfall totals of 50 inches and 25 inches respectively. Conversely, areas with small numbers of cattle such as parts of Acholi or south Jie county of Karamoja have mean annual figures varying from nearly 60 inches to less than 25 inches respectively.

Some authorities have laid stress on 'reliability', and similar concepts concerning the periodicity of rainfall, in separating the arable and pastoral economies or ways of life. Priority is often given in these rainfall reliability divisions to the climatic needs of arable agriculture which are considered to be more exacting than those of traditional pastoralism, which can thrive in a wider range of physical conditions. In 1956 the East Africa Royal Commission produced a series of rainfall reliability maps to accompany its report (4). One of these maps showed the prospects of

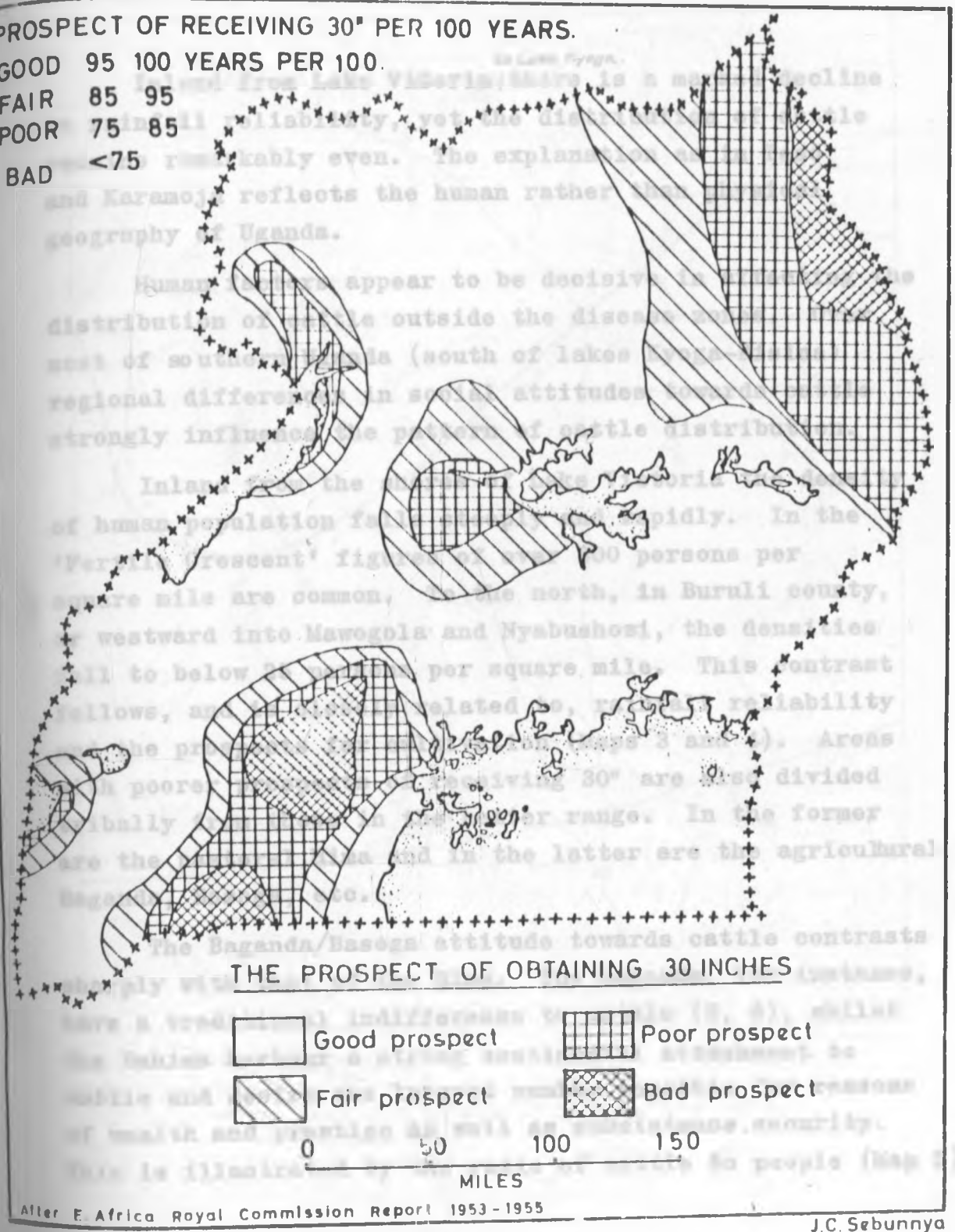
receiving 30 inches of rainfall in a given number of years per hundred over the whole of East Africa and a simplification of this map for Uganda appears as map 3. Boundaries on this map are necessarily vague and transitional and derived from a very limited number of recording stations. The figure of 30 inches was considered by the writers to be the basic minimum requirement of secure crop agriculture. It is necessary to mention that not only the figure of 30 inches, but the concept of 'rainfall reliability' have both met with some criticism in recent years.

From a comparison of maps 1 and 3 it is clear that, although rainfall reliability may be used to delimit ways of life, it has little relation to the distribution of cattle in Uganda. For instance, most of Teso district falls into the Commission's divisions of 'Good' and 'Fair' prospect of receiving 30 inches i.e. likely to receive 30 inches in 95-100 years per 100 and 85-95 years per 100 respectively. Over most of its area the district supports thriving cash and subsistence agriculture. In neighbouring Karamoja the reliability falls to 'Poor' and 'Bad' i.e. 75-85 years per 100 and less than 70 years per 100 respectively. Agriculture is slight and crop failure common and the society is strongly pastoralist. Yet it is Teso which has the greater concentration of cattle per unit area of land:

Table 2.

District	Number of Cattle per sq. mile of available pasture	Cattle per sq. mile of land area
TESO	202	130
KARAMOJA	98	58

RAINFALL RELIABILITY



Map 3.

Inland from Lake Victoria to Lake Kyoga, there is a marked decline in rainfall reliability, yet the distribution of cattle remains remarkably even. The explanation as in Teso and Karamoja reflects the human rather than physical geography of Uganda.

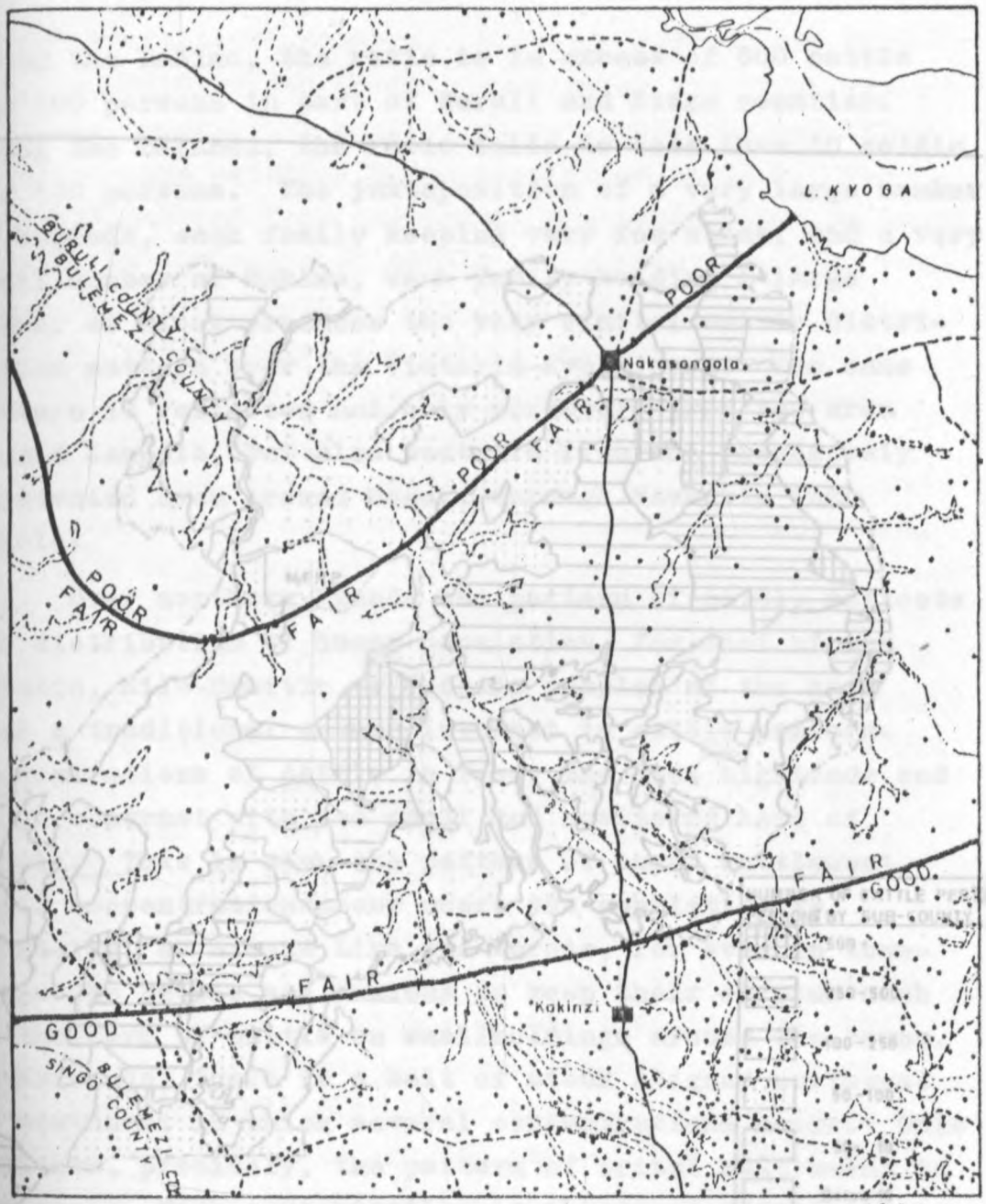
Human factors appear to be decisive in affecting the distribution of cattle outside the disease zones. Over most of southern Uganda (south of lakes Kyoga-Bisina) regional differences in social attitudes towards cattle strongly influence the pattern of cattle distribution.

Inland from the shores of Lake Victoria the density of human population falls steeply and rapidly. In the 'Fertile Crescent' figures of over 300 persons per square mile are common. To the north, in Buruli county, or westward into Mawogola and Nyabushozi, the densities fall to below 25 persons per square mile. This contrast follows, and is closely related to, rainfall reliability and the prospects for cultivation (Maps 3 and 4). Areas with poorer prospects of receiving 30" are also divided tribally from those in the better range. In the former are the pastoral Hima and in the latter are the agricultural Baganda, Basoga, etc.

The Baganda/Basoga attitude towards cattle contrasts sharply with that of the Hima. The Baganda, for instance, have a traditional indifference to cattle (5, 6), whilst the Bahima harbour a strong sentimental attachment to cattle and desire the largest number possible for reasons of wealth and prestige as well as subsistence security. This is illustrated by the ratio of cattle to people (Map 5).

ZONE A

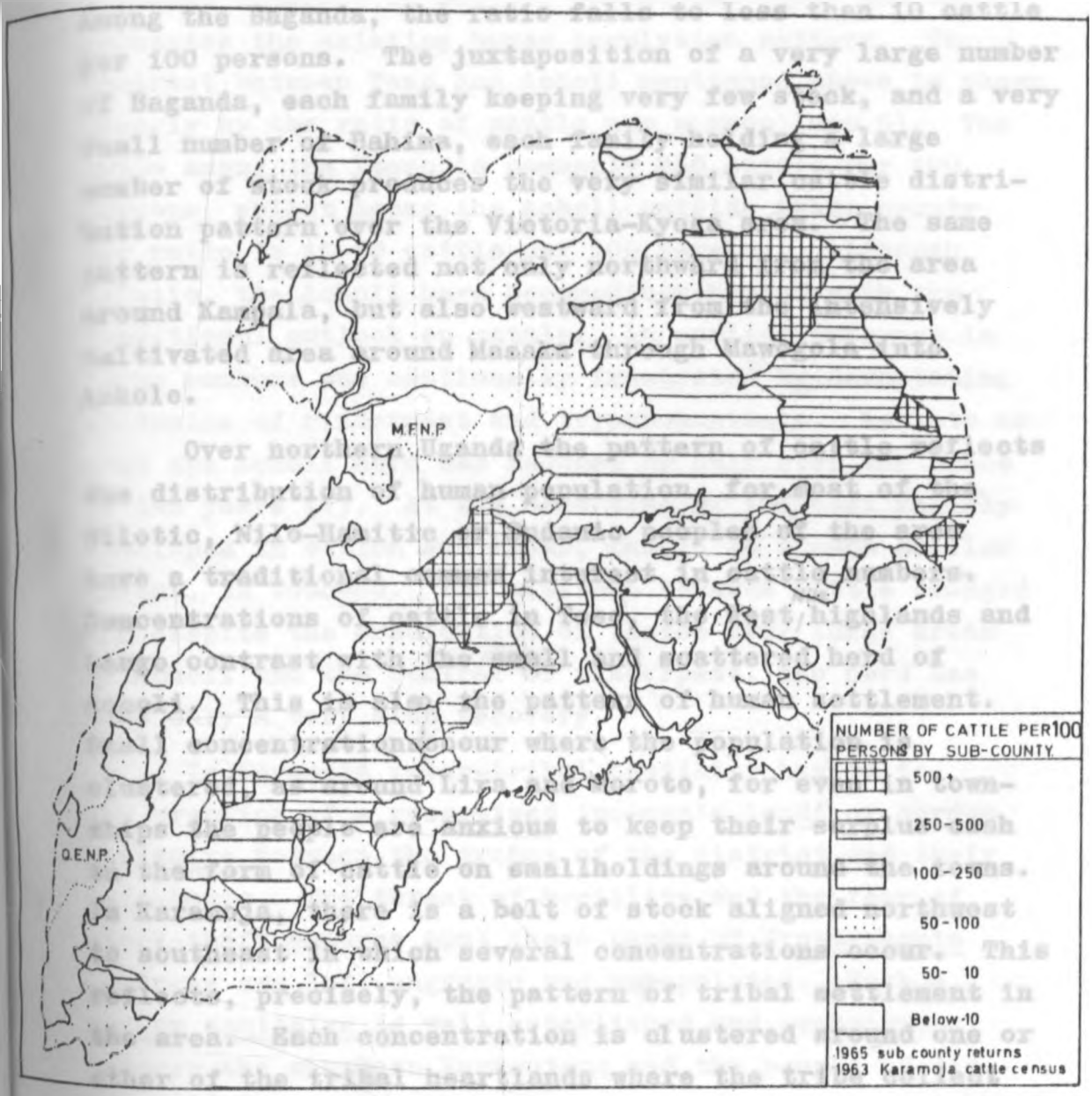
BULEMEZI & BURULI COUNTIES



Settlements
Swamps
Prospect of receiving 30" of rainfall (see text)
Major roads
Minor roads

0 5 10 15
Miles.

Map 4.


M.F.N.P
Q.E.N.P
NUMBER OF CATTLE PER 100 PERSONS BY SUB-COUNTY
500+
250-500
100-250
50-100
50- 10
Below 10
1965 sub county returns
1963 Karamoja cattle census

Map 5.

Among the Bahima, the ratio is in excess of 500 cattle per 100 persons in part of Buruli and Singo counties. Among the Baganda, the ratio falls to less than 10 cattle per 100 persons. The juxtaposition of a very large number of Baganda, each family keeping very few stock, and a very small number of Bahima, each family holding a large number of stock produces the very similar cattle distribution pattern over the Victoria-Kyoga area. The same pattern is reflected not only northward from the area around Kampala, but also westward from the intensively cultivated area around Masaka through Mawogola into Ankole.

Over northern Uganda the pattern of cattle reflects the distribution of human population, for most of the Nilotic, Nilo-Hamitic or Sudanic peoples of the area have a traditional common interest in cattle numbers. Concentrations of cattle in Teso, the West Nile highlands and Lango contrast with the small and scattered herd of Acholi. This is also the pattern of human settlement. Small concentrations occur where the population is clustered, as around Lira and Moroto, for even in townships the people are anxious to keep their surplus cash in the form of cattle on smallholdings around the towns. In Karamoja, there is a belt of stock aligned northwest to southeast in which several concentrations occur. This reflects, precisely, the pattern of tribal settlement in the area. Each concentration is clustered around one or other of the tribal heartlands where the tribe collect in the wet season and which is regarded as the homeland of that particular group. That of the Jie, north of Moroto, is particularly marked.

This broad cattle/human relationship is rein-

forced by cultural factors. Although most of the Nilo-Hamitic, Nilotic and Sudanic peoples of the north share a common interest in cattle, variations occur and these emphasise the existing human population pattern. The contrast between Teso and Acholi mentioned above is shown clearly by the ratio of cattle per person (Map 5). The ratio among the Iteso is commonly 250 cattle per 100 persons, whilst among the Acholi outside Agago county the ratio is 10-50 cattle per 100 persons. Although Nilotic, the Acholi have become disenchanted with the traditional outlook on cattle. An earlier interest in large numbers was continually frustrated by devastating epidemics of rinderpest and trypanosomiasis. As late as 1943 the Acholi herd was reduced by half over the space of two years (7). At the same time an interest rapidly developed in cotton and later, though to a much smaller extent, in tobacco. The attitude towards cattle changed and despite the eradication of tsetse over large areas of Acholi and the control of rinderpest, the herd has made only a very slow recovery.

In Karamoja inter-tribal hostility has led to the creation of a recognised 'no-man's land' or cordon sanitaire between the tribes of the district and their neighbours. The threat of hostility and the fear of stock-theft ensures that these bands of Hyparrhenia pastures are left ungrazed and unpopulated. Such a cordon sanitaire is well established and conspicuous between the southern Karamojong and the people of Jie. (Map 1). In 1965/67 a new cordon sanitaire was established along the Sebei plains. In this area, extended raiding by the Pian tribe drove the Sebei people back towards the foothills of Mt. Elgon.

CHANGES IN THE DISTRIBUTION OF CATTLE.

The pattern of Map 1 was the situation in 1965. The distribution of cattle shows marked regional changes over a short period of time. In some areas there is a considerable seasonal change in the distribution of cattle dependent largely on the seasonality of rainfall. In Karamoja district there is a dispersal of cattle over the western plains in search of water and grazing as the dry season advances (October-March) (8). As it is convenient to count cattle when they are concentrated and settled, the pattern presented on Map 1 represents the wet season distribution. In other areas of marked, though less severe, dry seasons smaller movements occur. In Teso the animals are taken to the swamp margins of Lakes Kyoga and in Buruli they are brought down to the branches of the Lugogo/Mayanja systems.

Long term changes have occurred and are continuing to change the distribution of cattle. Changing social attitudes influence the pattern of livestock. The people of Teso migrated to their present area from what is now Jie county of Karamoja (9). In their new homeland they were able to practise a more secure agriculture and extend their range of crops. Eventually cash crops permeated from the south and cotton was established. Acreages rapidly expanded in the three southern counties. In this area south of Lake Bisina, cotton competed for space with pasture and the latter declined as the old attitude towards cattle numbers changed. ~~Now the concentration of cattle thins out south of the lake despite an increasing density of people.~~ The ratio of cattle to humans ~~also~~ falls

rapidly and is indicative of a cultural change.

Table 3

County	No. of cattle per 100 persons
KUMI (S)	50 - 100 head
AMURIA (N)	100 - 125 head

The hills of Labwor county stand out from the other populated areas of Karamoja. Here in the wetter uplands there are good prospects for cotton and this is now an established crop. This is not entirely a reflection of "natural endowment" as an agricultural area but reflects social adaptability. The Labwor have been traditionally versatile as workers of iron and makers of pottery. The Pian people who also have an environment suitable for cotton grow virtually none. The area of Labwor is conspicuously thinly stocked in relation to other settled areas of Karamoja (Map 1).

The clearance of tsetse fly over 11,000 square miles of Uganda encouraged major changes in the pattern of livestock. The first great clearance: that of northern Mengo, was succeeded by a return of Bahima stockmen from Ankole and Bunyoro. This caused the cattle population to rise from 200 head in 1949 to over 100,000 in 1962 (10). The recent large clearance operations in Nyabushozi county stimulated the return of over 50,000 head from the west of Masaka (11). Closely connected in more recent times, with the clearance of tsetse is the establishment of large ranches in the former thinly stocked areas. So far, these have introduced 30,000 head into such areas but have made little impact of overall distribution. They do not appear conspicuously on Map 1.

Rapid changes in distribution have followed political instability. Refugees and their cattle have entered from the Sudan, Congo and Rwanda. Over 16,000 head of cattle were brought into northern Uganda (mainly Acholi) after the Anya Anya disturbances. Over 12,000 head were settled in Toro, brought by herders fleeing the Tutsi massacres in Rwanda. Internal troubles too, have made their mark: about 10,000 head were taken into Ankole from Masaka during the Buganda disturbances of 1966.

Pressures of population are encouraging movement of stock. This is particularly true in the Lake Victoria area (12) Cattle are being transferred from the area around Kampala and Masaka northward and westward to Buruli and Mawogola. These are then put under the common herding of the Bahima.

Despite the spread and scale of some changes, a three-fold analysis based on disease, cultural factors and population patterns still provides a valid basis for examining the distribution of cattle. Although localised changes in distribution and density of cattle are taking place and are likely to take place in the future, the broad features of the distribution are likely to remain.

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SECTION II.

Chapter 2.

THE PASTORAL ENVIRONMENT.

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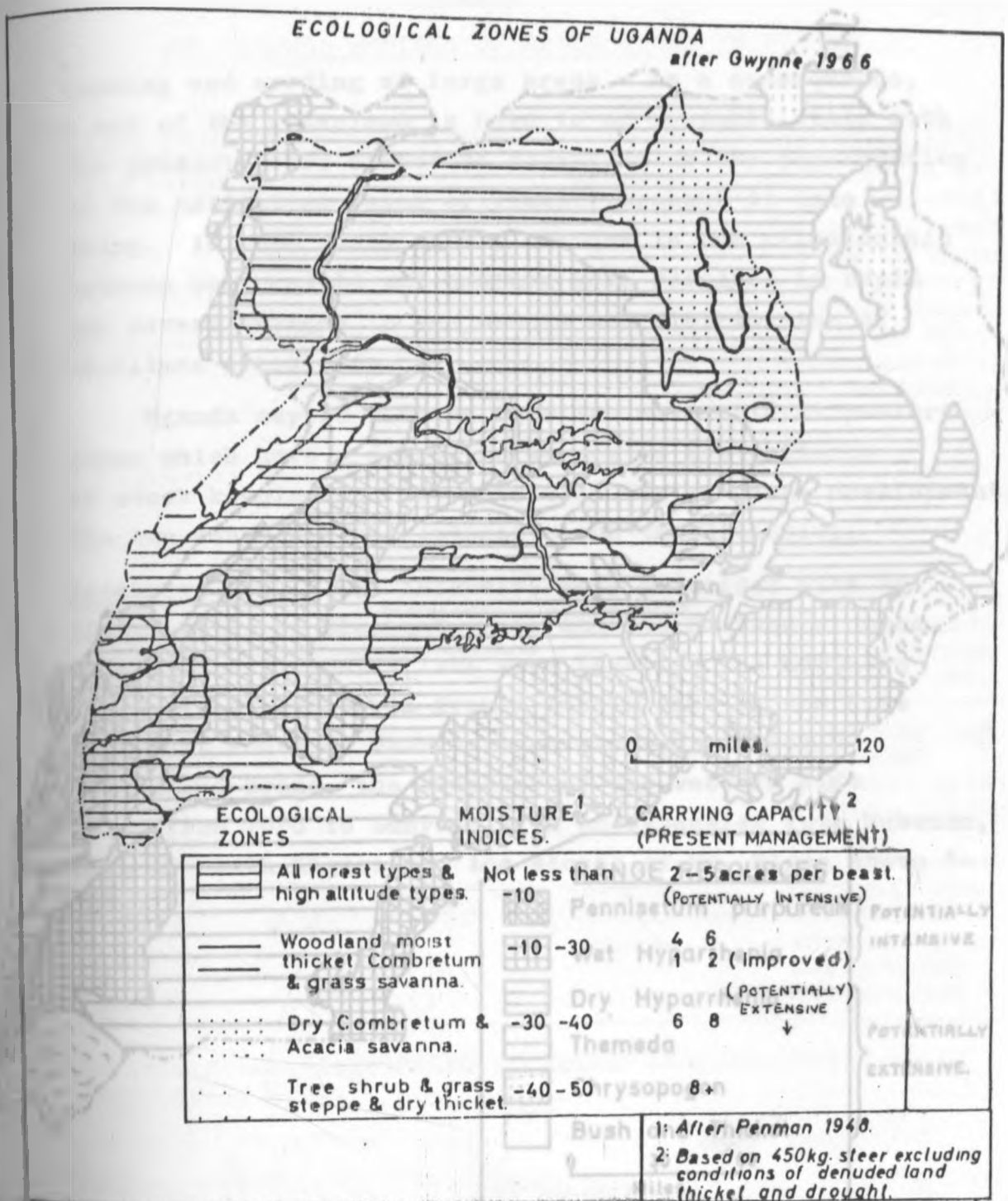
THE PASTORAL ENVIRONMENT

This section provides an overall picture of the various elements of the pastoral environment in Uganda. Each part, the natural pastures, natural water resources, bovine diseases and social attitudes towards cattle will be treated in detail in the later regional analyses. However, a brief review of the national picture will assist in understanding the localised studies.

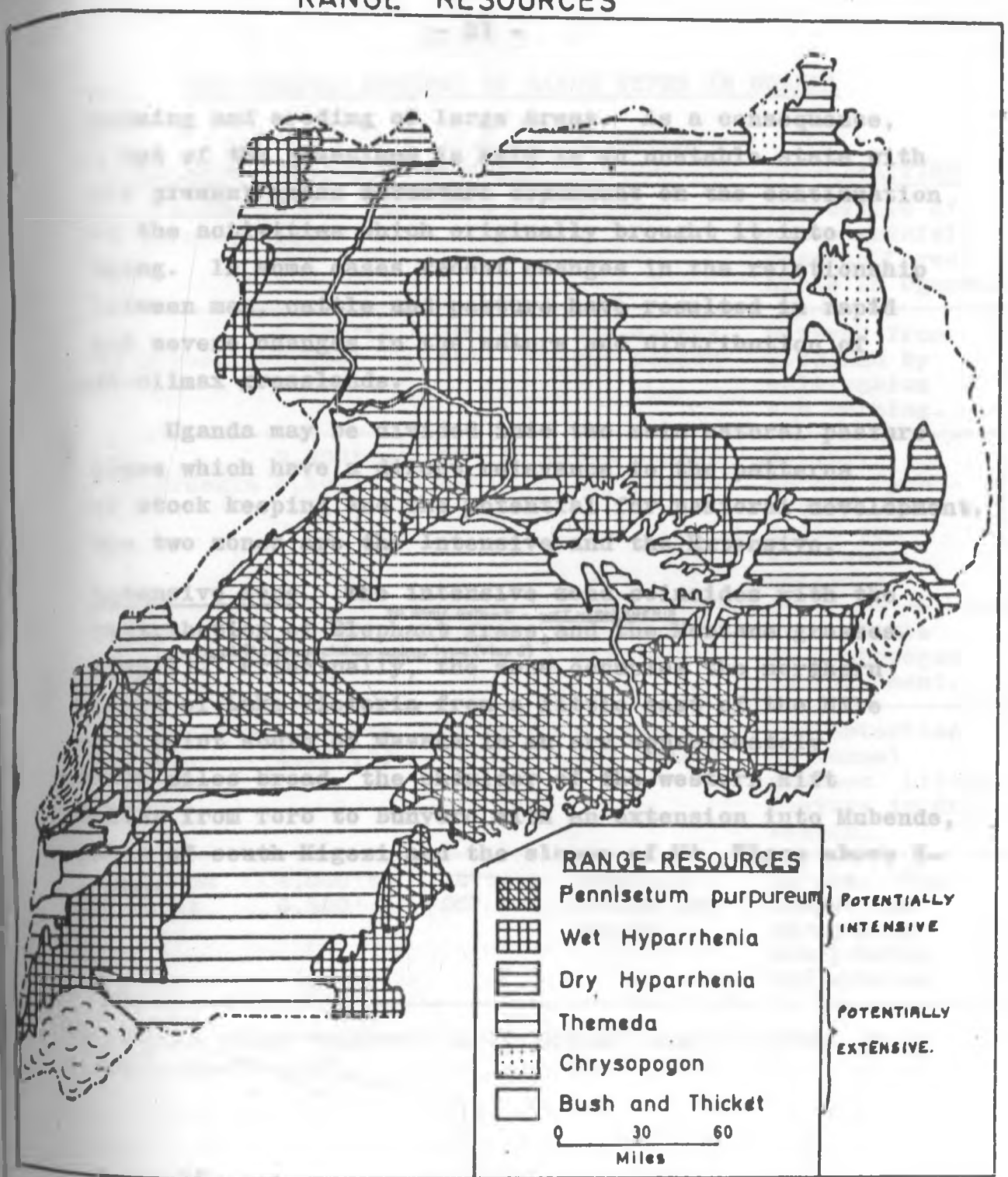
THE NATURAL PASTURES

Natural unimproved rangeland supports over 98% of the cattle population of Uganda. Planned supplementation and the large scale scientific reseeding of pastures are almost unknown. The importance of the quality and quantity of unimproved rangeland to the Uganda cattle industry was illustrated by Governor Cohen in 1956 when he stated: "90% of the pedigree of an animal goes in at the mouth" (1). The amount and type of grazing in any area will depend on the variety of the grass, seasonal variations in pasture value, the area of land occupied by cultivation, permanent swamp, tsetse fly and the number of animals stocked in a given area over time. In Uganda, most of the grassland types result directly or indirectly from the activities of man. In contrast to the ecological picture, or what would be without the hand of man (map 6), stands the picture of present range resources or what is. (map 7) Considerable changes in the ecological climax have resulted from the burning, cultivating, over-


ECOLOGICAL ZONES OF UGANDA
after Gwynne 1966
0 miles. 120
ECOLOGICAL ZONES
MOISTURE[1] INDICES.
CARRYING CAPACITY[2] (PRESENT MANAGEMENT)
All forest types & high altitude types.
Not less than -10
2 – 5 acres per beast. (POTENTIALLY INTENSIVE)
Woodland moist thicket Combretum & grass savanna.
-10 -30
4 6
1 2 (Improved).
(POTENTIALLY EXTENSIVE)
Dry Combretum & Acacia savanna.
-30 -40
6 8
Tree shrub & grass steppe & dry thicket.
-40 -50
8+
1: After Penman 1948.
2: Based on 450kg. steer excluding conditions of denuded land thicket and drought.

Map 6.

RANGE RESOURCES



Adapted from The "Vegetation of Uganda", Langdale-Brown et al, 1964

Map 7.

grazing and eroding of large areas. As a consequence, most of the grassland is held in an unstable state with the present grass structure dependent on the continuation of the activities which originally brought it into being. In some cases recent changes in the relationship between man, cattle and pasture have resulted in rapid and severe changes in the nature and distribution of sub-climax grasslands.

Uganda may be divided into two main natural pasture zones which have a direct relevance to the patterns of stock keeping and the potential for pastoral development. The two zones are the Intensive and the Extensive.

Intensive zone. The intensive zone coincides with the distribution of Elephant grass (to some extent - WET HYPARRHENIA) and the Montane grasses. (Map 7). Principally, the zone occupies the northern shore of Lake Victoria from a little east of the Nile to a point south of Masaka in an arc approximately fifty miles broad, the shoulder of the western Rift Valley from Toro to Bunyoro with an extension into Mubende, parts of south Kigezi and the slopes of Mt. Elgon above 5-6,000'. (and the forest climax ecology type (Map 6))

TABLE 4

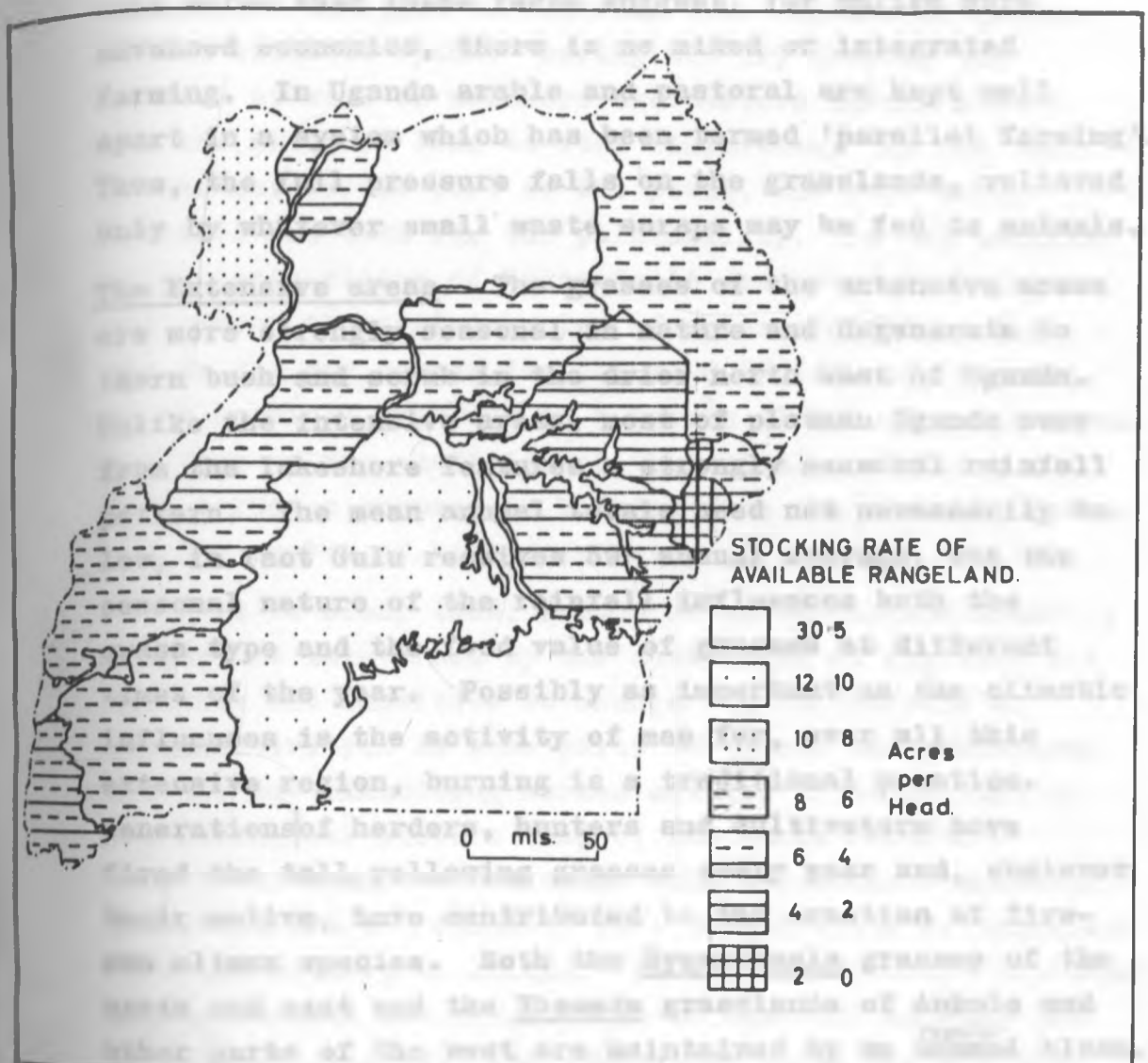
THE GENERAL ECOLOGY OF RANGE TYPES IN UGANDA

RANGE TYPE	ALTITUDE	RAINFALL	RAINFALL SEASONALITY	PECULIARITIES
Pennisetum purpureum	3,000' to 6,000'	50"+	minimal	indicative of heavy rainfall cleared forest areas in Uganda.
Wet Hyparrhenia	3,300' to 5,500'	40" to 60"	2-4 months dry season	Derived from woodland by cultivation and burning.
Dry Hyparrhenia	3,300' to 5,500'	27" to 59"	2-5 months dry season	Heavily burned Cymbopogon/Loudetia considerable nuisance.
Themeda triandra	4,000' to 6,000'	29" to 45"	Bimodal rainfall	Susceptible to Cymbopogon encroachment.
Chrysopogon Steppe.	3,000' to 4,000(?)	15" to 20"	6 months dry season	Characterised by annual grasses. Little pasture in dry season.
Bush and Thicket	4,000' to 6,500'	12" to 35"	approx.6 months dry season	Derived from steppe and savanna by overgrazing and erosion

Derived from: "Vegetation of Uganda Langdale-Brown et al 1964. pp.79 - 83.

Elephant grass or Pennisetum purpureum (Map 7) characterises the lower altitude parts of this zone. It coincides with a general forest type ecology and reflects both the high annual rainfall totals of this area and the absence of a long, marked dry period. The type grass, Pennisetum purpureum, is of little value to cattle if allowed to mature, when the leaf to stem ratio becomes extremely low, the food value diminishes, and the tall stands tend to shade out better grasses such as Brachyaria and Panicum. Pennisetum p. however, may be cut whilst young and fed to animals, and if kept short, the general pasture assemblage of the Elephant Grass zone is able to support a high density of cattle in a good condition. This factor plus the high density and high income of people over most of the zone favours dairying rather than extensive beef ranching. In some parts of the intensive zone, tsetse fly occupies large areas and such is the case in Bunyoro and much of Toro. In Bunyoro, although there are only 38,246 head of cattle in a district of 4,723 square miles (2) the presence of tsetse fly reduces the percentage of available grazing to only 6.7% of the District land area. This results in a relatively high stocking rate to available pasture (Map 8) of one animal per 4 to 6 acres. In Toro, the percentage rises to 20.9.

In Bugisu, the pressure on grazing is marked and is accentuated by the growing area under cultivation annually reducing the already small acreage of pasture land. In 1964, pasture land formed only 16.7% of the total land area of Bugisu district. This, when compared to the district stock total, gives an average stocking rate to available rangeland of only 0 to 2 acres per head which is



Compiled from a 1964 Veterinary Dept. estimate.

Map 8.

less than the ecological carrying capacity evolved by Gwynn et al (3). The real pressure on grassland is even worse than these facts suggest, for unlike more advanced economies, there is no mixed or integrated farming. In Uganda arable and pastoral are kept well apart in a system which has been termed 'parallel farming'. Thus, the full pressure falls on the grasslands, relieved only by whatever small waste scraps may be fed to animals.

The Extensive areas. The grasses of the extensive areas are more strongly seasonal in nature and degenerate to thorn bush and scrub in the drier north east of Uganda. Unlike the intensive areas, most of plateau Uganda away from the lakeshore features a strongly seasonal rainfall pattern. The mean annual totals need not necessarily be low, in fact Gulu receives 59" annual average, but the seasonal nature of the rainfall influences both the grass type and the food value of grasses at different times of the year. Possibly as important as the climatic influences is the activity of man for, over all this extensive region, burning is a traditional practice. Generations of herders, hunters and cultivators have fired the tall, yellowing grasses every year and, whatever their motive, have contributed to the creation of fire-sub climax species. Both the Hyparrhenia grasses of the north and east and the Themeda grasslands of Ankole and other parts of the west are maintained by ~~an annual~~ regular blaze. Both these species regenerate quickly after a burn and are able to colonise areas at the expense of slower growing or more fire sensitive plants.

The reasons for burning, as mentioned, vary considerably from clearing ground for cultivation to

driving out animals during a hunt. To the pastoralist, the burn may have several purposes but principally burning is designed to overcome the response of grasses to the climatic rythm. During the dry season, the grasses of most of northern and eastern Uganda mature and the ratio of leaf to stem diminishes. As the leaf is the nutritious part of the plant, the food value declines and with it, the palatability. In the western Hyparrhenia plains of Karamoja it was noted that in the wet season the protein value of grasses stood at 6.0% but in the dry season it fell to 0.3% (4). By burning, it is possible to bring on a "green flush" of young grass and keep up the condition of the animals. Burning also serves a purpose in keeping down the tick population and the number of harvester ants.

It is clear that, as many of the grassland areas of Uganda are maintained by the activities of man they are unstable and sensitive to changes in the pattern of human activity. In some parts of Uganda the grasslands are already exhibiting marked change. A comparison of the ecological picture (Map 6) and range resources (Map 7) in Karamoja indicates that the present pastoral resources are considerably more xerophyllous in character than the ecological climax. Much of what should be perennial Acacia savanna has degenerated to bush and thicket and Chrysopogon steppe. The vegetation belts are shifting gradually westward as perennials give way to annuals and annuals to steppe.

In Ankole change is also a feature of the pastoral resources as Loudetia and Eragrostis regimes become established on hill slopes. Worse than this is the spread of tussocks of Cymbopogon afronardus which have colonised

almost a quarter of the pasture land in the north-eastern segment of Ankole. In North Mengo the gradual spread of bush followed an Agriculture Department programme for early burns in the 1920's and 1930's. A late, and therefore fierce, burn has a large part to play in the control of bush. The desire by the Agricultural Department to prevent soil erosion led to a decline in the pastoral resources of what is climatically apastoral area in N. Mengo.

Contrasts exist in the pressure on grazing over the extensive zone, largely influenced by the density of human population and the presence of the tsetse fly. In Madi district, the presence of Glossina morsitans reduces the area of available pasture to only 5.9% of the district land area. This brings the stocking rate of the district dangerously near the carrying capacity (p.312a) (5) and introduces the threat of overgrazing. In contrast Acholi, with a very small human and cattle population (333,300 persons, 177,110 cattle) and the second largest district land area, has large expanses of under-utilised pasture. The carrying capacity of 1 head per 4 to 6 acres contrasts greatly with the stocking rate of 1 head per 30.5 acres. Comparing stocking rates with a carrying capacity based on ecological potential can be dangerous and the position of Karamoja requires explanation. The present stocking rate is calculated at 1 head per 6 to 8 acres against a carrying capacity of 1 head per 6 to 8 acres on the Acacia savanna and 1 to 8 on the steppe and dry thicket. The actual extent of steppe and bush (Map 7) is considerably greater

than the ecological extent illustrated on Map 6. As a consequence, the real carrying capacity is less, which indicates an overstocked condition, a factor also instrumental in explaining the process of change.

In a discussion of natural grasslands it is impossible to dismiss the part played by seasonal swamps and aquatic grasslands. Out of 5,700 square miles of swamp in Uganda, 3,200 sq. miles are of a seasonal nature and may be used as pasture in the dry season. These are burned over and provide a valuable addition to the pastoral resources in this annual period of shortage. The Sorghastrum and Panicum repens grasses of the swamp margins make up for a seasonal decline in other grass types.

NATURAL WATER RESOURCES

It has been estimated that unimproved cattle in Uganda require five to ten gallons of water per day (6). Whether or not this is obtained under natural conditions depends in any area on: the total rainfall, the seasonality of the rainfall and, the incidence of swamp, rivers, lakes and sandbeds. Only in Karamoja and parts of Ankole is production of unimproved livestock periodically severely constrained by inadequate water. However, the effect of water shortage in other areas of Uganda is diminished only because the level of livestock production is so low. Present natural water supplies are inadequate and quite unsatisfactory for any development programme.

Uganda is well endowed with a high and reliable rainfall (Map 3). Less than a quarter of the land area has 'Poor-Bad' prospects of receiving 30", in marked contrast

to much greater areas in Kenya and Tanzania. Most of the drier country with an unreliable rainfall lies in southern and northeastern Ankole and central and east Karamoja. In these areas droughts are common and shortage of water can lead to heavy losses of cattle. Karamoja, for instance, may expect on average, a shortage of water one year in four.

As important as the mean annual total and reliability of the rainfall is the factor of seasonality. With respect to water resources, the area of Uganda may be divided into three parts: intensely seasonal, strongly seasonal and, largely non-seasonal. In the first grouping the pastoral year is influenced by a long, hard, single dry season under conditions of low annual rainfall totals. This is the situation in the steppe belt of the manyatta zone northwest to southeast along central Karamoja. During the long dry season nearly all available surface water dries up and this partly necessitates a pattern of transhumance. The strongly seasonal area occurs where either the dry season is long and hard but the total annual precipitation is higher than in the previous group, or where the total mean annual precipitation is low but bimodal. The first type is found in the areas of Buruli, North Busoga and Uganda north of Lakes Kyoga-Bisina with the exception of the wetter parts around Gulu and the West Nile highlands. The second type is found in the drier parts of Ankole. In these 'strongly seasonal' areas the number of available watering points diminishes as the dry season advances and this necessitates short movements to some nearby lake, perennial river or seasonal swamp. There is no seasonal large scale transhumance as

there is in Karamoja. The last group is characterised by perennial water resources and largely coincides with the 'Intensive' grass zone mentioned earlier. Even in these parts there is not always sufficient surface water available in the immediate vicinity throughout the year, but the abundance of swamp in South Mengo and large parts of Bunyoro ensures a steady supply of water within a short distance.

Natural water supplies are a considerable barrier to production improvement in the drier areas and improved stock cannot be kept on traditional sources of water. Most water becomes heavily polluted with parasites in the dry season as an increasing number of animals drink from the same source. The search for water in the dry season often involves treks in the sun and this walks off a large part of the weight gain which is particularly important if the animals are to be raised primarily for beef. The amount of dry matter consumed and, with it, the amount of weight gain are directly related to the quantity of water available and thus water becomes a major factor in the efficient utilisation of pasture resources. Disease control work is largely nullified if cattle have to trek daily through tick-infested country in search of water. The concentration of stock around a very limited number of watering points also leads to grazing out of the peripheral areas, the limiting of the grazing during periods of waiting and serious erosion. In the wetter areas, natural water supplies are unsatisfactory as they are often in permanently swampy areas which may encourage foot rot. The sources of water for cattle are often the same as those for man and this creates the ideal breeding condition for tapeworm, which depends on

man as a host during part of the life-cycle. Though at present beef cattle production is limited by water only in Karamoja and Ankole it is clear that this reflects only the extremely poor level of production over much of the remainder of the country.

BOVINE DISEASES AND THEIR DISTRIBUTION IN UGANDA

As well as the common cattle diseases of temperate countries, Uganda also harbours many virulent forms of tropical bovine infections. Most of the major diseases occupy a distinct geographical area either as a result of limits set by the physical environment on the host, vector and/or parasite, or as a result of the recent activities of man. In recorded veterinary history, many of the major diseases have occupied a much wider geographical area in Uganda than their present limits suggest. Ecological conditions favouring the spread of infections such as Pleuro-pneumonia and Trypanosomiasis therefore exist over large areas of 'clean' pasture and the threat of expansion is great. As a consequence, strict control must be exercised to prevent the spread of the more virulent forms of disease. Possible expansions of infected areas through trekking for water and grazing in the dry season pose a considerable threat.

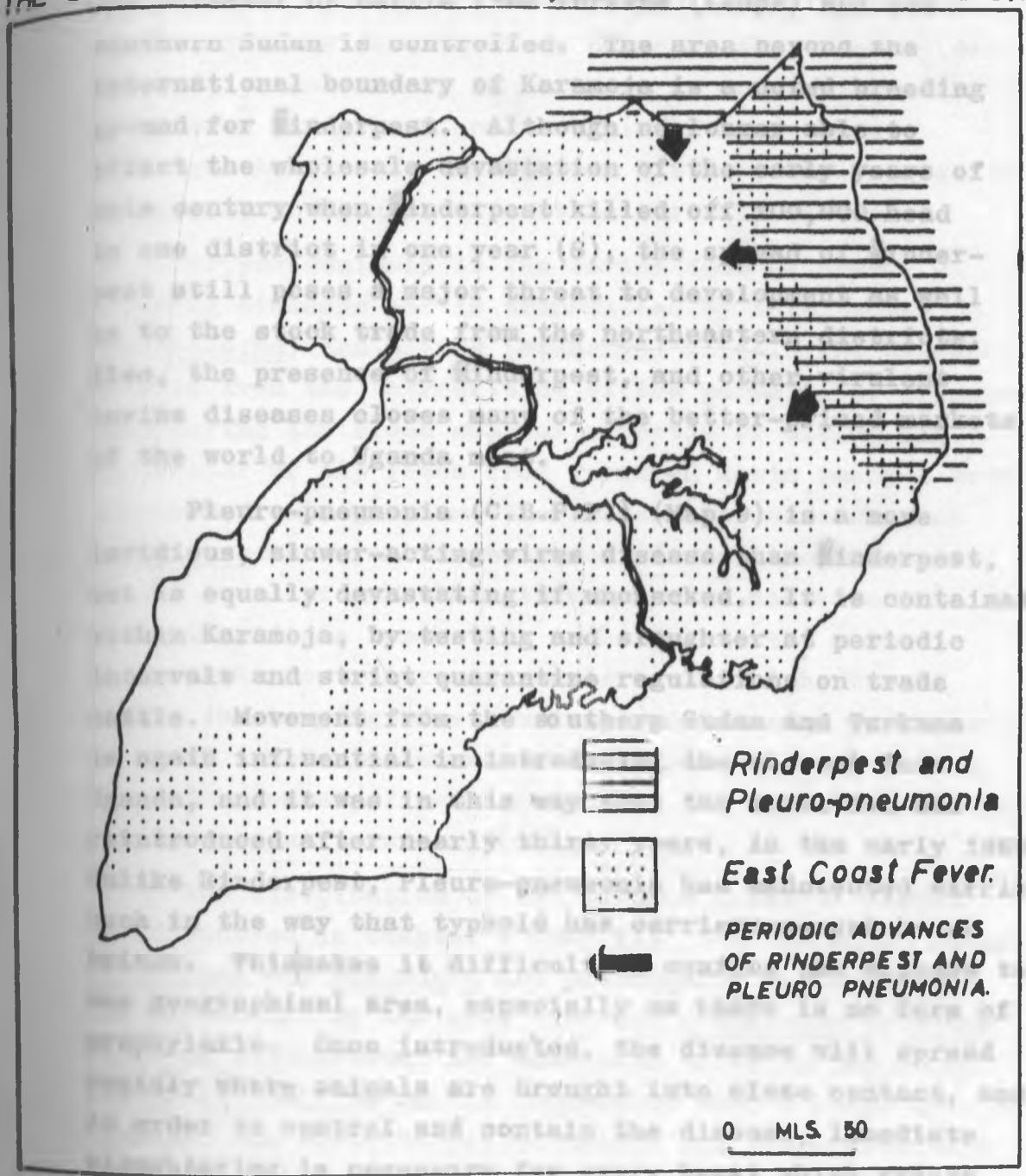
The diseases of cattle in Uganda commonly lead to abortion, stunting, delayed maturing, carcase condemnation and a high level of mortality. Although all these characteristics are common of stock in most parts of the country, many show a strong regional concentration. Debilitation and high mortality exercise a considerable influence on the production of cattle and the productivity of both animal and unit area of pasture in Uganda.

Further, the diseases pose a considerable threat to development schemes based on exotic and crossbred animals, and to the prospects for exporting meat to developed countries.

In Uganda, as in most parts of Africa, bovine diseases can be classified into two main groups: epizootic and enzootic. The epizootic forms are those which, like Rinderpest, sweep suddenly and devastatingly through pastoral areas causing very heavy losses. The enzootic diseases, however, are far less spectacular but equally as effective in the long-run. Disease festers in most parts of Uganda, holding back maturity, herd growth and size of ahimal. With improved treatment and control the epizootic diseases are now far less common in Uganda than they were in the years 1880-1945 and, consequently, the effects of enzootic forms are assuming far more relative importance.

Rinderpest (Map 9) is a virulent virus disease which has in the past caused enormous loss in a short space of time. In Uganda the disease has been confined to the northeast of the country since 1950 and its incidence is now extremely low. The Rinderpest area is contained by a 'Barrier' zone (see Section V) of vaccination which covers all, or part of, Madi, West Nile, Acholi, Lango, Teso, Bugisu and Sebei. (F.A.O. Joint Project No.15). Virtually unknown in East Africa before 1864(7), Rinderpest was partly responsible for the destruction of great herds of the Hima country in Bunyoro, Ankole and Karagwe. The disease continued to reappear, mostly from the northeast, between 1900 and 1945. With the introduction of vaccines, the disease has been successfully isolated, though it is not yet

THE DISTRIBUTION OF RINDERPEST, PLEURO-PNEUMONIA AND E.C.F.



Map 9.

possible to eradicate it altogether from Karamoja until the movement of cattle from Turkana (Kenya) and the southern Sudan is controlled. The area beyond the international boundary of Karamoja is a noted breeding ground for Rinderpest. Although no longer able to effect the wholesale devastation of the early years of this century when Rinderpest killed off 100,000 head in one district in one year (8), the spread of Rinderpest still poses a major threat to development as well as to the stock trade from the northeastern districts. Also, the presence of Rinderpest, and other virulent bovine diseases closes many of the better-priced markets of the world to Uganda meat.

Pleuro-pneumonia (C.B.P.P.) (Map 9) is a more invidious, slower-acting virus disease than Rinderpest, but is equally devastating if unchecked. It is contained within Karamoja, by testing and slaughter at periodic intervals and strict quarantine regulations on trade cattle. Movement from the southern Sudan and Turkana is again influential in introducing the disease into Uganda, and it was in this way that the infection was reintroduced after nearly thirty years, in the early 1960's. Unlike Rinderpest, Pleuro-pneumonia has undetected carriers much in the way that typhoid has carriers amongst human beings. This makes it difficult to confine the disease to one geographical area, especially as there is no form of prophylaxis. Once introducted, the disease will spread rapidly where animals are brought into close contact, and in order to control and contain the disease, immediate slaughtering is necessary for every beast which reacts positively to testing. Pleuro-pneumonia is the principal cause of the rigid quarantine system and on-site slaughter

requirements which so strongly influence the spatial and chronological pattern of beef cattle supply in Uganda. If this disease were to reach Buganda, as it nearly did in 1963, years of work in building up an exotic and cross-bred dairy herd would be placed in jeopardy. Although the disease causes very little actual mortality at present in Uganda, it must be strictly contained.

Trypanosomiasis is the bovine form of human sleeping sickness and is transmitted by both tsetse (sp.Glossina) and biting (Stomoxys) flies. The disease results from the introduction of the parasite or trypanosome during the blood meal of a tsetse or biting fly. The vector or fly feeds from favoured hosts amongst both cattle and wild game and the latter, in cases such as bushpig, acts as an immune reservoir for the disease. If the level of infection in an area is moderate to heavy then it is impossible to herd domestic cattle, because the mortality rate would be too high, but if light, the keeping of stock is possible under prophylaxis. As small stock are immune to trypanosomiasis they form the main element of meat production and supply where the fly is present in strength.

The distribution of the savanna forms of tsetse was discussed in Chapter 1 (Map 2). The 'savanna' forms pallidipes and morsitans are principally responsible for disseminating the more virulent congolense or vivax forms of trypanosome, and were seen to be an important factor in limiting cattle production over a large area of Uganda. The distribution of tsetse and trypanosomiasis is strongly influenced by factors affecting the vector and the parasite.

The vector requires to be near shade during the hours of sunshine and thus favours a habitat where bush

abounds or where the lower branches of treesprovide a resting place. Acacia bush and savanna are thus frequently the favoured habitats of the tsetse. The fly belt in Uganda, found largely in these vegetation conditions, is an extension of a band covering 4,000,000 square miles of Africa between latitudes 14°N and 29°S. Other physical factors also influence the distribution of tsetse, - the rainfall should exceed 25" if the fly is to thrive, and an altitude below 4,000' is favoured, though exceptionally the fly survives up to 7,000'. At exceptional altitudes, however, the tsetse fly may survive though the trypanosome may not.

Conditions favouring the presence of tsetse exist over a much wider area than the 11,000 sq. miles that are at present occupied by the fly. In fact, much of Uganda which is now tsetse free was formerly the domain of tsetse fly and the present limits of tsetse distribution are often the work of Man (Map 2). Over 11,000 square miles of tsetse habitat has been cleared of the fly in this way since 1945, but the threat of resurgence is ever present (9). As with diseases mentioned earlier, the problem of cattle movement is considerable, and in nomadic areas such as Ankole treks for water and grass into or near the fly belt often result in the introduction of disease into otherwise uninfected tsetse country. At present the level of production from existing herds is little influenced by tsetse, as both mortality and debility are slight. However, large areas of the country with a low reliability of rainfall and an otherwise natural endowment as pasture lands (parts of Ankole and northern Kigezi) are unproductive largely as a result of tsetse infestation.

East Coast Fever is a tick-borne disease which causes extremely heavy calf losses, considerable stunting and loss of production. The distribution of East Coast Fever (E.C.F.) is strongly governed by the ecological requirements of the vector: the tick. Ticks, particularly the principal offender Rhipicephalus appendiculatus, require a rainfall above 25 inches and an altitude below 7,000 feet in areas of fairly long grass. Thus, in Uganda, the disease festers in all areas except Ruwenzori, parts of Kigezi and Mount Elgon, and the drier interior and eastern parts of Karamoja District. (Map 9). Where it does occur, E.C.F. is estimated to kill off 20-25% (10) of the calf population. In isolated cases such as parts of Acholi and Ankole, where the nutritional level of cattle is very low, as many as 80% of calves have been known to die of the disease. In some parts of the country, a long history of contact with E.C.F. has resulted in a limited degree of inherited immunity. This appears to be true of the hardy small East African Zebu animal of Teso. As there is no cure for E.C.F., control of the disease is effected by eradicating the vector. At present E.C.F. has a more serious effect on the production of slaughter cattle than all other diseases combined.

Foot and Mouth disease has little impact in Uganda. The unimproved nature of most of the livestock results in the disease having only a very slight effect on production or productivity. Localised outbreaks are common in the Eastern and Northern Regions. Nevertheless, this disease as much as any other is responsible for a fear of Ugandan meat on the world market and until Foot and Mouth is eradicated there is little prospect of export

to better priced outlets.

The remaining diseases covered in this brief overall review are detected only after slaughter. Parasitic infestations such as Cysticercus bovis and liver-fluke are very common and lead to heavy condemnations of slaughtered stock. The presence of Cysticercus bovis, an intermediate stage of the tapeworm Taenia saginata, results from the close association of cattle and man and is thus most commonly found in cattle originating from the Pastoralist areas where the symbiosis of man and beast is closest. Liver fluke, and related parasites are often contacted at water holes and points where cattle gather in large numbers to drink. Transmission is rapid and losses through condemnation are often high. Liver fluke is thus for instance very common in Teso.

SOCIAL ATTITUDES TOWARDS CATTLE

In Uganda, social attitudes towards cattle exercise a considerable influence over the regional characteristics ~~level~~ of slaughter stock production and sale. Attitudes extend not only to the stock themselves but also over the areas grazed and the water drunk. It is possible, for the purposes of this study to define three main areas of differing social attitudes towards cattle. Although the place of cattle in the economy of any area may be a reflection of the poor climatic prospects for reliable crop agriculture, this is by no means a certainty. The Hima cling to their entirely pastoralist way of life regardless of the environmental factors prevailing in any area they occupy, and may even coexist with tribes such as the Bairu who live by settled agriculture. Alternatively, some tribes such as the Iteso reveal a greater acceptance of change and have adopted both cash and subsistence crops whilst retain-

ing large numbers of cattle (Chap.1.). It is impossible to be deterministic about social attitudes, their origins and adoption, though it sis easy to see how pressures from cultivation gradually push the more versatile activity, pastoralism, into the less clement areas. At present social attitudes are important not only in influencing the level of production, the use of resources, the pattern of sale and the response to advice in many areas but also act very often as a considerable barrier to progress.

It is convenient for this study to divide Uganda into three main socio-cultural groups with regard to stock - keeping: the Pastoralist, Pastoralist-Cultivator and the Cultivator. These groups are studied in more detail in Section IV, but before outlining their characteristics it is necessary to note that these are the broadest of generalisations and all these societies are subject to quite radical spontaneous or imposed change with the spread of new ideas.

The Pastoralists are those people to whom cattle form the basis of subsistence, exchange, prestige and culture. Some tribes, such as the Suk or Hima may involve themselves only with cattle, shunning cultivation. Others like the Jie or Karamojong may grow a few grain crops. Amongst the Pastoralist-Cultivators cattle have lost their pivotal place in the society and culture but still play a part in prestige and the acquisition of a bride. However, the tribes in this category, such as the people of Teso, are well within a cash economy and regard their cattle as having a cash value as well as a value within the tribal standards. This is not to suggest that the Pastoralists do not sell their cattle, they do but they do not regard them in the light of a cash reserve or investment as do the people of Teso or Lango. The Cultivator group has little cultural or social interest in cattle per se , though as with the Banyoro they may have done so at one time. This group, the Cultivators regards cattle instead as

economic rather than a social asset. Numbers are of little consequence and the question of amassing numbers for bride price is a thing of the past. People such as the Baganda typify this last outlook. They are essentially cultivators regarding cattle-keeping as "Hima work" which they often farm out to itinerants from the Western Region.

NOTES

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7. Mettam R.W.M. 'A Short History of Rinderpest in Special Reference to Africa' Ug.Jnl.5/22 1937 pp.22-26.
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9. U.S.A.I.D. Report No.P.10/T 617-A-14-AA-2-30001, 1963 p.125.
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SECTION III

THE PATTERNS OF PRODUCTION AND SUPPLY

SECTION III

Chapter 3

PART I. THE LEVEL OF BEEF CATTLE PRODUCTION

The production and productivity levels of slaughter cattle in Uganda are almost universally low. Some regional variation is introduced by the three major 'types' of stock prevailing in the country and by the interaction of physical factors and aspects of management. All variation is nevertheless within this framework of extremely low production and productivity. As yet, less than 1% of the National Herd is in the hands of significantly improved management and so factors influencing production in the traditional sector are overwhelmingly predominant.

The present level of slaughter cattle production under traditional management is typified by the following characteristics:

(a) A slow rate of growth of the total cattle population averaging 2.4% (1). per annum.
(b) A heavy calf mortality averaging from 20 - 25% (2).
(c) A calving average of only 65% against 90% in well-managed herds (3).
(d) A slow rate of maturing, roughly twice as slow as the optimum. Animals commonly taking 6-7 years to reach maturity.
(e) A small eventual liveweight of 560 lbs. - 600 lbs. average.
(f) A low meat yield of 22% lean meat - the meat being largely coarse fibred.
(g) Periodic heavy losses from drought (see chap.5, Section IV).

The heavy calf mortality is in a large part responsible for the very slow rate of expansion of the total cattle population. The growth figure of 2.4% per annum represents a national average, but with the exception of Karamoja, variations from the average are slight. In Karamoja, the figure is double that of the national average growth rate at 5% Apart from reducing the size of a surplus which might possibly be marketed, the slow rate of growth limits the number of locally produced breeding animals available for development schemes. The high mortality among calves is superimposed on a very low calving average of only 65%, and these two factors combine to hold back very considerably the growth of cattle numbers in Uganda. Both production and productivity suffer as a result. Losses of calves account for 20-25% of the natural annual crop of animals, but as mentioned earlier, this average figure rises to 80% in some parts of Acholi and Ankole. In exceptional years, the entire calf crop of some areas has been lost through disease (4). It has been proved that under improved conditions the level of calf survival can rise to 97% as against the present 75%. (5)

The relatively small number of calves which survive the first few months of life are often weakened and later stunted by the rigours of disease and reared under often quite unsatisfactory systems of management. The pressures of the physical environment such as lack of water, shortage of grazing, and poor management practices such as inadequate feeding of calves, delay the normal maturing time by as much as 50-60% so that animals in Uganda commonly take six to seven years to reach full growth. The slow rate of maturing alone considerably reduces the turnover

per unit area of pasture and brings down the level of productivity per acre. Bearing in mind the largely non-commercial nature of most stock-keeping in Uganda, it is largely academic to speak of the level of production and productivity in terms of animals reaching any cash market, but the level of production under current methods reveals the scope for considerable improvement as this sector becomes commercialised.

At maturity, the Uganda animal weighs an estimated 560 lbs.(6). This figure is by no means an overall average but represents a sample of animals bought in the cattle trade. As it is often common for only the worst animals to reach the market, the figure is probably an under-estimate of the true position. Despite this, the figure of 600-800 lbs. which might result after the adjustment for a generally better animal plus the weight lost in movement to sale, is still considerably below the 1,000 lbs. or more which characterises beef animals on the ranches of the Kenya highlands. The present low weight reflects the poor plane of nutrition, disease problems and mismanagement.

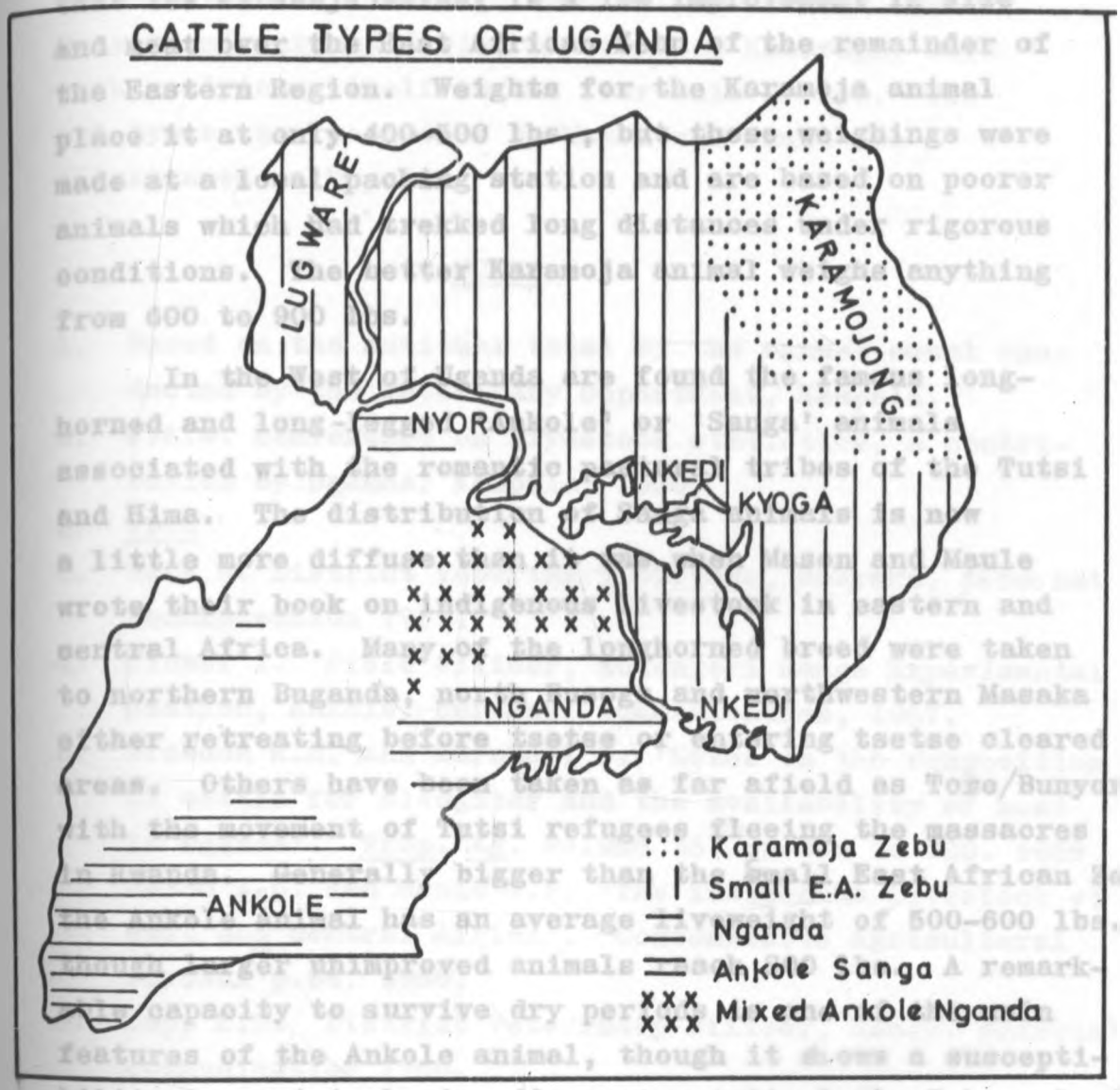
The carcase reflects the low standard of the animal from which it came. The meat is generally extremely coarse and lean meat forms only 22% of the carcase or 199 lbs. lean meat equivalent. The small number of cattle available as well as the very low yield per beast results in an average of only 3.91 grammes of protein from beef per person/day being available in Uganda against 36 in Argentina and 11.5 in South Africa. As most of the meat consumed in Uganda is thoroughly stewed before consumption, the present toughness is of little importance but the level of quality at present does not satisfy the requirements of the growing higher income sector in the townships,

which relies on imported hind cuts from Kenya. Production can no longer be considered only in terms of increasing the numbers of cattle marketed or reared but must consider the changing quality requirements.

The characteristics of production common to all parts of Uganda, are superimposed on a regional pattern of cattle 'types'. It is not really possible to speak of 'breeds' in the modern sense in Uganda, and throughout this work, the expression 'types' will be used for the traditional herds. This regional variation in genetic type results in differing regional responses to the prevailing physical and human environment. Three main cattle 'types' occur in Uganda and their distribution is illustrated on Map 10.

The largest grouping is that of the Small East African Zebu which dominates most of the Eastern and Northern Regions, and constitutes 75% of the total herd of Uganda. As the name implies, the unimproved animal is small in stature averaging only 471-661 lbs. (7). Figures considerably below this are found in many parts of the Eastern Region. An estimate for the Bugisu Zebu is 450-500 lbs., and for the Sebei animal 550-600 lbs. (8). The Small East African Zebu shows a relatively high inherant resistance to tick-borne diseases. For this reason it was favoured as a breed for development ten to twelve years ago in Uganda, though it has subsequently taken second place to imported Borans.

A sub-type of the East African Zebu is found in Karamoja and is related to the hardy Boran animal found in the area of that name in northern Kenya. The heavier boned Karamoja animal is able to survive rigorous conditions, particularly drought, and is able to convert the poor grazing of the north east into meat very efficiently.


CATTLE TYPES OF UGANDA
LUGWARE
KARAMOJONG
NYORO
NKEDI
KYOGA
NGANDA
NKEDI
ANKOLE
::: Karamoja Zebu
| | Small E.A. Zebu
— Nganda
= Ankole Sanga
xxx Mixed Ankole Nganda
xxx
Based on a map by
I.L.Mason & J.P. Maule

Map 10.

Estimates by veterinary officials (9) have suggested that the Karamoja animal is a 15% improvement in size and meat over the East African Zebu of the remainder of the Eastern Region. Weights for the Karamoja animal place it at only 400-500 lbs., but these weighings were made at a local packing station and are based on poorer animals which had trekked long distances under rigorous conditions. The better Karamoja animal weighs anything from 600 to 900 lbs.

In the West of Uganda are found the famous long-horned and long-legged 'Ankole' or 'Sanga' animals associated with the romantic pastoral tribes of the Tutsi and Hima. The distribution of Sanga animals is now a little more diffuse than it was when Mason and Maule wrote their book on indigenous livestock in eastern and central Africa. Many of the longhorned breed were taken to northern Buganda, north Busoga and northwestern Masaka either retreating before tsetse or entering tsetse cleared areas. Others have been taken as far afield as Toro/Bunyoro with the movement of Tutsi refugees fleeing the massacres in Rwanda. Generally bigger than the small East African Zebu, the Ankole animal has an average liveweight of 500-600 lbs., though larger unimproved animals reach 800 lbs. A remarkable capacity to survive dry periods is one of the main features of the Ankole animal, though it shows a susceptibility to certain bovine diseases, particularly Tuberculosis. The Ankole longhorn forms 15% of the total herd in Uganda as does the last group - the 'Nganda'. This animal represents a cross between the Sanga and Zebu animals and is of a small stature. It is found principally along the northern shore of Lake Victoria, corresponding in area as the name suggests, with the original lakeside Kingdom of Buganda (10).

Although a whole range of sub-types exists in Uganda, such as the Kyoga Zebu which resulted from Banyoro migrations during the time of Kabarega, this work restricts itself to the four main groups. The sub-types, as recognised by Mason and Maule are illustrated on Map 10.

NOTES

1. Based on the national total of the annual count conducted by the Veterinary Department, Kampala.
2. F.A.O. conference on livestock statistics, a contribution by Uganda, Kampala, 1966.
3. Ibid
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5. Fisher I. Field Officer, Ruhengeri Range Experimental Station, Ankole, personal communication, 1967.
6. Breedon R.M. and Marshall B. 'Notes on the composition of cattle for slaughter and the availability of meat in Uganda'. Trop. Ag. volume 36. 1959 pp.309 to 320. ~~1959~~
7. Mason I.L. and Maule J.P. 'The indigenous livestock of east and central Africa'. Commonwealth Agricultural Bureaux 1960 p.64. ~~1960~~.
8. Sopp R.D. District Veterinary Officer, Mbale. personal communication 1966.
9. Thimm B. Animal Health Research Centre, Entebbe, personal communication 1967.
10. It is necessary to point out that such figures as are available for the weights of indigenous African cattle in Uganda are:
    (1) Based on very small samples,
    (2) Often derived and extrapolated from very small geographical areas - note variation in small East

African Zebu,

(3) Often out of date.

(4) Based on specialised samples such as trade animals which may well be the poorest rather than the best a district has to offer.

PART 2 - SUPPLY

Chapter 4

THE SOURCES OF SLAUGHTER CATTLE

The slaughter requirements of the Uganda beef trade are not met entirely by supplies from the national herd. Annually deficits are made up by the importation of stock from both Kenya and Tanzania and of chilled meat from Kenya. In 1965, the national herd totalled an estimated 3,626,643 head of cattle (1). The overall offtake of stock for both family consumption and for the trade sector may be crudely estimated by calculations based on the number of traded hides. In doing this, some allowance must be made for those hides which have been damaged or used by the owner for domestic purposes and for those hides brought into the country illegally from the southern Sudan, the Congo and Rwanda. (2). By this method of hide equivalents, the Veterinary Department produces an annual estimate of the national offtake, and in 1965 this came to 620,000 head. (3). A figure of just over half a million represents 17% of the total cattle population of Uganda and many people (4, 5) would regard this as an unreasonably high estimate of the national offtake. A figure nearer 10%-12% has been suggested (4). The only relatively accurate records of offtake come from the statistics collected at the local government cattle markets and the resale markets, and these cover only a fraction of the total (6).

Apart from the difficulties which arise in estimating the overall offtake, many further problems are involved in calculating the number of animals entering the trade sector, for much of the trade passes unrecorded.

No continuous or reliable records are available of the number of animals slaughtered in the 'bush' or at roadside stalls and smaller village markets. It is the duty of chiefs and sub-chiefs to keep a record of all slaughters, in reality these records are discontinuous and extremely inaccurate. (7). Of the 620,000 cattle recorded as a hide-equivalent offtake, only 127,000 were handled through the official marketing system, though some of these may well have been sold twice (see 'Scale of Movement'). 127,000 head of cattle represents only 3.5% of the national herd passing through the recorded cash sector, or 20% of the estimated national offtake. Although most quantitative data in beef cattle in Uganda is derived from this 20% this study attempts to balance this with observations made in the field. It is not possible to estimate what part of the remaining 80% is in the hands of village butchers, is consumed at feasts, dies without later consumption or, is in fact slaughtered somewhere beyond the borders of Uganda and smuggled in as hides. For this last reason, it is not possible to say with any accuracy that, in fact, 80% is a true figure for the unrecorded offtake sector, and the cash transactions at the organised markets may well represent a much higher percentage of the national offtake if many of the other hides are illegally imported.

In 1965, supplies from Ugandan sources yielded 145,400,000 lbs. of meat (8) against a total estimated demand of 158,500,000 lbs. which leaves a deficit, in carcase equivalents based on a 530 lb. animal, of approximately 30,000 carcases. Some of this deficit is made up

by the importation of both low and high grade slaughter animals from Kenya and low grade slaughters from the Mwanza area of Tanzania. In 1965, 6,208 head of cattle were imported from the Kenya Meat Commission in Eldoret, and 57 tons of chilled beef were purchased from the same source. In the same year Tanzania supplied 5,446 head of cattle. The total import figure varies considerably from year to year and reached a peak of over 17,000 head of cattle in 1963. The figure of high grade chilled beef is more stable as a local substitute does not exist.

Supplies of slaughter cattle originating in Uganda are channelled through four main types of market. Each market type is distinct in terms of location, consumer hinterland, purchasing hinterland and, method and volume of trade. The four principal market types are:

(a) The Rural Butcher,
(b) The County or Local Government Market,
(c) The Resale Markets and,
(d) The Ranch Markets.

THE RURAL BUTCHER

Anywhere that people congregate regularly in a mood to buy, there very often will be found the wattle and daub stall or the plain wooden table of the rural butcher. Although the amount of trade handled by any one enterprising individual is very slight, the large number of individuals in the trade results in this sector having a larger estimated turnover than that of the organised local government markets (9). No accurate records of the village butchers exist, and this estimate is based on a subtraction of accurate local government figures from the total hide returns, a figure already noted as being of questionable value.

As the name implies, the rural butcher operates in the countryside, usually at the local produce market where he may be a paying stallholder. Butchering is a part-time activity and prior to market day, the butcher leaves his work on his smallholding and visits farmers in the local area in search of a cheap animal for slaughter. The prices he pays for these animals are generally 40% lower than those prevailing in the organised markets and, partly for this reason, beef is often 25-50^{c} cheaper in the countryside. (10). Why local farmers are willing to part with animals at this lower price revolves principally around a fear of veterinary inspection at the county markets. Where cattle are in very short supply, as in Bunyoro, the part-time butcher will often make-do with small stock, for which there is sometimes a preference and a higher unit return. If peasant farmers in the area are willing to dispose of animals cheaply, the butcher, should the capital be available, will purchase over his immediate requirements and maintain the surplus cattle on his small farm until needed.

When people meet in the produce market at the weekend the rural butcher forsakes his farm for his other trade. In order to become a butcher, the enterprising peasant needs the necessary capital to purchase his first animal, the will to risk losing what is not sold in the statutory twenty-four hours sale period, and membership of the Moslem religion to accord with the ritual slaughter requirements. It is a law throughout the countryside that fresh meat must be sold on the day of slaughter and there is no possibility of the market butcher being able to afford costly refrigeration equipment. Nevertheless, many small farmers are prepared to take this risk from week to week.

The fortunes and often the existence of the rural butcher are dependent on the prevailing level of rural income (11). When money is readily available it is common for the demand for meat to rise (12), and so the number of butchers varies seasonally with both the volume of the crop harvest and the level of return from the crops. At times of hardship it is not uncommon for butchers temporarily to abandon their commercial interests and return to the production of subsistence crops until more money is circulating in the local area.

Where the village butcher operates close to an administrative centre such as a sub-county or miruka headquarters, provision is made for the hygienic slaughter of animals on a local authority concrete slab where animals can be killed under the supervision of veterinary staff. This considerably increases the risk taken by the butcher, though at present, the general absence of veterinary inspection at the village level and the freedom from fear of carcase condemnation encourages the small butcher to continue his trade with only a limited risk on his very little capital.

In recent years the phenomenon of rural butcheries away from markets has appeared and boomed as small traders have established their stalls at crossroads, taxi halts and 'bus parks. Unlike their village counterparts in the produce markets, the roadside butchers, such as those along the Tororo-Mbale road, open daily, taking advantage of the regular passage and congregation of travellers.

THE LOCAL GOVERNMENT OR "COUNTY" MARKETS

The organised local government cattle markets were developed largely in the early part of the nineteen thirties and were intended to serve four main purposes:-

1) To commercialise the livestock sector and spread the money economy,
2) To assure a regular supply of meat to the growing townships,
3) To offer a more lucrative alternative to the "bush" trader,
4) To provide a source of revenue to the local government.

The market network covers, with varying degrees of intensity, the whole of Uganda and is under the control of the local district administrations (13) and sometimes, as in the case of Teso, a Livestock Marketing Officer is appointed to develop the trade through the markets. In function, these local markets differ from the rural butcher system in scale of operation and in not selling meat. The market establishments provide a place where cattle may be traded for consumption elsewhere. The local government cattle trading centres have two main types of trade: supplying the urban and high income peri-urban market within the district and/or supplying animals for transfer to urban or high income peri-urban or rural areas in other parts of the country. The emphasis varies from district to district.

The markets are held at regular, advertised, intervals at or near the county headquarters. Urban butchers, traders, both buyers and sellers and peasant farmers come together to do business. The market may, as

in Teso and Lango, be well equipped with fencing and water and a hut for the resident veterinary officer who must preside over any sale. In some other parts of Uganda, as in Bunyoro, the market may be no more than an agreed site where transactions may be effected and supervised. On the appointed day, cattle are brought and those offered for sale are taken into the market and fees are paid to the local government and to the Veterinary Department to cover the obligatory inspection. In some districts, of which Karamoja is one, these fees may represent the bulk of the District income. The sale is conducted by private treaty through a long and tedious process of haggling. Bulk-buying is consequently very difficult for firms such as Uganda Meat Packers who make all their Uganda purchases through agents at the 'county' markets. Despite this problem, the bringing together of many animals has, for the larger buyer, obvious advantages over foraging in the bush. The large number of buyers helps to encourage competition and so the prices are generally higher at the county market than in the rural environs. Further, the buyers are intending to sell either the cattle or the meat in areas where a higher price prevails. To overcome some of the disadvantages of the private treaty system, in April 1964, the Veterinary Department transformed the markets in Karamoja into auctions. At the auctions, animals are brought into the ring, shown, and bids taken from the collected buyers. As with all county markets records are made and permits issued for later movement of the stock. Bunyoro District has, from August 1967, declared all forms of marketing in the traditional sector, except for that conducted at the county markets, illegal. The higher price prevailing at

local government markets will make it difficult for the village butcher to continue purchasing if bush marketing is now a crime.

In size and thruput the markets vary considerably, from the installations in Karamoja where up to 9,382 animals have been traded at one market (Kaabong 1961) to Bunyoro where only 109 animals were traded at Kimengo in 1966. The frequency of the markets is also an index of trade. Many of those in Teso and Karamoja open fortnightly or monthly, whilst those in Bunyoro are held twice or thrice annually. Markets in Buganda open weekly, but this reflects the fact that most are produce markets as well as cattle trading centres and not that they necessarily have much livestock business to transact.

The operation of the market varies considerably in different parts of Uganda. In Teso and Lango, the markets are largely the domain of a large trading community acting principally as buyers intending to sell the cattle for a profit elsewhere. In Karamoja the traders, again, as in Teso and Lango, often Somalis, act this time as sellers to the butchers from the larger urban areas of the "Fertile Crescent" and also to the agents of a Kampala meat packing concern. All the domestic low grade supplies for urban areas and packing in Uganda, originate in the county markets. The volume of trade at the county markets is, however, dependent on many factors other than demand, not least of which is the capital limitations of the large trader class.

THE RESALE MARKETS (MUNICIPAL MARKETS)

The resale markets form the outlet for cattle bought at county markets by the trader community of

Teso, Lango and to some extent, Ankole who wish to sell their animals for higher prices in the "Fertile Crescent". These markets sell directly at the railhead for immediate slaughter (14). At present only three resale markets exist in Uganda: Mukono, Bukona and Nalukongo. Other resale markets in Buruli, Kyaggwe and Bugerere have ceased to function since 1963. Mukono, which is the only resale market functioning fully in 1966 handled 19,652 head in 1965 which makes it easily the largest cattle market in Uganda. Butchers from the high-income peri-urban area of Kampala attend the daily market and buy animals which are then immediately slaughtered. The meat is transported by vehicle to various retail outlets within a radius of thirty miles (15). The need for transport and the very high price prevailing at Mukono excludes the small scale village butcher.

The proximity of the resale markets to townships allows veterinary inspection. In reality, this is cursory at Mukono, the fear of condemnation is slight and the risk of loss low. Some animals are transferred after sale by rail from Mukono to the Municipal market at Nalukolongo (Mengo) and to the Kampala abattoir, but only 2,364 were transferred in 1965. Only Nalukolongo has a functioning abattoir and slaughters at Mukono are performed in the open.

THE RANCH MARKETS.

As yet the ranch markets, like the ranches themselves, are in an embryonic condition and in 1966 they handled only 1,500 head of cattle (i.e. less than 1%). All ranch sales are conducted as auctions at regular,

advertised intervals, though in 1966 only the Bunyoro Ranch Company market had had any long experience of sale. Sales differ at the ranches in being organised on a basis of known weight and quality grade introducing the basis of quality/price differential which is either lacking or only crudely estimated at the other forms of market. Plans to open three or four new ranch markets should assure the rapid growth of this sector of the trade in the near future.

THE LOCATION OF THE PRINCIPAL MARKET TYPES

Rural Butchers: The locations of the rural butchers closely reflect places where people come together regularly in a mood to buy. Three main locations are common in Uganda:

1. At the rural produce market,
2. At bus and taxi parks, crossroads and along main highways, and,
3. At the boundary of municipal areas.

The rural butchery is strongly consumer oriented and is not dependent on large numbers of cattle being available in the immediate area as its needs are small and it is always in a position to substitute small-stock if beef animals are not forthcoming. It was impossible in the time available to map the distribution of rural butchers as they are not, unlike their urban counterparts, a licensed community. The following assumptions may be made on observations.

The relationship of village markets and village butchers is close. There are very few small produce markets in Uganda which do not have a stall where slaughtered animals will be sold on market day. The location factor in this case will be the same as those which governed the location of the produce market: an area with a large and commercially minded rural population. The presence of local taboos and preferences may strongly influence the type of meat the butcher is able to sell, but the presence of a butcher at the market is almost certain.

Where butchers site their premises along roadsides or at crossroads, the location may not reflect the density ofpopulation in the surrounding area, as it is

likely to do with the produce market. Instead it may represent a convenient point where a series of routes cross, where bus routes change, or anywhere that there is a strong possibility of travellers being delayed long enough to become potential customers. The roads of Bugisu are lined with such butcheries catering to a transient clientele. Oddly, butchers often locate at the larger county cattle markets and this reflects their position as sellers of meat and not cattle. It reflects also the large amount of money circulating at the county stock marts.

In recent years there has been a mushrooming of rural butcheries on the peripheries of the larger townships such as the concentration at Nyendo on the outskirts of Masaka, around Tororo, and most district headquarters. Though only technically 'rural', these butcheries locate themselves beyond the municipal limits to avoid the rigorous meat inspection obligatory by bye-law in the townships and carry on a healthy trade with buyers from the urban areas. This trade is quite illegal but difficult to detect as the individual quantities of meat entering the townships are small. Buying at the cheaper rural price, undercutting the urban price, and not facing the fear of condemnation, these peri-urban butchers are in a strongly competitive situation.

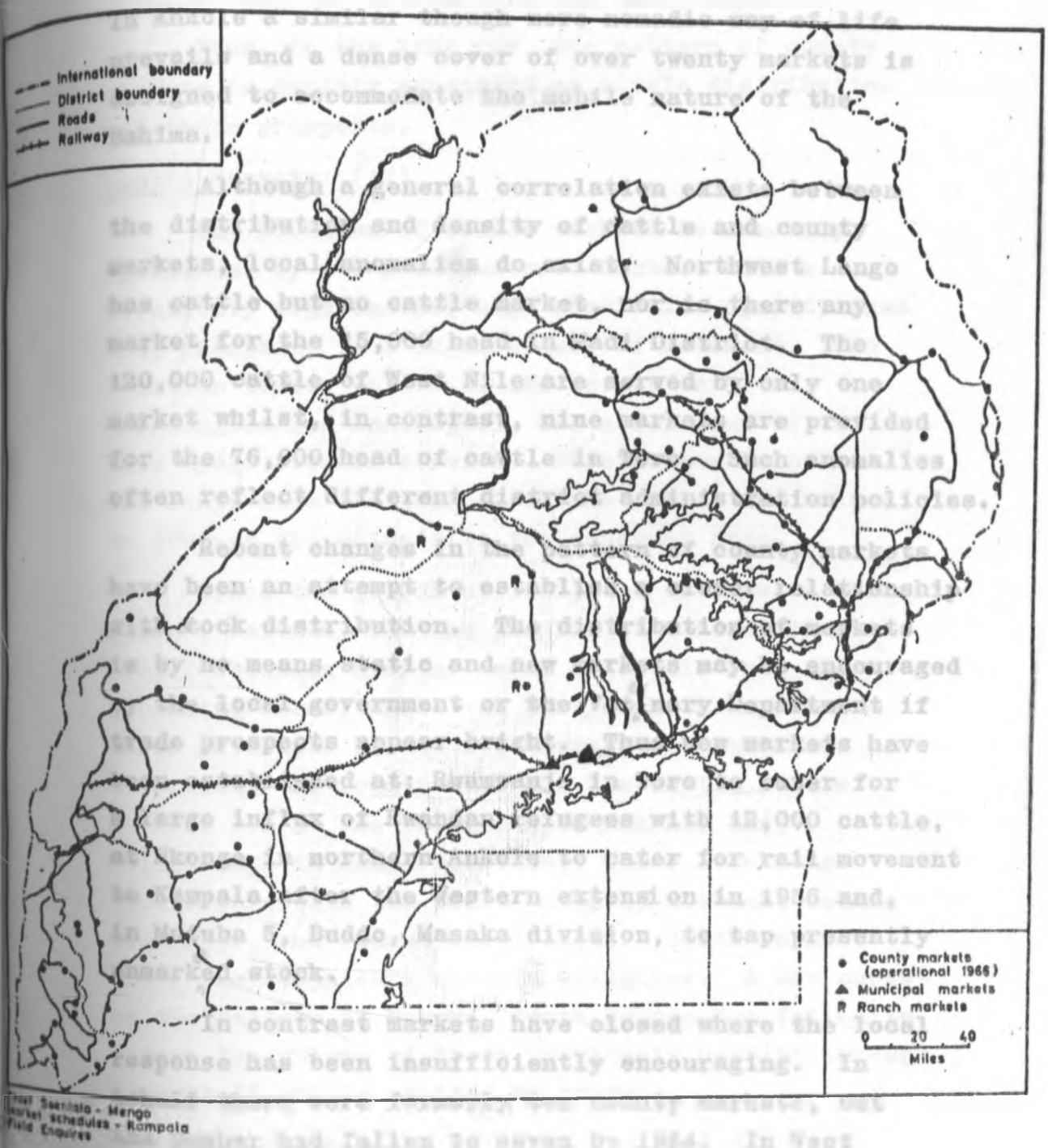
Local Government or 'County Markets'

Unlike the consumer orientation of the small village units, the distribution of 'County markets' is closely related to the trade element - cattle. The distribution of markets at this level compares in broad outline

with the distribution of cattle (Maps 11 and 1). The correlation of cattle and county markets is reflected also in the similarity of density patterns for, although the Pastoralist and Pastoralist-Cultivator areas of Karamoja, Ankole, Teso and Lango have 52% of the county markets on only 33% of the land area, these same areas have 51% of the national herd. A higher throughput often reinforces the correlation of market/cattle relationship in these higher density areas.

As the name implies, the county markets were originally centred at, or near, the county headquarters adjacent to a road or railhead. With time the pattern changed in response to cattle numbers, and trade prospects, so that areas such as central Bunyoro remained static or declined because of their small cattle population. In contrast, Teso had at least two markets per county by 1949 because the number of trade cattle made available was encouraging. As it requires permission to move cattle from one county to another, there was a strong case for establishing a market in any county where potential trade appeared favourable for the difficulties and expense of moving to another county might deter potential traders.

In Karamoja the location of county markets raises special problems (16). The markets were situated as usual at the county headquarters and the headquarters themselves had been created at the centre of the area where each tribal group clustered in the wet season. As each county represents a pastoralist tribe or sub-tribe grouping, each market is at the centre of a cattle cluster for at least part of the year. The central location is, however, seasonal and during the trans-humant movements of the dry season, the pastoralists of Karamoja are thus away from the main market network.


LOCATION OF OPERATIONAL CATTLE MARKETS, 1966
International boundary
District boundary
Roads
Railway
R
R
R
County markets (operational 1966)
Municipal markets
R Ranch markets
0 20 40
Miles
Field Enquiries

Map 22. 11.

This is one difficulty of locating a fixed marketing infrastructure in a very mobile pastoral economy. In Ankole a similar though more nomadic way of life prevails and a dense cover of over twenty markets is designed to accommodate the mobile nature of the Bahima.

Although a general correlation exists between the distribution and density of cattle and county markets, local anomalies do exist. Northwest Lango has cattle but no cattle market, nor is there any market for the 15,000 head in Madi District. The 120,000 cattle of West Nile are served by only one market whilst, in contrast, nine markets are provided for the 76,000 head of cattle in Toro. Such anomalies often reflect different district administration policies.

Recent changes in the pattern of county markets have been an attempt to establish a closer relationship with stock distribution. The distribution of markets is by no means static and new markets may be encouraged by the local government or the Veterinary Department if trade prospects appear bright. Thus new markets have been established at: Rwamwanja in Toro to cater for a large influx of Rwandan refugees with 12,000 cattle, at Nkonge in northern Ankole to cater for rail movement to Kampala after the Western extension in 1956 and, in Mutuba 5, Buddo, Masaka division, to tap presently unmarked stock.

In contrast markets have closed where the local response has been insufficiently encouraging. In Acholi there were formerly ten county markets, but the number had fallen to seven by 1964. In West Nile Ovujo market was closed leaving only one remaining, and a large number of small county markets

have closed in Bugerere and south Kyaggwe since 1963, leaving only two in Bugerere and one in Kyaggwe.

Thus, in the long run, the pattern of county markets is crudely sensitive to cattle distribution and trade prospects.

Resale Markets: (17)

The location of resale markets is strongly influenced by two main factors: contact with a relatively high income, high population density area and, proximity to a major artery of movement. The location factor in two of the resale markets: Nakasongola and Namasagali, was a terminus of the Lake Kyoga steamer service. Buyers from Kampala and Jinja made the journey to the market and walked or trucked the animals to the consumer area.

Since the floods of 1961, the closure of the steamer service, and the passing of a regulation in 1963 forbidding hoof movement of cattle into the consuming areas, these two port/markets have lost their principal location advantage and declined. At present the locations of the two active resale markets are at the railheads at Mukono, and Nalukolongo in Mengo township. These locations enable sale with the least possible movement before slaughter, and reduce the transport costs on meat after the compulsory on-site slaughter. A new market on the railway at Bukona, south Busoga has failed to revive the volume of trade previously passing through Namasagali and is avoided by traders.

Mukono is sited to serve the high density - high income population in the coffee area east of

Kampala up to a radius of thirty miles from the market though not Kampala itself, although the hinterland was considerably larger before the imposition of on-site slaughter. Nalukolongo is designed to provide for the former 'Kibuga' or Mengo, but in reality that area depends mostly on supplies of cheaper Karamoja meat purchased in Kampala. (18).

Ranch Markets

As a result of the higher quality of animal sold, the freedom from later carcase condemnation and consequently the higher profit margin to the butcher, the ranch markets can afford to be located at the ranch, knowing that butchers will be prepared to absorb the costs and inconvenience of movement. In 1966, there were four markets operating, of which Sanga (Ankole) was the largest. The ranches and the markets are all situated near main roads which allows butchers to walk or truck their animals. Also the markets are all within easy distance of urban areas, - Ankole Ranch market is near Masaka - Bunyoro near Hoima/Masindi. An on-site sale is favoured for ranch cattle as a minimum of movement is preferred in the heavily infected regions often found encompassing the ranch development areas. It is planned for cattle to be transported from the ranches by road to any consumer area where a high price prevails. Location adjacent to a main road or railway (Aswa Acholi) allows, for the by-passing of the on-site market and opens a wider marketing hinterland. The location of the ranch market is thus source-oriented but adjacent to main lines of movement.

N O T E S

1. Veterinary Department Annual Report for 1965, Government Printer, Entebbe, Appendix 1.
2. For some of the difficulties surrounding enumeration of cattle in Uganda see the proceedings of the F.A.O. conference on livestock statistics held in Kampala, December 1966, and for an interesting study of similar problems in Nigeria see Ferguson D.J. 'The Nigerian Beef Industry' Cornell International Development Bulletin No.9 1967.
3. The East African Livestock Survey based its calculations on hide figures plus 5% for those not marketed.
4. Mann I.D. see a contribution to the F.A.O. seminar on 'Crop and Livestock Processing in East Africa', Kampala, 1967.
5. Ferguson D.J. personal communication, 1968.
6. The hide figures for Lango are unreasonably large in relation to the size of the district herd.
7. An attempt was made to calculate the number of cattle slaughtered in the villages based on sub-chiefs' returns. This proved abortive as the returns are both discontinuous and unreliable.
8. International Bank for Reconstruction and Development, 'A Report to the Uganda Development Corporation on the Prospects for Beef ranching in Uganda', Report P.10, Nairobi p.2. 1967. p 2
9. This has been assumed both in the report above and in 'Wholesale and Retail beef prices in Uganda', a report by the Uganda Development Corporation as part of an application for a loan from the World Bank, in 1966.
10. The 40% figure was supplied to the Uganda Development Corporation by district veterinary officers and appears in the above report.

11. The rural butchers have in economic terms a 'high level of entry' into the market when conditions are suitable.
12. See section IV, dealing with zone 'C'.
13. Only in matters of finance and everyday administration. Decisions regarding health and major policy changes come from the veterinary headquarters.
14. The much smaller trade originating in Ankole is brought to the railhead by truck. Animals originating within the market district may be walked, but none from outside that district.
15. Estimate of radius based on buyers' addresses and market master's experience at Mukono.
16. See: 'The problems of marketing cattle in nomadic areas' F.A.O. conference on livestock statistics, Kampala, 1966. The term nomadic is defined in the work but differs from many interpretations of the term.
17. The resale markets have often been termed 'municipal markets (see op.cit. no. 9). However, they are neither located at, nor designed to serve exclusively municipal areas.
18. Nalukolongo offers cattle for sale in the urban area of Mengo, but the lower price obtaining there plus the cost of an extra day's rail journey and lairage encourages traders to avoid this resale point. Kampala abattoir has no sale or resale function for the animals slaughtered there have all been purchased in advance, probably at Mukono and forwarded for slaughter and inspection on the day of sale.

Chapter 5

THE PATTERNS OF STOCK MOVEMENT

Many of the cattle sold at the county markets are destined for transfer to consuming areas outside the district of sale, though the emphasis on later movement varies considerably in different parts of Uganda.

Table 4

DISTRICT	PERCENTAGE TRANSFERRED (1966)
a. Karamoja	92
b. Ankole	85
c. Teso	91
d. Bukedi	8
e. Busoga	0
f. Bunyoro	0

Monthly Trade Reports,
District Veterinary Officers.

The movement of cattle, as with most trade movements, is an expression of localised shortage, though in specific areas the reasons for the movement are more precise. The reasons may include:

(i) income differences stimulating a higher price for meat and slaughter cattle;

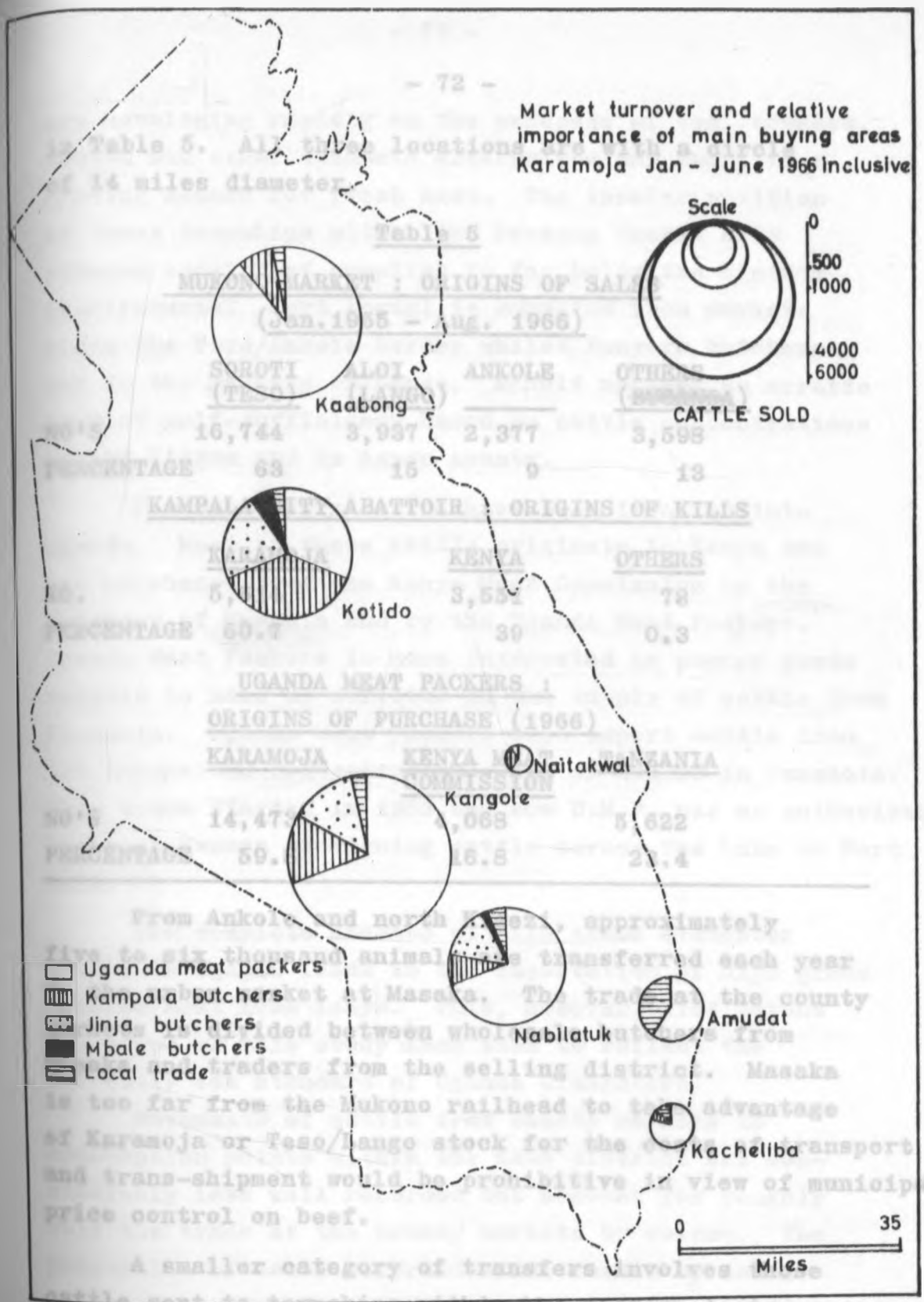
(ii) localised demands for large quantities of specified types of animals such as those required for freezing and;

(iii) a totally insufficient local capacity to supply even minimal local requirements such as in the conditions of the tsetse belt townships.

From Karamoja, well over 90% of the cattle traded at the Local African Government or 'county' markets are transferred from the district. (Map 12). The cattle remaining are bought by the larger local meat traders to service contracts with the army, prison service and schools. Buyers and their agents travel regularly from Kampala, Jinja and Mbale to attend the stock auctions where relatively cheap animalsmay be purchased in quantity. These animals provide not only for the municipalities represented at the auctions but also, through the services of wholsalers, for the peri-urban peripheries of these townships. As much as 60% of the cheaper meat entering Kampala City is destined for consumers beyond the city limits (1). The largest single buyer (map 12) in Karamoja is Uganda Meat Packers who make all their domestic purchases for freezing from the lower-priced stock in that district. As much as 60% of the total district trade may be destined for U.M.P. in any one year.

Transfers from Teso and Lango are destined largely for the high income area around Mukono, and cattle from these two districts rarely enter the townships of the "Fertile Crescent". In 1965-66, Teso and Lango stock accounted for 78% of total sales at Mukono and numbered nearly twenty thousand head. A smaller transfer from Teso is despatched to the densely populated western foothills of Mt. Elgon, and originates mostly in the three counties south of Lake Bisina.

Thus, sharp divisions occur in the geographical origins of trade stock converging on a small area around Kampala. This remarkable pattern is illustrated


Market turnover and relative importance of main buying areas Karamoja Jan - June 1966 inclusive
Scale
0
500
1000
4000
6000
CATTLE SOLD
Kaabong
Kotido
Naitakwal
Kangole
Nabilatuk
Amudat
Kacheliba
Uganda meat packers
Kampala butchers
Jinja butchers
Mbale butchers
Local trade
0
35
Miles

Map 12.

in Table 5. All three locations are with a circle of 14 miles diameter.

Table 5

MUKONO MARKET : ORIGINS OF SALES

(Jan.1965 - Aug. 1966)

	SOROTI (TESO)	ALOI (LANGO)	ANKOLE	OTHERS (~~BUGANDA~~)
NO'S	16,744	3,937	2,377	3,598
PERCENTAGE	63	15	9	13

KAMPALA CITY ABATTOIR : ORIGINS OF KILLS

	KARAMOJA	KENYA	OTHERS
NO.	5,614	3,551	78
PERCENTAGE	60.7	39	0.3

UGANDA MEAT PACKERS :

ORIGINS OF PURCHASE (1966)

	KARAMOJA	KENYA MEAT COMMISSION	TANZANIA
NO'S	14,473	4,068	5,622
PERCENTAGE	59.8	16.8	23.4

From Ankole and north Kigezi, approximately five to six thousand animals are transferred each year to the urban market at Masaka. The trade at the county markets is divided between wholesale butchers from Masaka and traders from the selling district. Masaka is too far from the Mukono railhead to take advantage of Karamoja or Teso/Lango stock for the costs of transport and trans-shipment would be prohibitive in view of municipal price control on beef.

A smaller category of transfers involves those cattle sent to townships within the western tsetse belt. Towns such as Hoima, Masindi and Fort Portal

are developing rapidly on the proceeds of tea, tobacco, cotton and other economic enterprises and there is a growing demand for fresh meat. The insular position of these townships within the Savanna tsetse belt reduces local beef supplies to far below the minimum requirements. Fort Portal is supplied from markets along the Toro/Ankole border whilst Bunyoro butchers buy in the markets of Lango. Acholi manages an erratic form of self-sufficiency based on cattle concentrations around Kitgum and in Agago county.

For many years cattle have been imported into Uganda. Most of these cattle originate in Kenya and are purchased from the Kenya Meat Commission by the butchers of Kampala and by the Uganda Meat Packers. Uganda Meat Packers is more interested in poorer grade animals to make up deficits in the supply of cattle from Karamoja. Uganda Meat Packers also import cattle from the Sukumaland concentration south of Mwanza in Tanzania. This trade started in 1963 and now U.M.P. has an authorised buyer at Mwanza consigning cattle across the Lake to Port Bell.

The complete absence of high grade slaughter cattle in Uganda leads to the importation of high grade chilled meat from Kenya. This, however, lies beyond the scope of this study other than to reflect the currently low standard of Uganda slaughters.

Movements of cattle from county markets to consumption points within the same district are considerably less well recorded but account for roughly half the trade at the county markets by volume. The proportion of total recorded trade formed by local movements varies from 6-8% in transfer oriented districts such as Karamoja to 100% in areas such as the "Fertile Crescent" where local demand is high. In some cases,

as with Gulu, local purchases may still involve a considerable degree of movement as the source area is at Kitgum. In Teso, where every county has at least two markets, and a large cattle population, local needs can be satisfied with a smaller degree of movement than in Acholi. Stock will often be taken many miles within Buganda in order to achieve the higher prices obtaining at Mukono. Generally, in Buganda, the local purchasing pattern is to concentrate on buying at the transfer - resale markets and not to travel to the small county markets for the very few animals which are offered.

For the village butcher the purchasing hinterland, and therefore the length of movement, is very small. Butchers prefer to concentrate on the area where they are known rather than incur the inconvenience and expense of travelling further afield where, anyway, they would not be known and their bargaining position would be weakened. An estimate by the Veterinary Office in Kitgum for the buying area of a village butcher in Acholi is 10 square miles.

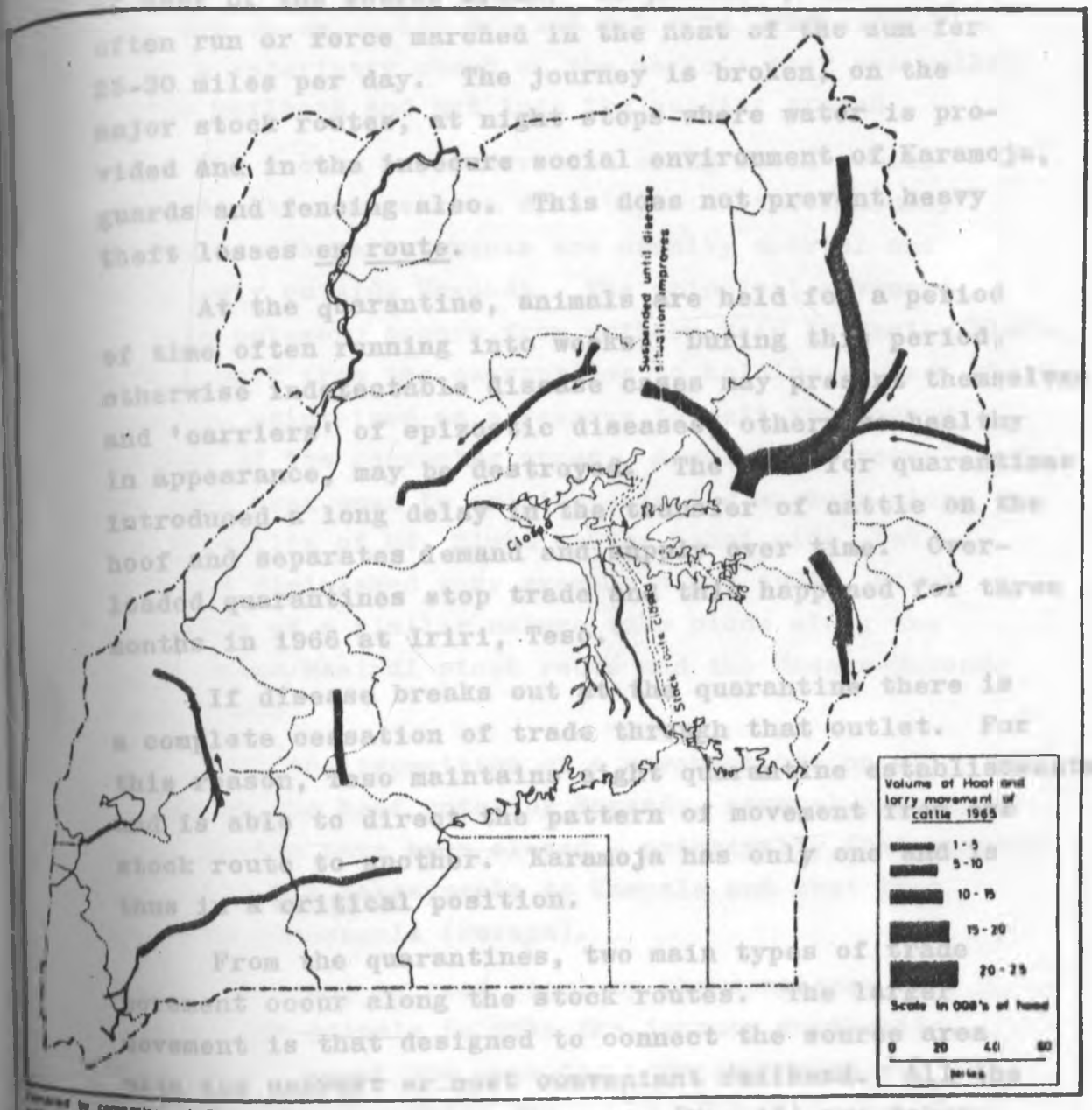
THE ORGANISATION OF STOCK MOVEMENT

At present live animals rather than chilled or frozen meat, make up the inter-district transfers to the major consuming areas of Uganda. Although there are many hazards in moving live animals long distances between major disease zones, the lack of organisation and capital amongst the traders and small retailers, as well as a prejudice against low grade frozen meat, makes the movement of meat rather than animals necessary at present and unlikely in the near future. At the moment, the main media used in the movement of slaughter cattle

are: stock routes, truck, rail and water. The organisation of movement by any one of these media is strongly influenced by the distribution of disease in both source and consumer areas, the security position in isolated pastoral areas, the relative isolation and accessability of the source area and the range of alternatives available.

Stock Routes: Despite fears regarding the transmission and dissemination of virulent diseases, the capital limitations of traders moving live animals or butchers taking their few purchases from county market to retail outlets, restrict the widespread use of lorries. For this reason, movement on the hoof is still a marked feature of both the intra- and inter-district trade of Uganda outside Buganda, and the internal trade of Buganda. To control unsupervised trekking and in order to contain disease, the Veterinary Department has established a network of gazetted stock routes. These form the only legally recognised line of movement for cattle on the hoof. The network and the volume of trade passing along each artery in 1965 is shown on Map 13. The map also includes the movement of cattle by truck as the figures for hoof and lorry movement are undifferentiated. In Karamoja, Teso and Lango, nearly 100% of movement is on the hoof. Only in Ankole is lorry movement developed, accounting for perhaps 50% of transfers.

Cattle sold at the county markets are carefully inspected by the Veterinary Department field officer, and if free from disease, are issued with a movement permit which allows transfer to another district or movement to another county. The animals are then trekked along the stock routes to the retail outlet, or in the case of inter-district movement, to the quarantine. The journey is theoretically limited to stages of not more



Compiled by comparison of District Trade Monthly Returns with E.A.R.& H. comparative returns 1965

Map 13.

than 15-20 miles per day which is the maximum if weight loss is to be avoided in the rigorous climatic conditions of many of the source areas. In practice, animals are often run or force marched in the heat of the sun for 25-30 miles per day. The journey is broken, on the major stock routes, at night stops where water is provided and in the insecure social environment of Karamoja, guards and fencing also. This does not prevent heavy theft losses en route.

At the quarantine, animals are held for a period of time often running into weeks. During this period, otherwise indetectable disease cases may present themselves and 'carriers' of epizootic diseases, otherwise healthy in appearance, may be destroyed. The need for quarantines introduced a long delay in the transfer of cattle on the hoof and separates demand and supply over time. Overloaded quarantines stop trade and this happened for three months in 1966 at Iriri, Teso.

If disease breaks out at the quarantine there is a complete cessation of trade through that outlet. For this reason, Teso maintains eight quarantine establishments and is able to direct the pattern of movement from one stock route to another. Karamoja has only one and is thus in a critical position.

From the quarantines, two main types of trade movement occur along the stock routes. The larger movement is that designed to connect the source area with the nearest or most convenient railhead. All the district transfers from Karamoja (Map 13) are taken from the quarantine point to the railhead at Soroti. Here animals are put into a holding ground adjacent to

the railyard until consigned south. Animals to be consigned and originating in the district from which they are to be railed are not put into quarantine. After a veterinary check at the markets they are walked to the railhead and put into the holding ground.

The second major movement along stock routes connects the source area directly with the consumer district. These movements are usually shorter and occur only outside Buganda. The principal movement in this category occurs from southern Teso to Bugisu/Mbale. Cattle walk from the quarantines to holding grounds where they are maintained as a reserve to suit the demand pattern of the consuming areas. A smaller movement to the same area used to originate in the markets along the foothills of Mt. Elgon on the Sebei side, but this has diminished very greatly since 1965. Other movements of a similar nature take place along the Lango-Hoima/Masindi stock route and the Masaka-Mubende stock route.

With the imposition of a movement ban on all cattle on the hoof entering Buganda, several principal stock routes have been closed - principally that connecting Lango via Nakasongola to Kampala and that from Lango to Namasagali (Busoga).

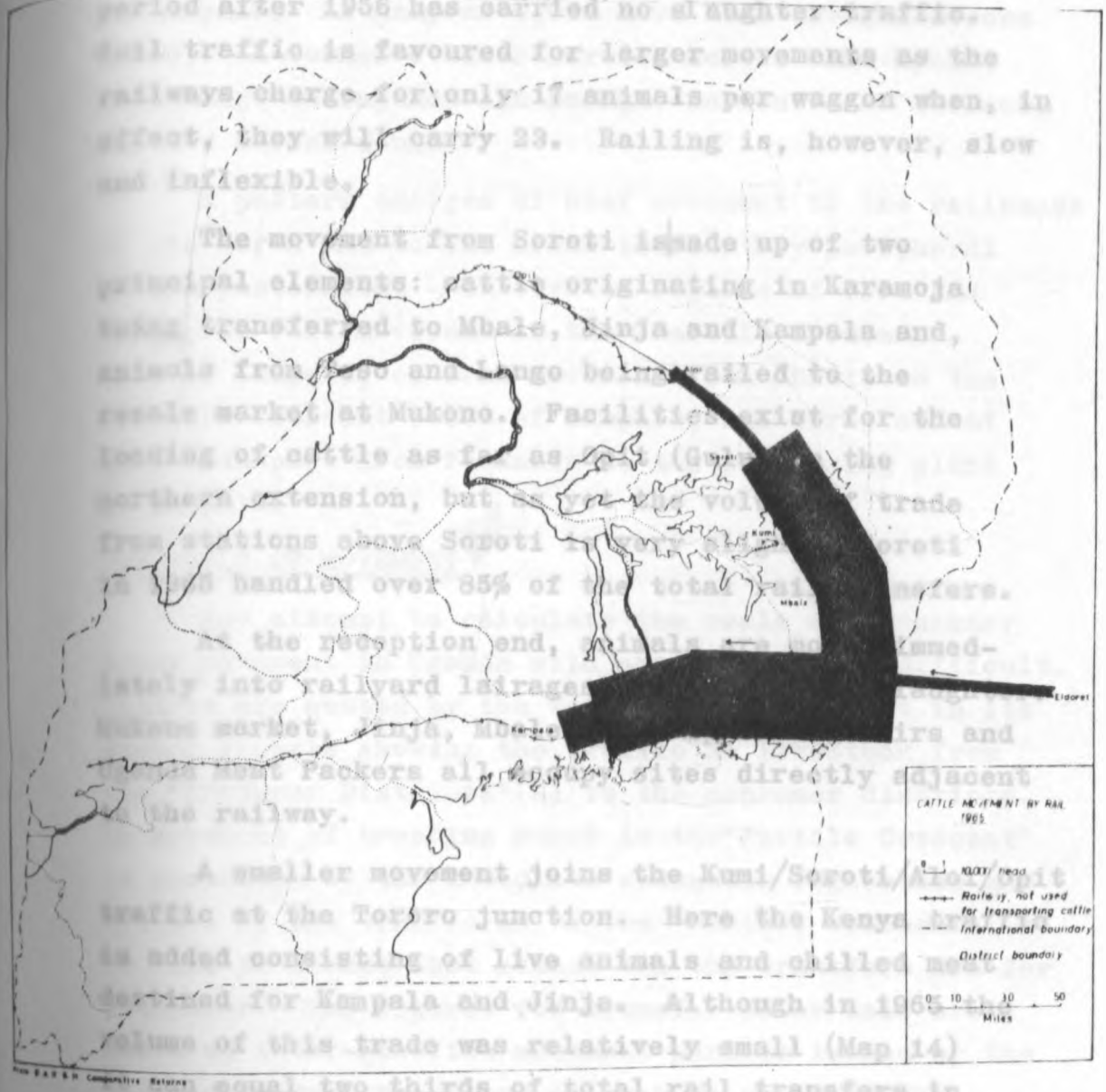
Road: Movement by road requires the consignee to have enough animals to make the journey worthwhile, i.e. fill a truck and possibly have some prospect of a return load to offset the costs of the journey from frequently inaccessible and distant source areas. The roads in pastoral areas such as Karamoja are often impassable in the wet season and the depreciation and

wear on a lorry is great. For this reason trucking is still on a small scale and takes place principally in Buganda where the final selling price for cattle is high, the roads are generally metalled and where movement on the hoof into the area is forbidden.

Movements to high income areas, where the railway does not offer an alternative, are generally by road. Such is the movement from Ankole to Fort Portal. Trucking from Ankole to Kampala is explained by the inconvenience and delay in railing, and the generally good roads. The larger butchers from Masaka have their own trucks and travel to the markets and return in one day. This illustrates two advantages of road movement: speed and flexibility. By taking the animals directly from purchase point to slaughter it is possible to by-pass the quarantines for there is no danger of contact with local cattle. This allows the purchase and slaughter of animals within 24 hours, the closer contact of demand and supply and an avoidance of weight loss on the trek from source area to consumption point. The trucker is in a position to take his animal to any destination by any route and is not tied to stock routes. At present only movements from Ankole are by lorry on anything approaching a large scale (2-4,000 head).

Rail: The greatest volume of inter-district movement is by rail (Map 14). In 1965, transfers by rail formed 65% of the total inter-district transfer traffic. The majority of this trade is concentrated on the main line east of Kampala and the northern extension to Soroti. Smaller movements originate from Aloi and

VOLUME OF CATTLE MOVEMENTS BY RAIL, 1965



Map 14.

Opit, but c.90% of the trade is between Kampala/Mukono and Soroti. The western extension, except for a brief period after 1956 has carried no slaughter traffic. Rail traffic is favoured for larger movements as the railways charge for only 17 animals per waggon when, in effect, they will carry 23. Railing is, however, slow and inflexible.

The movement from Soroti is made up of two principal elements: cattle originating in Karamoja being transferred to Mbale, Jinja and Kampala and, animals from Teso and Lango being railed to the resale market at Mukono. Facilities exist for the loading of cattle as far as Opit (Gulu) on the northern extension, but as yet the volume of trade from stations above Soroti is very slight. Soroti in 1965 handled over 85% of the total rail transfers.

At the reception end, animals are moved immediately into railyard lairages and held until slaughter. Mukono market, Jinja, Mbale and Kampala abattoirs and Uganda Meat Packers all occupy sites directly adjacent to the railway.

A smaller movement joins the Kumi/Soroti/Aloi/Opit traffic at the Tororo junction. Here the Kenya traffic is added consisting of live animals and chilled meat destined for Kampala and Jinja. Although in 1965 the volume of this trade was relatively small (Map 14) it can equal two thirds of total rail transfers in years such as 1963. The Kenya animals are loaded at Eldoret.

Water: Since 1964, the Lake Victoria steamer service has been used to transport cattle from Mwanza port to Port Bell, eight miles from Kampala. At present all

animals are destined for the Uganda Meat Packers plant in Kampala. As many as 8,076 have been brought across (1964). A former steamer service across Lake Kyoga, from Lango to Buganda and Busoga, as mentioned earlier, has now closed down.

A pattern emerges of hoof movement to the railheads of the north and to the areas immediately peripheral to the pastoralist - cultivator regions of Teso and Lango; of rail movement to the "Fertile Crescent" east of Kampala, of road movement from Ankole to the "Fertile Crescent" west of Kampala, and Toro, and of lake transport from Tanzania to the processing plant at Kampala.

THE SCALE OF MOVEMENT

Any attempt to calculate the scale of slaughter stock movement in Uganda with any accuracy is difficult. Figures are quoted by the Veterinary Department in its annual reports showing the traffic in livestock from the "Producer Districts"(2) to the consumer districts. As movement of breeding stock to the"Fertile Crescent" is forbidden by the immediate slaughter regulation and 9/10ths of the traffic is to the "Fertile Crescent", it is safe to assume that almost all the transfers are for slaughter. The figures for transfer after sale are based on inter-district movement permits issued by the Veterinary Department and as such do not show the traffic within administrative districts. The trade from areas such as the Bahima pastoralist region around Nakasongola, to the butchers of Kampala is completely masked.

Using the permit figures for 1965, 46% of the 127,000 cattle passing through the organised market system were transferred to other districts. This figure, however, needs correction for the 127,000 cattle would include some cattle being sold twice. The duplication occurs at the resale markets of the "Fertile Crescent" where animals already sold to traders in Teso and Lango are sold again for higher prices. A similar type of error is introduced by the continuous resale of animals along the price/income gradient from N. Kigezi to Masaka and Kampala. There is no accurate estimate of the scale of this operation but it probably totals 15% of the overall transactions at the official county and resale markets.

Of the sixty thousand or so animals transferred from one district to another annually from sources within Uganda, Buganda and Busoga absorb over 85-90% of total movement. Overall, the scale of recorded movement varies considerably from year to year, being in the region of 65,000 head in the absence of exceptional circumstances such as drought or failure of the cash crops. In such exceptional circumstances as the drought of 1961 or the floods of 1962, the figure may rise dramatically (Table 6).

TABLE 6

INTER - DISTRICT CATTLE TRANSFERS

YEAR	NO. OF HEAD
1961	100,000
1962	99,624
1963	64,254
1964	65,283
1965	66,314

Veterinary Department

Although it is common for publications to speak of a decline in cattle transfers in Uganda, calculations are frequently based on one or other of the exceptional years of 1961 or 1962. The total inter-district transfer of live cattle in a normal year has grown from 1945 when it was 54,800 head to 65,000 or so between 1963 and 1965. Of the total inter-district transfers some 29,000 move on the hoof and by road, 42,000 by rail and 6,000 by water. Regional contributions to the total movement contrast greatly from district to district with Karamoja providing 15-35%, Teso 30-35% and Ankole 7%. The percentage is extremely variable from year to year with districts assuming different levels of relative importance. This is only a small part of the general variability which plagues cattle marketing in Uganda at the present time.

NOTES

1. Veterinary Department Annual Report for 1955 page 14. See also an interesting study carried out by students of the Geography Department at Makerere in 1965 entitled 'The supply of fresh meat to Kampala'.

2. A Veterinary Department term including Teso, Lango, Karamoja, Ankole and, oddly, Kigezi.

Chapter 6

VARIATION, VARIABILITY AND LOSS

A characteristic feature of the supply pattern as it exists at present in Uganda, including even the supply from ranch markets, is unreliability and sudden change. It is common for the cattle owners of Teso and Lango to offer the largest number of animals for sale at the time of year when demand in the consuming area is at its lowest point, but to this complication is added the fact that it is impossible to forecast, even crudely, the number of cattle offered for sale in any district from year to year or month to month. The unreliability factor affects the supply of cattle to the markets, the operation of the markets in any particular area and the transfer of animals from market to consumer. Large, sudden and quite unpredictable changes typify the total district offtake in any chosen year, the price at which the cattle are offered and sold and the speed with which they may make the journey to the consuming area.

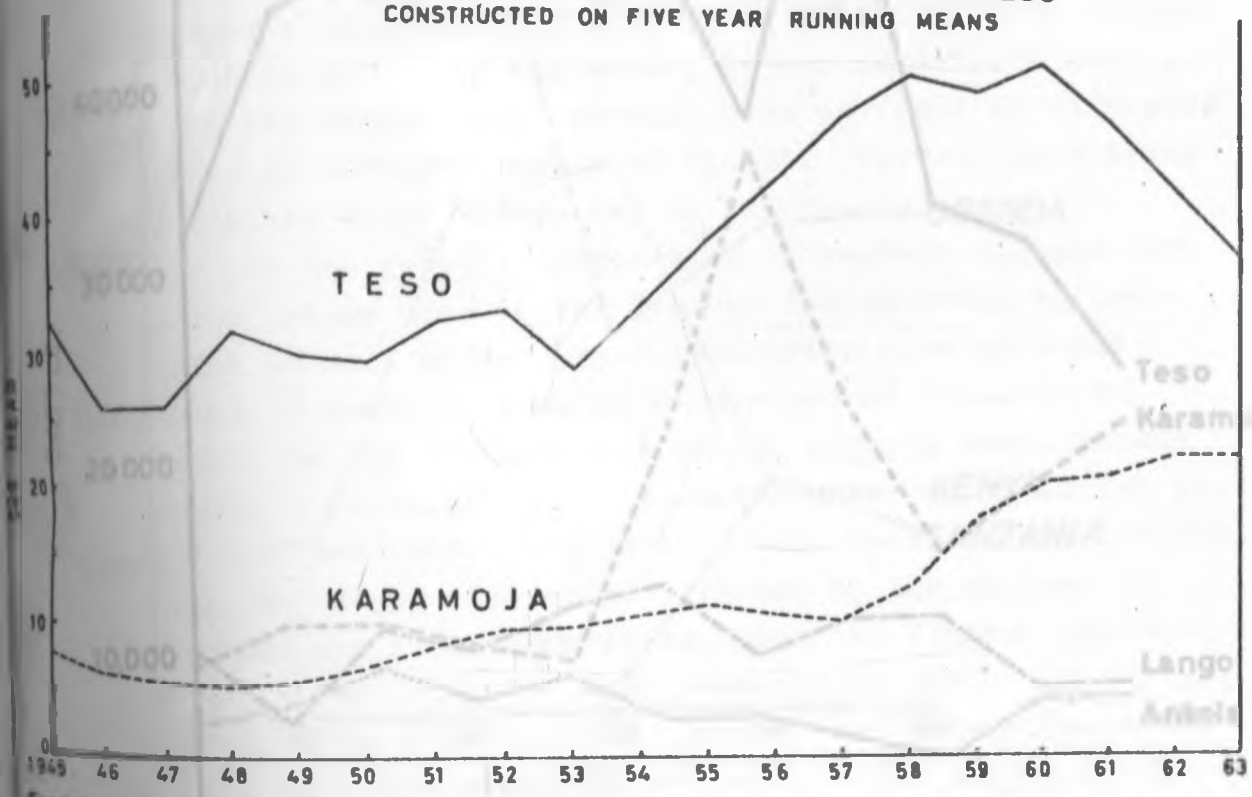
Added to the variability is loss. Animals are lost through theft, through death and through slaughter in quarantine. More serious are losses incurred through a 12-15% weight reduction during trekking, and losses of up to 30% through carcase condemnation. Animals from Karamoja fare worst for although they cost 30% less they have a 15% weight loss giving a liveweight of 390 lbs., and a condemnation rate reaching 28-30% (Uganda Meat Packers.) (1).

TOTAL ANNUAL SALES AND TRANSFERS: The principal urban consuming areas suffer from an erratic pattern of supplies from the areas of surplus. Forward ordering is almost impossible and one cannot estimate at the beginning of the year how much of the urban and higher income rural demand for beef will be satisfied from domestic transfers. The problem of unreliability does not affect the village market sector so greatly, as the local butcher is usually able to satisfy his needs from the immediate area. Many of the consumer areas have strongly seasonal demand patterns, but these areas are often dependent for supply on other parts of Uganda where different factors influencing supply may prevail. The volume of inter-district cattle trade season by season in Uganda depends on factors at play in the source areas and not on changes in the level of demand.

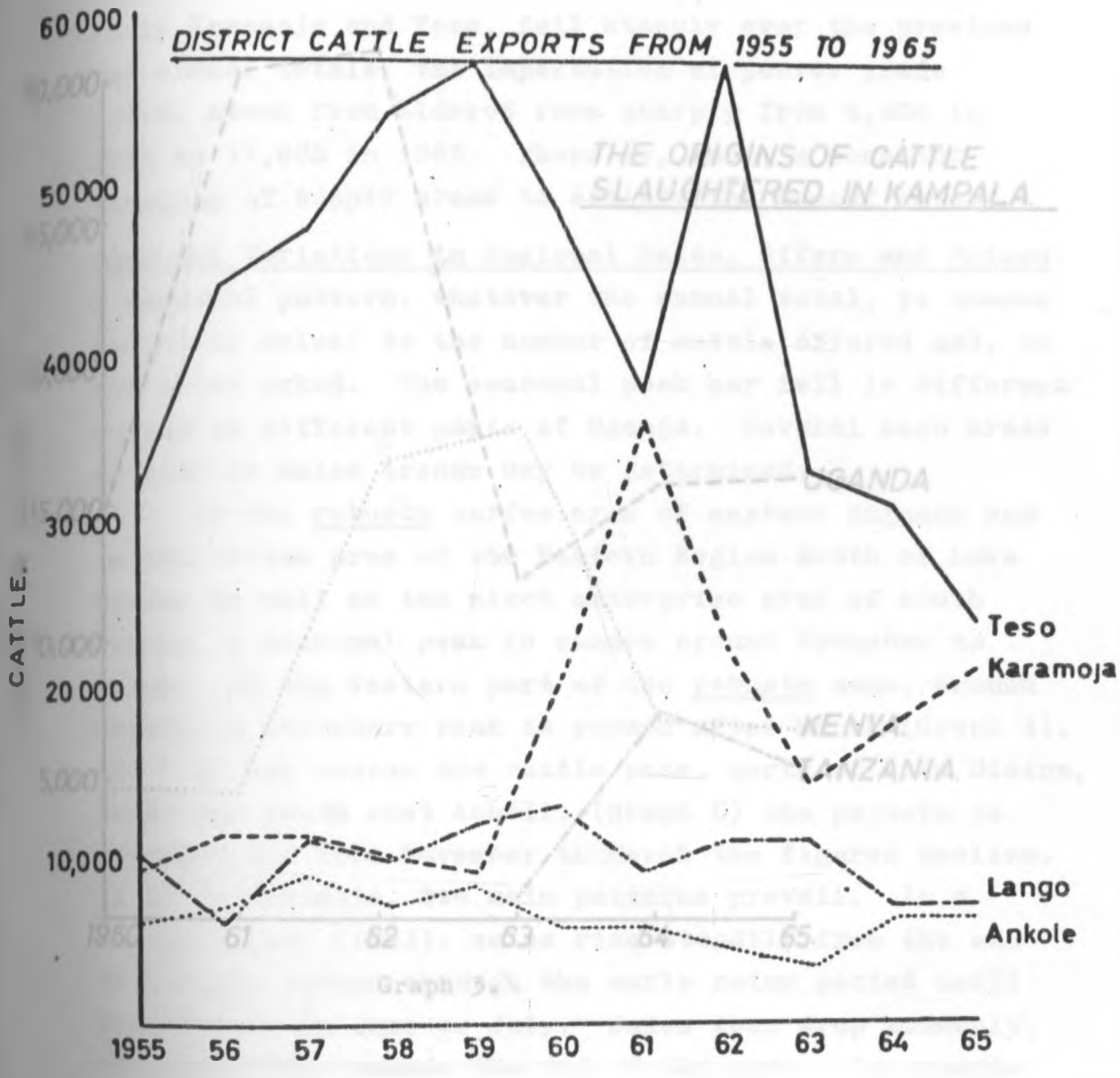
A five year running mean of transfers from the principal producer districts of Teso and Karamoja (Graph 1) reveals a steady rise over the past twenty years, trailing off in Teso after the early 1960's. A comparison with graph 3 however, illustrates that the running mean is compounded of a series of violent fluctuations from year to year. The magnitude has reached a 400% variation over the previous annual total. Further, it is interesting that, though neighbouring, the two districts show very different responses in the same year. The very high 1961 figure for Karamoja transfers is in sharp contrast to the recession in Teso. In 1962, the pattern is reversed as Teso cattle transfers rise sharply and Karamoja transfers fall. Local factors are thus strongly influential, and, as illustrated later, produce different responses depending on the

combination of economic, cultural and physical circumstances at play in the local environment. The importance of these sudden localised changes is realised when it is appreciated that Teso, Lango and Karamoja account for 81% of the average annual domestic transfer movement to Kampala, Jinja, Mukono and Mbale as well as providing most of the slaughter animals for Bunyoro. The inability of these consumer areas to obtain regular and adequate supplies from national sources produces a variable annual dependence on stock from foreign sources. In 1961, the consumer area of the 'Fertile Crescent' was able to obtain 74,000 head from districts with a surplus, whilst in 1962, the figure had dropped to only 47,000. (2). The localised nature of annual changes brings pressure to bear, also, on particular geographical sectors of the consumer market, for as has been shown, certain source areas serve specific consumers, (e.g. Teso and Lango serve Mukono). Thus a recession in Karamoja will be particularly felt in the low income sector of the urban markets in the 'Fertile Crescent' and in the processing (freezing) sector (3).

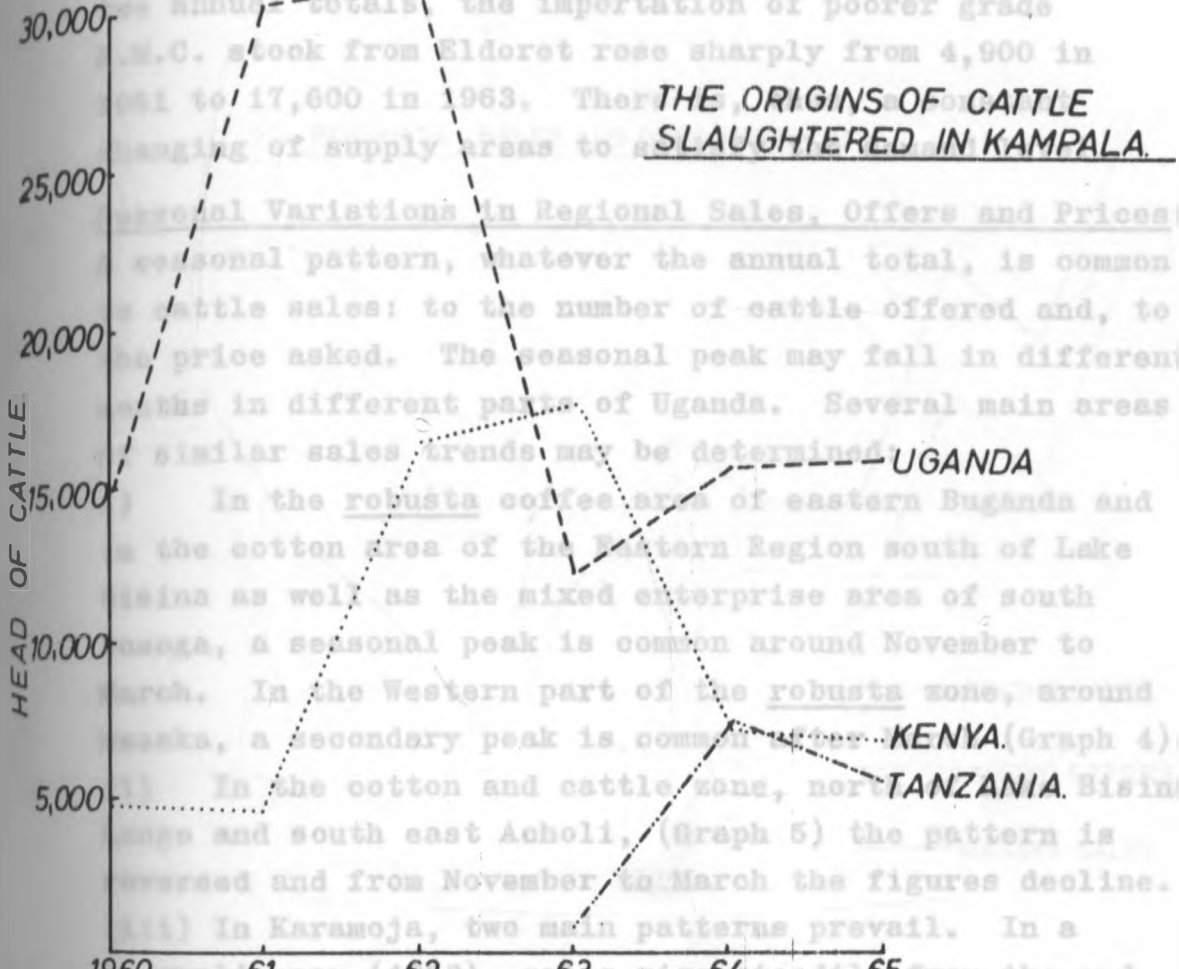
Comparing the volume of annual transfers from the areas of surplus (graph 2) with the pattern of supply to Kampala (graph 3) it is evident that when the numbers are available they can be absorbed at the consumer end. This fact is illustrated by the variable level of imports from neighbouring territories. These importations closely reflect the number of animals available, or more strictly, not available from Ugandan


CATTLE TRANSFERS FROM KARAMOJA AND TESO
CONSTRUCTED ON FIVE YEAR RUNNING MEANS
TESO
KARAMOJA
50
40
30
20
10
0
1945
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
From Annual District Returns : Teso and Karamoja.

Graph 1.


DISTRICT CATTLE EXPORTS FROM 1955 TO 1965
60 000
50 000
40000
30 000
20 000
10,000
CATTLE.
1955
56
57
58
59
60
61
62
63
64
65
Teso
Karamoja
Lango
Ankole

Graph 2.


THE ORIGINS OF CATTLE SLAUGHTERED IN KAMPALA.
HEAD OF CATTLE
30,000
25,000
20,000
15,000
10,000
5,000
1960
61
62
63
64
65
UGANDA
KENYA.
TANZANIA.

Graph 3.

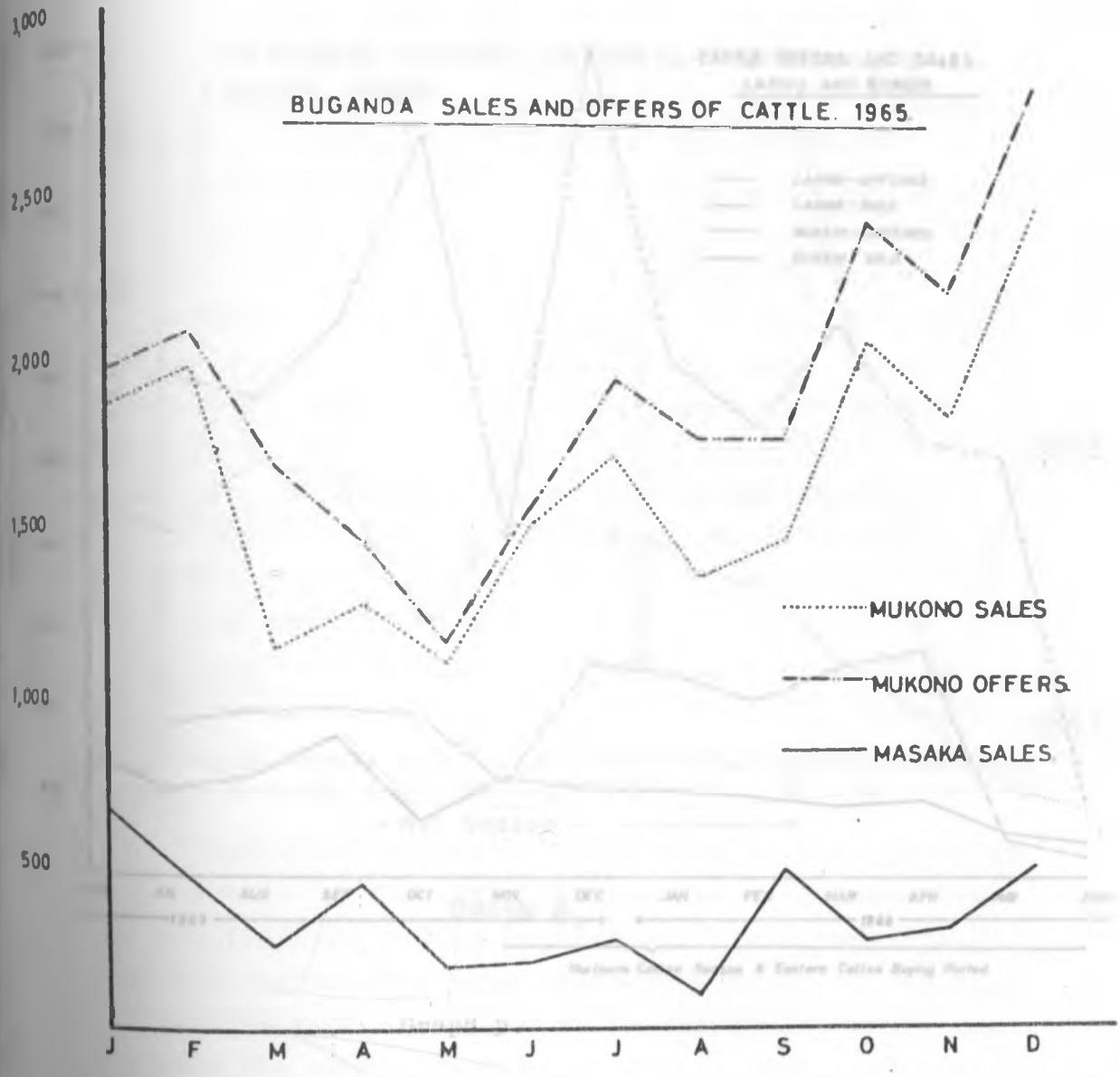
sources. When, as in 1963, the volume of cattle offered at the county markets of the north, particularly Karamoja and Teso, fell steeply over the previous two annual totals, the importation of poorer grade K.M.C. stock from Eldoret rose sharply from 4,900 in 1961 to 17,600 in 1963. There is, thus, a constant changing of supply areas to satisfy the demand level.

Seasonal Variations in Regional Sales, Offers and Prices: A seasonal pattern, whatever the annual total, is common to cattle sales: to the number of cattle offered and, to the price asked. The seasonal peak may fall in different months in different parts of Uganda. Several main areas of similar sales trends may be determined:

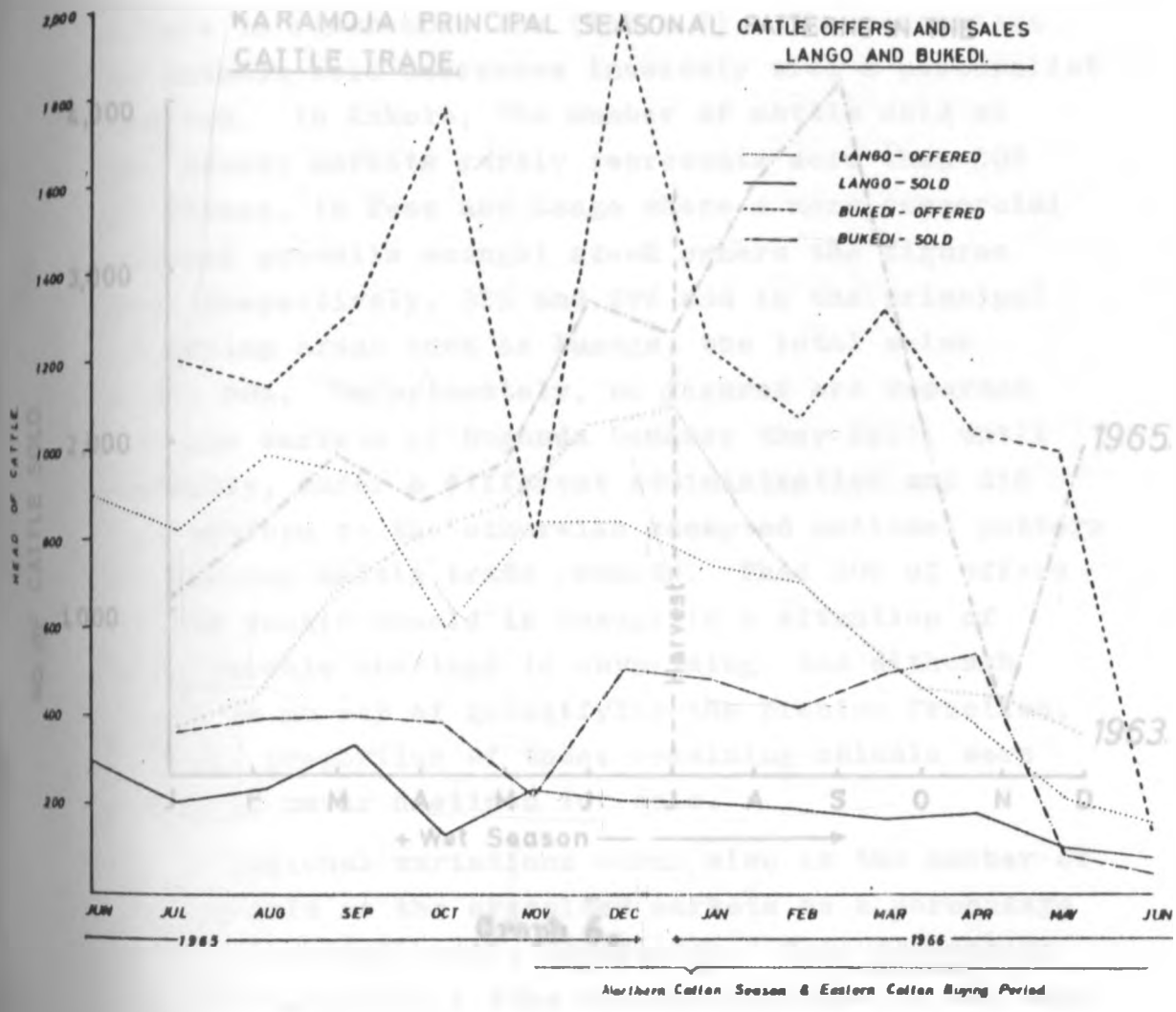
i) In the robusta coffee area of eastern Buganda and in the cotton area of the Eastern Region south of Lake Bisina as well as the mixed enterprise area of south Busoga, a seasonal peak is common around November to March. In the Western part of the robusta zone, around Masaka, a secondary peak is common after March (Graph 4).

ii) In the cotton and cattle zone, north of Lake Bisina, Lango and south east Acholi, (Graph 5) the pattern is reversed and from November to March the figures decline.

(iii) In Karamoja, two main patterns prevail. In a 'normal' year (1963), sales rise steadily from the end of the dry season through the early rainy period until the harvest in June or July. Sales then drop suddenly, and trail off towards the end of the year. In exceptional years (1965) (Graph 6) sales continue as normal until the period before harvest (July). At this point they start to rise steeply. Sales continue rising only to crash dramatically in the space of a

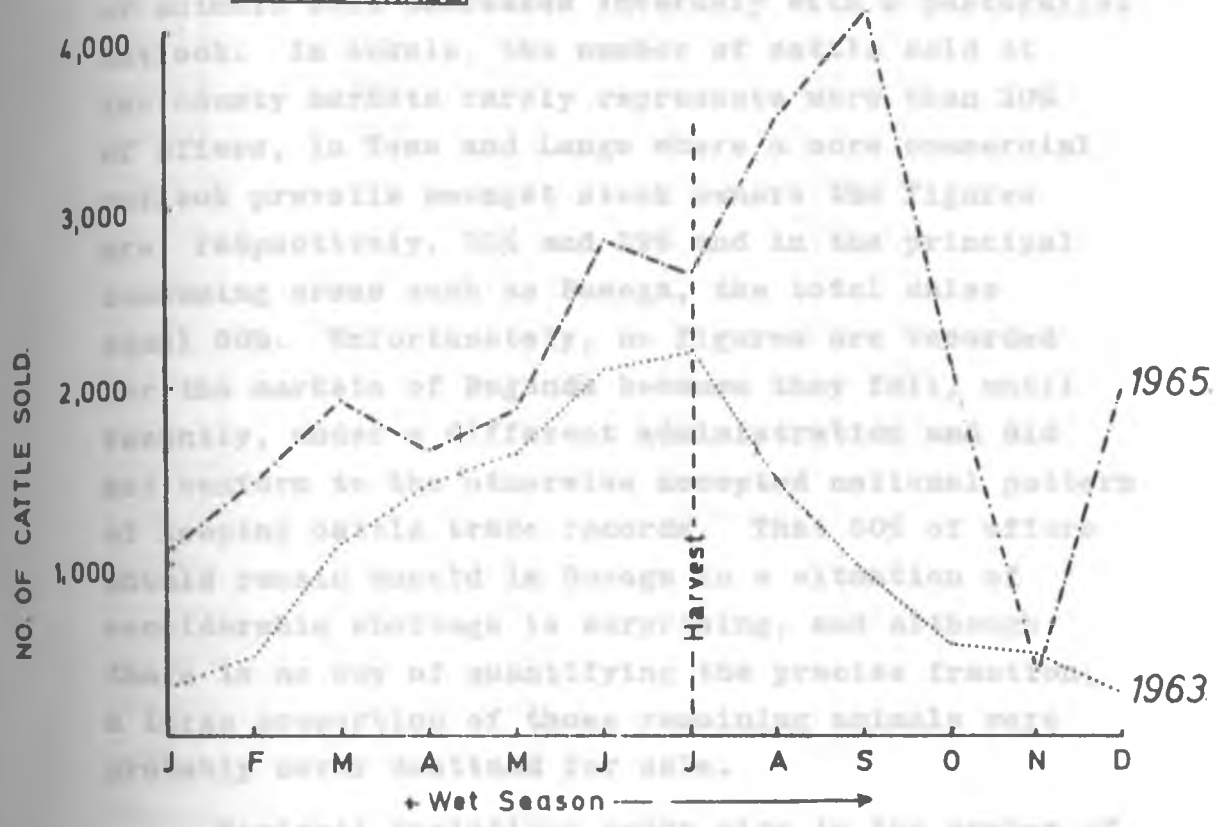

BUGANDA SALES AND OFFERS OF CATTLE. 1965
3,000
2,500
2,000
1,500
1,000
500
MUKONO SALES
MUKONO OFFERS
MASAKA SALES
J
F
M
A
M
J
J
A
S
O
N
D

Graph 4.


CATTLE OFFERS AND SALES
LANGO AND BUKEDI.
LANGO - OFFERED
LANGO - SOLD
BUKEDI - OFFERED
BUKEDI - SOLD
HEAD OF CATTLE
2,000
1800
1600
1400
1200
1000
800
600
400
200
JUN
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
1965
1966
Northern Cotton Season & Eastern Cotton Buying Period

Graph 5.

KARAMOJA: PRINCIPAL SEASONAL PATTERNS IN THE CATTLE TRADE.



Graph 6.

few weeks.

Regional variations occur in the percentage of cattle offered at the market which are eventually sold. In some districts, the ratio of sales to offers is remarkably low (Table 7). The percentage of animals sold decreases inversely with a pastoralist outlook. In Ankole, the number of cattle sold at the county markets rarely represents more than 20% of offers, in Teso and Lango where a more commercial outlook prevails amongst stock owners the figures are, respectively, 32% and 29% and in the principal consuming areas such as Busoga, the total sales equal 50%. Unfortunately, no figures are recorded for the markets of Buganda because they fell, until recently, under a different administration and did not conform to the otherwise accepted national pattern of keeping cattle trade records. That 50% of offers should remain unsold in Busoga in a situation of considerable shortage is surprising, and although there is no way of quantifying the precise fraction, a large proportion of those remaining animals were probably never destined for sale.

Regional variations occur also in the number of cattle sold at the organised markets as a percentage of the district cattle population. This percentage may not represent a true district offtake in the case of markets such as Mukono where the cattle originate outside the area. High marketed percentage offtake figures (i.e. 10% and over) generally suggest a strong resale function at the markets concerned rather than a high level of penetration in the local area. In the cattle surplus areas the number of cattle sold at the county markets is large in absolute terms, but

TABLE 7

UGANDA: DISTRICT CATTLE SALES IN ORGANISED MARKETS
JULY 1965 - JULY 1966

District	(a) Cattle Offered	(b) Cattle Sold	(b) as a % of (a)	Cattle Population 1965	Marketed Cattle as % offtake of district cattle population
Acholi	960	672[1]	70	144,229	.5[1]
Ankole	51,042	10,252	20	310,663	3.3
Bukedi	14,493	4,879	33	173,392	2.8
Bunyoro	2,097	829	39	32,109	2.5
Karamoja	21,316	39,361[2]	-	720,000	5.4
Kigezi	6,768	3,377	50	90,180	3.7
Lango	8,682	2,576	29	368,960	.7[1]
Teso	89,353	29,424	32	560,942	5.53
Toro	12,191	7,826	64	75,929	10.3
AVERAGE			37		
BUGANDA	(Jan.-Dec. 1966 only available)				
Masaka	N.A.	5,568	-	155,567	3.5
Mityana	N.A.	681	-	84,491	.8
Mubende	N.A.	1,840	-	25,487	7.2
Mukono	N.A.	19,294[3]	-	78,131	24.6
Bowa	N.A.	11,713	-	205,882	5.7
Busoga	5,518	3,098	56.1	221,271	1.4

%age National average offtake = 17%

%age National average marketed offtake = 3.5% (1965)

District Veterinary Monthly reports 1965/66
Annual Report Regional V.O. Buganda 1966
Annual Report Veterinary Dept. Kampala 1965.

Notes:

1. Lango & Acholi figure very low as much of the District market system closed because of disease. Cattle were exported however without going through the county markets. (~~export = offtake of 1.6% Acholi 3.0% normal~~

~~Lango marketed offtake~~).

2. The reversal of figures in Karamoja is due to private sales outside the auction ring resulting in the cattle not being offered but being recorded as sold.

3. The offtake for Mukono is deceptive as it involves a great deal of resale of Teso and Lango cattle at the railhead.

4. The districts and period chosen coincide with those used in the Uganda Development Corporation application to the World Bank entitled "Wholesale and retail beef prices in Uganda". Reference may thus be made to that volume for greater monthly detail if required.

relative to the cattle population of the areas, the percentage district offtake via the county markets is very low. Taking the examples of Teso and Karamoja, the figures are 5.5% and 5.4% (1965/6) respectively, though the Karamoja figure was exceptionally high in 1965/6 because of drought and is more normally 3.4% The figure for a major consuming area such as Busoga is also remarkably low at 1.4%, but the factors producing thissmall figure are very different from those prevailing in the surplus areas. The Mubende figure reflects a large number of Ankole animals being sold. Of county markets located in consumer areas, only in Toro is the total percentage offtake relatively high at 10.3%. Though again there is the danger of double counting, for some of these animals originate in the markets of Ankole.

Regional variation and variability are features also of the prices at which cattle are offered and sold in Uganda. Over the whole of Uganda a general November-January peak characterises the seasonal price pattern. The value of the peak price varies considerably in different parts of the country:

TABLE 8

SEASONAL WHOLESALE PRICE VARIATIONS FOR CATTLE SOLD IN ORGANISED MARKETS: JUNE - JUNE 1965/66

District	Highest Av. Price Shs.	Month	Lowest Av. Price Shs.	Month	Difference Shs.	%age.
Ankole:	289	November	207	January	82	40
Bukedi:	310	December	212	October	98	46
Lango:	343	January	255	(June	88	34
Mbale (Bugisu)	300	December	200	(Ju/July	100	50
Teso:	332	December	239	(July	93	39
Toro:	378	December	267	November	111	42
Mukono:	464	December	375	Sept.	89	24

Annual District Veterinary Reports and D.V.O. Mukono.

The highest average obtains at Mukono where a price 86/- greater than that in any other area prevailed in 1965. Even the minimum price at Mukono is higher than all maxima elsewhere except Toro. The returns at Mukono also differ from those in other areas by being more stable, having a seasonal percentage difference of only 24, though in terms of shillings, the difference is as great as in other districts. Price variation is a feature of the annual as well as seasonal patterns. Average prices in Karamoja vary from 90/- to 250/- and in the coffee boom during the early 1950 period in Buganda, the price of cattle at the local markets rose as much as 300%.

MARKET CLOSURE

The figures for cattle marketed in Acholi and Lango in Table 7 col. e., are exceptionally low. Nevertheless, the extremely small totals reflect a perennial problem of supply hinterlands for some consuming areas: market closure. This problem exists throughout Uganda, and taking the example of 1966: all the markets in Sebei were temporarily closed because of Foot and Mouth disease; Acholi markets were shut down from June to November as Pleuro-pneumonia occurred in the district; five trading counties of Lango were also put under quarantine as Foot and Mouth broke out; two principal cattle producing areas of Teso were closed; the Bukedi markets were shut for one and a half months and, even the auction at the Bunyoro Ranching Company was closed down by order of the Veterinary Officer in that district.

All these closures were for disease, principally Foot and Mouth and Pleuro-pneumonia, though Brucellosis was the culprit in the case of the Bunyoro Ranch. In many of these cases, the supply to certain areas ceased completely. Hoima, relying on Lango and the thrice-annual markets in Bunyoro found itself without beef when Lango was quarantined. Closures in the major areas of Teso, Lango and Karamoja can lead to massive increases in the importation of stock from Kenya and Tanzania as in 1963. These market closures of a temporary nature are not to be confused with the long term closures in areas such as Ovujo, West Nile, where a total indifference to cattle trading made the operation of county markets expensive and inconvenient.

LOSS Added to the difficulties of purchasing cattle at the organised markets, is the threat of loss in transit or after slaughter. Whilst en route the animals may be stolen, and nearly 1,000 animals were lost this way in Karamoja in 1967. (4). Thefts are common from quarantines and night stops. After slaughter, those animals killed in or near the larger municipalities will be subject to veterinary inspection. At this stage parts of or even the entire carcase may be condemned on health grounds. As there are no by-products plants in Uganda, such condemnation is total loss in many cases and the entire carcase is waste. The level of loss through condemnation will depend on the state of the carcase and the degree of veterinary scrutiny. In Kampala, as many as one third of the carcases arriving at U.M.P. from Karamoja, are condemned (5), whereas at Nalukolongo, the level is less than 5% (6). This only partly reflects the

different geographical origins of the animals. The different level of veterinary inspection in Mengo township is as important.

To losses from theft and condemnation are added losses in liveweight in transit. Estimates of loss vary from 50 lbs. per beast to 100 lbs. on the journey from Karamoja to Kampala (7). A 5% loss has been estimated for animals taken from the Bunyoro Ranch to Hoima. (8).

NOTES

1. The animals purchased by Uganda Meat Packers are generally the poorer stock offered in Karamoja. Allowing for a low estimate of weight lost in transit of about 60 lbs. this gives an average weight in the source area of about 450 lbs. The better animals would weigh at least 200 lbs. more.
2. Veterinary Department Annual Trade Reports, 1961 and 1962 (unpub). on file.
3. The term 'processing plant' is in common usage in official literature when referring to the Uganda Meat Packers establishment in Kampala. The plant does not, however, process carcases but merely freezes them for export.
4. Veterinary Office Annual Report, District Veterinary Officer, Moroto, 1967.
5. Mitchell R. Resident Veterinary Officer, Uganda Meat Packers, personal communication, 1966.
6. Municipal Health Officer, Mengo, personal communication, 1967.

7. Walsh S. Veterinary Department, personal communication, 1966, Mitchell R. op. cit. No.5

8. Kabagambe R. Bunyoro Ranching Company, personal communication, 1967.

Chapter 7

A CASE STUDY OF A DISTRICT MARKETING SYSTEM: ACHOLI (Northern Region) (Map 15)

For the purpose of a brief market study, Acholi may be divided into three parts:

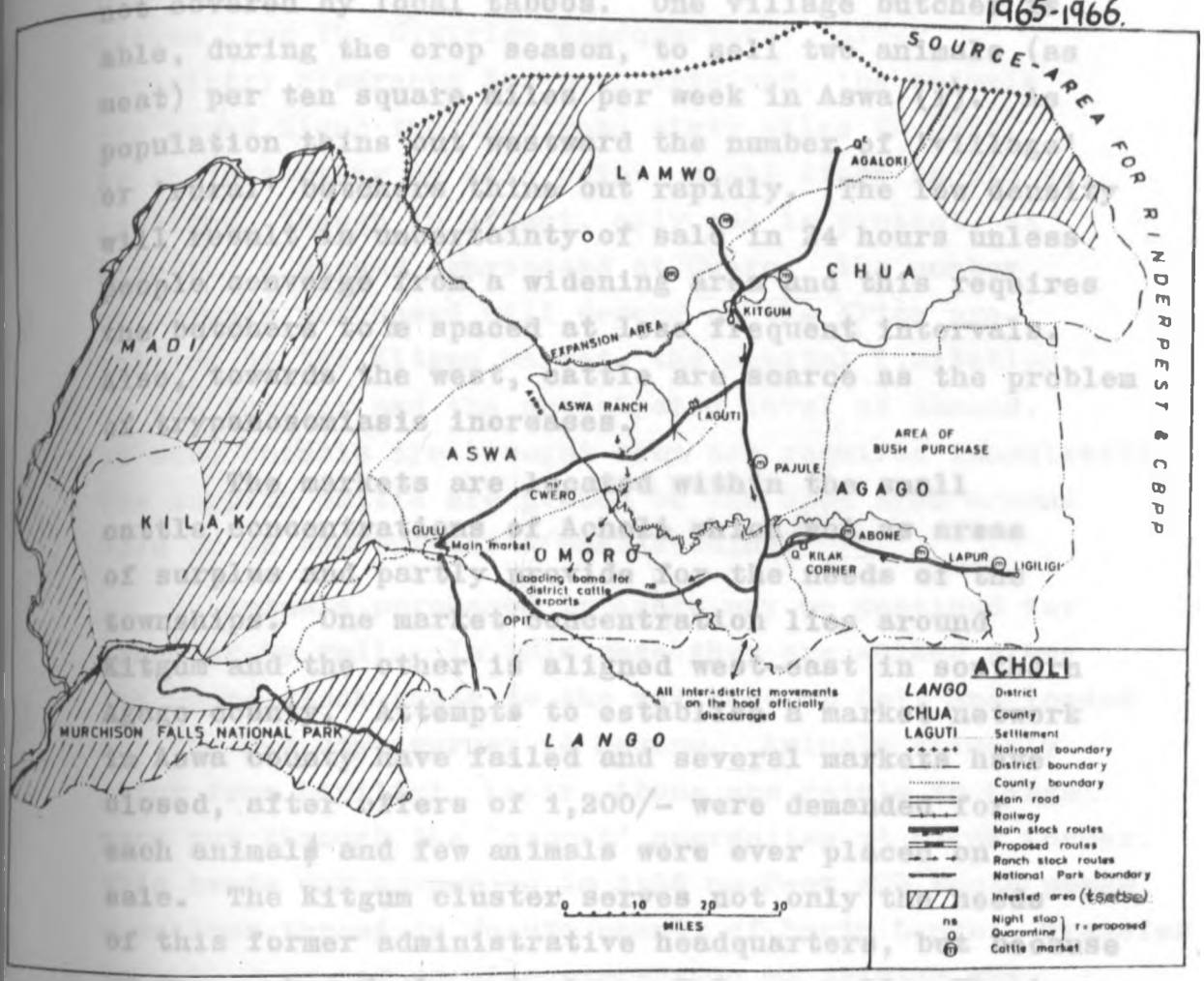
1) An area almost devoid of cattle in Kilak, western Lamwo, and north Chua counties. This coincides closely with the tsetse area and, in the west, partly with the riverine belt which was depopulated during the sleeping sickness epidemics in the early part of this century.

2) A central area covering most of Aswa, north Omoro, south Lamwo and west Chua counties. In this area cattle are more numerous and the numbers of livestock reflect the higher population densities in this central belt, especially in the clusters around Gulu and Kitgum (50-99 persons per square mile).

3) A southern strip, mostly in Agago county where conditions are related to those in north Teso. The ratio of cattle to humans is greater than elsewhere in the district at 250-500 head per 100 persons.

Acholi provides a useful area of study as it has or had, an urban area served by the county markets, a village butcher network, a small transfer trade to other areas by hoof and rail and, most of the problems symptomatic of the present marketing system for cattle in Uganda.

Village butchers operate principally in the central and southeastern part of the district and open their stalls once or twice per week to coincide


1965-1966.
SOURCE-AREA FOR RINDERPEST & CBPP
LAMWO
AGALOKI
CHUA
KITGUM
EXPANSION AREA
MADI
ASWA RANCH
LAGUTI
AREA OF
BUSH PURCHASE
ASWA
PAJULE
AGAGO
KILAK
CWERO
GULU
Main market
OMORO
ABONE
KILAK
CORNER
LAPUR
LIGILIGI
Loading boma for
district cattle
exports
OPIT
All inter-district movements
on the hoof officially
discouraged
MURCHISON FALLS NATIONAL PARK
LANGO
0 10 20 30
MILES
ACHOLI
LANGO District
CHUA County
LAGUTI Settlement
National boundary
District boundary
County boundary
Main road
Railway
Main stock routes
Proposed routes
Ranch stock routes
National Park boundary
Infested area (tsetse)
ns Night stop
Q Quarantine
r = proposed
Cattle market

Map 15.

with the dates for produce markets. The growth of income from an expanding cotton and tobacco economy has encouraged the consumption of beef and other meats not covered by local taboos. One village butcher is able, during the crop season, to sell two animals (as meat) per ten square miles per week in Aswa (1). As population thins out westward the number of 'village' or 'rural' butchers thins out rapidly. The low density will result in uncertainty of sale in 24 hours unless people converge from a widening area and this requires the butchers to be spaced at less frequent intervals. Also, towards the west, cattle are scarce as the problem of trypanosomiasis increases.

The markets are located within the small cattle concentrations of Acholi which act as areas of surplus and partly provide for the needs of the townships. One market concentration lies around Kitgum and the other is aligned west-east in southern Agago county. Attempts to establish a market network in Aswa county have failed and several markets have closed, after offers of 1,200/- were demanded for each animal$ and few animals were ever placed on sale. The Kitgum cluster serves not only the needs of this former administrative headquarters, but because of the market failure in Aswa, Gulu as well. The Agago markets provide cattle for rail transfer to Buganda and, until 1966/67, also provided animals for the same destination trekked through Lango to the railhead at Aloi.

Some of the animals sold at the markets around Kitgum may be slaughtered in the township. The beast is killed early in the morning on the municipal slab and the veterinary official inspects the carcase for

tapeworm, liverfluke and other infections.

The stock sold for consumption in Gulu is purchased by the butchers who have travelled up to Kitgum from the District Headquarters. After veterinary clearance has been obtained, the animals are moved along the main road sixty miles to Gulu. At the statutory 20 mile point, night stops should be provided, though in effect, only one is present, at Laguti. A second is proposed at Cwero. The number of animals purchased will depend on the price prevailing at the Kitgum market, the capital limitation of the butcher and the anticipated level of demand. If more animals are brought than are required immediately, the surplus cattle are grazed on the open area around Gulu or on the butcher's smallholding.

Animals purchased in Agago may be destined for transfer by rail. In this case they are walked along the Omoro stock route to the railhead at Opit and loaded for the 3-4 day journey to Mukono. Animals formerly going from Ligiligi, Lapir, Abone and Pajule to Lango were put through the 'export' quarantine at Kilak Corner. This trade was suspended in 1966 as Foot and Mouth posed a serious threat in Moroto county of North Lango. Transfer by rail does not require quarantine as animals are sealed in wagons until slaughter in Buganda.

The pattern described is very much the 'ideal' rather than the reality of stock marketing in Acholi. The entire marketing procedure broke down in 1965/66 and the total number of cattle passing through the county market system from July 1965 to July 1966 represented a percentage district offtake of only 0.5% In September 1965 only one animal was offered for sale in Acholi.

The closure and movement restriction order was a result of pleuro-pneumonia outbreaks originating in the southern Sudan or Jie (Karamoja) and transmitted by transhumant or nomadic herds. Consequently, urban butchers began foraging the countryside competing with their rural counterparts for cattle. The practice became widespread in Agago in order that the needs of Gulu and Kitgum should be met. The transfer trade ceased completely and the revenue from cattle markets was nil. Attempts to stimulate the marketing of cattle around Gulu failed completely in the face of local indifference. The provision of trade cattle both for district, urban and transfer needs is thus very unpredictable in Acholi despite an established market infrastructure and strong demand pattern.

****

The various patterns described in this section are the result of interacting physical, cultural and economic circumstances. Before any improvement or transformation of the present traditional sector can be made, the physical and human circumstances prevailing in different areas must be understood. In the section that follows, the patterns in the traditional sector are analysed by reference to a series of regional groupings in each of which the interaction of physical and human factors produces a recognisable and characteristic pattern of production and supply. These areas, termed 'Cattle Economies' form the superstructure upon which the remainder of this work, namely the analytical section, is based.

NOTES

1. An estimate based on information received at the Veterinary Office in Kitgum, Acholi.

SECTION IV

AN ENVIRONMENTAL ANALYSIS OF PRODUCTION AND SUPPLY PATTERNS IN THE TRADITIONAL SECTOR

SECTION IV
Chapter 8.

THE BEEF CATTLE ECONOMIES OF UGANDA

In Uganda, as in most parts of Africa, the place of cattle in the cultural outlook, the subsistence diet and commercial life, varies from place to place and from tribe to tribe. In time, these aspects are all subject to changes of a quite radical nature. In any traditional area, it is necessary to understand this threefold framework before an analysis may be made of the way in which cattle are raised or the manner or quantity in which they are sold. Each of these three factors may be instrumental in producing or helping to produce a quite distinctive response to the prevailing physical environment, and in fact, such is very much the case in Uganda. Thus for the purpose of this study, a series of distinct regional groupings was evolved, based on subsistence, cultural attitudes and the local economy.

The groups have been entitled 'Beef Cattle Economies', but the term 'economy' is not intended to have an assumed cash or exchange economy context. In one of the economies, cash and cattle have very little relationship. It is necessary to point out at this stage that the economies were of course, devised entirely for one purpose: the analysis of cattle production and supply patterns. For this reason they are not offered as having any merit as 'natural regions' of Uganda. The economies may, in short, be said to result from the interaction of social and cultural values and a range of physical possibilities. Only in the case of the

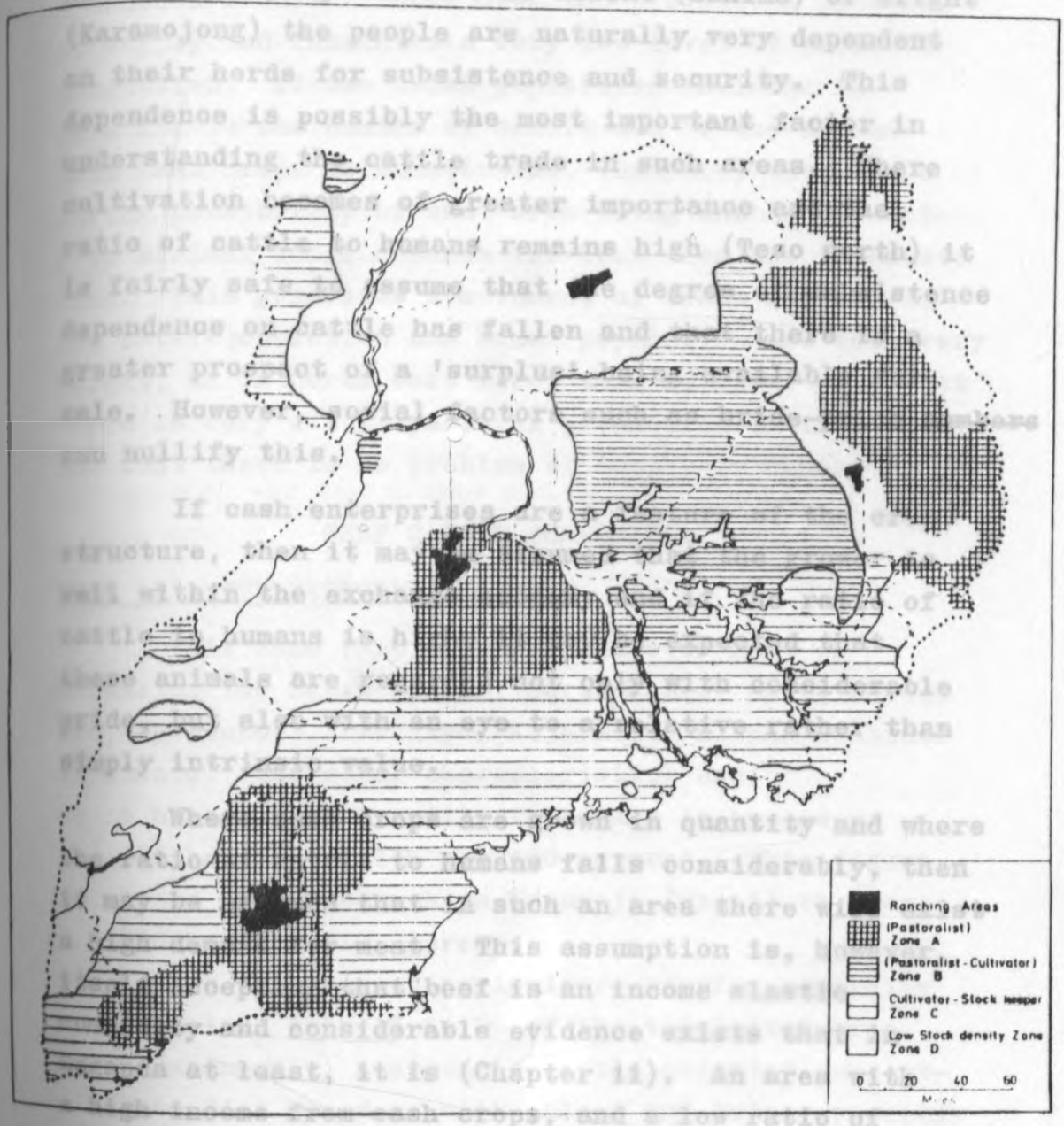
tsetse belt does one physical factor dominate to such an extent as to render all other factors relatively unimportant.

The dividing lines between the main groupings (Map 16) are intended to be approximate. As many of the criteria used in delimiting these zones are themselves approximate, and as a diversity of criteria have been used, the divisions may be considered to fade gradually from one into the next. There may be exceptions to this rule however, where strongly different cultural values are harboured by neighbouring tribes such as the Bahima and the Bairu. It is necessary to remember, also, that all the boundaries are liable to quite sudden change. (e.g. the Sebei Plains: see Chapter 1). The principal criteria used in drawing up the cattle economies were:

The ratio of cattle numbers to human numbers. A high ratio of cattle numbers to the prevailing human population total (Map 5) is indicative of a pastoralist outlook where cattle play a large part in the social and cultural values. A high ratio alone will not indicate the part played by cattle in the subsistence of an area, but will suggest the possibility of a working surplus for trade. Where more than approximately 100 cattle per 100 persons is the local ratio, these areas may be said to have a 'pastoralist' outlook in which cattle play an important part in the way of life. This does not mean that cattle entirely dominate the way of life, for the areas with a high ratio may also have a high degree of settled agriculture and cash crops.

Crop Agriculture. The degree of crop agriculture and the dependence of a people upon food crops strongly

CATTLE ECONOMIES



Map 16.

influence the nature of cattle production and supply in Uganda. Where the ratio of cattle to humans is high and crop Agriculture is absent (Bahima) or slight (Karamojong) the people are naturally very dependent on their herds for subsistence and security. This dependence is possibly the most important factor in understanding the cattle trade in such areas. Where cultivation becomes of greater importance and the ratio of cattle to humans remains high (Teso north) it is fairly safe to assume that the degree of subsistence dependence on cattle has fallen and that there is a greater prospect of a 'surplus' being available for sale. However, social factors such as bride-price ~~numbers~~ can nullify this.

If cash enterprises are a feature of the crop structure, then it may be assumed that the grower is well within the exchange economy and if the ratio of cattle to humans is high, it may be expected that these animals are regarded not only with considerable pride, but also with an eye to a relative rather than simply intrinsic value.

Where cash crops are grown in quantity and where the ratio of cattle to humans falls considerably, then it may be assumed that in such an area there will exist a high demand for meat. This assumption is, however, itself accepting that beef is an income elastic commodity and considerable evidence exists that in Buganda at least, it is (Chapter 11). An area with a high income from cash crops, and a low ratio of cattle to humans may be regarded as a region of demand for supplies originating in areas of fewer cash crops and a higher stock/human ratio unless local taboos are strong enough to overcome the economic forces.

A very low cattle population. Where the number of cattle is very small, then this sparsity may exercise a considerable influence over the prevailing patterns of supply and indicates a very low level of pastoral production. If the human population is large in relation to the number of cattle and if the income from cash crops is substantial, (Bunyoro) there is a strong possibility of that area being unable to meet even minimal local demands for beef from the immediate area. This generates a movement of trade stock. If the cattle population and human population are both very slight, as in north east Teso, then it means only that there is very little pastoral production in that area, but that there is no problem of supply or demand.

BEEF CATTLE ECONOMIES.

ZONE 'A': THE PASTORALIST ZONE

This zone (Map 16) is found over most of Karamoja, the Sebei Plains, north Mengo, north Busoga and, Nyabushozi, Isingiro, Kajara and Mitoma counties of Ankole. The zonal characteristics are:

a) A high ratio of cattle to humans in excess of 100 head of cattle per 100 persons. This figure rises in parts such as Karamoja (Map 5) to over 500 head per 100 persons.

b) A very slight crop agriculture varying generally from less than 1% to 2% of the total land area.

c) Consequently, a strongly cattle oriented subsistence diet based on milk, blood and butter possibly supplemented with grain and meat from small stock.

d) A generally, though not always, rigorous physical environment with frequent drought and water shortage.

e) A very strong sentimental and aesthetic attachment to cattle.

It is impossible to be too deterministic about the correlation of certain economies and particular physical environments. Although most of the pastoralist groups find themselves in the less hospitable areas, this is not always so. In Ankole, the pastoralist Bahima coexist with the agricultural Bairu and this makes the delimitation of cattle economies particularly arbitrary, and sometimes deceptive in some small areas.

ZONE 'B': THE PASTORALIST-CULTIVATOR ZONE

This zone covers most of Teso north of Lake Bisina, and west of eastern Usuku, central and east Lango, parts of Agago county of Acholi and three small outliers in Bukutu county of Toro, the Bungungu area of Bunyoro, and the Labwor Hills. The zonal characteristics are:

a) A generally high ratio of cattle to humans, at 100 to 250 head of cattle per 100 persons.

b) Crop agriculture forms an important element in the land use of this zone and cattle no longer have a major part to play in the subsistence economy. Cultivated land forms from 8% (south-east Acholi) to ~~52~~% (~~Bukedea~~ Soroti cty., Teso) of the total land area.

c) Over most of the zone, cash crops play a significant part. In the area of Teso, Lango and Acholi, cotton occupies from 5 to 15% of the cultivated area of some counties. In Bugungu, fishing provides the source of income with fish being landed and traded at Wanseko. In Bukutu, conditions are rather marginal for inclusion in Zone 'B' though there is some trading of food crops and a little cotton is grown.

Zone 'B' Teso and probably zone 'B' Lango are derived from earlier zone 'A' type cultures which accounts in part for the high ratios still prevailing and helps illustrate the changing nature of the zonal boundaries.

ZONE 'C': THE CULTIVATOR-STOCK KEEPER ZONE

This zone covers the northern shore of Lake Victoria to a point just south of Masaka and extends northward to include the three southern counties of Teso district. Outliers of the zone are found in south Kigezi, along the West Nile highlands and, around the township of Fort Portal in Toro district. The zonal characteristics are:

a) A low ratio of cattle to humans. The ratio is everywhere below 100 head per 100 persons, but over most of the area it falls below 50 head.
b) The sentimental attachment and importance given to cattle in zones 'A' and 'B' are no longer present. Consequently, the term 'Pastoralist' has been dropped.
c) The cultivated area is often large rising from 15% of the county land area in Bukoli to over 71% in Central Bugisu (1). Figures over 25% are common.
d) The proportion of the cultivated area under cash crops is considerable. In Bukedi district 15% of the cultivated area is under cotton (2) with local concentrations as high as 25-30% in Palissa county. (3) In Busoga the overall district total of the percentage of cultivated land under cotton is 10. This figure is depressed by the fact that northern Busoga belongs to zone 'A'. In the south concentrations as high as 35-40% are found in Kigulu.

e) A high density of human population is also a characteristic of this zone. Commonly the density is over 200 persons per square mile though figures much higher than this are found in localised cases. Sub-counties with over 400 persons per square mile are found in each of the constituent areas of the zone.

In this category, agriculture clearly dominates, and cattle play a very secondary role in the rural economy. It would be possible for pastoral activities still to remain dominant in zone 'C' if the relatively small number of cattle in each herd were of a very high quality. This is not so, and the cattle of zone 'C' are often of an even lower quality than those in zones 'A' and 'B'.

The inclusion of the West Nile highlands into this zone presents some difficulties. Although the population density is high, a cash crop economy is well established and the ratio of cattle to humans is relatively low, nevertheless, the pattern of beef demand and supply is as yet quite diminutive. This may reflect the inclusion of a Sudanic tribe in the otherwise largely Bantu grouping of zone 'C', or it may reflect the very recent development of West Nile after a long isolation. It is best to consider the area as marginal to the zone, but very much in a state of transition.

ZONE 'D': THE LOW STOCK DENSITY ZONE

This zone covers the area described as 'thinly stocked' in chapter 1. Briefly, that is a belt from north Kigezi through Toro, Bunyoro, parts of West Nile, Madi and Acholi. Smaller areas exist on Mt. Elgon, the Ruwenzori range, the Turkana Escarpment, South Ankole

and the Karamoja-Teso/Acholi borderland. The zone is characterised by a very low density of cattle not exceeding 10 head per square mile and falling to below 5 in places. Within the zone are a variety of cash and subsistence crop economies, and the thinly stocked nature does not necessarily indicate a general economic stagnation. Over most of the zone, tsetse prevails, though this is not so of much of Acholi. In many parts of the zone, the difficulty of keeping cattle is indicated not only by the small numbers, but also by the very low ratio of stock to humans (below 10 head per 100 persons in Bunyoro).

THE RANCHES:

Though these have not been considered as cattle economy zones, they are quite distinct in that the attitude prevailing in these areas is common: a desire to range animals scientifically solely for beef production. The ranches have a distinct identity in the patterns of production and supply of beef cattle in Uganda and they contrast markedly with the other four economies which are all within the traditional sector. At present, ranches are found in Ankole, Acholi, Teso, Bulemezi, Bunyoro and (on paper) in south west Lango. Areas such as Ankole or Bunyoro are found mostly in zone 'A' or zone 'D' economy regions. Originally, all the ranches would have been found in zone 'D' environments, for they were designed either to follow-up tsetse clearance or were sited in areas where compensation would be at a minimum. Subsequently, some of them have become surrounded by zone 'A' environment as traditional pastoralists and their cattle occupied the areas around the ranches after tsetse clearance.

The size of the zones and the number of cattle in each is illustrated in Table 8. The Pastoralist zone ('A') has nearly 1/3 of all the cattle in Uganda with only 1/5 of the land area and, together with zone 'B', contains over half the national herd (54.9%) on only 1/3 of the land area. In contrast, the Low Stock Density Zone, ('D'), covers over 40% of the land area of Uganda, but contains only 17% of the stock. Surprisingly, in the almost total absence of mixed or integrated farming, one fifth of the cattle in Uganda are located in the Fertile Crescent. At the present stage, only 1% of the land surface has been scheduled for development under full commercial ranching, and less than 0.5% of the national herd is raised on ranches.

Some difficulty arises in using cattle economies as the basis for study because the figures collected for trade and production are on a district or county basis. Comparing Map 16 with a political map of Uganda, it is clear that many of the cattle economies cut across administrative boundaries. In Buganda, there is a sharp division between zones 'A' and 'C' northward or westward from the lakeshore; in Kigezi, zones 'A', 'C' and 'D' exist within the district boundary. Wherever possible, figures have been obtained for the smallest administrative areas to take account of the cattle economies, but this has not always been possible.

The zones are subject to considerable change. A low density situation largely reflects the presence of tsetse fly or tribal friction and any adjustment to these factors will very probably alter the boundary

TABLE 8.

CATTLE ECONOMIES.

ZONE.	LOCATION	AREA IN SQ. MLS.	%AGE TOTAL AREA	CATTLE POPULATION	%AGE NATIONAL HERD.
	'PASTORALIST'				
'A'	Karamoja	6,988	9.0	658,000	18.1
	Ankole	4,949	6.6	228,000	6.3
	N. Mengo	3,093	3.8	114,000	3.1
	Others	575	0.7	20,000	0.5
	'PASTORALIST-CULTIVATOR'				
'B'	Teso-Lango	8,360	11.1	808,000	22.2
	N. Busoga	577	0.8	46,000	1.4
	Labwor and Others	334	0.5	10,000	0.3
	'CULTIVATOR- STOCK KEEPER'				
'C'	West Nile	1,588	2.0	102,000	2.8
	'Fertile Crescent'	14,716	19.7	793,000	21.9
	Kigezi	2,591	3.5	137,000	4.2
	Toro	326	0.5	60,000	1.5
	'LOW DENSITY'				
'D'	Total	30,459	40.7	626,000	17.2
	RANCHING SCHEMES AND THE BUNYORO CONSOLIDATION AREA.	843	1.1	18,000	0.5

of the zone. Large areas of the Low Density zone of north Mengo were cleared of tsetse after 1947 and have subsequently been reclassified as zone 'A' following the immigration of Bahima pastoralists from Bunyoro and Ankole. Parts of zone 'B' have gradually become zone 'C' as crop acreages, the percentage of cash crops and the human population density has risen. This was noted earlier for Teso as the cash economy gradually permeated the Eastern Province from the Buganda focus.

NOTES

1. Based on McMaster D.N. in the 'Atlas of Uganda', Department of Lands and Surveys, Entebbe 1962.
2. District figure derived from the 'Report on the Uganda Census of Agriculture' volume 3, Government Printer, 1966.
3. Op.cit. No.1.

Chapter 9

ZONE A : THE PASTORALIST ZONE

The Pastoralist Zone, covering most of Karamoja, north Mengo, north Busoga, western Masaka and much of Ankole and north Kigezi has less than one twentieth of the population of Uganda although it covers one fifth of the land area. In this area are to be found, however, nearly one third of the entire national herd. This reflects the very high ratio of cattle to human populations (Map 4). A characteristic of the economy of these areas is the small degree of crop agriculture though even this can be very important in influencing sales patterns in Karamoja. For the three principal regions making up Zone A, the figures are as follows:

TABLE 9

REGION	% OF LAND AREA UNDER CROP AGRICULTURE.
Karamoja	1.3
Buruli (N.Mengo)	2.9
Nyabushozi (Ankole)	0.6

Uganda Atlas, 1962.

Many parts of the pastoralist areas are fully stocked or overstocked, and this strongly influences the levels and patterns of production and supply of cattle. These factors influencing production and supply become more important when it is realised that the larger urban areas and the meat packing industry are almost totally dependent on Zone A for supplies, and that Zone A contributes an average 25-30% of the total marketed offtake and 40-50% of total inter-district transfers.

The productive potential of the zone is very high but the present range resources illustrate a situation of degradation which is largely the work of

man - both pastoralist and administrator, particularly in the past thirty years.

From the large cattle numbers and great herds of Zone A, the overall percentage marketed offtake is the lowest in Uganda at about one fifth-one eigth of the figure for an advanced economy such as the United States (1). The degree of variability is also the greatest. Since 1960, the pattern of sales in Karamoja has become dramatically exaggerated (Graph 8) and the number of cattle sold reached a high point in 1961, repeated again in 1965 and 1966. In the intervening years, sales totals fell back sharply. The record sales totals do not reflect a sudden increase in the total district herd total but a 100%+ rise in the percentage marketed offtake over the normal 3 to 3.5% figure. The explanation of these trends and characteristics is found in the relationship between the pastoralist social system and a relatively demanding physical environment. In such a marginal physical habitat as that in which these pastoralist societies occur, it is common for the patterns of economic and, indeed all human activities, to mirror closely the seasonal changes in the climate.

RAINFALL

The relationship between rainfall, production and supply is very close, both directly in the effects on cattle through drought or starvation, and indirectly through the need for the people to conserve and later sell cattle if the crop harvest fails. Most of the zone is typified not by low annual rainfall totals so much as by a considerable unreliability of rainfall. Often annual rainfall totals exceed the popularly accepted

30 inch limit for settled agriculture as in western Pian county of Karamoja when the total rises to 45 inches. Only in north western Masaka and eastern Karamoja do sizeable areas occur with annual totals below 30 inches. More significant to this study is the unreliability of the rainfall with its attendant drought and crop failures. The Pastoralist Zone is seen on Map 3 to be roughly coincidental with areas of lower rainfall reliability so that in these areas, crop agriculture carries a high degree of risk.

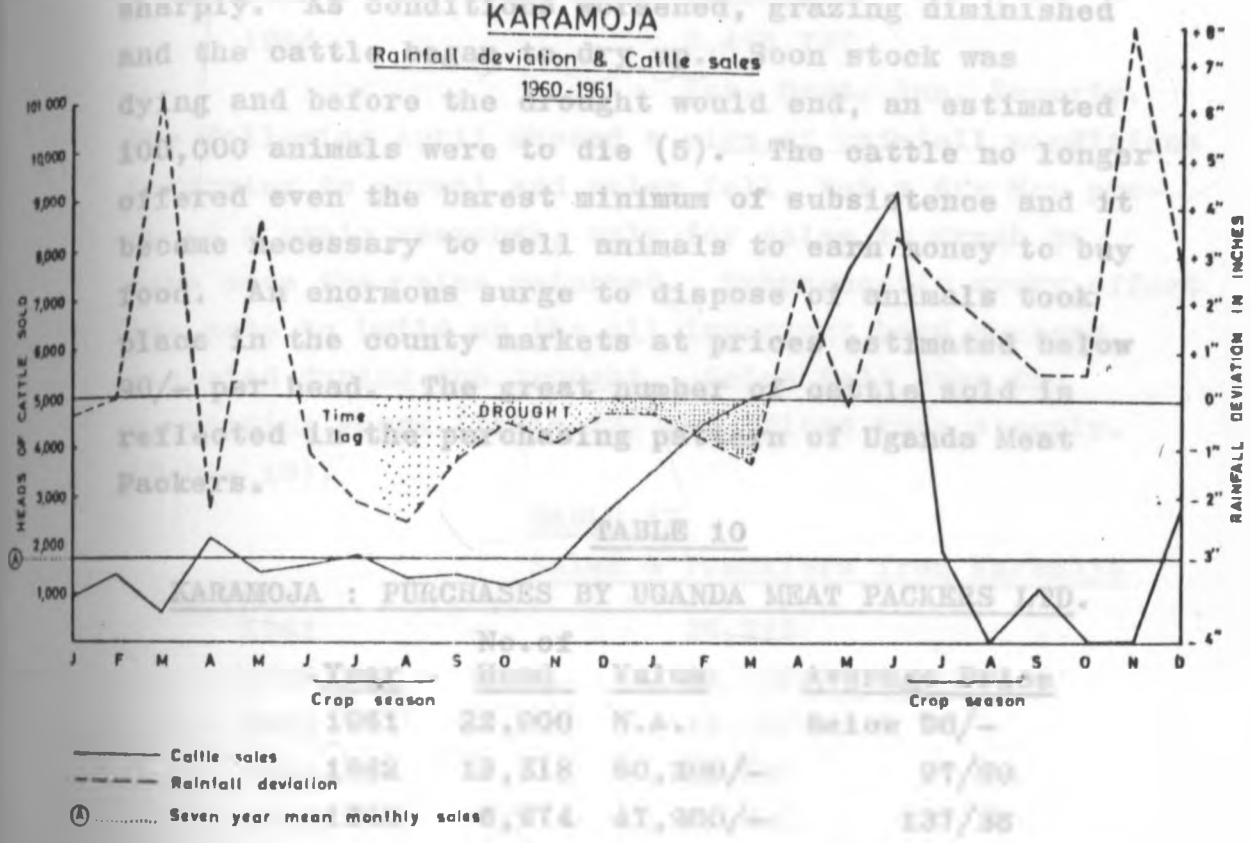
It is necessary, before examining the effects of this rigorous climate on production and sales of slaughter stock, to stress again an important difference between the economies of some Pastoralist peoples. Some, like the Suk (Pokot) and Bahima shun all forms of settled agriculture and subsist entirely on the milk and blood of cattle and the meat of small stock. These people are extremely sensitive to physical factors directly influencing the food producing capacity of their herds. Other peoples, principally the Karamojong, Jie and Dodoth, also rely heavily on their cattle for subsistence, but, contrary to the popular image, these tribes practise supplementary agriculture even though the Royal Commission said of areas with poor prospects of 30" that "the climatic conditions normally preclude productive arable agriculture" (1). The crops, principally sorghum, form an important part of the annual subsistence pattern and, after working amongst the strongly pastoral Jie, Gulliver was able to say: 'The Jie have an ..... economy wherein cereal foods are really no less important than animal foods .... scarcely a day passes when cereal foods are not eaten and they frequently form the only foods until the dairy herds

return in May' (2). This second group of pastoralists have a small reserve of crop agriculture between their subsistence needs and the production level of cattle.

From the point of view of livestock production, over the whole of Uganda F.A.O. could state only of Karamoja that "livestock productivity (is) generally limited by low or erratic rainfall" (3). This is perhaps, a little restricted and the rainfall has a far reaching and sometimes disastrous effect over many parts of this Pastoralist Zone.

Karamoja. The unreliability of rainfall over most of Karamoja is manifested in the frequency of serious drought. Over a 29 year period, serious crop failure occurred on average one year in every four, (4) and the incidence of drought very largely accounts for the two types of seasonal sales pattern outlined in section III and the periodic dramatic depletion of the district herd. The two sales patterns (graph 6) closely relate to the success or failure of the sorghum harvest. A study of a particular year will illustrate this.

In 1960/61 there occurred a long and extremely hard drought illustrated on graph 7 by reference to monthly rainfall deviations from a 30 year norm. The sales of cattle at the county markets increased towards the end of the dry season (January-April) in the normal pattern in order that taxes could be paid for there is no other source of cash income for the pastoralist other than to sell his cattle. By April the 'normal' onset of the rains, there was no sign of an end to the dry period and sales continued increasing. Normally, with the gathering of the sorghum harvest marketing falls quite steeply in July. In May, a deceptive


KARAMOJA
Rainfall deviation & Cattle sales
1960-1961
HEADS OF CATTLE SOLD
RAINFALL DEVIATION IN INCHES
Time lag
DROUGHT
Crop season
Crop season
J F M A M J J A S O N D J F M A M J J A S O N D
Cattle sales
Rainfall deviation
Ⓐ ..... Seven year mean monthly sales

Graph 7.

short rainy spell reassured the pastoralists of the onset of the rains, the good prospects for sorghum and the absence of a need to sell cattle. Sales fell. By June, however, the rains had ceased and there was little hope of the cereal crops ever being harvested. As a response, the people fell back heavily on the cattle for subsistence and cattle sales again fell sharply. As conditions worsened, grazing diminished and the cattle began to dry up. Soon stock was dying and before the drought would end, an estimated 100,000 animals were to die (5). The cattle no longer offered even the barest minimum of subsistence and it became necessary to sell animals to earn money to buy food. An enormous surge to dispose of animals took place in the county markets at prices estimated below 90/- per head. The great number of cattle sold is reflected in the purchasing pattern of Uganda Meat Packers.

TABLE 10

KARAMOJA : PURCHASES BY UGANDA MEAT PACKERS LTD.

	Year	No.of Head	Value	Average Price
	1961	22,000	N.A.	Below 90/-
	1962	12,318	60,300/-	97/90
	1963	6,974	47,900/-	137/36
	1964	8,798	86,900/-	197/54
Jan/Aug.	1965	6,882	108,856/-	314/-
Jul/Jul.	1965/66	29,361	N.A.	178/-
Total	1966	18,890	N.A.	183/33

U.M.P. Ltd.

The considerable depletion of stock numbers through drought, starvation and sale showed itself in the national herd totals recorded during the annual censuses.

TABLE 11

UGANDA : CATTLE POPULATION

Year	Head of Cattle	
1960	3,618,180	)
1961	3,382,762	) Karamoja drought.
1962	3,464,603	
1963	3,463,937	
1964	3,496,797	

Vet. Dept. Ann. Reports.

The following April showed a sign of rainfall conditions returning to normal and sales fell, but a dry May produced a panic response, only for sales to crash to zero once the rains returned. Subsequently every effort was made to build up the all important herd numbers depleted during the drought. Sales fell over the succeeding years (Table 12) and prices rose steeply. (Table 10).

TABLE 12

Sales & Transfers from Karamoja

1961	-	36,217
1962	-	22,735
1963	-	14,181
1964	-	18,049
1965	-	21,044

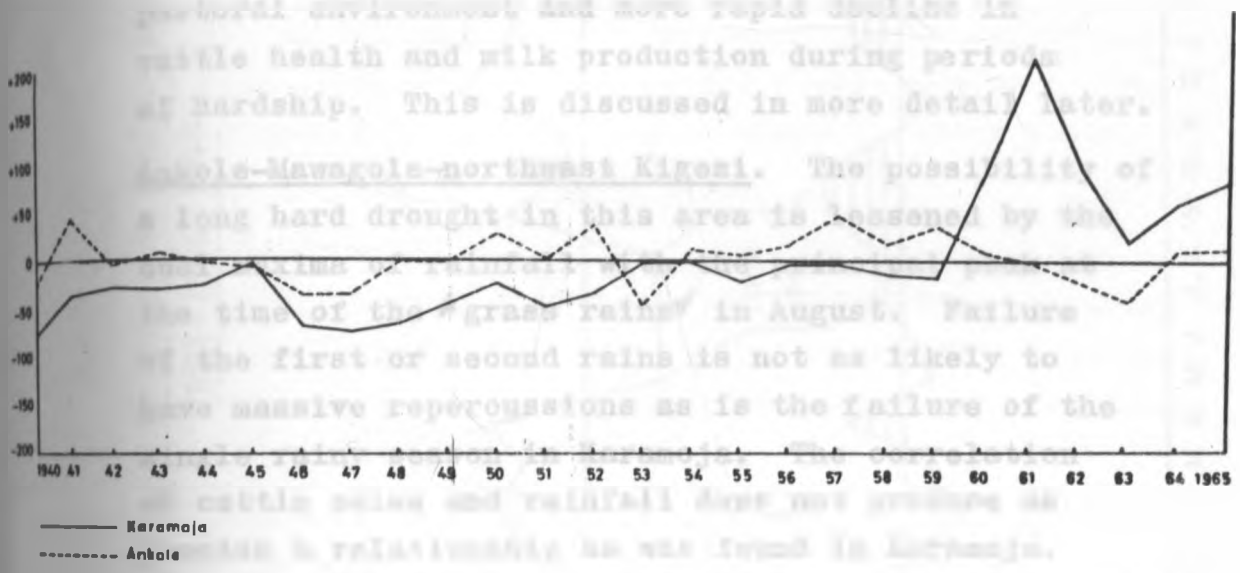
Vet. Dept. Moroto.

The figure of 36,217 cattle sold in 1961 represented a 59% increase over the previous highest figure since 1945 and has not been equalled since. (Graph 8).

In 1965, similar conditions occurred (graph 6) producing record purchases by Uganda Meat Packers at the county markets (table 10). The sudden price drop is closely connected with a widespread and urgent desire to sell. The sales totals in 1965 were to

KARAMOJA / ANKOLE

Percentage Deviation in cattle sales from 30 year mean

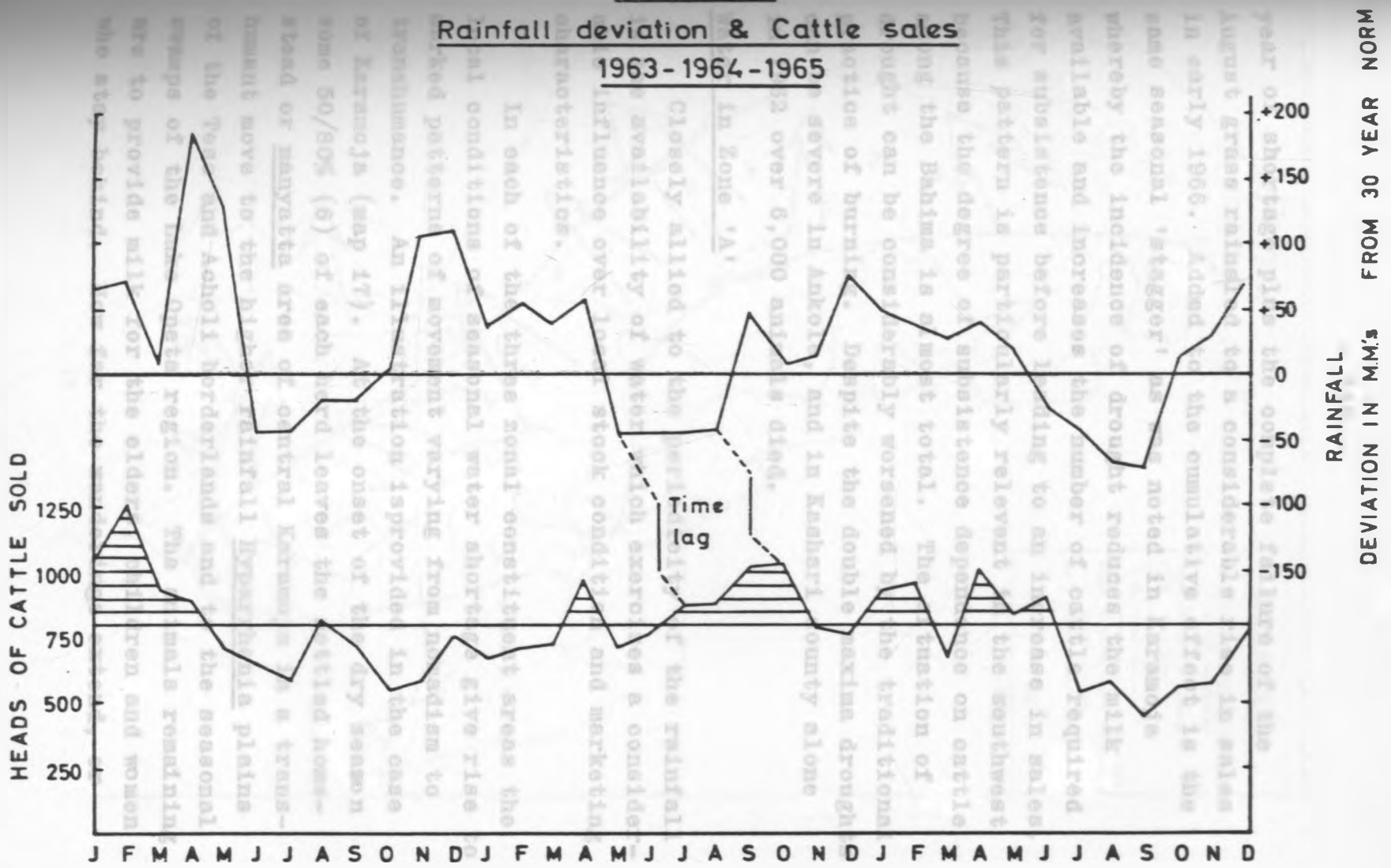


Graph 8.

some extent offset by the large scale distribution of famine relief breaking the drought - cattle - subsistence relationship. Some 240,000 lbs. of maize flour was being distributed weekly in Karamoja during the 1965 drought and, without this the sales figure for cattle might have exceeded the 1961 record. It is questionable whether the droughts of the 1960's were any worse than previous dry periods, especially the dry season of 1953, and the dramatic rise in sales totals may well reflect the decline in the pastoral environment and more rapid decline in cattle health and milk production during periods of hardship. This is discussed in more detail later.

Ankole-Mawagola-northeast Kigezi. The possibility of a long hard drought in this area is lessened by the dual maxima of rainfall with the principal peak at the time of the 'grass rains' in August. Failure of the first or second rains is not as likely to have massive repercussions as is the failure of the single rainy season in Karamoja. The correlation of cattle sales and rainfall does not produce as precise a relationship as was found in Karamoja. However, significant connections can be distinguished.

The pattern for three years 1963,64, and 1965 is shown in graph 9. A peak in cattle sales is noted early in each year connected with the need to acquire cash to meet tax payments. The relationship that emerges in Ankole is staggered over a period of years and is not as sensitive within one year as it is in Karamoja. The effect is cumulative. A dry period from June to October 1963 did not produce an exceptional rise above the mean level of cattle sales. The continuation of dry conditions the following year did produce a higher sales level, but the addition of a third


ANKOLE
Rainfall deviation & Cattle sales
1963-1964-1965
HEADS OF CATTLE SOLD
1250
1000
750
500
250
Time lag
+200
+150
+100
+50
0
-50
-100
-150
RAINFALL
DEVIATION IN MM's FROM 30 YEAR NORM
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

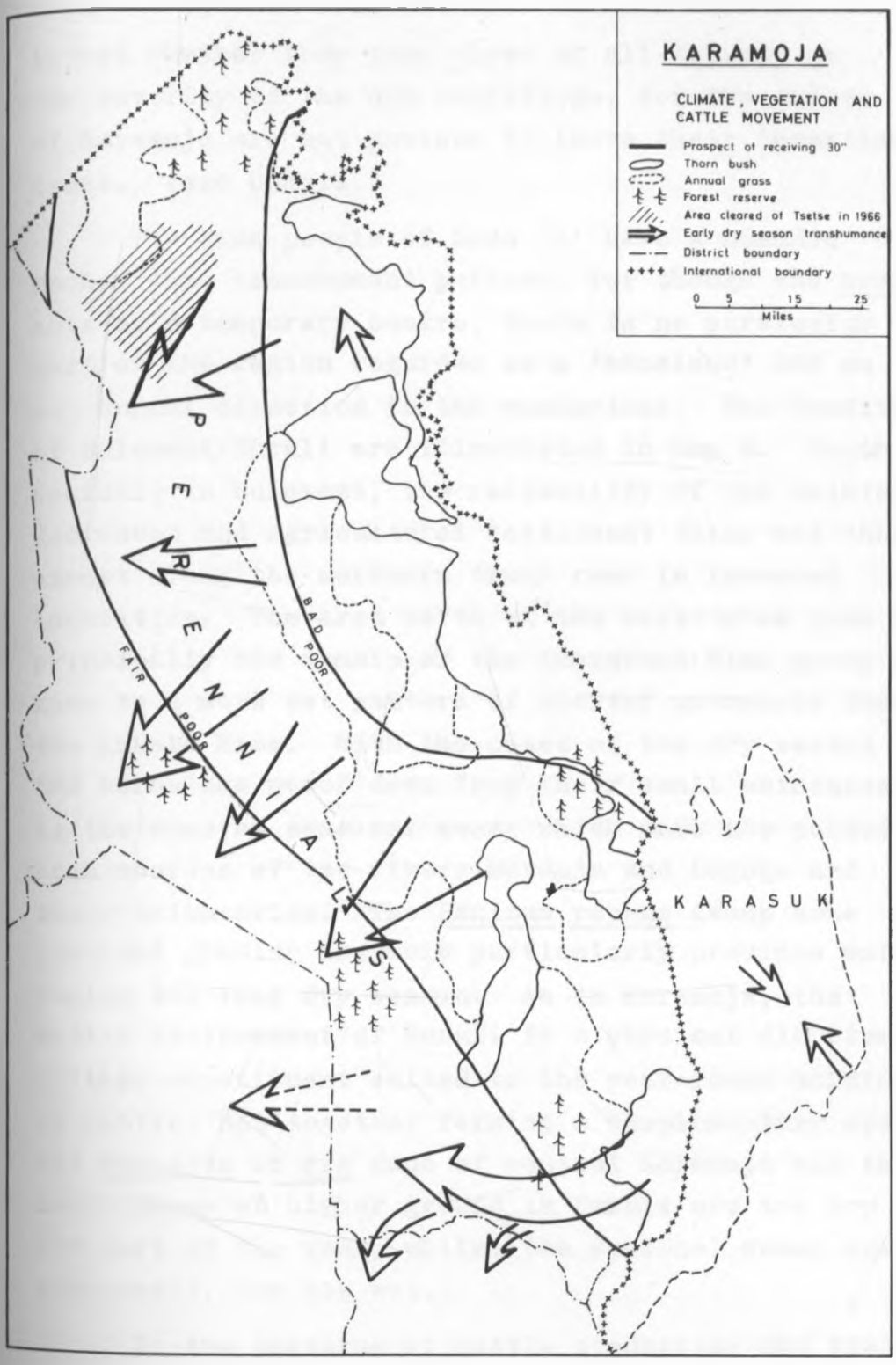
Graph 9.

year of shortage plus the complete failure of the August grass rainsled to a considerable rise in sales in early 1966. Added to the cumulative effect is the same seasonal 'stagger' as was noted in Karamoja whereby the incidence of drought reduces the milk available and increases the number of cattle required for subsistence before leading to an increase in sales. This pattern is particularly relevent in the southwest because the degree of subsistence dependence on cattle among the Bahima is almost total. The situation of drought can be considerably worsened by the traditional practice of burning. Despite the double maxima droughts can be severe in Ankole, and in Kashari county alone in 1962 over 6,000 animals died.

Water in Zone 'A'

Closely allied to the periodicity of the rainfall is the availability of water which exercises a considerable influence over local stock condition and marketing characteristics.

In each of the three zonal constituent areas the local conditions of seasonal water shortage give rise to marked patterns of movement varying from nomadism to transhumance. An illustration isprovided in the case of Karamoja (map 17). At the onset of the dry season some 50/80% (6) of each herd leaves the settled homestead or manyatta area of central Karamoja in a transhumant move to the higher rainfall Hyparrhenia plains of the Teso and Acholi borderlands and to the seasonal swamps of the Lake Opeta region. The animals remaining are to provide milk for the elders, children and women who stay behind. How far the wanderings extend, or


KARAMOJA
CLIMATE, VEGETATION AND CATTLE MOVEMENT
Prospect of receiving 30"
Thorn bush
Annual grass
Forest reserve
Area cleared of Tsetse in 1966
Early dry season transhumance
District boundary
International boundary
0 5 15 25
Miles
P E R E N N I A L S
BAD POOR
FAIR POOR
KARASUK

indeed whether they take place at all depends on the severity of the dry conditions, for the tribes of Karamoja are not anxious to leave their 'heartland' areas. (see Chap.1.)

The Hima people of Zone 'A' have a nomadic rather than transhumant pattern, for though the kraal acts as a temporary centre, there is no particular part of the region regarded as a 'homeland' and no set annual direction to the wanderings. The conditions of Bulemezi/Buruli are illustrated in Map 4. North of Kakinzi, in Bulemezi, the reliability of the rainfall decreases and agricultural settlement thins out sharply except along the northern trunk road in favoured localities. The area north of the cultivated zone is principally the domain of the immigrant Hima group who keep to a more set pattern of shorter movements than the Ankole Hima. With the onset of the dry season the herds are moved down from their small eminences to the arms of seasonal swamp which mark the ponded back courses of the rivers Mayanja and Lugogo and their tributaries. The Panicum repens swamp zone provides grazing and more particularly provides water during the long dry season. As in Karamoja, the cattle environment of Buruli is a physical dichotomy: neither constituent suited to the year-round holding of cattle, but together forming a complementary system. The manyatta or ere zone of central Karamoja and the small areas of higher ground in Buruli are too dry for part of the year, whilst the seasonal swamp areas, conversely, are too wet.

In the patterns of cattle production and trading in Uganda, the movement to water has an important effect. Whilst off in search of water and grazing,

the herders find it necessary to kraal the animals in small temporary night shelters. This encourages the rapid transmission of disease, especially the serious Pleuro-pneumonia which is favoured by conditions of confinement. As this disease has invisible 'carrier' animals, the threat is made considerably greater. The close cohabitation of man and beast during the nocturnal kraaling leads to conditions favourable to the spread of Cysticercus bovis which spends part of its existence in human faeces. This, in part, accounts for the extremely high Cysticercus bovis condemnation noted in animals from this zone. (Section III) (7). The confinement of animals also encourages the spread of parasitic diseases at the few watering points. Helminthic infections are thus a common feature of the Karamoja/Buruli carcases. In some cases, where watering points are particularly scarce, animals may be watered on alternate days only, and it has been estimated that this common practice alone deprives animals in Tanzania under similar conditions to Karamoja of 30/50lbs. liveweight annually (8). Long treks to water also encourages the loss of weight, and in Isingiro county, Ankole, walks of 10 miles are still common, so that a statement made in 1938 remains true that: "The average weight of a dressed Nkole carcase is very low as are the fat content, flavour and tenderness. All of this reflects the distance travelled to water." (9).

The need for trekking is very real and leads to considerable difficulty in the planning and location of markets. The market infrastructure is essentially static in the short run, whilst the herds are part of a seasonally dynamic system. It was seen earlier that the markets in Karamoja are based on wet season

tribal nuclei. The concentrations of 200,000 animals or more in the western plains during the dry season dispersal are served by no markets, and this has been noted as the time when sales are more likely to be forthcoming in a normal year. F.A.O. noted this problem: 'In connection with nomadic tribes, it may be pointed out that their scattered nature and their continuous movement deprive them of the ordinary marketing facilities' (10). The truth of this statement is however, questionable, for in the Ruzhumbura/Ankole/ Mawagola part of zone 'A', five times more markets are provided in relation to the number of livestock than in Karamoja. The offtake via the markets is nevertheless, even lower than in Karamoja. It appears that if the necessity for sale arises, and it is necessity rather than attraction which matters in Pastoralist areas in Uganda, then distance from a market is a minor factor.

The question of desiccation has been raised in Karamoja, and the following comment was made in 1953: "I think that there is little doubt that the amount of water produced by the natural water holes tends to decrease, whilst those which once were regarded as permanent are now no longer reliable". (11)

A fear is felt that dryness will breed dryness and that the dry wind from the Turkana lowlands (April-September) will carry desiccation further and further west. This is closely related to the present situation of increasing stock numbers, diminishing pastures, and the drastic changes in the cattle marketing in Karamoja.

THE INFLUENCE OF THE DIMINISHING PASTURES

All the constituant areas of zone 'A' lie in the ~~Wet~~ Moist or Dry Combretum Savanna ecological zones, with the exception of a small part of east-central Karamoja which is classified (Map 6) as Steppe and Dry Thicket. With the exception of the last area, the optimal carrying capacity of the zonal economy under traditional methods of management is 4-8 acres per beast (12) based on available rangeland totals. In both Ankole and Karamoja the average stocking rate to available rangeland is already within these limits and conditions of severe localised overstocking are common. Only in the recently reoccupied area of north Mengo is the pressure slight. The localised overstocking has given rise to foci from which considerable pasture degeneration is spreading. In Karamoja this has reached crisis proportions and it is now common for drought to have a considerably more serious effect (note graph 8) because the grass structure and the seasonal herd nutritional value of grazing are falling whilst the district continues to grow. The changes which have taken place in the pasturelands have led to a strong increase in the magnitude of seasonal sales with totals now varying from season to season by over 20,000 head in Karamoja. During times of drought, animals are being offered in a generally poorer condition than was the case in the past.

Karamoja:

In this district the pasture deterioration has reached the greatest extreme and may be clearly attributed to Man in his attempt to apply nationwide or 'blanket' planning without first appreciating the local side effects on natural resources and, the social outlook and habits of the people.

The vegetation pattern in Karamoja (Map 17) is aligned north north-west to south south-~~west~~ east in three major zones parallel with the topographic orientation and isohyets. The rainfall declines sharply towards the heights of the eastern rift which form the Turkana escarpment. In this eastern area rainfall totals fall to below 20". The remainder of the district is a plain largely of red and black clays sloping gently westwards and broken only by the volcanic remnants such as Kadam and Toror. Rainfall rises to 45" in the western plains.

The three main vegetation areas are:(14)

1) The western perennial "dry Hyparrhenia" plains extending into the plateau savanna of northern Uganda. The area of the 'western plains' provides dry season grazing and water for the Karamojong stock (13). This area also contains considerable expanses of aquatic grasses and seasonal swamp.

2) The 'steppe' region stretches along the centre of the district south of a point near Kaabong. This region is typified by annual grasses so the availability of pasture is strongly seasonal and this partly necessitates the pattern of transhumance. The characteristic grass type is Sporobolous (14).

3) The 'thorn bush' area is found in three areas; two being along the eastern boundary of the district and one in Bokora county. The thorn bush areas have the lowest pastoral value and are characterised by semi-arid succulents, large expanses of open ground and very little grass, particularly in the dry season.

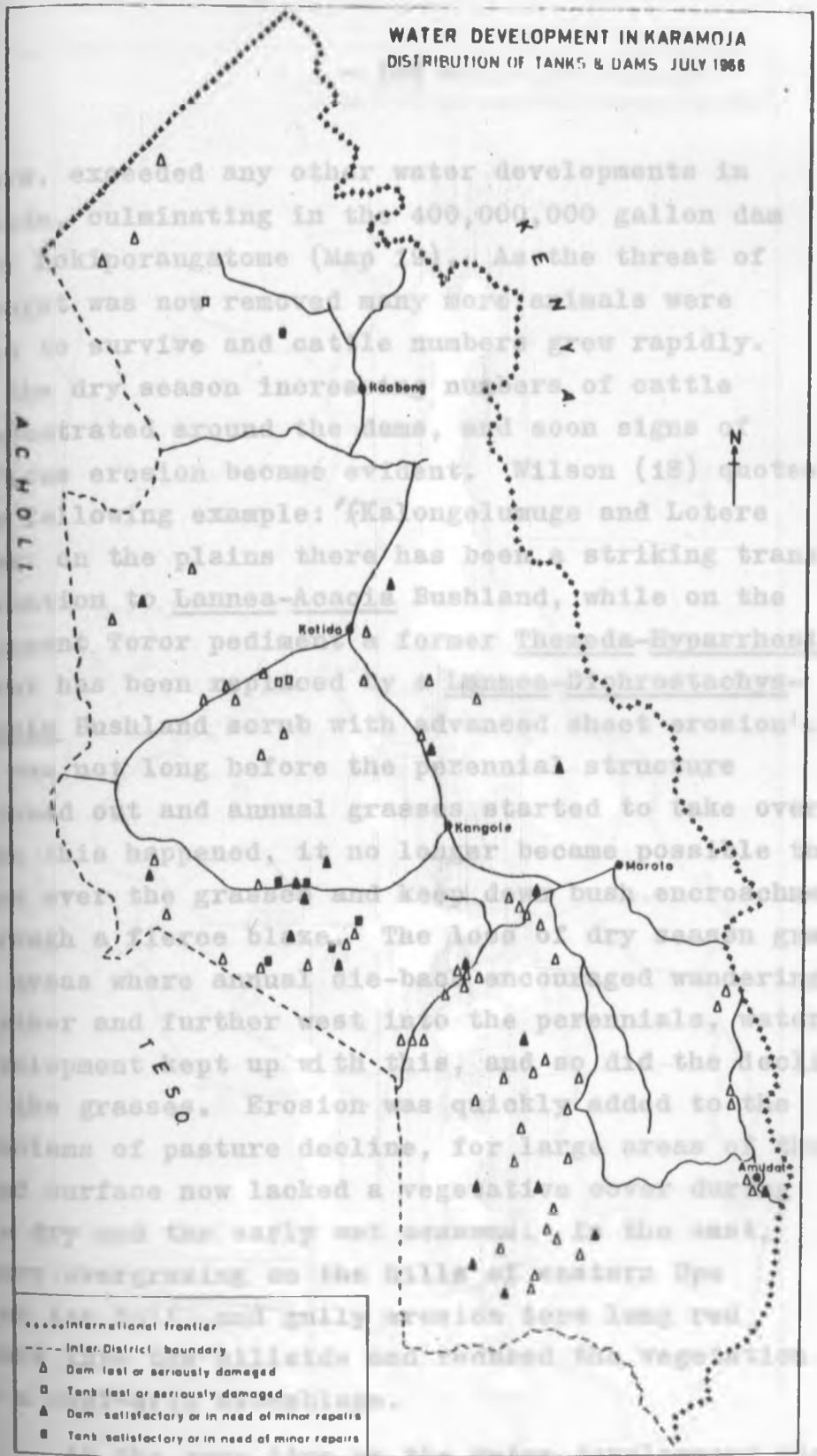
All three vegetation zones are man-induced sub-climaxes produced by burning and overgrazing and are both very sensitive to change and relatively unstable. Further, the present vegetation zones were seen in Section II to be geographically very different from the ecological zones (Maps 6 & 7) reflecting a considerable change already worked by the hand of Man. The rate of the change from the ecological potential is reflected in observations made in the district in recorded history (15). It seems clear that the steppe is encroaching on the western perennials and is, in turn, being consumed by the thorn bush. There is, in effect, a gradual westward shift in the steppe and bush vegetation belts. This could be attributed to a climatic change if evidence of instability was reflected in the perennials. There is no such evidence. The increasingly Xerophytic nature of vegetation in Karamoja is the work of man, and where man has been absent as in the cordons sanitaire, the vegetation has remained significantly unchanged. Fine stands of Hyparrhenia still prevail between the downgraded areas of the Bokora and the Jie. Against this background of change, the recent devastating drought years of 1961, 1965 and 1966 may be examined more critically, the reason for the totally unprecedented sales totals explained and the increasing variability of sales and prices understood.

The balance of cattle numbers and grass structure was maintained originally by the constraints of water and disease. Frequent and severe droughts and, later, devastating epizootics of Rinderpest and Trypanosomiasis held in check a strong social desire for the maximum

number of cattle for reasons of subsistence, and bride wealth. The balanced equation was upset by a series of administrative plans and developments which back-fired seriously.

The first stage in the pasture degradation and declining level of slaughter production was a mis-understanding during the inter-war period. At this time large areas of dry season grazing were erroneously taken away from the peoples of Karamoja in the belief that these areas were not within the grazing sphere of any of the Karamoja tribes (16). The dry season grazing of the Matheniko and Borora tribes was taken and given to Teso district as part of Usuku county. In the east, the dry season grazing of the Pian (17) between the Cherorongit Hills and the Kanyangareng river was given to Kenya and rapidly filled up with the Suk or Pokot peoples. This had three effects: it led to the increased pressure of grazing on the central homestead or manyatta belt to the rapid devastation of the dry hills of the east by the large numbers of cattle brought by the Suk pastoralists and to inter-tribal hostility over grazing areas.

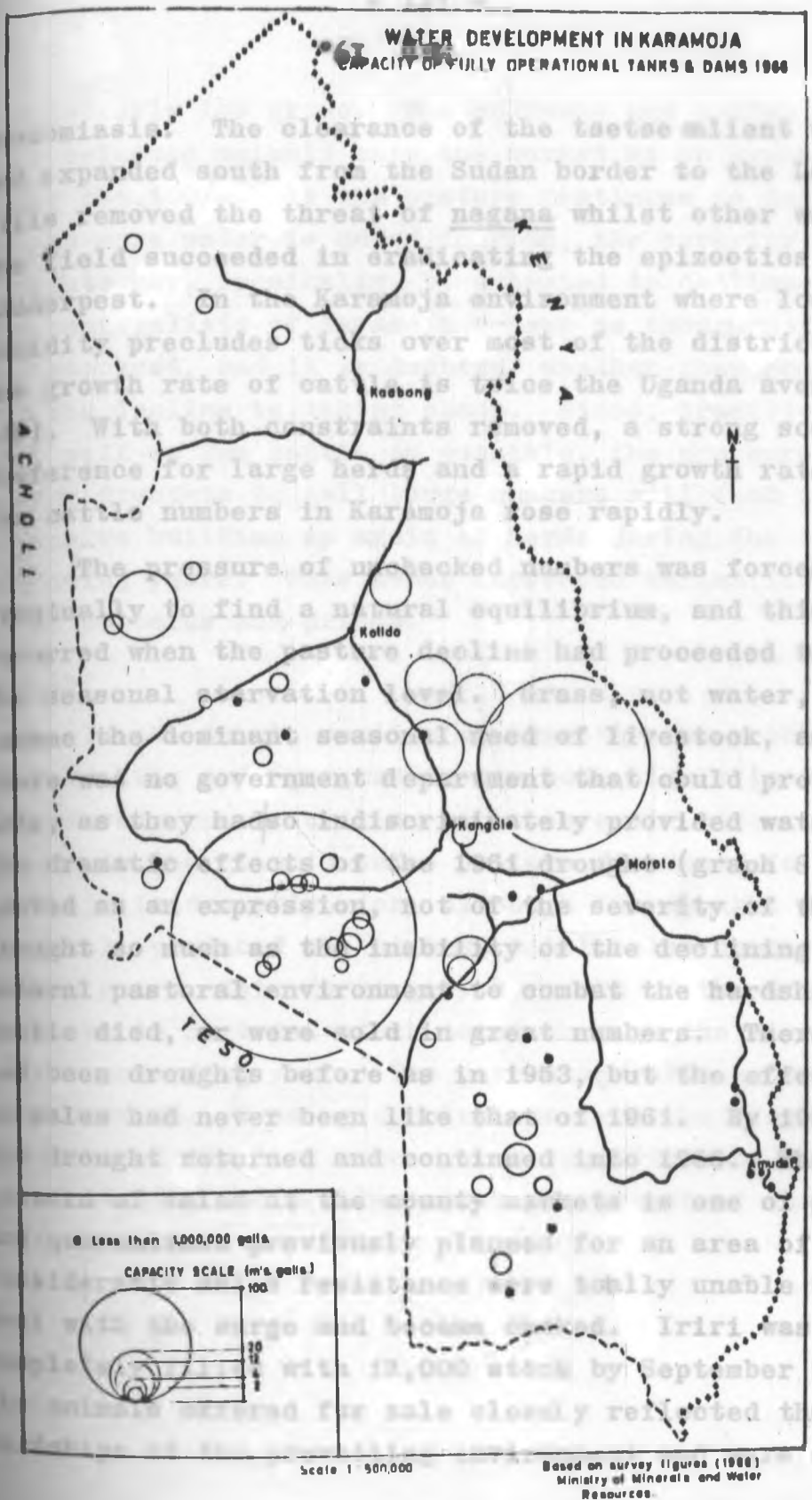
To the initial pressure on the homestead zone was added further pressure when two of the natural constraints on cattle numbers were removed. During and after the 1930's over 108 dams and tanks were built in Karamoja without any attempt at a parallel controlled grazing programme. These were designed originally to 'open up' the western plains and reduce the severity of the drought. To this end most of the dams and tanks (Map 18) were concentrated in an area along the Perennial zone of the western plains. The capacity of these dams and later,


WATER DEVELOPMENT IN KARAMOJA
DISTRIBUTION OF TANKS & DAMS JULY 1966
KENYA
ACHOLI
TESO
Kaabong
Kotido
Kangole
Moroto
Amudat
N
international frontier
Inter-District boundary
Dam lost or seriously damaged
Tank lost or seriously damaged
Dam satisfactory or in need of minor repairs
Tank satisfactory or in need of minor repairs
Scale 1 500,000
Based on 1966 survey by the Ministry of Minerals and Water Resources

Map 18.

tanks, exceeded any other water developments in Uganda, culminating in the 400,000,000 gallon dam near Lokiporangatome (Map 19). As the threat of drought was now removed many more animals were able to survive and cattle numbers grew rapidly. In the dry season increasing numbers of cattle concentrated around the dams, and soon signs of serious erosion became evident. Wilson (18) quotes the following example: 'Kalongelumuge and Lotere Dams: on the plains there has been a striking transformation to Lannea-Acacia Bushland, while on the adjacent Toror pediment a former Themeda-Hyparrhenia cover has been replaced by a Lannea-Dichrostachys-Acacia Bushland scrub with advanced sheet erosion'. It was not long before the perennial structure thinned out and annual grasses started to take over. When this happened, it no longer became possible to burn over the grasses and keep down bush encroachment through a fierce blaze. The loss of dry season grazing in areas where annual die-back encouraged wanderings further and further west into the perennials, water development kept up with this, and so did the decline of the grasses. Erosion was quickly added to the problems of pasture decline, for large areas of the land surface now lacked a vegetative cover during the dry and the early wet seasons. In the east, heavy overgrazing on the hills of eastern Upe took its toll, and gully erosion tore long red scars into the hillside and reduced the vegetation to a semi-arid assemblage.

At the same time as the water development was taking place, advances in veterinary science were reducing the enormous toll from rinderpest and tryp-


WATER DEVELOPMENT IN KARAMOJA
CAPACITY OF FULLY OPERATIONAL TANKS & DAMS 1966
ACHOLI
Kaabong
Kotido
Kangole
Moroto
Amudat
TESO
N
0 Less than 1,000,000 gallo
CAPACITY SCALE (m's gallo)
100
20
10
4
1
Scale 1 500,000
Based on survey figures (1966)
Ministry of Minerals and Water
Resources

Map 19.

anosomiasis. The clearance of the tsetse salient which had expanded south from the Sudan border to the Labwor hills removed the threat of nagana whilst other work in the field succeeded in eradicating the epizootics of rinderpest. In the Karamoja environment where low humidity precludes ticks over most of the district, the growth rate of cattle is twice the Uganda average (19). With both constraints removed, a strong social preference for large herds and a rapid growth rate, the cattle numbers in Karamoja rose rapidly.

The pressure of unchecked numbers was forced eventually to find a natural equilibrium, and this occurred when the pasture decline had proceeded to the seasonal starvation level. Grass, not water, now became the dominant seasonal need of livestock, and there was no government department that could provide this, as they had so indiscriminately provided water. The dramatic effects of the 1961 drought (graph 8) served as an expression, not of the severity of the drought so much as the inability of the declining natural pastoral environment to combat the hardship. Cattle died, or were sold in great numbers. There had been droughts before as in 1953, but the effect on sales had never been like that of 1961. By 1965, the drought returned and continued into 1966. The pattern of sales at the county markets is one of panic and quarantines previously planned for an area of considerable sales resistance were totally unable to deal with the surge and became choked. Iriri was completely filled with 12,000 stock by September 1965. The animals offered for sale closely reflected the hardships of the prevailing environment and were of a

particularly low grade. The enormous and sudden need to sell released animals onto the market at an average price under shs.100/-. As the pasture continues to decline, and as more water is added in Pian, the severity of droughts may, ironically, be expected to continue. The pastoralists of Karamoja behave as though nothing had happened, and it is doubtful whether they comprehend why the decline is taking place. Since, traditionally, they sell as few cattle as possible, the pressure during droughts to sell large numbers will lead to intensive building up again of herds during the following years. This means increased variability of sales patterns and prices.

Ankole:

In the Ankole section of zone 'A' the problems of overstocking and overgrazing are both highly localised and of very recent origin. An apparently strong resemblance to the climate-sales pattern discussed for Karamoja is deceptive for, although the drought of 1966 in Ankole produced the highest total sales numbers in thirty years, this is largely a result of the dramatic increase in District stock total through the migration in the preceding year. The percentage offtake remained just over 2%. Drawing conclusions from the district patterns of the last three years is difficult, for the following table illustrates the extent of changes in the period 1965/1966:

TABLE 13

NYABUSHOZI AND MITOMA COUNTIES : ANKOLE

Gomborora	Capacity	Cattle Population (April 1965)	Cattle Population (June 1966)
Sabawali N	12,000	34,571	35,606
Sabadu N	15,750	9,002	16,459
Musale N	8,470	550	6,237
Sabagabo N	12,280	7,068	15,163
Sabagabo M	7,000	3,304	7,363
Sabadu M	13,500	5,383	5,296

R. J. Johnson, Mbarara.

In the period of one year most of the north-eastern part of Ankole District has become either fully stocked or, as in the case of Sabawali, grossly overstocked. If one takes the District as a whole, a similar pattern of rapid change emerges, creating localised stress:

TABLE 14

STOCKING RATE : ANKOLE

County	Land Area in Sq. Miles	No. of Head 1958	No. of Head 1965	Density 1958	Density 1965	Acres per Head 1965
Kashari	401	28,389	34,200	70	85	7
Buhweju	348	7,311	6,100	21	18	35
*Igara	395	15,300	18,900	39	47	14
Bunyaruguru	393	NA				
Rwampara	608	49,760	52,600	82	87	7
Nyabushozi	1423	10,009	65,900	7	46	14
Isingiro	1017	8,419	18,200	8	17	35
*Shema	320	23,375	24,400	73	76	8
Kajara	355	74,255	71,700	109	201	3
Mitoma	668	8,915	16,500	13	25	32

*Shema and Igara are predominantly agricultural counties and

lie outside zone 'A'.

Although available acreage per head outside the county of Kajara appears to compare favourably with the figure quoted in Map 6 for this ecological zone it must be remembered that the stocking figures are calculated on total land area. Figures are not available for percentage pasture area by county, but for the District a figure of 55% is quoted (20). This, however, may not be generally applied as it is much greater in counties outside the main agricultural areas of the north west and the tsetse salient of the south. Areas such as Kashari and Rwampara are at, or as in the case of Kajara, in excess of the ecological carrying capacity at the present level of traditional management.

The sudden and considerable rise in stock population in some parts of Ankole is due to the return of emigrant Bahima, following tsetse clearance. Also in 1964 some 45,000 Bahima herders were repatriated by the Veterinary Department from Mawagola in western Masaka. In 1965 a further 10,000 cattle and their owners entered Nyabushozi during the Buganda disturbances. The total level of illegal movement is not known, but in all, movement into Nyabushozi county raised the census return from 65,900 head in 1965 to 99,000 head in 1966 (21). The optimum carrying capacity was quoted at 68,000 which is considerably less than the present stock population of the area. The situation of overstocking is still further accentuated by the fact that part of Nyabushozi is reserved for the large Ankole Ranching Scheme, which has only three thousand of the cattle.

Parallel to the problem of localised stock concentration, is the rapid colonisation by the blue

grass Cymbopogon afronardus. When in its early stages of growth this grass is some value to cattle, but once it achieves its tussocky form, it is useless. About 25% of Nyabushozi is under tete grass or Cymbopogon and this adds to the already considerable pressure on grazing. Where stocking is heavy and some tussocks of 'tete' exist, the cattle will naturally graze around the 'tete' selecting the better Brachyaria and Cynodon species which are also found. 'Tete' regenerates and spreads very rapidly and will colonise at the expense of the more succulent low grasses. If burning is added to a situation of heavy stocking, as it inevitably is in Ankole, the considerable fire tolerance and regenerative capacity of 'tete' assure its continued spread over the countryside at the expense of the low grasses.

From the evidence of a sub-county grazing survey (22) conducted in 1964, it appears that conditions in the pastoral areas of Ankole resemble the breakdown of shifting cultivation before a growing population pressure. The restrictions on the movement of stock from one county or miruka to another results in high stocking rates being maintained for considerable periods in some areas, at the expense of the pastures. The old response of 'moving on' is no longer possible. Although the better distributed rainfall may not accentuate pasture degeneration quite as markedly as in Karamoja, it is clear that the pressure on grazing is acute in some areas. The level of milk production and, therefore, human subsistence, from the cattle of Ankole may fall if the pasture resources decline, and this will encourage the keeping of larger herds to meet subsistence needs. In this way the problem could spiral.

Burning in Zone 'A'

The traditional pastoralists of zone 'A' all feature grass-burning as part of their yearly rhythm, to such an extent that the grasses of much of Ankole/Mawagola/Ruzhumbura and the western plains of Karamoja are a fire sub-climax form. The Themeda grasses of Ankole would possibly thin out considerably if the burning were stopped. Burning takes place along the western plains of Karamoja early in the dry season when the tall stands of Hyparrhenia are fired to produce a 'green flush'. Mature grasses have a high stem to leaf ratio, and it is the leaf which contains the proteins, carbohydrates and amino acids, and as tall grasses harden in the dry season they retain more cellulose than nitrogen. By encouraging the 'green flush' the availability of foodstuffs is increased. (23)

Burning helps to maintain the level of production in a period of hardship, whilst at the same time killing off ticks. Ticks pose a considerable threat of E.C.F. to the stock of Karamoja which have developed little or no inherent resistance to the disease. Similar principles are involved in the burning over of the Buruli/Bulemezi swamps. In Ankole burning is often later than in Karamoja and is designed to anticipate the 'grass rains' of August, and provide a quick flush as the end of the dry season. This keeps up the essential family milk supplies and provides a boost to the possibly declining stock condition after the dry period. Burning also has an important part to play in both Ankole and Karamoja in the control of bush. An early burn in Ankole causes the premature germination of Acacia, whilst a late and fierce burn along

the western plains of Karamoja is instrumental in the control of bush encroachment.

Burning is now beginning to have a major detrimental influence on production level. Although the practice is essential to the present pastoral rhythm in Karamoja, in Ankole the value is being rapidly lost. With the introduction of strict control on cattle movement even down to the miruka-miruka (24) level, the pastoralist has to remain on the area he has burned. The problem is often accentuated by conditions of general overstocking. Thus, in 1965, vast areas of Ankole's rolling hills were blackened during a period of extensive illegal burning. The grass rains were late and what little pasture remained had been burned. This deprived herders of any pasture for their stock, and consequently the condition of the animals rapidly declined. Entreaties by the Enganzi and the local government (25) to stop the burning failed to produce any response.

The present concentrated burning has led also to serious side effects on the grass structure apart from the encouragement given to tete mentioned earlier. A heavy burn followed by rain on the hillslopes has led to a problem of erosion, downwash and skeletal hillslope soils. An extreme view of the situation was expressed by the Ankole pasture agronomist who stated: 'burning leads to erosion and many hilltops have seen the last of their soil, especially in Kashari and Nyabushozi' (26). An Eragrostis and Loudetia regime becomes established on the hillslopes whilst on the lower valley slopes patches of bananas thrive indicating the accumulation of down-washed soil. Claims have also been made that a hot burn 'reduces the grass growth by 50% in the following year' (27). The problem of burning, seen

in connection with that of gross overstocking is beginning to influence sales, but more directly it is leading to a decreasing pasture area and nutritional plans for the district stock in parts of Ankole. In Karamoja, where burning also serves a useful purpose, the spread of annual grasses is reducing the severity and even possibility of a burn, and bush encroachment is becoming an increasing problem.

DISEASE, CATTLE MOVEMENT AND THE NEED FOR ISOLATION

The physical separation of the main consumer areas for beef and the main cattle surplus areas is inevitable at present. The returns from extensive beef production cannot compete with the higher returns from alternative agricultural activities in the Fertile Crescent, and so the large demand for beef must be satisfied by a transfer of cattle from elsewhere. It was seen in Section III that this movement is plagued by delays, losses and frustrations and that these three problems are particularly characteristic of Zone 'A'. Most of these characteristics may be attributed to the geography of bovine disease in Uganda and the necessity for stringent control. The control of the major epizootic diseases is made difficult by two main factors: the proximity of both Ankole and Karamoja to major regions of trypanosomiasis, or Pleuro-pneumonia and Rinderpest, and the necessity to move animals from these areas. The problem of disease is exaggerated also by movements which take place within the districts and threaten the trade cattle with infection and the marketing system with dosure. Some compromise must, therefore, be found between the threat of carrying disease to the developing cattle industry of the consumer area, and the present necessity for movement. The compromise is isolation and this accounts for the delays, losses and market

closures. In Karamoja, where animals have to be walked through eastern Teso to Soroti, veterinary regulations are most stringent. All animals must be held for the incubation period of the principal diseases after which they can be released. The problems of Rinderpest and Pleuro-pneumonia in Karamoja were outlined in Section II. These two diseases introduce the long and costly delays in the movement of cattle from the Karamoja markets to the consumer areas.

In Ankole, the principal 'trade' diseases are Foot and Mouth disease and East Coast Fever, with periodic troubles arising from Trypanosomiasis. Despite the availability of motor transport to move some animals directly from sale to slaughter, the marketing system in Ankole is still subject to delays through closure. Some areas were closed for over two years because of Foot and Mouth disease in the market areas (28) and this caused a disruption in the supply to Fort Portal and Masaka. Since much of Ankole's transfer trade in cattle is to south Buganda, the threat from Foot and Mouth must be taken very seriously in view of the Fresian, Guernsey and other exotic dairy cattle in that area. An illegal movement of animals from Ankole, through Mawagola and Bulemezi to Mukono must be regarded not in the light of the small number of animals involved but the threat they pose through the transmission of disease.

Movement by Bahima and their herds from season to season is strongly influential in bringing about market closures. The problems of containing and eradicating the disease in a form of pastoralism involving as much movement as that of the Bahima are very great.

Illegal cattle movements brought Foot and Mouth into Masaka and Kinoni closing the cattle trade of that area recently.

The problem of Trypanosomiasis is as great as that of Foot and Mouth disease. Herds of cattle may thrive in a fly area without any danger of infection until an animal with the trypanosome parasite is brought in from another area and the tsetse fly become disease carriers. In this way the movement of animals within the periphery of the fly belts is extremely dangerous and can cause widespread dispersal of the disease and heavy losses. Trekking by Bahima cattle has been the cause of infestation, or reinfestation of several areas of Ankole and during the period of a growing T.vivax threat in the early part of the 1950's, it was noted that 'There can be little doubt that the increase in T.vivax has been due largely to the widespread indiscriminate and illegal movement of cattle by Bahima herdsmen, who - despite the introduction of Local Government orders to control stock movement, remain a law unto themselves' (29). Not only does this type of disease transmission lead to a breakdown in marketing, but the infection of many square miles of pasture by tsetse fly carrying the parasite closes this land to cattle. In this way much of Ankole was reduced from pastoral production to almost empty bush in the late 1940's and early 1950's.

Sebei

As a footnote to movement, disease and trade in the area of Zone 'A', some mention should be made of the Sebei area. This area stretches around the northern

slopes of Mt. Elgon and falls away northward to the Karamoja plains. Constant raiding by the Karamojong, principally by the Pian, and the large illegal movement of cattle into Sebei from the Kenya side of Elgon brought Foot and Mouth disease into the area in 1966. The concealment of stolen cattle in the forest, and the later dispersal of the same animals all over the district to avoid police detection, led to a rapid spread of the disease and the complete breakdown of the Sebei marketing structure and with it a large part of the 'on-the-hoof' supply to Mbale township.

THE INFLUENCE OF SOCIAL FACTORS ON PRODUCTION AND SUPPLY

The pastoralist tribes of Uganda have societies centred strongly on their cattle, and the part played by cattle in the society and culture strongly influence the characteristics of production and supply. Though formerly pastoralist peoples such as the Iteso have adapted to a situation which favours cash and subsistence cropping, many of the pastoralist tribes still live in physical environments which are harsh and ~~still~~ demanding. Others, like the Bahima, have moved into areas such as Igara where cultivation is possible, yet they remain exclusively pastoralist. It is possible to recognise a conservatism in the behaviour of the pastoralists, though it is very necessary to avoid any form of cultural or physical determinism and to recognise the existence of change where circumstances are favourable.

It will help at the outset to establish the meaning of 'conservative' as the word is used here. Whilst the tribes of the pastoralist zone may appear notoriously slow to change, i.e. conservative, they are not reactionary i.e. set deliberately against change. The conservatism arises from an overriding need to assure subsistence in

a sometimes harsh environment. Such a way of life does not favour casual experimentation, and the reward for sudden change is often slow or sudden death. The herder who improves his pastures may well have them overgrazed by his neighbours during drought, the herder who builds up his stock of animals provides a ready attraction for raiders. The herder who depletes his herd for cash is likely, or was in Karamoja until recently, to starve during the frequent droughts.

The low offtake at the county markets derives from two principal factors: the need and desire to conserve numbers and, the lack of attraction provided by the cash economy. The pastoralist is anxious to keep stock numbers for reasons of subsistence, insurance against drought, prestige, wealth and bride 'price'. The frequently quoted arguments of prestige and wealth are all too often used alone to explain the large numbers of cattle per head in these districts and the indifference to money is used to explain the fact that these areas of potentially greatest surplus, have the smallest percentage marketed offtake. Against this, the argument of subsistence is rarely raised but is of considerably more significance. It is true that the pastoralist requires anything up to 100 head of cattle to exchange for a wife. It is also true that the pastoralist measures his esteem for the next man by the number of cattle he possesses, rather than any factor regarding the quality of his animals, but more important to the question of numbers is the pastoralist's need to ensure a supply of food for himself and his dependents. As cattle play the major role in the subsistence diet of these areas, it is natural that a philosophy of 'the more cattle you have, the safer you are' arises (30). For this reason, in order to have an insurance against poor years, the pastoralist

attempts to hold the maximum number of productive cattle and resists any inroads into the size of his herd. The situation is accentuated by the lack of penetration of a cash economy into these areas. It is even questionable whether, under the prevailing dietary structure of the pastoralist areas, there really is a large surplus of cattle: 'The 4/6 head of cattle per person in Dodoth kept by prosperous Dodoth provide for barely enough milk to supply the children during the dry season'. (31).

For a cash economy to be effective, and consequently for an effective number of cattle to be sold for money, there must be some attraction in obtaining money in the first place. In most of zone 'A', such an attraction is largely absent. Over most of Uganda people sell cattle to raise school fees. In Karamoja, Buruli and Ankole, the pastoralists have an attitude towards schooling which borders on hostility. Any Karamojong sending his son to school would require an assurance that the loss of a young herder would be rewarded in a way which he, the father, would regard as worthwhile, since he has to pay the school fees. The acquisition of a general literacy level and a knowledge of European history does not match these needs. Instead, the schoolboy loses his regard for his elders and his fund of pastoral skills gained through years of tending the family herds. Over the whole of Karamoja district there are but 83 primary schools with a total enrolment of only 9,000 (32). Many of the students, furthermore, originate not in Karamoja, but in Teso. There is really very little incentive to sell animals to raise school fees in the pastoralist areas and the nomadic and transhumant ways of life also make any form of

educational continuity difficult.

At present few items exist which the Pastoralist would wish to buy if he has to sacrifice an animal to purchase them, though this pattern is destined to change with increasing contact. Only taxes and foodstuffs in times of shortage generate a need for money. Added to this is the very low penetration level of retail outlets in Karamoja. Shops are restricted by law to the few settlements, and the Karamojong and related tribes traditionally regard townships as basically areas of ill repute.

The bringing of the worst animals and young bull calves to market has been used many times as an argument to illustrate an 'ignorance of modern concepts of cattle quality' among the pastoralists. More probably it reflects instead, the keen knowledge the pastoralist has regarding his own well-being, subsistence, survival and prestige. Instead of failing to understand quality, the pastoralist is attempting to conserve it. The best animals are retained in the herd to provide milk and good breeders. Young bulls are taken to the market as immatures because the Karamojong needs to concentrate on cows to provide milk. Bulls consume the same, or even more, grass in an environment of considerable scarcity and provide no recurrent supply of food in return. The pastoralists, despite their large numbers of cattle, rarely consume beef. Thus, the pastoralist is offering for sale his only real surplus, young bulls and unproductive females. There is more to this argument than simply large soft eyes, long horns and a fine coat, there is the question of staying alive. This desire to maximise the subsistence

productivity of the herd within the limits of traditional technology accounts for the unbalanced herd structure.

TABLE 15

District	Heifers/Cows	Bulls/Bullocks
Ankole	66.3%	15.3%
Karamoja	67.0%	17.2%
Uganda	55.1%	23.5%

Report on the Uganda Census of Agriculture (33)

It has already been mentioned (Sec.III) that the large difference between sales and offers in the pastoralist zone, is largely dependent upon social factors, but social factors may also be used to explain the price at which these cattle are offered. The need to conserve the herd numbers leads the seller to try and dispose of the minimum of animals at the maximum price. By obtaining the maximum price for each animal, there is a strong possibility that the herder will not have to sell so many cattle to meet his cash requirements. The marketing of cattle in the pastoralist areas reflects the 'target income' concept which accepts the fact that seller's have a set cash income requirement i.e. taxes and no more. Offering a higher price to a seller in these circumstances will tend to reduce rather than increase the number of cattle a pastoralist will sell. This gives rise to a backward sloping supply curve which is the reverse of a 'normal' economic response.

Social factors are influential not only in understanding the sales patterns but also over the patterns of production in the Pastoralist zone. The 'problem' of communal grazing does not become a problem until degradation of the grassland begins as it seems to have done in much of zone 'A' or until improvement

is attempted. The common rights over pasture land make the control of overgrazing impossible, whilst the lack of interest in cattle sales closes one safety valve to the pressure on grassland. There is no common mechanism for halting the process of down-grading which has been increasing recently, or improving what there is. There is no hope of selective breeding, pasture improvement, husbandry control, disease control or almost any other facet of modern production until communal grazing is either abolished or successfully mobilised into a vehicle for change. Communal grazing works directly against the pastoralist set on improving his animals and producing for a marketed surplus.

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6. Op.cit. Parsons p.6.
7. See also section on 'processing'.
8. Hutchison H.G. 'The Undeveloped Potential of Livestock' Ag. Development in Tanzania, I.P.A. Dar-es-Salaam 1965.

9. Mackintosh W.L.S. 'Some notes on the Abahima and the Cattle Industry of Ankole' Government Printer, p.8. 1938.

10. F.A.O. 'Problems of Enumerating Nomadic Cattle' seminar on Livestock Statistics, Kampala 1966.

11. Watson, J.M. 'The Karasuk Area', a letter to Veterinary H.Q. 1953 (on file).

12. Conditions in Karamoja are now far from optimal, and under the figure 4-8 accepts the possibility of supplementary pastures in the dry season. For the district without transhumance, the figure is probably over 10-14.

13. For detail on the Karamoja situation see Baker P.R. 'Environmental Influences on Cattle Marketing in Karamoja' Occ.paper No.5 Dept. of Geography, Makerere, 1967.

14. For greater detail see Wilson J. in Langdale-Brown I. et al "The Vegetation of Uganda" Govt. Printer, Entebbe 1964.

15. Ibid.

16. This is explained by the absence of people in the area when the inspection was made during the wet season.

17. Brasnett J. 'The Karasuk Problem' Uganda Journal volume 22 No.2 pp.113/122 1958 and Turpin E.A. 'The Occupation of the Turkwel River area by the Karamojong Tribe, 'Uganda.Journal' Volume 12 1948.

18. Op.cit. Wilson J. No.14.

19. F.A.O. Seminar on Livestock Statistics, Kampala 1966, Uganda Contribution.

20. Harrington, G. Pasture Agronomist, Veterinary Department, Mbarara, pers. comm. 1966.

21. Annual Reports of the Buganda Kingdom Veterinary Service 1965, Regional Veterinary Officer, Buganda 1966, and the annual census of stock returned by the District Veterinary Office, Mbarara, 1965 and 1966.

22. A Grazing Survey of two sub-counties of Ankole, produced by the Veterinary Office, Mbarara and existing only in manuscript in their files. (1 map).

23. Breedon, R.M. and Thornton D.D. 'Grazing Proposals for South Pian county (Karamoja),' cyclostyled for Veterinary Department, 1965.

24. A Miruka is the smallest administrative unit in Uganda.

25. A circular to all school teachers and organisations was sent out from the office of the Enganzi or Prime Minister of Ankole warning of the implications of burning. A local bye-law makes burning illegal and imposes severe penalties.

26. Harrington G. 'Grassland Farming in Ankole', District Veterinary Office, Mbarara, cyclo. 1966.

27. Ibid.

28. District Veterinary Officer, Ankole, pers. comm.1967.

29. Veterinary Department, Annual Report, Government Printers Entebbe, 1953. p.5.

30. Hutchison (op.cit No.12) suggests that this philosophy is scientifically unsound.

31. Thomas E.M. 'Warrior Herdsmen' 1961 p.7.

32. Ministry of Education, Planning Division, pers. comm. 1967.

33. Ministry of Agriculture and Cooperatives, Report on the Uganda Census of Agriculture, Govt. Printer 1966, Entebbe.

Chapter 10

ZONE 'B' : THE PASTORALIST-CULTIVATOR ZONE

In zone 'B' a high ratio of cattle to people is still a characteristic though the figure rarely rises over 250 cattle per 100 persons as it does in many parts of zone 'A'. From the point of view of the patterns of cattle production and supply, the most important feature of the zonal economy is the presence of cash crops. The principal cash crop, cotton, is a peasant enterprise grown on a large number of small-holdings in all parts of the zone. Cattle have a similar distribution to cotton in this economy, being widely dispersed among a large number of peasant holdings and not gathered in the great herds found in Karamoja and some parts of Ankole. The close juxta-position of cattle and crops would seem to augur well for the establishment of a mixed farming system especially as oxen are used so extensively for ploughing in Teso. The commercial outlook, revealed by the rapid acceptance of cotton from its original focus in Buganda suggests that the peasant might have a 'normal' commercial outlook towards his cattle. Both these ideals of integrated farming and a planned normal supply pattern at the cattle markets are, in fact, far from the realities of zne 'B'.

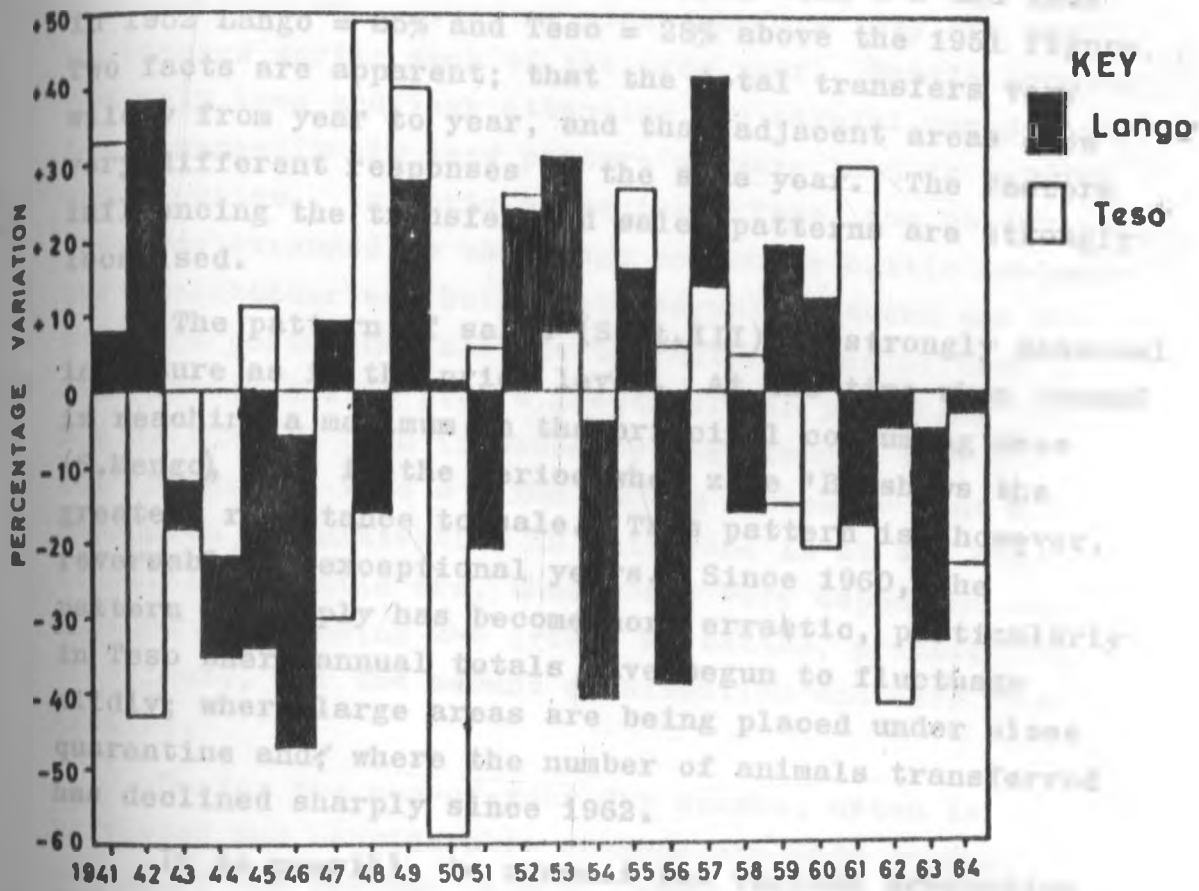
In much the same way as the farming pattern might indicate a planned commercial cattle economy, so the natural pastoral resources indicate a far higher level of production and quality surplus for market than is actually the case. The herd, particularly of Teso, is far better structured for beef than that reviewed under

zone 'A'. Bulls and bullocks from 33.9% of the Teso district herd and 31.8% of that of Lango. These percentages compare with a national average of 23.5 (1). The beef potential appears good. The cattle are raised on a broad area of Hyparrhenia savanna and swamp margin grasses which provide year round grazing and, with the lower grasses such as Cynodon, a reasonably high plane of nutrition. There is little shortage of surface water, for much of the zone near Lakes Kyoga, Bisina and Opeta has large expanses of seasonal swamp. Swamp is generally widespread throughout the zone except in Bugungu where the herders take their animals to Lake Albert. Marketing is effected through a widespread and well organised series of large markets at the county level.

Despite the seemingly generous nature of productive resources, the apparently favourable outlook of the peasant farmer and the adequate marketing network, the patterns of production and supply of slaughter cattle in zone 'B' are only marginally less variable, unsatisfactory and unreliable than those prevailing in zone 'A'. It is true that the overall percentage offtake at the county markets is twice that of zone 'A'. On the basis of a six year average the percentage for Teso is 7% and that for Lango 6% (2). These figures are still, however, low. The low figure reflects the extremely low rate of turnover per unit area and a maturing time roughly twice as long as it could be.

As important as the relatively small market throughput is the considerable seasonal and annual variability of sales, though resulting from different reasons from those prevailing in zone 'A'. Graph 10 illustrates one

PERCENTAGE ANNUAL VARIATION IN CATTLE TRANSFERS



Graph 10.

year's transfers as a percentage rise or fall above or below the transfers for the previous year. Line 0-0 indicates an idealised steady annual offtake from a well stocked area, i.e. an annual variation of 0% if one year's sales are compared with those of the previous year. All figures are measured from line 0-0 and thus in 1952 Lango = 25% and Teso = 28% above the 1951 figure. Two facts are apparent; that the total transfers vary wildly from year to year, and that adjacent areas show very different responses in the same year. The factors influencing the transfer and sales patterns are strongly localised.

The pattern of sales (Sect.III) is strongly seasonal in nature as is the price level. At the time when demand is reaching a maximum in the principal consuming area (S.Mengo), this is the period when zone 'B' shows the greatest resistance to sale. This pattern is, however, reversable in exceptional years. Since 1960, the pattern of supply has become more erratic, particularly in Teso where annual totals have begun to fluctuate wildly; where large areas are being placed under close quarantine and, where the number of animals transferred has declined sharply since 1962.

It is possible to connect the various production and supply trends quite closely with the cotton crop. Unlike the pastoralists of zone 'A', the peasant farmers of zone 'B' do not rely on cattle for subsistence and the cattle trade over most of zone 'B' can be explained by reference to the physical and human factors influencing cotton and the social and cultural values attached to cattle.

CLIMATE, COTTON AND CATTLE

i) Production: The cotton crop has assumed supreme importance in the agricultural life of Zone 'B'. Cattle, though present in large numbers, now occupy a very secondary position and must wait whilst the cotton plot is planted, weeded or picked before they are fed or watered during much of the crop year. Cattle receive not only less and less attention and careful management, but progressi v ely less pasture as more land is planted under cotton. In parts of southern Teso, the cotton crop has expanded to the stage now where cattle numbers per smallholder are being considerably reduced and the southern parts show all the characteristics of Zone C. Even though cattle play a great part in ploughing and 90% of land in Teso is opened by the plough, they are not integrated into a mixed farming system so that the expansion of cultivation in this zone is at the expense of cattle. Cattle are, therefore, very dependent on factors influencing the growth of cotton, principally on climate, for the amount of attention and care they receive.

During the end-of-year dry season, cotton is harvested and considerable demands are made on the labour of the peasant farmer. The daily needs of cattle during the cotton harvest are met by one of two management methods. If the peasant tends his animals himself it will be necessary to keep the animals kraaled until he has some free time. The animals are secured in a thorn kraal to protect them from predators from dusk to morning. Close confinement for long periods soon results in the grass being grazed completely from the kraal floor. There is no question of supplementation and so, during confinement the animals eat nothing. This

loss of grazing in kraals is common in many parts of Uganda and causes the loss of 8-10% of grazing time per day. In Teso, where the animals may remain secured until 11 a.m. in the harvest time, the losses rise to ¼ of the grazing time.

An alternative to owner-herding is the employment of paid herders. It is commonly accepted amongst farmers in this zone as well as in the Fertile Crescent that a herder, to be worthwhile, must come from the Western Region and be Hima/Tutsi in origin. Thisleads to the importation of mismanagement practices from zone 'A' and the introduction of practices which become ecologically maladjusted in the changed conditions of zone 'B'. The herders are needed particularly at the beginning of the dry season when the cotton harvest is not too far distant. At this time when cotton is making its heavy demands on the time of the smallholder, the problems of water and grazing increase and cattle need the most attention. The herder gathers together animals from several owners and takes them away to the margins of the seasonal swamps. Here the animals are kraaled.

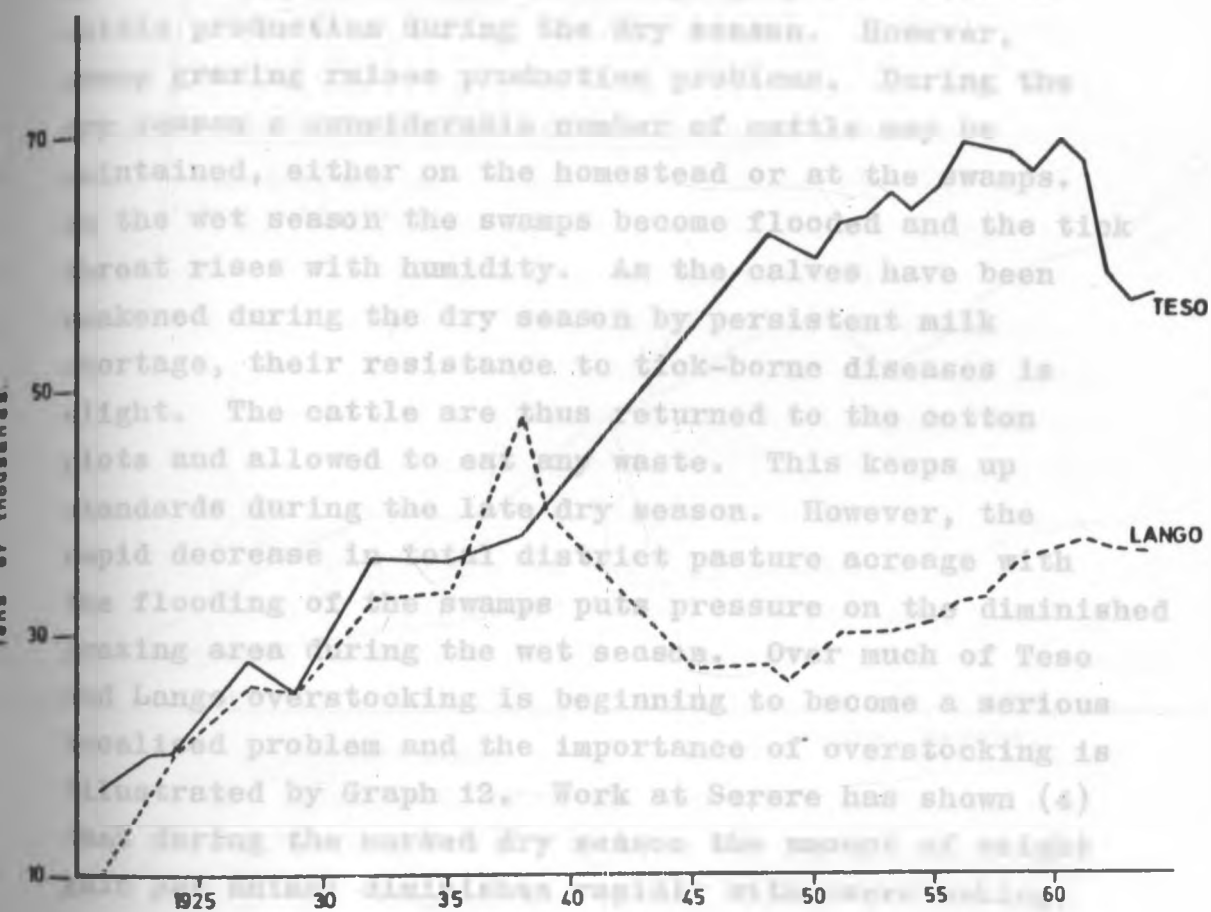
At the swamps the animals normally pick up a heavy load of internal parasites so that a 100% liver condemnation for fluke is not an uncommon result at Soroti slaughterhouse. The herders are paid 40/- per month plus the milk from the animals. They generally are excessive in their demands for milk and leave very little for the calves. Such a lowered plane of nutrition as that which results from too little milk, not only stunts the growth of calves and delays maturing time, but reduces the resistance of calves to East Coast Fever. Thus calf mortality is high and animals

develop slowly, reducing the productivity per grazing/ acre.

In zone 'B' production is affected in three ways by the herding together of animals and then moving them in search of grass or water. Movement around the northern shore of Lake Kyoga in Teso led to contact with and rapid dissemination of, Trypanosoma vivax. This form of 'nagana' led to the loss of many animals in the 1962/1963 period (graph 11) and contributed to a sharp downturn in the steady growth in the district herd. In 1963 contact with animals from the north east brought Pleuro-pneumonia into Teso and led to widespread quarantine restrictions after thirty years of 'clean' conditions. The origins of this contact are not in the widespread mixing of Teso and Karamoja animals because the tribal groups are not on friendly terms. However, it is not uncommon for herders from Karamoja to exchange two male animals for one Teso cow. The Teso people are less concerned about a female preponderance in their herds than obtaining cattle for dowry and wealth, and this encourages trade of this sort. Movement also lies behind the rapid spread of Foot and Mouth disease and contributed to losses and market closure in Moroto county of Lango during 1966.

The Bahima continue their practice of burning in the fire sub-climax Hyparrhenia grasses of Teso and Lango, and although this maintains the grass complex it has two serious side effects. In Amuria county of Teso an early burn, i.e. early in the dry season, leads to the widespread exposure of top soil to aeolian erosion during the period of the Turkana wind which whistles hot and dusty across Eastern Teso from the Karamoja plains.

THE GROWTH OF HERDS IN TESO AND LANGO

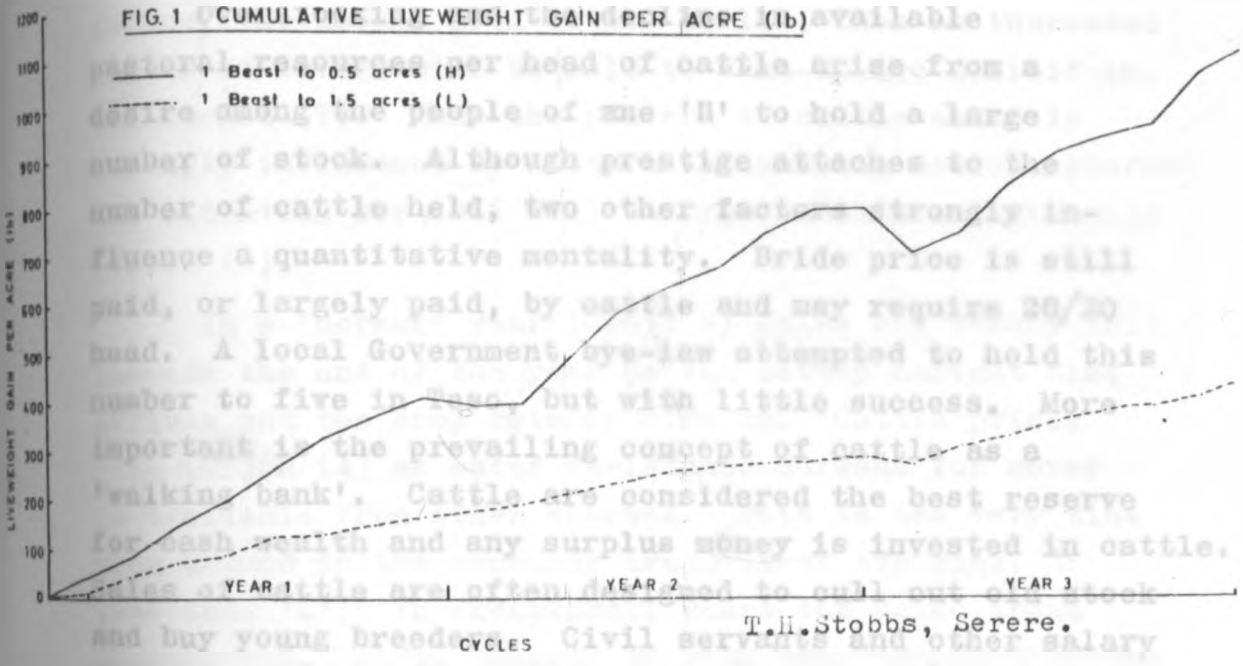


After F.A.O.

Graph 11.

In 1964/1965 this wind was reputed to have removed much of the top soil cover of eastern Amuria (3). Alternatively, a late burn exposes the soil to the ravages of water erosion at the onset of the wet season.

The swamps of zone 'B' and Lake Albert in Bugungu, have a large part to play in keeping up the level of cattle production during the dry season. However, swamp grazing raises production problems. During the dry season a considerable number of cattle may be maintained, either on the homestead or at the swamps. In the wet season the swamps become flooded and the tick threat rises with humidity. As the calves have been weakened during the dry season by persistent milk shortage, their resistance to tick-borne diseases is slight. The cattle are thus returned to the cotton plots and allowed to eat any waste. This keeps up standards during the late dry season. However, the rapid decrease in total district pasture acreage with the flooding of the swamps puts pressure on the diminished grazing area during the wet season. Over much of Teso and Lango overstocking is beginning to become a serious localised problem and the importance of overstocking is illustrated by Graph 12. Work at Serere has shown (4) that during the marked dry season the amount of weight gain per animal diminishes rapidly with overstocking. Actual weight loss may not become a feature unless overstocking is severe, but the productivity per unit pasture and the rate of growth of the cattle are considerably reduced. In 1952, it was said of Teso, 'The overall stock density is now 131 per square mile on available grazing .... any increase will lead to degradation ..... exports (transfers) must keep above 33,000 per annum if this is to be avoided.' (5). The



T.H.Stobbs, Serere.

Graph 12.

present stocking rate is now in excess of 200 per sq. mile in management methods and a transfer level nowhere near 33,000 head per annum. In Lango, the problem is less severe, but F.A.O. stated "it is now fully stocked". (7) Labwor with only one animal per 33 acres obviously faces no pressure on grazing, but Teso is falling below the minimum ecological stocking rate of 1:4 to 6 acres (Map 6).

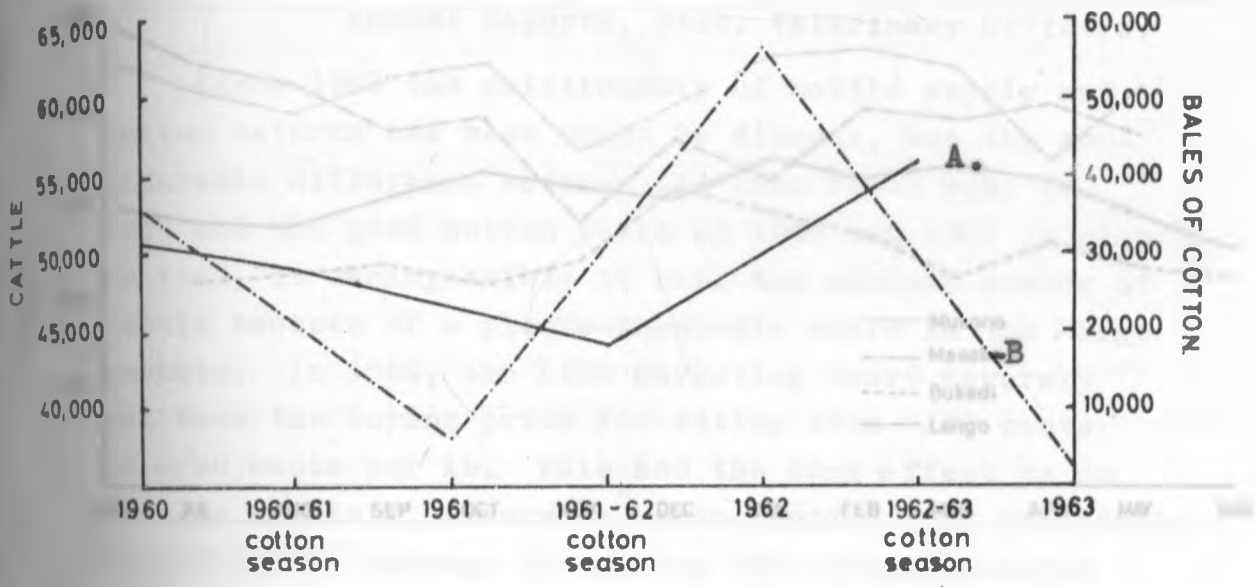
Overstocking and the decline in available pastoral resources per head of cattle arise from a desire among the people of zone 'B' to hold a large number of stock. Although prestige attaches to the number of cattle held, two other factors strongly influence a quantitative mentality. Bride price is still paid, or largely paid, by cattle and may require 20/30 head. A local Government bye-law attempted to hold this number to five in Teso, but with little success. More important is the prevailing concept of cattle as a 'walking bank'. Cattle are considered the best reserve for cash wealth and any surplus money is invested in cattle. Sales of cattle are often designed to cull out old stock and buy young breeders. Civil servants and other salary earners buy animals to keep on their smallholdings near town (see Map 1) and these animals may be sold in time of hardship or used in the acquisition of a wife.

ii) Supply: To understand the nature of the relationship between cotton and the supply patterns of marketed cattle in zone 'B' it is necessary to understand the nature of the prevailing cash economy. Zone 'B' is characterised by the 'target income' outlook mentioned in Zone 'A'. Such an outlook supposes the peasant farmer to have a known ceiling of cash wants and assumes he is not anxious to secure money over and above this amount.

The cash needs of the Zone B peasant farmer are met principally from his cotton crop (or fish in Bugungu), and the level of return from cotton strongly influences the number of cattle sold. Where the yield of cotton has been high, then the ceiling will be reached entirely or almost entirely from crop returns. If, for climatic reasons or because the Lint Marketing Board's price is low, the income from cotton is low, then an increased number of cattle will be sold to make up the deficit in the target (7). Thus the pattern of cattle sales is strongly influenced by factors influencing cotton returns. The situation for 1962 will enlarge on this relationship (Graph 13).

In a 'normal' year (Graph 5) sales and offers fall towards the end of the year as the cotton harvest time arrives and the crop returns come in. Cattle prices rise (Graph 14) as sales resistance hardens for money is available from other sources. This is the very time when demand in the consumer areas is at its peak. (see Zone 'C') In exceptional years the sales trend is reversed, as for example in 1962 when severe flooding was widespread in Teso and much of the cotton crop was either lost, stained or rotted. To improve the income situation a record number of cattle were taken for sale. Such was the rush and so low the price that many cattle (24,000) were traded without passing through the county markets, and transferred to Buganda. In all, 57,000 animals were transferred from Teso and 70,000 from the whole of Zone 'B' (Table 16).

THE IMPACT OF THE 1962 FLOODS ON COTTON PRODUCTION AND CATTLE SALES IN TESO.

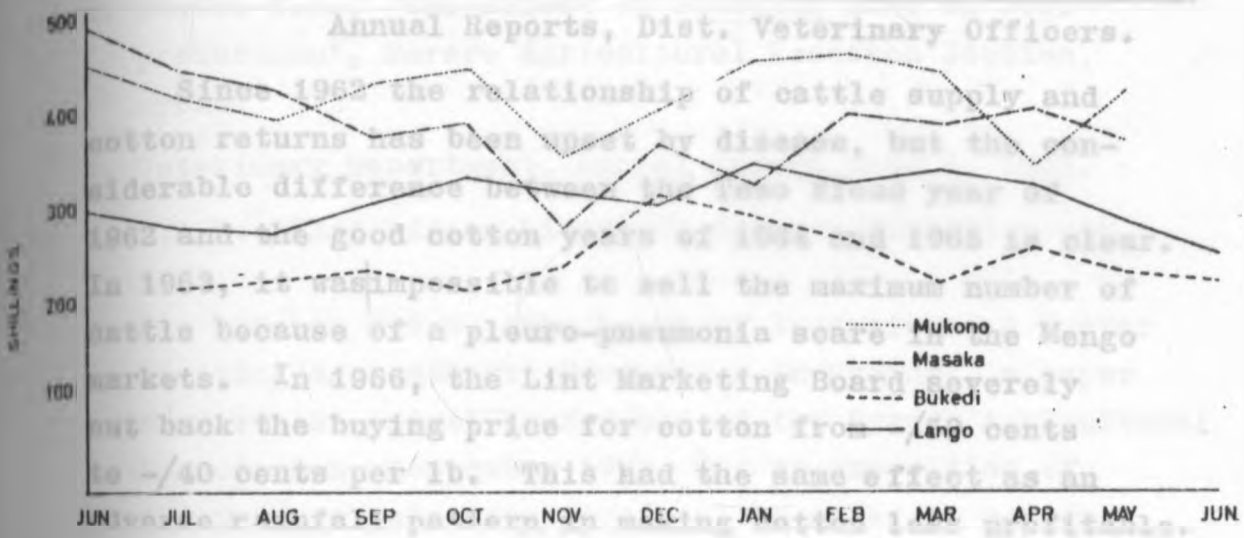


Agriculture and Veterinary depts.
Soroti

A: Cotton Production.
B: Cattle Sales.

Graph 13.

SEASONAL VARIATION IN CATTLE PRICES



Graph 14.

TABLE 16

Year	District Transfer Lango	District Transfer Teso
1961	9,764	38,655
1962	11,656	57,753 - N.B.
1963	11,122	33,396
1964	7,441	31,733
1965	7,184	24,407
1966	6,446	30,352

Annual Reports, Dist. Veterinary Officers.

Since 1962 the relationship of cattle supply and cotton returns has been upset by disease, but the considerable difference between the Teso flood year of 1962 and the good cotton years of 1964 and 1965 is clear. In 1963, it was impossible to sell the maximum number of cattle because of a pleuro-pneumonia scare in the Mengo markets. In 1966, the Lint Marketing Board severely cut back the buying price for cotton from -/59 cents to -/40 cents per lb. This had the same effect as an adverse rainfall pattern in making cotton less profitable. Expanding the acreage to make up the target required a lot of extra work, for cotton is a very demanding crop and as a consequence the number of cattle marketed rose sharply. Interestingly, therefore, a wet year in Teso may lead to a rise in cattle sales, whereas in Karamoja the opposite response would prevail.

1. Ministry of Agriculture and Co-operatives, 'Report on the Uganda Census of Agriculture', Government Printer, Entebbe, Table IX-4 p.68. 1967.

2. Veterinary Offices, Soroti and Lira, Annual Trade Reports annexed to the Annual District Veterinary reports.

3. Ward T. Arapai Agricultural College, Teso, personal communication 1967.

4. Stobbs T.H., 'The Effect of Stocking Rate on Beef production', Serere Agricultural Research Station, cyclo.

5. Veterinary Department, Annual Report page 7. 1952.

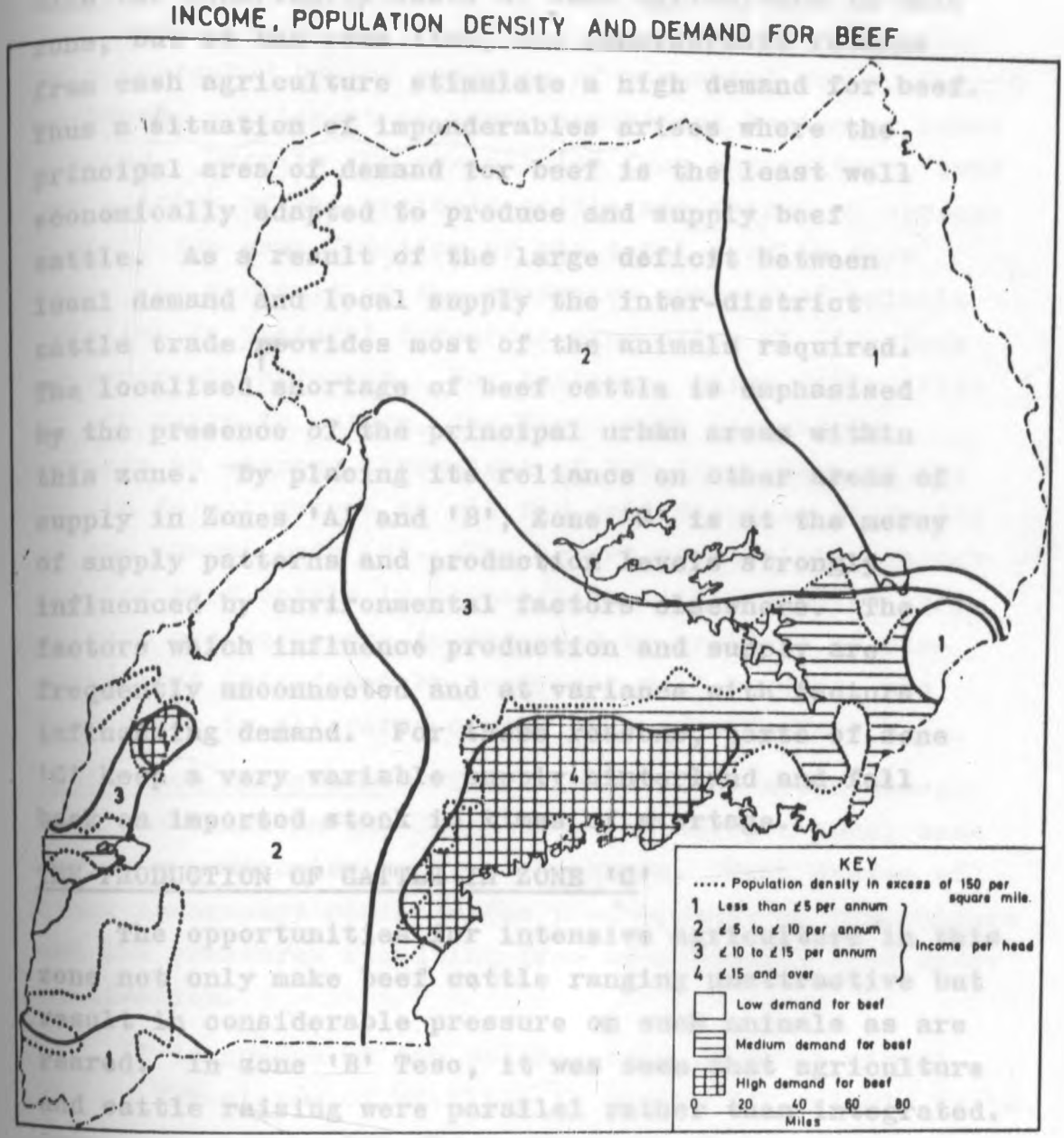
6. F.A.O. 'East Africa Livestock Survey' (draft) cyclo 1966.

7. See Belshaw D.G.R. 'The Level of Incentives; A Factor Limiting Agricutlural Production in Uganda', a paper read at the Annual Conference of the Uganda Agricultural Association, September 1963, for an exposition of the inverse relationship of cattle sales to cotton incomes.

Chapter 11.

THE CULTIVATOR STOCK-KEEPER ZONE

Zone 'C' extends eastward from Masaka in an arc forty miles or so wide around the northern shore of Lake Victoria. East of the Nile, the zone gradually widens to include most of south Busoga, Bukedi, Bugisu and the three southern counties of Teso. Smaller parts of the zone showing the characteristics defined in chapter 8 occur in the West Nile Highlands, the Fort Portal area and the thickly populated uplands of south Kigezi. The high and reliable rainfall over most of the area, has in company with the high population density resulted in an intensive system of cultivation. A history of contact with the outside world encouraged the growth of cash crops in a focus centred around the lake ports of South Buganda. The spread of a cash economy worked along the fertile belt around the northern lakeshore westward to Masaka and eastward towards Teso. The majority of zone 'C' now has an established cash crop economy based principally on cotton and coffee in the lakeshore area and Eastern Region, tobacco and coffee in West Nile, and tea around Fort Portal. The high returns from reliable cash agriculture have resulted in a high per capita income pattern over most of zone 'C' (Map 20) being highest in south Mengo and lessening, outward with the length of historic contact and proximity to former cash crop export points. The income level declines through Busoga towards the Eastern Region and reaches its lowest point in Zone 'C' in the geographically outlying parts of south Kigezi and the West Nile Highlands.


INCOME, POPULATION DENSITY AND DEMAND FOR BEEF
KEY
..... Population density in excess of 150 per square mile.
1 Less than £5 per annum
2 £5 to £10 per annum
3 £10 to £15 per annum
4 £15 and over
Income per head
Low demand for beef
Medium demand for beef
High demand for beef
0 20 40 60 80
Miles

Map 20.

Returns from raising beef cattle cannot compete with the opportunity costs of cash agriculture in this zone, but at the same time, the considerable returns from cash agriculture stimulate a high demand for beef. Thus a situation of imponderables arises where the principal area of demand for beef is the least well economically adapted to produce and supply beef cattle. As a result of the large deficit between local demand and local supply the inter-district cattle trade provides most of the animals required. The localised shortage of beef cattle is emphasised by the presence of the principal urban areas within this zone. By placing its reliance on other areas of supply in Zones 'A' and 'B', Zone 'C' is at the mercy of supply patterns and production levels strongly influenced by environmental factors elsewhere. The factors which influence production and supply are frequently unconnected and at variance with factors influencing demand. For these reasons, parts of zone 'C' keep a very variable supply hinterland and fall back on imported stock in times of shortage.

THE PRODUCTION OF CATTLE IN ZONE 'C'

The opportunities for intensive agriculture in this zone not only make beef cattle ranging unattractive but result in considerable pressure on such animals as are reared. In zone 'B' Teso, it was seen that agriculture and cattle raising were parallel rather than integrated. Over much of zone 'C' the problem is one not only of a lack of integration but rapidly increasing competition from cultivation resulting in the lowest level of production in Uganda/, a strange irony in this fertile belt.

Available grazing is limited very considerably by the large and expanding area under cultivation. Locally the general level of pressure on pastoral resources may be accentuated by the presence of permanent swamp, forest reserves, settlement or areas containing bovine or human disease. Despite the competition from agriculture, over one quarter of the nation's cattle are raised on approximately the same fraction of the total area in this Zone. As a result of the excessive numbers of animals relative to pastoral resources production of livestock is adversely affected. For instance, after taking five or six years to mature, the Nkedi Zebu (1) rarely exceeds an average liveweight of 500 lbs. Many of the cattle do not mature at all for calf diseases claim 25% of the annual crop (2). The severe constraints against raising beef cattle in competition with intensive agriculture are once more accentuated by problems of mismanagement introduced by immigrant paid herders, who are common in all parts of the Zone outside West Nile.

Systems of Management: Three patterns of stock management are found in the Cultivator-StockKeeper zone, each having a particular regional emphasis. Each system of stock management reflects the predominance of agriculture and the pressures resulting from an expanding area under cultivation.

1) It is common in the upland areas of south Kigezi and on the slopes of Mt.Elgon in Bugisu for animals to be tethered on the homestead for most of the day. By tethering to a post or tree, the animal may be held on the farmstead without endangering the crops of either the holder or his neighbour. Grazing is extremely poor in the eroded area near the homestead and so cattle are tethered on the plot margins and the amount of grazing

is limited by the length of the thong. By using this system an extremely high stocking rate to available pasture of nearly 1 head per acre is achieved in Bugisu(3). However, it is common and often necessary for some form of crude supplementary feeding to be provided from crop remnants if this rate is to be maintained. In Kigezi potato tops, plantain stems, which also contain much moisture, sorgum cuttings and elephant grass are added to the diet of the cattle. The tethering system has never matured into anything but "parallel farming" and the vitally needed integration of cattle, crops and pasture is inevitably absent. Even the casual grazing of old cotton fields, noted earlier in Teso, is missing over much of zone 'C', for so many of the crops are perennials or tree crops such as plantains, coffee, tea and cassava. More commonly, the animal spends its life tethered, and wanders only when it is taken to water, or is allowed under careful supervision to graze field boundaries. In the Elgon area the tethering system operates under particularly acute pressures and the Veterinary Department, in 1951, noted "gross overstocking by stunted and unproductive animals' (4), as the most common form of livestock management. The naturally poor standard of livestock resulting from this system of management is acutely worsened by a continuance of the dowry system. The already limited grazing on Elgon is put under even greater pressure by a desire to keep excessively large numbers of unproductive cattle to be exchanged later as bride-price. These cattle compete for grazing with others which may find their way into trade, and this contributes to the very low standard of marketed livestock in the area.

ii) A second system, this time common to much of the 'Fertile Crescent' is the 'Common Herding' of animals by migrant Hima or Banyarwanda pastoralists. This system is by no means confined to this zone but the effects of it are heightened by the severely limited nature of the grazing. Each day the animals are gathered from their respective owners by the paid herder and put together into a herd. They are then taken to any patch of available grass whether along the roadside, on one of the lateritic hilltops or along the margins of some valley swamp. In lakeside Buganda and Busoga the practice of common herding is particularly widespread and the pattern of events in that area may be examined as typical. The male Muganda/Musoga traditionally does not share the sentimental attachment to cattle which is common amongst many other tribes. Peasants in this intensive cash crop area require the income from crops to send their children to school and hire herders to do the work of the small boys in guarding cattle. The system of 'Common Herding' in zone 'C' differs from that noted earlier in Teso and Lango, for in the zone 'C' area of Buganda, only nine percent of farmers made any claim to rights over the very poor and very limited pasture land, in contrast with Teso-where 51% claimed such rights (5). The pattern of grazing in Buganda/Busoga (within zone C) has become one of random foraging rather than organised herding on communal grazing areas. Only in Bukedi, where the pressures from cultivation are less and a more pastoral tradition prevails amongst some of the Nilotic peoples, does the percentage of farmers claiming grazing rights rise to thirty. The presence of

'Mailo' or individual land rights in Buganda has little impact on cattle raising. Grazing is still predominantly communal. Clearly this is not so where exotic or cross-bred animals are raised on the smallholding or on improved pastures.

The Common Herding of cattle involves the loss of much grazing time. Time is spent on gathering, walking and distributing stock. Altogether, the grazing time extends between ten a.m. and five p.m. The long periods when cattle are unable to graze accounts for possibly 8-16% of the optimal grazing time (6). Much of this lost time is spent in walking to or from the owner's farmstead. This loss of grazing time has to be considered in the light of the poor pasture available during the eating hours. It is understandable that a small size, slow maturing rate and generally very poor condition, typify the cattle of the lakeshore. The standard of the livestock is obvious to the casual traveller through Buganda who soon becomes acquainted with the miserably thin, small animals grazing the roadside under the 'care' of a Muhima herder.

Mis-management by the employed herder adds to the pastoral problems inherent in the zone 'C' pastoral environment. Many of the management practices are naturally bad, but some have become dangerous only in being practised in a different ecology and under completely different environmental conditions. It was noted that in Teso, milk was added to the monthly salary of the paid herder as a concession to his traditional diet. The 'milk money' system is common also in zne 'C', only here it reduces the already low level of calf nutrition to danger point. The milk yield of the unimproved 'Nganda' cow is very low and calves require a high plane of

nutrition if they are to fight the tick menace which thrives in the high humidity conditions of this area'C'. The herders are more than generous to themselves in allocating milk and, if possible sell any surplus in the local countryside where there is a high demand. This leaves the calves weak and many never survive an otherwise debilitating attack of East Coast Fever. Survivors are left weak, stunted and susceptible to a whole range of other infections.

To the mismanagement of the pastoral environment must be added the problem of burning. Herders feel an almost ritual obligation to burn over pastures even when this is not necessary. A widespread burn will leave a situation of considerable shortage of grass in an area of already severely limited pastures.

A variant of the 'Common Herder' system prevails in Kigezi. It is very difficult for the smallholder in the patchwork hills of south Kigezi to maintain his cattle on his farmstead all year. It is then the practice for farmers from several holdings to gather together and herd their animals communally on any available piece of grass near a river, on a football field etc. Each member shares herding duties for one week and reaps the benefit for the remaining time. By using this system the cattle may be taken to some swamp margin or grazed on the valuable Pennisetum clandestinum occurring on the margins of smallholdings. The communal herding system also relieves the owner of the tedious and time consuming task of trekking down the hillslope to water the animals every day.

In West Nile in areas such as Maracha where the pressures from population and cultivation are intense and less than 2 acres of grazing is available to each

animal, it is common for several cattle to be put together into a herd and taken into the Congo to graze. Some animals are also sent to lower areas east towards the Nile.

iii) A third system of herding: 'Transfer Herding', is becoming increasingly common. This practice involves the movement of cattle on a more long term basis than the daily treks of 'Common Herding'. Where the pressure on pastoral resources is great, as for instance in the area around Kampala, cattle owners may transfer their animals from the area of pressure to some adjacent part of Zone 'A'. The stock will be entrusted to the care of a relative or paid herder. The practice was first recorded in 1952 (7) when over 1,000 animals were moved north from the vicinity of Kampala to north Bulemezi, though it may in fact be older. To some extent a transfer of animals is occurring to areas of less pressure as part of a general outward movement towards the peripheries of the Fertile Crescent. But this involves both herder and cattle. In Masaka it is becoming increasingly common for animals to be taken westward and put under the care of Muhima in Mawagola. This eases the pressure on natural grasses in the coffee belt. On a smaller scale, in Bugisu, animals are now being sent over Elgon to the neighbouring forests of Elgon in Kenya where they are ranged for 1/- per month (8).

Although grass is rapidly assuming the place of a major production constraint over most of zone 'C', the problem of water shortage can be acute in localised cases. Over most of the zone, rainfall is high and reliable, but surface water may not always be easily accessible. In Kigezi, the extremely accidented nature of the terrain

necessitates long and frequent walks to water as mentioned earlier. The adverse effect of the daily walk has been accentuated recently by the obstruction of pathways as a result of expanding cultivation (9). The inalienable rights of the holder of planted land require that cattle be kept well away from standing crops. Thus, long and circuitous deviations are common. In Bukedi and south Busoga the problem of seasonal water shortage can arise in exceptional years and in 1965 the District Veterinary Offices at Bukedi, Bugisu and Busoga mentioned the problem of water as 'serious'. In Busoga the unusually small number of watering points became rapidly infected with parasites in 1965 and carcase condemnation was heavy at Jinja.

SUPPLY

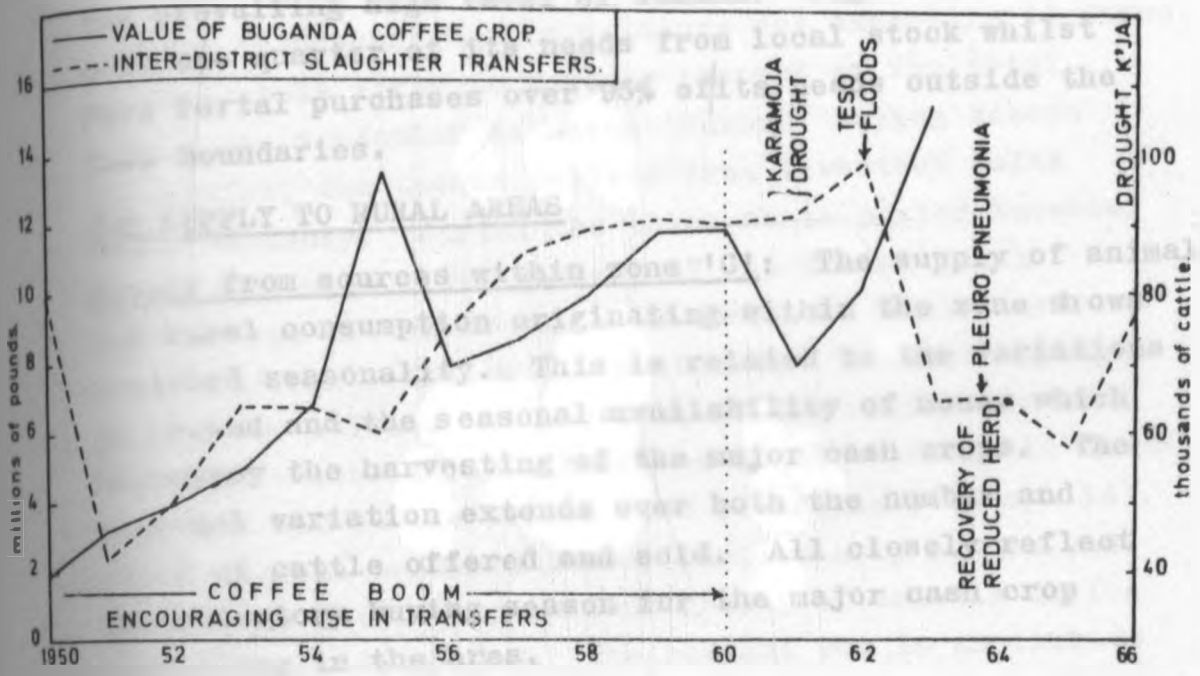
The supply of beef to zone 'C' consists principally in inter-district and international movements of stock. Nearly 90% of the total inter-district movements of cattle in Uganda every year are destined for consumption in the Cultivator/Stock keeper zone though the urban and rural areas of zone 'C' draw on distinct geographical areas for their sources of supply. (Section III).

Over most of south Buganda, south Busoga, and Bukedi, the demand for beef has been shown to be strongly income elastic. This means that a rise in income is mirrored to some degree by a rise in demand for beef. Enquiries in the field suggest that people throughout Uganda will buy more beef if more money is available. Against this relationship must be measured local taboos, but although these are commonly harboured against pigs and poultry, taboos against beef are less common.

Thus over most of Uganda, and particularly over zone 'C', the demand for beef will be reflected in the level of income. In evidence of this is the fact that during four years of the coffee boom of the early 1950's, the transfer of cattle for consumption in the coffee belt (graph 15) rose rapidly. This was despite a 300% price increase for beef in four years of the boom. It was noted at the outset of the boom that: 'the average price of cattle is double that of six years ago .... the great demand for meat is without a doubt, associated with the general affluence of the African population following a general rise in the prices obtainable for cash crops' (10).

A crude estimate of the level of demand for beef may thus be made by mapping the income level and for this purpose the map by O'Connor (11) has been used. (Map 20) The volume of demand may be, again crudely, estimated by the density of human population within the given income groups. A demand distribution map for beef may thu be roughly delimited for Uganda (Map 20).

In the South Mengo coffee belt income is higher than elsewhere in Uganda and population density exceeds 300 persons per square mile over most of the area. As a consequence demand, and as seen in Section III, price for beef cattle is highest over this belt. The high prices and local shortages generate the inter-district trade from Teso and Lango. East of the Nile, population density remains high but income falls and with it price, and for this reason the zone 'B' traders by-pass Busoga. Where income falls still further as in south Kigezi, traders from Ruzhumbura trek their animals east to Masaka and north to Fort Portal where a higher income and better price prevail rather than to the south of their own district. The


VALUE OF BUGANDA COFFEE CROP
INTER-DISTRICT SLAUGHTER TRANSFERS.
millions of pounds
thousands of cattle
KARAMOJA DROUGHT
TESO FLOODS
DROUGHT, K'JA
RECOVERY OF REDUCED HERD
PLEURO PNEUMONIA
COFFEE BOOM
ENCOURAGING RISE IN TRANSFERS
0
2
4
6
8
10
12
14
16
40
60
80
100
1950
52
54
56
58
60
62
64
66

Graph 15.

Mengo is explained by the income and population density levels.

Many of the higher income areas have now come to depend very heavily upon transferred stock to satisfy the prevailing high level of demand. Buganda now meets only one quarter of its needs from local stock whilst Fort Portal purchases over 95% of its needs outside the Toro boundaries.

THE SUPPLY TO RURAL AREAS

Supply from sources within zone 'C': The supply of animals for rural consumption originating within the zone shows a marked seasonality. This is related to the variations in demand and the seasonal availability of money which accompany the harvesting of the major cash crops. The seasonal variation extends over both the number and price of cattle offered and sold. All closely reflect the statutory buying season for the major cash crop prevailing in the area.

In South Buganda local cattle supplies are dominated by the buying season for robusta coffee (12). This is illustrated by the sales recorded in 1962/63.

TABLE 17

1963

INCOME DERIVED FROM:

PERIOD	COFFEE		LIVESTOCK	
	Shs.	%	Shs.	%
Aug/Sept.	33.7	10.6	.7	4
Sept/Oct.	4.1	1.4	.5	3.2
Oct/Nov.	13.1	4.1	3.5	21.1
Nov/Dec				

also coincides with the Christmas festivities in the area

Table 17 (cont'd)

from: The Patterns of Income and Expenditure of Coffee Growers in Buganda 1962/1963. Ministry of Planning and Economic Development, Kampala, appx.VI (i) 1967.

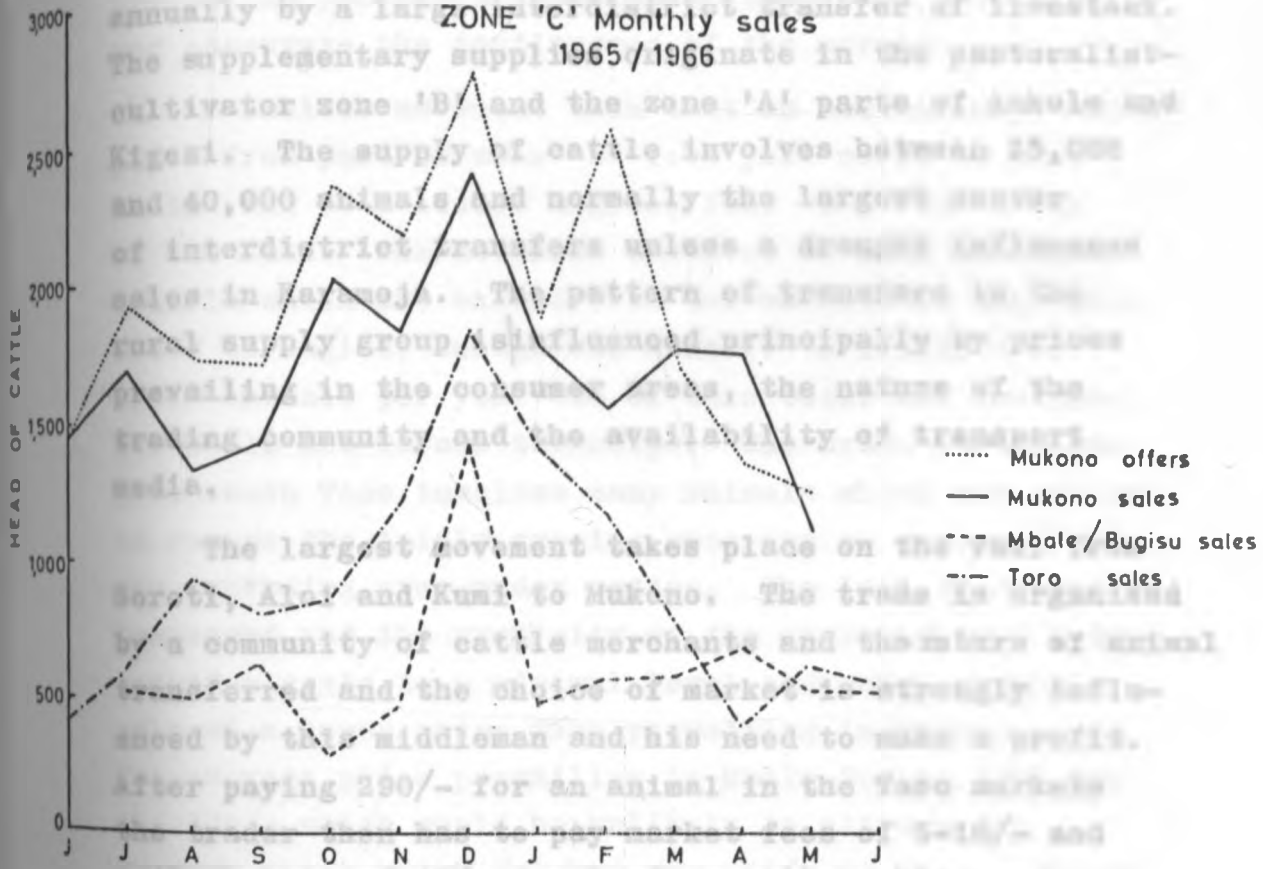
The table records the income of those coffee growers in Buganda having holdings not exceeding 1½ acres, approximately fifty to seventy percent of the total. During the September to March 'Mukono' buying season for coffee, the income derived from livestock sales rises suddenly. During the three month period November to January over sixty percent of the annual total income from livestock sales is accrued. A smaller rise in April/June reflects the western or 'Masaka' buying season for coffee. At the time of the coffee harvest there is a considerable increase in the expressable demand for beef and cattle prices rise accordingly (Graph 14). The itinerant butchers become particularly active and attempt to obtain the maximum number of animals during this high price period. The peasant who is anxious to spend his coffee money on a brief period of luxury is also anxious to ensure the maximum return from the sale of his livestock knowing that the highest prices are prevailing. This contrasts with the 'target income' outlook of zone 'B'. If demand for beef is high, why then do the coffee farmers sell their cattle? The answer is a ~~question~~ matter of scale for consumption of animals on the smallholding is rare as a whole carcase is an excessively large quantity of beef for one family to consume unless some celebration is in progress. Storage of meat in the heat and humidity prevailing is impossible, though some may be smoked. Thus peasants depend on butchers for their meat requirements. The coffee season also coincides with the Christmas festivities in the area

of the 'Mukono' coffee buying ~~area~~ zone east of Masaka and this accentuates the rise in demand. With such a great demand and such a limited local supply, relatively few cattle offered for sale are ever refused (Graph 4).

In other parts of Zone 'C' demand and crop returns may be related. In Bukedi (graph 5) the relationship of cotton and cattle contrasts with that seen in Teso and Lango. In Bukedi the income level and demand for beef are higher so that during the cotton season the demand for cattle within the district is high. A more 'normal' attitude towards stock sales exists amongst the people of the district than that prevailing in zone 'B' and both sales and offers rise during the cotton season (graph 5). This contrasts directly with Lango.

In the Mbale and Toro rural environs, seasonal variations in sales are also marked (Graph 16). In Bugisu a strong rise occurs around the coffee and cotton buying periods. In Toro the rise is sudden and sharp at Christmas, and the sales trend may be explained by the diversity of crops in that area so that one crop season does not dominate the income pattern. Instead the sudden rise reflects the expenditure on large festivities over the Christmas period, and higher prices obtaining for meat at that time of year (Sect.III)

Throughout the zone, heavy pressure on local supplies is characteristic. The competition to buy the few animals offered is intense and is reflected in the relatively small number of animals remaining unpurchased at the markets. It is quite common in areas such as Ankole, (Zone 'A') for eighty percent of the animals offered to remain unsold. In Busoga the figure


ZONE 'C' Monthly sales
1965 / 1966
HEAD OF CATTLE
3000
2500
2000
1500
1000
500
0
J J A S O N D J F M A M J
Mukono offers
Mukono sales
Mbale / Bugisu sales
Toro sales

Graph 16.

drops to 43.9, in Kigezi to 50 and in Toro where the rural market is rather isolated from alternative sources, only 36% remain unsold.

Rural Supplies transferred from other Zones.

The inadequate supplies to rural areas of slaughter stock originating within zone 'C' are supplemented annually by a large interdistrict transfer of livestock. The supplementary supplies originate in the pastoralist-cultivator zone 'B' and the zone 'A' parts of Ankole and Kigezi. The supply of cattle involves between 25,000 and 40,000 animals and normally the largest sector of interdistrict transfers unless a drought influences sales in Karamoja. The pattern of transfers in the rural supply group is influenced principally by prices prevailing in the consumer areas, the nature of the trading community and the availability of transport media.

The largest movement takes place on the rail from Soroti, Aloi and Kumi to Mukono. The trade is organised by a community of cattle merchants and the nature of animal transferred and the choice of market is strongly influenced by this middleman and his need to make a profit. After paying 290/- for an animal in the Teso markets the trader then has to pay market fees of 5-10/- and rail charges of 15/- per head as well as his own return fare on the railway, expenses at the consumer market, sale fees, possible losses through injury or death of animals in transit, possible condemnation, and still make a working profit. The average price prevailing in Busoga at shs.291/- is not able to cover all the requirements! Thus the trade concentrates on the highest income rural area of south Mengo where prices of

over 450/- are common at Mukono. The trader could be in a difficult position here and his prices forced down because it is economically impossible to take unsold animals back to Teso and animals which remain unsold for a day or two rapidly lose condition on the almost non-existent grazing at Mukono. Nevertheless, the shortage of beef cattle in south Mengo and the high income prevailing prevent a lowering of the price obtaining and encourage the continuance of the movement.

A smaller movement than that on the railway, takes place from part of zone 'B' Teso just north of Lake Bisina and to a lesser degree, Zone 'C', Teso south of the Lake. The movement involves as many as 13,000 animals which are walked from the markets to the rural areas of Bugisu, Busoga and Bukedi. A little over 1,000 animals per year out of this total are destined for Mbale and Tororo townships. The trade southwards from south Teso involves many animals which are culled to reduce the rapidly growing pressure on pastures from the expanding area under cotton. The lack of organised transport and the proximity of the consumer area reduce transfer costs to a minimal level and makes possible sale at a lower price than prevailing in Mukono. The average price prevailing in Mbale-Bugisu 1965 was shs.264/- which would be unlikely to attract the average stock which fetched shs.291/- in Teso. Poorer stock thus often feature in the trade, and most of the business is conducted by smaller traders buying the 'leftovers'. However, the very small size of Bugisu animals influences the small market price and when bigger animals from Teso are offered they naturally command a premium.

The attraction of higher prices in Masaka Division and Toro stimulates a trade in cattle from

the Hima areas of Ankole and north Kigezi. The trade to Toro is centred largely around the market at Kamwenge in north Ankole where animals are trucked to Saaka near Fort Portal, slaughtered and the meat redistributed to the rural area. It is impossible to bring trade animals into the higher income rural areas because of the threat of Trypanosomiasis in Toro.

The trade to Masaka originates in both Ankole and north Kigezi. Some animals are taken by traders and sold along the income gradient towards Masaka, often several times before being finally slaughtered. Other animals are taken by the larger wholesale butchers in Masaka and the meat redistributed to the rural area for consumption. It is not possible to define the proportion of urban slaughters being consumed outside the townships.

A small and intermittent movement sometimes occurs between the Hima ranges of northern Mawagola and the Mubende division of Buganda. These cattle are offered for sale at the local markets and produced the deceptively high 7.2% district marketed offtake in 1965. As with Mukono, this figure is grossly distorted by the sale of animals originating outside the zonal economy.

In West Nile the level of income and the prevailing social habits as yet do not stimulate an in-movement of slaughter stock. The Sudanic peoples, in common with many of the northern tribes of Uganda, rarely eat beef. Unlike parts of Toro or Buganda where beef is part of the weekly diet, over most of West Nile it is uncommon for beef to appear more than twice yearly in the family food pattern (13). With the growing number of returning migrant workers from the sugar estates and towns of south Buganda and Busoga, new dietary habits are being adopted and already, a shortage of meat is becoming a

feature of the area near Arua.

THE ORIGINS OF RECENT CHANGES IN THE PATTERN OF TRANSFERS TO THE RURAL AREAS OF SOUTH MENGO AND SOUTH BUSOGA.

Before 1960, the traders of Teso and Lango brought their animals south by rail and water to a series of resale markets in north and south Mengo, Bugerere and Busoga. Cattle were loaded at Kelle or Bugondo ports in Teso or Namasale in Lango and transported to Lwampanga in Buruli or Namasagali on the Nile (Busoga). On landing, they were either sold to butchers from the more populous areas to the south at resale markets such as Nakasongola, or were walked southwards by the traders to the higher price areas of Kyaggwe and south Busoga. Other animals, often of a better quality, were loaded at the Soroti railhead and transferred to Mukono. From Mukono they were sold live and taken on the hoof to the farms of the rural butchers to be grazed until slaughtered. A large number of animals could be bought in this way if capital was available, as maintainance costs were very slight. Animals were also taken from Mukono for resale in small markets in Mengo and Bugerere.

This pattern has now changed as a result of the closure of lake services on Kyoga and problems arising from disease. The Lake Kyoga and River Nile traffic in livestock is suspended, there is no longer any distribution of live animals from Mukono, the small resale markets of Mengo and Bugerere have collapsed and the sale of Teso and Lango stock in Buganda is now confined to Kyetume market, Mukono. The total volume of transfers from zone 'B' (Cult./Past) has fallen very considerably.

In 1961, as a result of the heavy rains, extensive flooding submerged the port installations at Namasagali, Bugondo etc., and the lake traffic to Busoga ceased. This resulted in many minor traders being unable to transfer small numbers of animals cheaply to the Busoga market. It became necessary to transport the cattle by rail, for which more than seventeen animals are needed to gain preferential rail rates. Also, the long walk from southern Teso/Lango to the nearest railhead boma or loading point increased delays and costs which were added to the already increased cost of moving by rail. The bigger traders already avoided Busoga because of the lower price prevailing there. With the closure of the cheaper water service the avoidance of Busoga became total. In an attempt to revitalise trade and assure the densely populated area in south Busoga of a reliable source of meat, a new resale market was sited, not on the river, but on the railway at Bukona. It proved impossible to attract the Teso/Lango trading community and Bukona market lapsed into disuse. By 1965, the rural demand for meat was putting considerable pressure on the inadequate numbers of cattle in Busoga and in order to avoid market fees and possible carcase condemnation the cattle owners took advantage of the increased demand for local animals by selling in the bush. By the end of 1965 the District Veterinary Officer complained that 'virtually nothing goes through the county markets' (16) and the throughput fell to 1.4% of the district herd.

In south Mengo the termination of the Lake Kyoga service closed the market at Nakasongola to the resale trade and it became necessary instead to make the

costly rail journey from Teso and Lango through the Eastern Region to Mukono. This increased the cost of moving very considerably, more than doubled the distance and, as with Busoga, eliminated the smaller trader. As significant to the present system of marketing transferred animals in rural south Mengo is the pattern of events in 1963. In that year Pleuro-pneumonia became very widespread in Karamoja and entered Teso for the first time since the late 1930's. Through some manner of illegal movement an infected animal entered the trade stock travelling from Soroti. It was detected in south Kyaggwe and the Veterinary Department realised that despite rigid inspection arrangements it was still possible for Pleuropneumonia to enter the dairy improvement area of south Mengo. To have stopped the transfer trade entirely would have left rural Kyaggwe and Bugerere without 2/3 of their beef supply and reduced the Teso District revenue very considerably. As a compromise it was decided that the transfer traffic should continue only if the animals are slaughtered at the railhead. This eliminated any hoof traffic after sale or from the railhead to the smaller resale markets of Kyaggwe and Bugerere. The volume of trade available from local sources was insufficient to support the smaller resale markets and gradually they closed. The function of Mukono changed drastically at this point for now it was not able to act as the first stage in a resale chain for live animals but was forced to sell animals for immediate slaughter. Effectively this meant that Mukono was no longer selling cattle - it was selling meat. Buyers had now to acquire transport and buy only what they could be sure of selling within twenty

four hours. Capital limitations acquired a new importance for a lorry or van was needed, and if any quantity of animals was to be purchased, refrigeration equipment was necessary for storing the meat. The hinterland of Mukono, which had once penetrated forty or fifty miles or more now drew in to an economic daily drive, which the Divisional Veterinary Officer estimated at between twenty and thirty miles (15). Formerly cattle could have been walked to slaughter or later resale over greater distances. Smaller butchers were unable to purchase transport, meet the middleman's price or buy at the now defunct secondary resale markets. Thus the volume of trade at Mukono declined sharply and this is reflected in the pattern of transfers from Teso (Table 16). Letters from the Teso Cattle Trade Committee to Veterinary headquarters repeatedly blame the new movement restrictions for the rapid decline in transfers to Mukono but until the threat of pleuro-pneumonia is removed the present function of Mukono and the present pattern of sales will remain.

SUPPLIES TO THE URBAN AREAS OF ZONE 'C'

The principal sources of supply were outlined in Section III where it was seen that different urban areas in the zone draw on distinctly different source regions. Briefly these are:

a) Kampala-Jinja — draw on Karamoja and Kenya (cattle and chilled meat)

b) Masaka-Fort Portal — draw on Ankole in zone 'A' and north Kigezi.

c) Mbale — draws on south Teso (zone 'C'), the Sebei plains and Karamoja.

d) Tororo — draws on Bukedi and Kenya.

The origins of these well established hinterlands lie not only with proximity to an area of surplus, but

also with factors of municipal price control, veterinary scrutiny, and price competition from neighbouring areas. For supplies originating in Uganda, all the urban areas in zone 'C' depend on transfers from the pastoralist or pastoralist cultivator areas of Karamoja, the Hima areas of the West and Teso. This hinterland structure introduces one of the principal difficulties at present making an assured supply from any area within Uganda impossible. The urban areas are not dependent upon the income from any specific crop to provide the cash to buy beef. People in townships are generally assured of a regular income and maintain a steady demand for beef. Factors governing the number of animals made available in the source areas are quite unrelated to the demand pattern and have in contrast, a markedly seasonal pattern. At certain times of year, therefore, it is necessary to look elsewhere for cattle to make up a seasonal shortage or an emergency stoppage if the supply markets are closed. For these reasons some of the bigger townships have more than one source area.

The nature of incomes within the townships also has an effect on the pattern of supply. Within the townships as income grows so does demand for better quality meat, a demand which cannot at the moment be met from Ugandan herds. The demand for better grade meat is satisfied from the stock of the Kenya Meat Commission station in Eldoret. The problem of seasonal shortages and the need for rapid changes in the geographical supply areas, is strongly accentuated by the low degree of capitalisation in the retail sector. Very few of the butchers even in Kampala, have large chill stores in which to stockpile carcases. Municipal authorities have not so far been able or

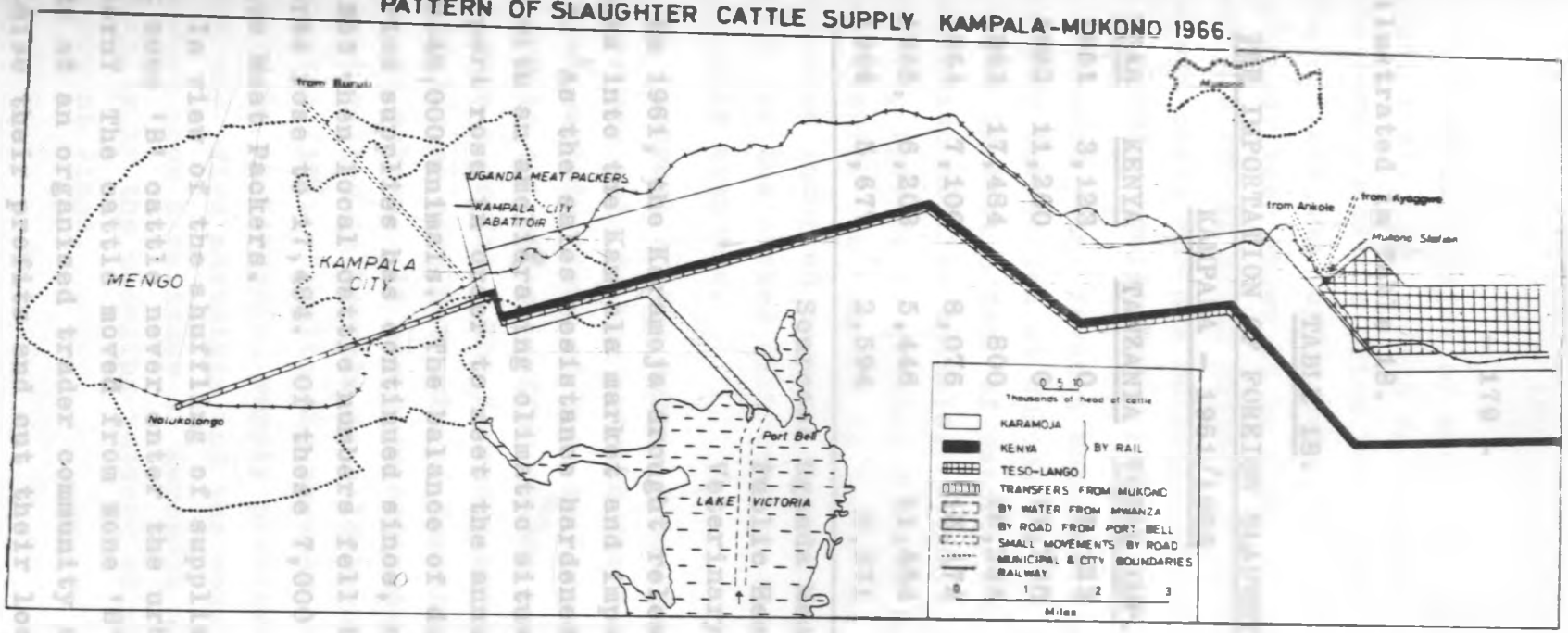
disposed to provide these facilities and so the urban meat trade is conducted on a very short time horizon. Shortages are quickly felt and have to be accounted for in a short space of time.

Kampala and Jinja Both Kampala and Jinja depend very heavily for supplies upon Karamoja. Often as many as 75% of the cattle arriving at Kampala originate in Karamoja and, in Jinja the percentage has been over 90. (table 17). In contrast to its rural environs, Kampala handles virtually nothing from Teso and Lango. In 1965 only 262 animals were transferred to Kampala from the resale market for zone 'B' animals at Mukono. The remarkable difference in supply areas for Kampala and Kyaggwe is illustrated in Map 21. The isolation of supply hinterlands is almost complete. Teso and Lango animals were shown earlier to by-pass Jinja for reasons ofprice.

Kampala and Jinja depend almost entirely on other areas for beef cattle and this was emphasised in a survey by de Sousa (16), in 1965, when he noted for the Kampala City Abattoir that of 19,113 animals slaughtered in the first half of that year less than fifty came from the densely populated rural area around the city.

It is difficult to see why Kampala is content to tie itself to a source area as notably unreliable as Karamoja when 20,000 animals arrive annually at Mukono. No meat from Mukono may be sold within Kampala (17) and so, apart from a small illegal trade, the two areas of Kampala and Mukono operate in isolation. Kampala is by no means adequately supplied from Karamoja and often falls heavily on imports of foreign stock from Kenya. The close relationship between the availability of Karamoja slaughters and the volume of Kenyan imports

PATTERN OF SLAUGHTER CATTLE SUPPLY KAMPALA-MUKONO 1966.



is illustrated in Table 18.

TABLE 18.

THE IMPORTATION OF FOREIGN SLAUGHTER INTO KAMPALA - 1961/1966

YEAR	KENYA	TANZANIA	TOTAL IMP.	LOCAL
1961	3,123	0	3,123	30,000
1962	11,260	0	11,260	33,000
1963	17,484	800	18,284	20,934
1964	7,100	8,076	15,176	20,756
1965,	6,208	5,446	11,654	23,655
1966	5,677	2,594	8,271	28,399

Sources: Uganda Meat Packers,
Public Health Dept., Kampala
Veterinary Department.

In 1961, the Karamoja drought released 30,000 animals into the Kampala market and imports were only 3,123. As the sales resistance hardened in the north east with an ameliorating climatic situation the need to import rose in order to meet the annual requirements of 30-40,000 animals. The balance of domestic and imported supplies has continued since, reaching a peak in 1963 when local cattle numbers fell to 20,934 and imports rose to 17,484. Of these 7,000 were taken by Uganda Meat Packers.

In view of the shuffling of supplies, why is it that zone 'B' cattle never enter the urban supply pattern? The cattle moved from zone 'B' are in the hands of an organised trader community anxious to maximise their profits and cut their losses. At Mukono a series of factors act in favour of the traders. Firstly, the price prevailing is not limited by any control over

the final selling price of meat. In the municipalities, bye-laws limit meat prices and thereby the butchers' profit margin and the price he is able to pay for cattle. Since the buying price for cattle in Teso has already been shown to be high, it would be impossible for an urban butcher to cover that, the transport costs and the butcher's profit and still make a working profit under resale price maintenance.

A second point favours Mukono. The level of veterinary inspection at Mukono is, at best, cursory and there is little fear of carcase condemnation or condemnation of live animals. Traders and buyers, therefore, operate in greater freedom and higher prices result. In Kampala in 1965, one fifth of cattle slaughtered incurred partial condemnation. Thus the reasons for the marked dichotomy in the supply pattern are soundly economic.

In contrast to the Mukono situation, Kampala butchers are able to buy animals for between 100 and 200/- at certain times of year in Karamoja, transport them 300 to 400 miles, suffer ~~20-30%~~ the condemnation and still make a profit. The Karamoja animals are then distributed as meat not only to Kampala but to Entebbe, Mengo and Nakawa. It has been estimated that 60% of the meat killed in Kampala is sold beyond the City boundaries (~~18~~). Despite the cheaper buying price for animals in Karamoja, supply problems have recently eroded any price advantage and the considerable problems attendant upon a reliance on Karamoja are illustrated forcefully by the changing pattern of supply to the new abattoir at Jinja.

TABLE 19

Year	JINJA MUNICIPAL ABATTOIR ANNUAL THROUGHPUT Head of Cattle	JINJA PURCHASES IN KARAMOJA
1961	8,089	6,184
1962	6,533	5,023
1963	3,533	3,104
1964	3,787	3,616
1965	1,497	1,198
1966	6,224	4,542

Medical Officer of Health,
Jinja Municipal Council.

The urban area of Jinja has through municipal consumption and redistribution a capacity to handle more than 8,000 head of cattle annually. Since the second War almost all the urban needs have been met from Karamoja. In 1961 the abattoir at Jinja handled over 8,000 cattle, 6,184 of which were obtained in the drought stricken north east, and the remainder, locally. It soon became known that veterinary control at the new abattoir was more rigid than had been the case previously and the risk of condemnation, high. By 1962 the number of Karamoja animals fell by over a thousand and the number of local animals was halved. In 1964, a favourable d imatic situation in Karamoja pushed down sales by Jinja butchers to 3,616 and 100 or so local animals were made available. The total throughput was less than half the proven capacity. Butchers wearied of the Karamoja supply pattern as early as 1963 and started buying animals from Mukono, despite the higher price, but this was stopped after the Pleuropneumonia scare. Instead, butchers turned to buying meat from Mukono and by 1965 the throughput of the new abattoir has fallen to only 1,497. At this point the municipal council acted to change the supply pattern

because the abattoir was losing £5,000 annually and there was a fear of infected meat being bought from the poorly supervised market at Mukono. Meat from Mukono was forbidden and butchers were forced to return to Karamoja for supplies once more. In 1966 during the drought 6,224 animals were put through the abattoir, 4,542 originating in Karamoja. The return to wet conditions in Karamoja brought back all the frustrations and in early 1967, a leading Jinja butcher applied for and got permission to dispense with the live cattle trade and import 2,000 lbs. of meat daily from the K.M.C. He accurately, if smewhat laconically, pointed out the difficulty of being 'at the mercy of the Karamoja rain'.

Fort Portal and Masaka. The dependence of Fort Portal and Masaka townships on the zone 'A' areas of Ankole is if anything, even greater than the dependence of Kampala on Karamoja. Fort Portal has long depended on Ankole, for the heavily cultivated area around the township has too few cattle to meet the demands of the urban area. Beyond the cultivation zone around the urban area, much of Toro is infested with tsetse and cattle are few or absent. To meet the demands of the municipal area and also the needs of the urban hinterland which extends as far as people come to buy at the market at the week-end, butchers travel with their own trucks to markets on the Toro-Ankole border. Traders also operate to Fort Portal from Nyabushozi, Kajara and even Ruzhumbura county of Kigezi. Such is the exceptionally high price obtaining in Fort Portal (Sect.III) that traders will travel these considerable distances and still be assured of a profit. At Fort Portal the animals are

kraaled in a holding ground at Saaka until required for slaughter. The dependence of Fort Portal upon transferred supplies is illustrated conclusively by the following table for slaughters at the municipal abattoir in August 1966:

TABLE 19

Origin	Ankole	Butuku (T)	Burahya (T)	)
No.	126	7	3	) Head of Cattle.

Municipal Health Officer, Ft. Portal.

For the whole year, less than 100 out of the 2,000 animals killed originated in Toro in the cultivated area around Fort Portal or in the Semliki area.

Masaka butchers purchased 5,568 head of cattle from the local Divisional county markets in 1966, but purchased over 5,000 head from the markets of Ankole and north Kigezi.

Mbale. Mbale township purchases from three principal sources and thus rarely faces shortage. In 1965, 444 animals were bought at the Karamoja markets. These represent a far better purchase for Mbale butchers than for their counterparts in Kampala or Jinja for the short rail journey from Soroti to Mbale ensures that the cattle arrive in a relatively healthy condition. As well as animals from Karamoja, the butchers of Mbale buy from the south Teso portion of Zone 'C'. These animals are generally the poorer stock which represent too great a risk for traders consigning animals from Kumi to Kampala by rail. Mbale butchers are able to secure the poorer cattle at far below the going price for Teso cattle and the animals are then walked or trucked

southward after veterinary inspection to a holding ground north of Mbale. 1,381 were moved from south Teso in 1965. Mbale buys also from the Sebei plains in the chain of markets, Buyembe, Ngenge, etc. which follow the northern foothills of Mount Elgon. Cattle bought in these markets are moved to a large and well equipped holding ground at Siroko. With two holding grounds and three geographical areas acting as sources of supply, Mbale has the least problem of seasonal shortage. Recently, considerable raiding by the Pian tribe has cleared much of the Sebei plains of people and cattle and repeated outbreaks of Foot and Mouth disease have temporarily closed the Siroko source to Mbale.

Tororo: Tororo municipality does not participate in the Karamoja auctions but prefers instead to make up any local deficit from Kenya. The attraction of Kenya lies in the proximity of Tororo to both Kenya and the main railway line. In 1966, 2,226 cattle were slaughtered at the municipal abattoir - all of which originated in Bukedi or south Teso. In the same year, 162,000 lbs. of meat was brought into the municipal area, about 40% of which was Kenya Grade 1 and 60%, Grade 2. Since the crisis shortage at Jinja abattoir, Tororo has transferred carcases to Busoga. In 1966, 162½ were despatched.

Arua: Arua township frequently faces seasonal shortage of beef. The people of Maracha county which surrounds the township are reluctant to sell cattle, even at high prices. The prices prevailing in the township are not generally high enough to attract traders from out side. However, in 1964, traders from Lango expressed

an interest in an experimental sale in Arua. This would have required the railing of animals from Aloi to Pakwach, transferring to a ferry and then transferring again to a truck or facing a long trek to Arua. Apart from the economic problems involved in such a movement, a fear of cattle moving through the Nile tsetse belt caused the Veterinary Department to veto the idea. Continued attempts by the butchers to encourage the opening of new markets have failed, for previous new markets were all closed when offers would not fall below 1,000/- per beast! At present only Lodongo market operates and much of the meat requirement of Arua is met from a special goat market. Plans exist at present for five new markets but the position at Arua is still one of beef shortage.

The supply pattern to both urban and rural parts of Zone 'C' illustrates in detail the problems of demand and supply being at the mercy of different factors and the operation of a trade where 'normal' economic theory and price response is of limited value as a medium of controlling supply. It also shows the unsatisfactory nature of meat supplies to the growing urban sector and, the pressures of a growing and ever more sophisticated demand on an unchanged traditional supply sector. The strains have started to show more clearly in recent years and the growing need to protect pastoral developments in the consuming areas is making the sources and system of supply ever more unsatisfactory.

1. District Veterinary Officer, Bukedi, communication to Regional Veterinary Headquarters, Mbale, 1966.
2. 25% is a commonly quoted estimate amongst veterinary staff in this zone - accurate figures or even samples for the fatalities from E.C.F. in Buganda or other parts of Zone 'C' do not exist.
3. Based on the land use figures on file at the Veterinary Department, cyclostyled 1964.
4. Veterinary Department Annual Report, Government Printer Entebbe, 1952, p.10.
5. Ministry of Agriculture and Cooperatives, ' Report on the Uganda Census of Agriculture', volume 1, table IX-9, Government Printer, 1965.p.65.
6. Estimates of the amount of grazing lost vary considerably and rise to over 20%. Some figures for the area around Kampala are quoted by E.R. Tiharuhondi in a B.Sc paper for the Department of Agriculture, Makerere (ms) entitled: ' A Comparative Study of Pasture Management on Commercial and Experimental Farms around Kampala', 1966.
7. Veterinary Department Annual Report, Government Printer 1952, p. 13.
8. District Veterinary Officer, Sebei (Mbale), Monthly Report September 1965.
9. District Veterinary Officer, Kabale, Kigezi, Annual Report 1965.

10. Veterinary Department Annual Report, 1950, p.6.
11. O'Connor A.M., ' An Economic Geography of East Africa', fig. 2, 1967, p. 10.
12. Ibid, fig 7, p. 77.
13. District Veterinary Officer, Kabale, Kigezi (formerly of West Nile), personal communication, 1967.
14. Divisional Veterinary Officer, Mukono, personal communication 1966.
15. D'sousa et al, ' A Survey of Fresh Meat Supplies to the Kampala area', an unpublished essay, Geography Department, Makerere, 1965.
16. The Municipal Officer of Health has signed an order banning all meat in Kampala except that originating at the Uganda Meat Packers abattoir, the City abattoir or the Kenya Meat Commission.

Chapter 12.

ZONE D : THE LOW STOCK DENSITY ZONE

Although within Zone 'D' are to be found a wide range of subsistence and cash agriculture such as we noted in zones 'B' and 'C' and a wide field of social and cultural attitudes towards livestock, the predominant characteristic as far as this study is concerned is the very small number of cattle. Some parts of the zone were pastoralist areas before being overrun by a Rinderpest or Trypanosomiasis epizootic, and some, in fact, lay in rainfall reliability areas which made cultivation very difficult. The zone may be considered in two parts: areas where Trypanosomiasis excludes cattle completely and areas where a low cattle density prevails in the absence of tsetse fly. Parts of Uganda where cattle are excluded by law, such as the Forest Reserves and Game Parks, lie outside the scope of this chapter.

Production: Quite clearly where the tsetse infestation is moderate to heavy the production of slaughter cattle is reduced to nil, as cattle are excluded. This is the situation over most of the area shown as 'savanna tsetse' on Map 2. It is possible with the aid of prophylactic drugs such as Antricide Prosalt to maintain animals in some areas of light infestation though this is costly. In other parts of the tsetse belt the fly occurs in pockets and it is possible to graze cattle if the known concentrations are avoided. An example of this practice was found along the banks of the Nile in West Nile district. At Rigbo people keep cattle, whilst at nearby Ogoko the problem of Trypanosomiasis precludes stock. Where areas such as south-west Lango, north east Usuku,

south West Nile and south Ankole, show a coincidence of low rainfall reliability and tsetse then a basically pastoral area is closed to its principal means of exploitation, and the productivity of the area considerably reduced.

Outside the tsetse belt, in Acholi, the small number of animals is explained by the small population and by cultural and historical factors (chap.1) but the problems of production are considerably accentuated by factors of the social and cultural environment. During the daytime it is common for stock owners to leave their animals tied up until 11 a.m. and at night it is not uncommon for animals to be found wandering. Neglect is common in Acholi and the herders are more devoted to their hunting of game and growing of tobacco or cotton than to caring for domestic livestock. During the wet season in the heavy rainfall conditions of Acholi, ticks multiply and the threat of East Coast Fever rises. A toll of 80% of the calf crop is not uncommon among the calves of Acholi and in this way the herd has never fully recovered from being decimated during the Rinderpest and Trypanosomiasis outbreaks of the 1940's. To the problems of mismanagement, in the Palabek area, must be added the shortage of available surface water. It is not uncommon for animals to be watered on alternate days only. The 30 acres of grazing per animal in Acholi are little indication of the standard of animal produced.

Over much of Usuku and the tribal marches of Karamoja fine stands of Hyparrhenia grasses contrast with the overgrazed areas nearby. The threat of physical danger from inter-tribal hostility closes these marchland areas to grazing and the production of cattle is virtually nil.

Pressure from tsetse considerably diminishes the amount of pasture available to the animals which are kept in the Bunyoro and Madi parts of zone 'D'. At present the small proportion of available pasture (see Sect. III) in these two districts results in production being held down. IN Bunyoro the live-weight of local animals was doubled when they were fed properly at a moderate density on the Bunyoro Ranch.

Supply: Although the number of cattle throughout zone 'D' is small, nevertheless, the demand for beef is often quite marked. The cotton and tobacco economies of Bunyoro and Acholi are bringing in a substantial cash income. Bunyoro lies in fact in Income Zone 3 on map 21. Despite the small human population there is still a strong desire to spend money on meat, particularly in the townships and it is clearly impossible to satisfy anything but a slight demand from the very small number of cattle in the area.

In Bunyoro the needs of Hoima and Masindi can not be met from the extremely small zonal market throughput. Kijunjubwa and Kimengo markets had a total sale of only 183 animals in 1966 and opened only three times during the year. This is hardly likely to meet the daily demand of the townships. As a result it has become common for buyers to purchase outside the zonal area. Butchers from Hoima and Masindi travel to west Lango and, despite the fact that they are unable to compete with Mukono prices for Lango animals, they are able to buy poorer stock from peasants. Other animals are brought in the Christmas market at Bugungu. The Bugungu animals are walked over the

escarpment at Butiaba and lose at least 10% of their purchased liveweight by the time they arrive at the townships. The strangely high percentage of offers to sales in Bunyoro (Sect.III) is explained by the fact that the markets open very infrequently and tend to offer too many animals at one time for the butchers to absorb without storage facilities. In 1966, Bunyoro had to supplement the 183 animals purchased within the zone by 2,000 imported from elsewhere.

Gulu requires some 600 animals annually and is unable to purchase these in the immediate area, not simply because the cattle population is too small but because people will not sell. The need for bride price is too great. A transition in social attitudes and values may be observed which partly relates to the length of contact with a cash economy. The people of south east Acholi show a willingness to sell cattle for cash whilst the people of west Acholi and Madi still refuse to part with their animals. Gulu is forced to buy from the area around Kitgum and move animals sixty miles on the hoof (Sect.III pt.IV). The butcher in Moyo, Madi is faced with considerable problems in providing beef for the township, as local supplies of cattle and the local resistance to sale preclude all organised marketing.

Partly as a consequence of the severe local constraints on the supply of beef from the small stock population, the growth and acceptance of substitutes has been a marked characteristic of this area. Except in Acholi where traditional taboos operate, the goat/cattle ratio is higher in the Low Density zone than in

the rest of Uganda. The reason for this is not strictly a search for alternatives, but a question of survival, for small stock are not susceptible to most of the ~~bovine~~ diseases which devastated the herds of cattle in the past and preclude large stock numbers today (see next section). The following table illustrates the ratio:

TABLE 20

District	Cattle/Goat	District	Cattle/Goat
Lango	1:4	Acholi	1:.33
W. Nile	1:1¼	Madi	1:.20
Busoga	1:1	Teso	1:.25
Bugisu	1:.5	Sebei	1:.25
Bukedi	1:.5	Karamoja	1:.33
Ankole	1:1	Kigezi	1:1½
Toro	1:2 - NB. Buganda 1:.25	Bunyoro	1:4 - NB

IN Bunyoro there is a marked preference for goat meat which now sells at a higher price than beef. This preference may have arisen from the protracted shortage of stock in the district (60 years plus). In Acholi as in West Nile and Madi the common Nilotic preference for protein through milk rather than meat operates so that beef provides 36% of animal protein in Eastern Province, but only 14% in the Northern Province (11). Milk, however, provides 78% in the latter. Cattle, therefore, form an important part of the daily diet as providers of milk, which at the extremely low local yields requires a disproportionately large number of beasts, in turn hardening resistance to sales for the urban areas even more.

A recent phenomenon is the growth of meat supplies from the local environment, through game-cropping projects. In Bunyoro an average of 40 elephants

(1) are consumed monthly, whilst the Hippo. cropping scheme at Queen Elizabeth Park has 'contributed greatly to the meat supply of the district (of Toro)'. (2)

NOTES

1. Game Department, Masindi, Bunyoro, personal communication 1967.
2. Veterinary Department, Fort Portal, personal communication 1967.

Chapter 13.

SUPPLIES FOR PROCESSING FROM THE TRADITIONAL SECTOR

In 1962, a small private meat packing concern in Kampala was taken over by the Government as a daughter company of the Uganda Development Corporation and named the 'Uganda Meat Packers Ltd.' (U.M.P.) The firm at present exports only frozen sections of low grade meat, making all its Uganda purchases in Karamoja. Earlier attempts to spread the buying net over a wider area failed because animals were not forthcoming at a low enough price. As a consequence of the erratic supply pattern in Karamoja, U.M.P. rely from year to year on variable numbers of Kenyan and Tanzanian stock to make up the deficit. This is but one problem of tying a modern industry to supplies from traditional sources.

Annually sixteen to twenty thousand animals are slaughtered at the railhead abattoir belonging to U.M.P. in Kampala. All the cattle arrive either by rail from Eldoret or Karamoja *via* Soroti, or by road from the Mwanza steamer terminus at Port Bell. Once slaughtered the animals are frozen, though up to fifteen per day may be released to the lower grade sector of the Kampala retail trade. At present there is no by-products unit to make use of hoof, bone, intestines, etc. as there is in Kenya. The frozen sides are of a low quality and are transported by rail through Kenya to Mombasa and to ports in the Middle East and Europe. In 1966 the pattern of exports was as follows:

TABLE 21

1966.

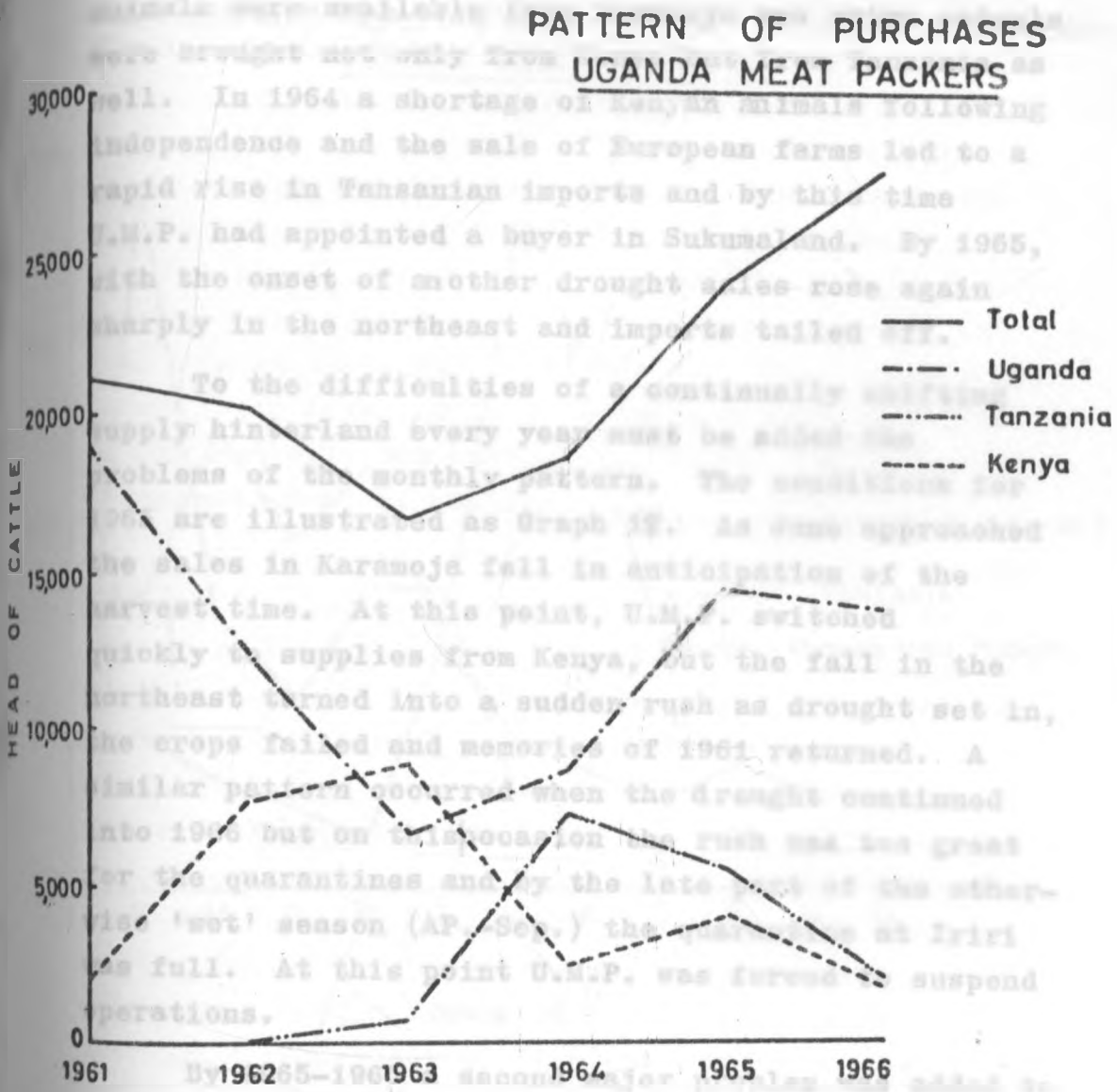
DESTINATION	CENTALS (1)
Congo (Kinshasa) (2)	10,751
Cyprus	7,818
Netherlands	7,273 (3)
Jordan	1,148
Burundi	581

Annual Trade Report (E.A.)

The total export trade amounted to 27,595 centals valued at £271,482 which compares with 191,680 from Kenya valued at £2,993,846.

U.M.P. concentrates on obtaining animals at the lowest possible price for, at present, the quality of Ugandan stock and the problem of contagious bovine disease closes the better priced markets of the U.S.A. and U.K. These two countries absorb 70% of the world trade in beef and pay highly competitive prices of approximately double the purchase price in East Africa. U.M.P. is forced to sell poor carcases for industrial purposes to the Middle East and Northern Europe where it fetches only U.S.$370 per ton. The low buying price for the U.M.P. product, therefore, necessitates the lowest possible purchase price and only in Karamoja are animals found at a sufficiently low price.

The yearly need for 16-20,000 animals can rarely be satisfied by supplies from Karamoja alone. In 1961 the U.M.P. buyer in Karamoja (Graph 17) found no difficulty in meeting almost all the throughput needs and purchased nearly 20,000 animals. In 1962 the number of cattle available at the Karamoja markets fell drastically as the rainfall improved after the 1961 drought. The butchers from Kampala, Jinja and Mbale were able to outbid the U.M.P. buyers. U.M.P. was


PATTERN OF PURCHASES
UGANDA MEAT PACKERS
HEAD OF CATTLE
30,000
25,000
20,000
15,000
10,000
5,000
0
1961
1962
1963
1964
1965
1966
Total
Uganda
Tanzania
Kenya

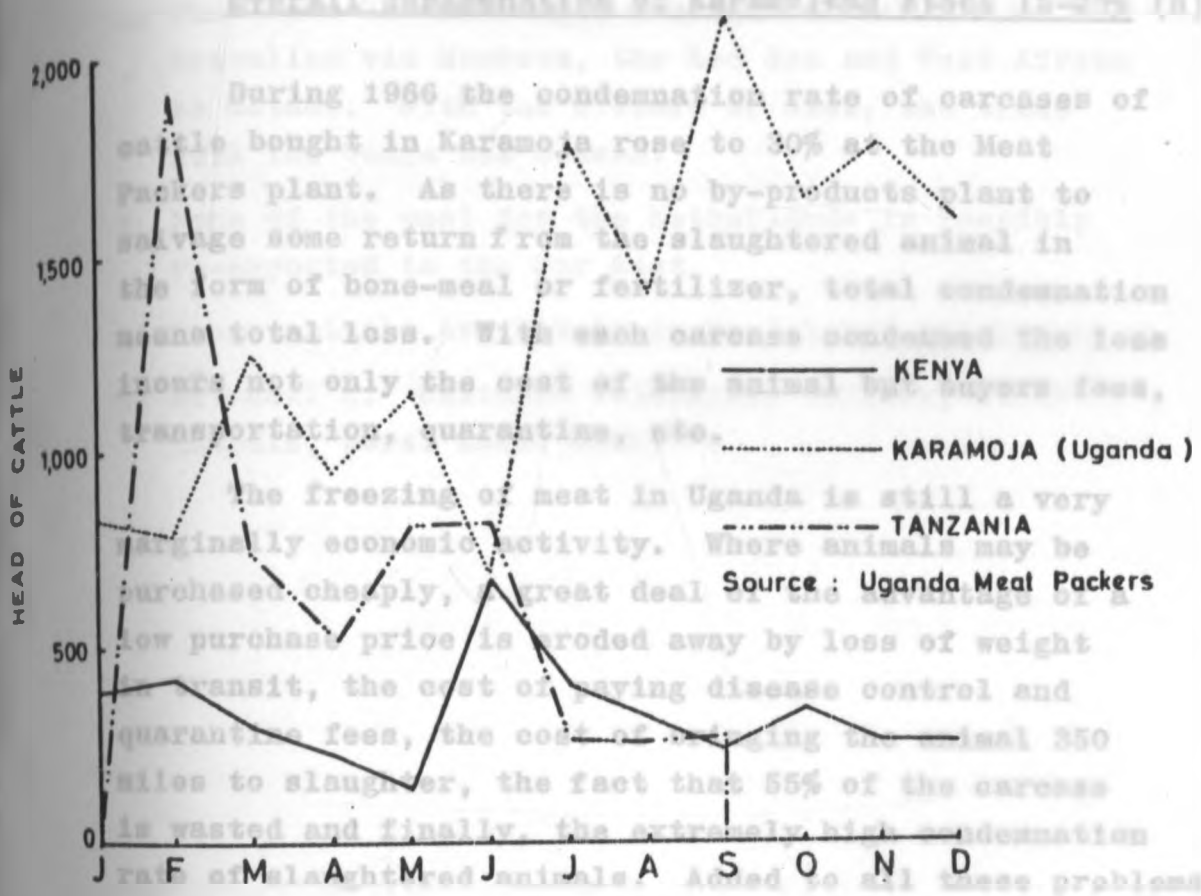
Graph 17.

forced to turn to Kenya and in that year imports from Kenya rose from 2,000 to 6,000 animals. By 1963 the problem of local supplies worsened and only 7,000 animals were available from Karamoja and extra animals were brought not only from Kenya but from Tanzania as well. In 1964 a shortage of Kenyan animals following independence and the sale of European farms led to a rapid rise in Tansanian imports and by this time U.M.P. had appointed a buyer in Sukumaland. By 1965, with the onset of another drought sales rose again sharply in the northeast and imports tailed off.

To the difficulties of a continually shifting supply hinterland every year must be added the problems of the monthly pattern. The conditions for 1965 are illustrated as Graph 18. As June approached the sales in Karamoja fell in anticipation of the harvest time. At this point, U.M.P. switched quickly to supplies from Kenya, but the fall in the northeast turned into a sudden rush as drought set in, the crops failed and memories of 1961 returned. A similar pattern occurred when the drought continued into 1966 but on this occasion the rush was too great for the quarantines and by the late part of the otherwise 'wet' season (AP.-Sep.) the quarantine at Iriri was full. At this point U.M.P. was forced to suspend operations.

By 1965-1966 a second major problem was added to the headaches of buying from a traditional pastoralist source. With the appointment of a new full time veterinary inspector at the U.M.P. plant the condemnation rate from Cysticerous bovis rose suddenly.

GEOGRAPHICAL ORIGINS OF LIVE SLAUGHTER PURCHASES
UGANDA MEAT PACKERS 1965



Graph 18.

TABLE 21

MAY 1st to DEC. 31st 1966	C.bovis
Total cattle slaughtered (4)	18,010
Carcases totally condemned	2,093
Percentage	8.6

Overall condemnation of Karamojong stock 15-20% (5)

During 1966 the condemnation rate of carcases of cattle bought in Karamoja rose to 30% at the Meat Packers plant. As there is no by-products plant to salvage some return from the slaughtered animal in the form of bone-meal or fertilizer, total condemnation means total loss. With each carcase condemned the loss incurs not only the cost of the animal but buyers fees, transportation, quarantine, etc.

The freezing of meat in Uganda is still a very marginally economic activity. Where animals may be purchased cheaply, a great deal of the advantage of a low purchase price is eroded away by loss of weight in transit, the cost of paying disease control and quarantine fees, the cost of bringing the animal 350 miles to slaughter, the fact that 55% of the carcase is wasted and finally, the extremely high condemnation rate of slaughtered animals. Added to all these problems is the factor of sudden shortage or surplus in supplies of Ugandan cattle, the need to import from and export through a competitor country and, the fact that at present, Uganda is able to sell only to the less discriminating low price markets of the Middle East and Africa.

NOTES

1. 'Centals' are the international trade units used in the East African statistical Department trade reports. A cental is valued at 100 lbs.
2. The trade to the Congo, a neighbour of Uganda, travelled via Mombasa, the Red Sea and West Africa to Matadi. With the closure of Suez, the trade with the Congo has ceased.
3. Some of the meat for the Netherlands is possibly re-exported to the Far East.
4. Kenya animals are likely to be 'clean' on arrival.
5. Mitchell R. Resident Veterinary Officer, U.M.P. Kampala, pers. comm. 1968.

SECTION V.

THE IMPROVEMENT AND TRANSORMATION OF THE TRADITIONAL SECTOR.

SECTION V

Chapter 14

IMPROVEMENT AND TRANSFORMATION SCHEMES

Weaknesses of production and supply may be overcome by improvement or transformation. The former is based on a series of successive complementary changes which are gradually introduced into the traditional systems. Unlike improvement, which is labour intensive, transformation is capital intensive and introduces all phases of development simultaneously and on a relatively large scale, exclusive of traditional systems. For example, a village dipping scheme might typify a stage of improvement - a ranching scheme would exemplify transformation. Eventually, both lines of development have the same aim: scientific production and a planned surplus. In theory the speed with which the pastoral production and productivity are increased varies considerably between the patient efforts of the veterinary services amongst the pastoral peoples and the rapid results of a National development corporation or large ranching company. In reality large scale capitalised projects have not, so far, always led to a rapid increase in quantity or quality in Uganda.

Improvement schemes are located with reference to the nature of the development, for instance water schemes are concentrated in the areas of lower, less reliable or strongly seasonal rainfall, disease schemes are related to the distribution of vector, parasite, or virus. Transformation schemes in Uganda have had

one major location factor: large areas of thinly populated grazing where compensation for movement of people is kept to a minimum. Thus, most transformation schemes are located in Zone 'D' or areas which were recently in zone 'D' conditions.

IMPROVEMENT

Improvement of Production: Improvement may be considered as a chain of complementary processes each dependent on the former and preparatory for the next until eventually the pastoralist has been transformed into a small scale rancher or scientific stock rearer, with productivity per acre and per beast maximised, and with an optimum number of good quality cattle being marketed as demand requires. One example of an improvement chain is illustrated below, but there are many variations depending on local environmental circumstances.

RESEARCH INTO SOCIAL AND PHYSICAL ENVIRONMENT.

TENURIAL REFORM
WATER DEVELOPMENT AND DISEASE CONTROL
PASTURE UPGRADING
STOCK IMPROVEMENT
SMALL RANCH-HOLDING

} EXTENSION ADVICE & MANAGEMENT TRAINING

Once a basic knowledge of the area has been gained the process of instruction, extension and social change is begun. The elements of improved management are provided as the constrainst of the physical environment are removed. After the removal of constraints it

is then possible to begin increasing the productivity of both the pasture area and the stock. Throughout the whole process advice is forcoming and training provided. As each stage is completed the foundation has been laid for the next. Better cattle need better pasture and if better pasture is to be fully utilised then adequate water must be on hand. This same water is necessary to provide the tick spray and control disease and so forth. In this chapter the progress of improvement is examined. Recorded data is unfortunately slight, but all the principal lines of improvement in Uganda are reviewed.

RESEARCH

At the basis of all reform is an understanding of the subject and for the improvement of beef cattle production this includes not only the stock and the pasture but also the cultural and social outlook of the herder. Research into the human and physical environment is therefore fundamental to the planning chain and the neglect of any part of this might result in disastrous side-effects such as those described earlier in Karamoja. The whole process of successful improvement pivots on a collection of interrelated factors and never on any one individual reform. Whether new areas are being brought into production, or the productivity of existing areas improved, research is the foundation for what follows.

In Uganda research into pastoral resources is carried on in all types of cattle economies and at all levels of sophistication in Animal Health Research

Centres, District Farm Institutes, Agricultural Colleges, Veterinary Centres, Group Farms and in the monthly observations of District Veterinary Officers on their field inspections. At Serere Agricultural Research Station in Teso, work is in progress to develop not only a pasture mixture, but a suitable animal for introduction into the pastoral areas of Teso and Lango and probably much of the wet savanna. To combat the long dry season in the north, a legume has been introduced into a threefold mixture of Panicum, Stylosanthes and Chloris (1). By adding a legume the difficulties of conserving good fodder over the period of hardship are overcome and this effectively raises the stocking rate in much the way that early agrarian reforms abolished the necessity to slaughter animals during Winter in England. The mixture has proved extremely successful and has now reduced the acreage per head needed for one beast to ¾ acre. The eventual liveweight of the animal produced will often be in excess of 650 lbs. Unfortunately, the boost which this pastoral development could give to the overstocked pastures of Teso is at present nullified by the prevailing system of communal tenure in that district. Without enclosure or strict grazing control the introduction of the grass legume mixture is impossible and so it features only on the Soroti Prison Farm, Arapai Agricultural College, Ongino Leprosy Centre, and at Serere itself. To the extent that the small stock-holder is not yet in a position to adopt this pasture reform, the research work appears academic. However, it provides the basis of rapid introduction when other

constraints are removed. The effect on district cattle production is still slight as is the work being conducted at Serere (2) to breed East Coast Fever resistance into exotic Boran animals from the tick free areas of north Kenya.

In Karamoja work has been conducted on the regeneration of the perennial grasses which have been so dramatically reduced in this century. In the late part of the 1950's two large blocks of land were fenced on the Soroti-Moroto road and on the road south from Moroto to Pian. By allowing unchecked regeneration it was hoped to find whether or not perennial grasses would resume their former occupation. It was successfully shown in the 'Intensive Reclamation Areas' (3) that 'a rapid regeneration of perennial grasses such as Themeda triandra ... formed an effective cover in 2/4 years' (4). This research has proved that the productive potential of the Karamoja steppe can be dramatically increased if some means can be found of protecting areas during regrowth. This is, at present, quite impossible as was illustrated forcefully when the 'Intensive Reclamation Area' fences were smashed and the area devastated by Karamojong herders and their cattle during a pasture shortage.

In Ankole work has been in progress at the Muko Pasture station to evaluate a suitable stocking rate for the pastures of Ankole, (Chap 12) a means of combatting Acacia and, the effective control of Cymbopogon afronardus. It has been found that Cymbopogon resists all economic doses of herbicides and must be dug out to

be effectively destroyed. Systems of stocking level and pasture burning are being tried over a number of years (5) to arrive at a scientific stocking rate with or without burning for the rangland of Ankole. Parallel to the Ankole grassland research is an enquiry into the suitability of local and exotic animals and crosses on the natural grasslands of the district. Similar work to that at Ruhengeri (Ankole) is being performed at Kigumba to find suitable animals for the wetter pastures of Bunyoro. Many of the earlier fears (6) for imported livestock are being proved false by corrals of thriving Angus x Boran and Boran x Ankole etc.

Work in the intensive areas of Zone 'C' have attempted to find some form of supplementary feeding with farm produce to overcome the shortage of pasture. Bredon (7) has studied the feeding of Pennisetum purpureum, or elephant grass to stall-fed cattle. This represents the rationalisation of a practice long common among the Baganda. Attempts are being made to encourage the supplementation of elephant grass, the type grass of Zone 'C' in Toro also, and raise the level of production.

Individual projects conducted for the Veterinary Department, Water Development Department and Agriculture Department continue to add to the list of statistical data and recorded findings. However, sadly neglected there remain the social factors regarding herders and pastoralists. None of the main departments dealing with cattle or pastoral resources has any mechanism for including social factors in their research programmes. Too often social difficulties are recognised and by-passed but not analysed. In this way the destruction of Karamoja's pasture proceeded unchecked. The problem

was illustrated by F.A.O. (8) when they stated: 'where cooperation is impossible to obtain it may sometimes be advisable to let nature take its course without water development and disease control'.

Part of the problem of fully understanding social factors rests with the organisation of administrative departments for neither the agricultural nor veterinary sections consider social problems as being within their already overloaded timetable. In areas such as Karamoja the officers of the Veterinary service are often strangers to the district and have little time to devote to understanding motivations and needs (9). All too often before an understanding can develop the field staff are transferred and another outsider has to start from the beginning. To some extent information is provided in the published works of anthropologists and sociologists such as P.H. Gulliver on the Jie, and N. Dyson-Hudson on the Karamojong, but these works are not intended to provide detail specifically relevant to production and supply problems in the pastoral sector. The importance of social factors is only now being fully appreciated with the work of researchers such as Dr. P. Rigby amongst the Gogo in Tanzania who connect the social and economic problems and illuminate the mistakes of planners who anticipate 'standard responses from all people'. One authority has placed the need for social research in the Veterinary field at the forefront in saying: 'the magnitude of the social aspects of cattle-keeping outweigh the commercial considerations and constitute the principal obstacles to any improvement of either quality or quantity' (10) At present there is little possibility beyond an educated guess, of anticipating how pastoral peoples will respond to advice and this makes the advice

of limited value. Also there is a failure to understand motives and a continuance of too many sociological myths about pastoralist behaviour. Most regrettably, there is no organ for gathering and collating social information at Government level.

EXTENSION

Once research on improvement has been carried out, the process of social change, management extension and advice can begin. Open-air talks by the Veterinary Officer or local Medical Officer are now widespread. A striking example of the extension of research findings in a traditional pastoral society is the work done at the Moroto Farm Institute. Here animals with a high milk yield were available for cross-breeding with the local stock. This scheme was intended to reduce the number of animals needed for the basically milk diet of the people and thus release more animals for sale. This would in turn reduce the pressure on grazing whilst the income from cattle sales could be spent on foodstuffs. Being able to buy more food would lessen the tribesmen's dependence on their cattle, and money would be spent on improvements. The Karamojong proved extremely enthusiastic about the cross-breeding scheme, once it was shown that the improvement was possible in the traditional environment. Unfortunately, like so many schemes it terminated with the contract of the farm manager.

If people are receptive, or even if initially not, advice on production improvement must be taken from the research level into the field. It is important that findings are demonstrated to farmers under conditions as similar as possible to their own if the demonstrations are to have any impact. Thus classes in the vernacular are held at Farm Schools and Institutions in all cattle

economies throughout Uganda. At Bushenyi in Ankole, livestock farmers from all over the Western Region come on sponsored visits to see how production on their natural pastures might be improved, within the limits of their capital and ability. In the Eastern Region, five hundred visitors were taken from Teso to see the progress at the Ongino Leprosy Centre Ranch. Progress which could be emulated by a strong cooperative. Visits are made to the Mbarara Stock Farm, Ankole Ranch and District Farm Schools, and in this way the germ of change is spread.

To the personal visits are added radio broadcasts and circulars in the vernacular. Programmes on improving traditional herds are now common on Radio Uganda. The pasture research station at Muko (Mbarara) has taken the initiative in distributing circulars on grassland management in Runyankore. The people are being made aware of their shortcomings as herders and the poor use they make of the pastoral environment. Better farmers proudly exhibit their results (and often their new cars!) at the county and district shows and this demonstrates forcefully what can be done within the abilities of the peasant farmer or traditional herder.

At the stage where improvement has been stimulated in any one area it is often necessary to institute tenurial reforms to enable any of the development schemes to become reality and this is often the most serious impediment to pastoral progress in Uganda. Changes in tenure do not necessarily include enclosure, particularly at this early stage but it becomes vital later. Great success has been achieved recently in Ankole and Kigezi through the mobilisation of clan groupings as a medium of production improvement and the conservation of resources. Once a

group has decided to act together the progressive members will use clan pressure to prevent lazy or less cooperative members from jeopardising the scheme.

In Ankole the grazing society is built around a clan. The Society is sometimes ~~ponded~~ PROVIDED with a water point so that the group does not have to keep moving during dry periods. Each society normally occupies a grazing radius of four miles and organises the members into cooperatives at the muluka (parish) level. Members contribute money towards the construction of dip tanks and receive a subsidy of up to shs.5,000/- from the Government once the members have convinced the authorities of their competance and ability. At the same time herders agree to accept pasture rotation and careful dipping against East Coast Fever though where members are too poor to buy a dip, the Government is prepared to subsidise a hand spray. The use of clan grazing societies contrasts sharply with the former problems of communal grazing when the only prevalent attitude was indifference, for the grazing society has a leadership through which instruction is channelled. In 1966 there were seven such societies in the west, five in Nyabushozi and two in Kajara. By 1968, the number had risen to fifteen.

In Palibek, Acholi, the clan has again been used as the unit of development, and the same process has occured in Kinkizi and Bugangazi (Kigezi). In Kigezi, the two schemes are designed to fatten animals from two to four years of age. The members have already started fencing. In Lango, the formation of cooperative producer groups is developing rapidly but with a slightly different organisation. In Lango, one member looks after the animals for one week and another member the following

week and so on. This allows the other members to give close attention to their cotton and other crops. Drugs and other production improvements are bought communally and herd improvement and pasture upgrading commences once the society has proved itself a workable body. Although, in 1966 the few grazing societies mentioned were all at a very early stage, the concept of concerted group action is overcoming the prohibitive cost of fencing and social indifference. It is only natural that the pastoralists of Ankole wish to improve their pastures and animals for these are their livelihood and their pride. What was lacking before was the social organisation for mobilising advice and action. Unlike other attempts to revert to traditional methods, ~~e.g. Group Farms,~~ the grazing societies have achieved a considerable measure of success. However, as more sophisticated improvements such as pasture reseeding or cross breeding are planned enclosure becomes essential and the grazing societies are already considering this step.

There unfortunately were no records of enclosure for beef rearing in Uganda in 1966 but despite the strong social pressures operating against fencing communal range, fences are becoming a feature of parts of Teso, Bunyoro and Ankole. The necessary legislature for enclosing rangeland is often lacking in Uganda and the problem was illustrated by the Report of the Special Commissioner in Ankole 1962 (11). In Buganda, where 'mailo' land and a freehold concept has been an established concept since the Johnston agreement, the problems of enclosure and improved production from improved pasture and stock have been to a large extent, overcome though only in the dairy sector. In areas such as Teso, Karamoja or Ankole where a tradition of communal pastoralism is

well established the problems are enormous and the tearing down of fences is common (12, 13) though with the advent of clan rather than individual enclosure, the problem may become less acute.

Added to the social problems of fencing outside Buganda is the question of cost in relation to area. In the strongly seasonal grasslands of the northern plateau, Bugungu and Ankole a larger area is required to support one beast than is the case in the south. Therefore the cost of fencing is higher for an equivalent number of animals. Thus the problem of enclosure becomes financially greater as the carrying capacity of the natural range diminishes despite small economies of scale.

WATER DEVELOPMENT

In addition to natural water supplies, cattle in Uganda have been provided with a large number of dams and tanks. Artificial water supplies have been constructed in many areas either to open to grazing an area which previously lacked adquate surface water or to see animals through seasonal shortages. Other location factors have included:

a) Checking the movement of stock and the transmission of disease (14)

b) Preventing the proliferation of inter-tribal hostility over watering points,

c) To provide water for trade cattle in transit,

d) To provide water for anti-tick sprays and,

e) To provide focal points for pastoral development.

Boreholes, though they may assist in watering cattle during the long dry season, take a very secondary place to dams and tanks.

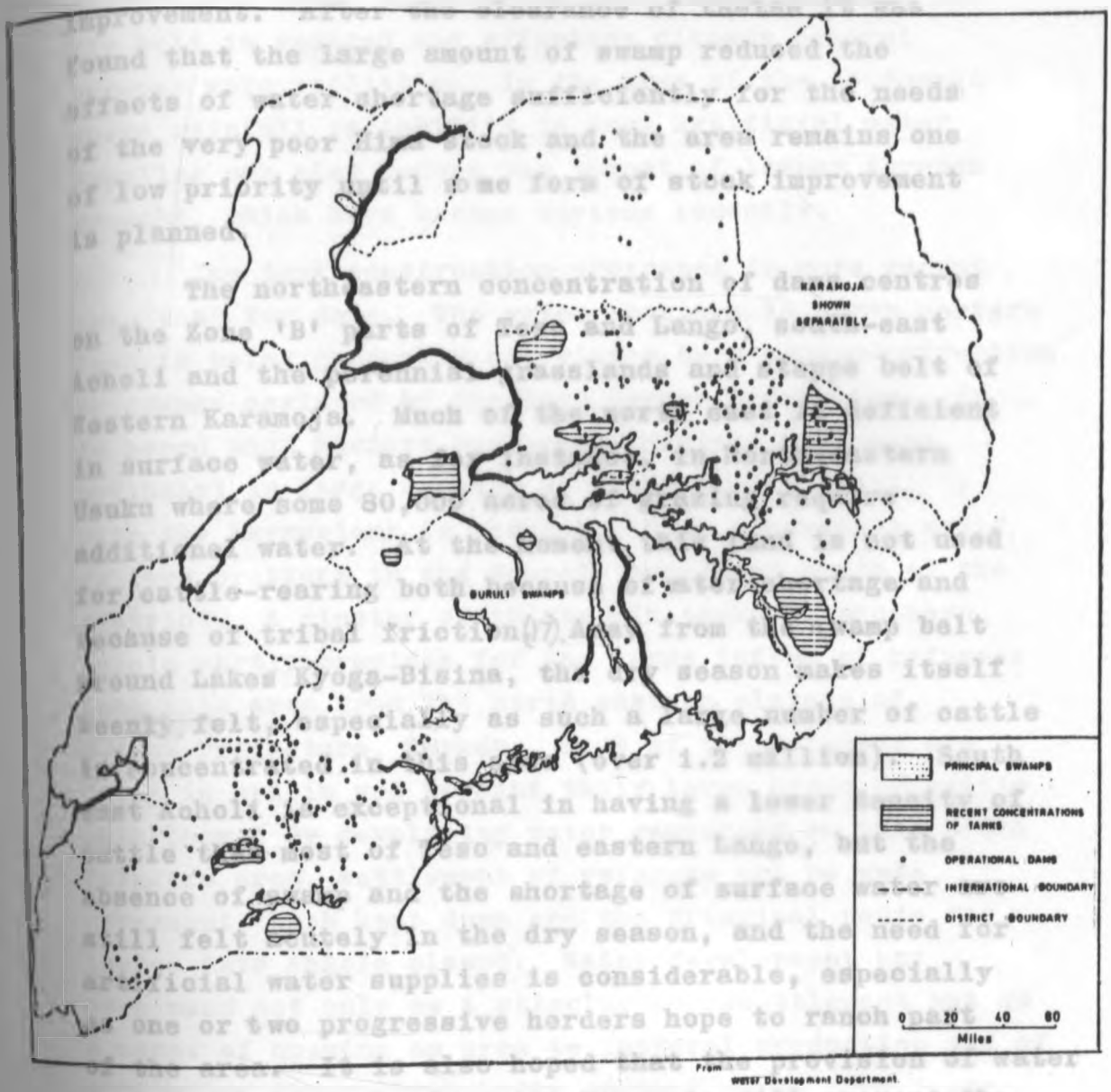
In the inter-war period when the provision of artificial water supplies for cattle began on a large scale, the effort was directed towards dam construction. Without the large scale modern earth-moving equipment available today it was much easier to build and maintain a dam wall than a 750,000 gallon tank dug out of the ground. Unfortunately, much of the country where water was 'most needed' at the time is topographically the least suited to dam construction. The programme of installing dams was concentrated mostly in the western plains of Karamoja. There the land is remarkably flat and cut into only by sharp-sided seasonal water-courses, quite unsuitable for damming back. Dams had, therefore, to be extremely long, situated at the end of shallow depressions. These dams ponded back great areas of water having no great depth and presenting a broad evaporation surface to the thirsty north-easterly winds from Turkanaland. With the heavy concentrations of rainfall during the tropical storms and the very high run-off factor from the compacted soils, dams were often inundated and washed away(15) Map 18 shows the remarkable number of dams in Karamoja which have been 'seriously damaged' or 'lost'. In Ankole the more accidented terrain was more suited to dam construction. There however many dams were choked by serious weed growth.

After 1946 it was decided that construction work should concentrate on ground tanks. These are simply large excavations made in sites chosen to provide the best chance of providing and retaining water. Unlike many dams, the surface area of water is small compared to the depth and this reduces evaporation. Water is pumped from the tanks into concrete drinking troughs

so that cattle cannot infect the source or damage the earth walls. The Ugandan authorities now have available to them sophisticated earth moving equipment which can construct a 750,000 or 1,000,000 gallon tank at a suitable site in a very short space of time. As tanks are not built across known water courses their siting presents some problems for they rely on local rainfall and groundwater conditions for their supplies. Thus, it is not uncommon for one tank to be full and another nearby nearly empty(16)

The location of dams and tanks (1965/66) is shown in Map 22. The location factors, as detailed above, have been various and there has been no unified water development policy. There are, in fact, several different organisations in Uganda dealing with water development and some duplication has occured in the past. At the request of a district administration, government office or private individual, if finance is forthcoming, water will be provided. If location and quantity of water resources were 'ideal' from the Water Development standpoint, each animal would have year round access to approximately 10 gallons of water per day which enables a suitable complementary intake of dry matter and a satisfactory level of weight gain. The water development 'ideal' is not, as Karamoja showed, always to the overall benefit of the district.

The dam construction programme started in the 1930's and concentrated initially, as has been mentioned, on two of the main pastoralist areas: the northeast and the southwest, where rainfall reliability is low and cattle numbers are large. The third pastoralist area Bulemezi/Buruli might appear neglected today for it has many cattle, an unreliable rainfall, but very little water development. However, at the time of the main


WATER DEVELOPMENT FOR PASTORAL PURPOSES 1965/1966
KARAMOJA SHOWN SEPARATELY
BURULI SWAMPS
PRINCIPAL SWAMPS
RECENT CONCENTRATIONS OF TANKS
OPERATIONAL DAMS
INTERNATIONAL BOUNDARY
DISTRICT BOUNDARY
0 20 40 60
Miles
From Water Development Department.

Map 22.

dam building programme, the area of north Mengo was tsetse country and there was little call for water improvement. After the clearance of tsetse it was found that the large amount of swamp reduced the effects of water shortage sufficiently for the needs of the very poor Hima stock and the area remains one of low priority until some form of stock improvement is planned.

The northeastern concentration of dams centres on the Zone 'B' parts of Teso and Lango, south-east Acholi and the perennial grasslands and steppe belt of Western Karamoja. Much of the north east is deficient in surface water, as for instance, in North-eastern Usuku where some 80,000 acres of grazing require additional water. At the moment this land is not used for cattle-rearing both because of water shortage and because of tribal friction(17). Away from the swamp belt around Lakes Kyoga-Bisina, the dry season makes itself keenly felt, especially as such a large number of cattle is concentrated in this area (over 1.2 million). South east Acholi is exceptional in having a lower density of cattle than most of Teso and eastern Lango, but the absence of swamp and the shortage of surface water are still felt acutely in the dry season, and the need for artificial water supplies is considerable, especially as one or two progressive herders hope to ranch part of the area. It is also hoped that the provision of water near the eastern border with Karamoja will prevent the movement of cattle around the Orom massif bringing the danger of Pleuro-pneumonia which results from contact with Jie herds.

The cluster of dams in Ankole and western Masaka is designed to anchor the Hima cattle and reduce the need

for a seasonal search for water. If the cattle distribution can be anchored around a series of watering points the threat of movement into the margins of the fly belt is reduced and effective disease control becomes more realistic. In the area of the southwest where rainfall reliability is low, artificial water supplies can also reduce the threat of losses through drought, which have become serious recently.

The tank construction programme is more recent than that for dams. The water shortage in north eastern Teso is being gradually alleviated by a tank-construction programme assisted by the West German Government. It is hoped that herders and cotton growers will move northeast in large numbers as inter-tribal hostility with the Karamojong is reduced. Such a movement would relieve pressure in the densely populated south of the district. A cluster of thirty six tanks in southern Ankole partly provides for the large influx of refugees into this area from the north eastern plateau of Byumba Prefecture, Rwanda. Most of the refugees are Tutsi in origin and brought their large herds of cattle with them. By developing water resources in this south Isingiro area, settlement of refugees can be made permanent, bush kept down and the principal route for tsetse into Ankole closed. Water development has been used not only as a stimulus to resettlement but as a means of opening an area to pastoral production and of protecting the ranching herds further north from tsetse.

The construction programme for tanks in Uganda is at present rapidly expanding and, with the aid of West German loans, work has been completed in Bunyoro, Lango, Teso and Karamoja. This recent work adds to the three hundred tanks completed under the First Five

Year Plan. The twelve tanks built in southeast Bunyoro (chap.13) have become integral parts of development programmes in the improvement and transformation sector, having been sited on group farms and ranches. It is hoped that adequate and clean water will reduce the trekking distance to less than two miles and reduce the parasite count in this area. In this way, weight loss and disease problems may be reduced. Also, in order that helminthic parasites may be successfully controlled, water will be pumped into troughs and there will be no opportunity to contaminate the water source. Previously artificial water supplies quickly became contaminated, but now the drinking area is separate from the main body of water.

Recently, since early 1966, the size of the normal tank unit has increased from 500,000 galls. in the early stages to 750,000 for the West German programme to a present standard of 1 m. In Karamoja, however, the tall stands of Hyparrhenia in West Pian have become the focus of a scheme to build six, six million gallon tanks with a serving radius of 3½ miles. each It is to be hoped that this will not add to the destruction of the already diminished savannas of Pian. In addition to the tanks constructed in Lango, Teso and Bunyoro under the West German Scheme, further tanks are to be built in Agago (Acholi) and requests have been made for twenty in Buruli and Bujenje (Bunyoro), fifteen in Rukiga and Ruzhumbura (Kigezi) and 25 in Nyabushozi (Ankole) north of the ranching scheme (18). Many of the tanks constructed since 1964 have been for ranching companies and examination of these will be left to the last chapter.

With the growing standard of health and improved production in the national herd it is necessary to

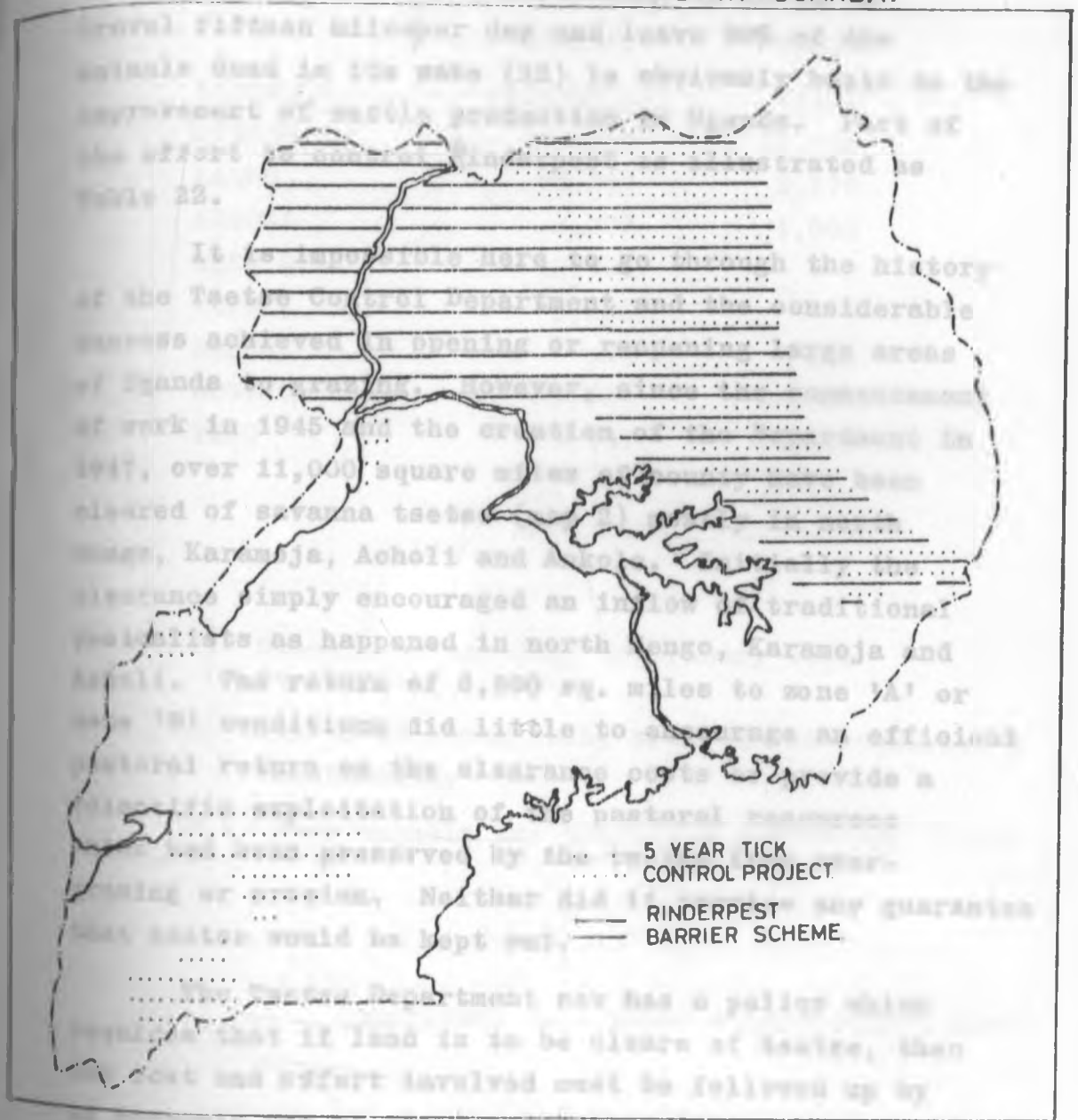
consider water supplies not only for drinking but also as a concomitant of the spraying programme. In order to spray or dip the 2,500-3,000 animals passing each week through a communal dip (19) it requires considerably more water than can be carried by hand. It is necessary to ensure a steady water supply if tick control by dipping or by spray race is to succeed. Already requests for water as part of an East Coast Fever control programme have come from Paimol, Adilang and Parabongo divisions of Agago county (Acholi), Naam Okora in Chua (20) and Omoro gombolola in Moroto county, Lango (21). These developments would be spaced at intervals of six to eight miles, deal with 500/1000 head of cattle and provide the basis of an adequate protection against tick borne disease.

DISEASE CONTROL

The second major constraint in the physical environment, disease, has been the field for the most spectacular work in the improvement of beef cattle production. Large areas have been opened up to cattle, mortality has been considerably reduced and the productivity of some areas improved.

Priority was given initially to controlling the major epizootic diseases of Rinderpest and Trypanosomiasis. The last major scourge of Rinderpest occurred in the 1940's when, with tsetse it swept through Acholi. By careful attention to mass vaccination the threat of Rinderpest has been contained behind a 'barrier' of regular treatment (Map 23) covering West Nile, Acholi, parts of Lango, Teso, Bugisu, Bukedi and Sebei. The project is part of a wider programme under the sponsorship of F.A.O. (Joint Project No.15) and was formerly designed to cover much of Africa. Political circumstances have made the comprehensive plan impossible but the Uganda section continues

RINDERPEST AND TICK CONTROL IN UGANDA.



Veterinary Dept. Records.

Map 23.

successfully. Rinderpest cases are now held to below thirty per annum and all within Karamoja. The removal of a disease which has been known to travel fifteen miles per day and leave 90% of the animals dead in its wake (22) is obviously basic to the improvement of cattle production in Uganda. Part of the effort to control Rinderpest is illustrated as Table 22.

It is impossible here to go through the history of the Tsetse Control Department and the considerable success achieved in opening or reopening large areas of Uganda to grazing. However, since the commencement of work in 1945 and the creation of the Department in 1947, over 11,000 square miles of county have been cleared of savanna tsetse (map 2) mostly in north Mengo, Karamoja, Acholi and Ankole. Initially the clearance simply encouraged an inflow of traditional pastoralists as happened in north Mengo, Karamoja and Acholi. The return of 6,500 sq. miles to zone 'A' or zone 'B' conditions did little to encourage an efficient pastoral return on the clearance costs or provide a scientific exploitation of the pastoral resources which had been preserved by the tsetse from over-grazing or erosion. Neither did it provide any guarantee that tsetse would be kept out.

The Tsetse Department now has a policy which requires that if land is to be cleare of tsetse, then the cost and effort involved must be followed up by an economic use of the cleared land (23). An exception to this arises where clearance is necessary to protect established areas of pastoral development nearby. As it costs approximately 3/- per acre to remove the tsetse fly,

TABLE 22

RINDERPEST VACCINATION IN 1966

DISTRICT	ROUTINE VACCINATION[1]	TRADE STOCK[2]
KARAMOJA	198,096	28,734
LANGO	68,342	3,570
ACHOLI	8,376	1,003
WEST NILE	19,938	-
TORO	3,182	-
BUKEDI	126	252
BUGISU/SEBEI	26,280	6,424
TESO	23,718	22,163
	348,058	62,146

1. Stock vaccinated by Veterinary team on tour.

2. All trade stock being transferred requires vaccination.

N.B. some animals are therefore vaccinated twice.

Veterinary Department Annual Report 1966.
p.3. T.1.

indiscriminate removal of the fly would be a costly and often fruitless activity. Unless land can be brought swiftly into use after clearance, then heavy recurrent costs will be incurred in keeping the tsetse habitat down and the fly out - all apparently to no purpose.

In the first Five Year Plan, extensive earlier gains of land from tsetse in north Mengo were followed by:

600 square miles cleared in Bunyoro,
600 square miles cleared in Ankole,
300 " " " " Karamoja,
300 " " " " Lango,
100 " " " " Acholi.

Serious attempts were made to develop the cleared land. Some of it such as North Mengo had climatic conditions suited only to pastoralism. Other parts, such as Bunyoro, were climatically suited to crops. Even in Karamoja an attempt was made to plan an integrated crop and cattle area in the cleared zone of the Napore foothills. Success so far has been limited.

The process of tsetse clearance in Uganda follows a set pattern, though the methods used may vary. By spraying, bush clearing or hunting out the game animals favoured as hosts by tsetse, the fly is gradually driven back until some natural barrier, such as a river, is reached. Where no natural barrier is present then a zone some three to four miles wide will be 'sheer-cleared' to remove the tsetse habitat. These zones have been termed 'consolidation lines' (24) as they are intended to consolidate the gains made and prevent re-entry of the fly. The tsetse department encourages dense settlement of the 'consolidation line' by peasant cultivators wherever this is climatically possible, as this effectively bars the re-entry of the fly. The alternative is regular

clearing of regenerating bush. So far, consolidation lines have been constructed south of the Mbarara/Lyantonde road, in an arc around Masindi and along the Nawus Lokulus watershed in Karamoja.

The problem of Pleuro-pneumonia over most of Uganda has been removed by careful testing and slaughtering of animals which react positively to tests. At present attempts are being made to eradicate the disease in its last stronghold: the northeast, particularly Karamoja. Cases of Pleuro-pneumonia are now few but the presence of the disease is enough to require considerable measures to protect the cattle trade, protect the dairy industry in the Fertile Crescent and establish a dairy industry in the Fertile Crescent and establish a name for Uganda as a 'clean' area for meat exports. The few cases of Pleuor-pneumonia which are recorded annually in Karamoja rarely exceed 50 to 100 and do not threaten the level of production by direct mortality. However, as there is no reliable prophylaxis against the disease and the problem of undetected 'carriers' remains a menace the total eradication of this virus infection is considered basic to the improvement of cattle production in Uganda.

Annually the eradication programme is carried out by careful testing of animals in Karamoja and ensuring the immediate slaughter of positive reactors. To combat the threat from endemic areas in Turkana and the southern Sudan, east of the Nile, quarantines have been constructed for all animals detected as entering from known infected areas. The recent spread of Pleuro-pneumonia into Acholi, Teso and in trade animals to Buganda, has led to the tightening of controlls over illegal entry. A quarantine has been established at Madi Opei in the north east of Acholi to house and control the Sudanese

refugees and their cattle. A small unofficial cattle market has been set up under veterinary supervision to encourage the herders to stay in one place. Over 7,000 animals were impounded in 1966, of which 100 had Pleuro-pneumonia. In Karamoja a quarantine has been established at Kamerisogol. By the strict control of animals some measure of control over the disease may be effected, but all too often the refugee Sudanese exchange animals with the Karamojong, Jie or Dodoth and in this way animals find their way far into Karamoja and account for the geographically diverse, small, isolated outbreaks which have featured in the 1960's (25). An attempt to police the district more efficiently with the Special Force is designed to cut down the raiding both from and into Turkana and the introduction of disease from the east but clearly this is an enormous problem. Increasing mobility on the part of the Veterinary Department has had a large part to play in isolating outbreaks and preventing heavy mortality or disruption of the trade.

With the control and gradual containment of the epizootic diseases the enzootic and almost omnipresent menace of East Coast Fever has come to achieve greater importance. It has been estimated that solely by controlling this one disease the cattle population of Uganda could be raised by over 725,000 head in ten years (26), making available possibly an extra 90,000 mature steers per annum. For Ankole, it has been stated that the income from cattle can be raised by 30% if careful attention is paid on to the spraying of stock.

As with Pleuro-pneumonia there is no form of effective prophylaxis against E.C.F. and if the disease is to be controlled then careful attention must be paid

to the eradication of the vector, the tick, and its favoured habitat. Originally a control programme was initiated giving a subsidy on spraying equipment and spray (acaricide). However, extension advice at the individual farmer level is difficult to achieve with the limited field staff,available, and peasants neglected to spray once the ticks vanished from the animals so that soon both ticks and disease returned and the farmers became disillusioned. Over much of northern Uganda spraying was carried out religiously until the dry season and then the animals went on trek to water and the tick population increased again with the rains.

Since 1964 there has been a considerable growth in the communal or 'self-help' dipping schemes in Uganda. Most of this work has been concentrated in Ankole district and is associated with the grazing schemes mentioned earlier. Groups willing to dip their cattle regularly and able to provide part of the cost of the dip will receive a subsidy on construction equipment from the Veterinary Department. It is, theoretically possible to reduce the deaths from E.C.F. under these conditions to 5% of the total calf crop. (27). Spraying at Ongino Leprosy centre brought the fatalities down from 45% to 15% and on the Bunyoro Ranch from 17% to 5%. Figures are not available for the communal schemes as yet.

The considerable increase in interest shown towards spraying encouraged the development of a phased plan for the eradication of E.C.F. commencing in 1966 and ending in 1970 and the estimated effects of this programme are tabulated as table 23. It is evident that the control of E.C.F. holds the greatest potential for increasing the Uganda national herd and the annual

surplus of meat available from national sources.

The plan designed to operate in five main areas:

1. Kyaggwe, small parts of Busoga and Kyoga county of Lango. Here this belongs to a dairy development programme and is outside the scope of this work.

2. Areas of Lango, Acholi, Teso, Bugisu and Sebei along the Karamoja border and almost following the present Rinderpest vaccination 'barrier zone'. As Karamoja is largely tick free it is planned to extend this condition westward to the cattle country of the Eastern and Northern Regions. 135 dips are to be constructed.

3½ In and around the Ankole Ranching Development area. This will include Nyabushozi, Mitoma, Kashari, Rwampara and Kajara in Ankole and Kabula and Mawagola in Masaka. This will add to the programmes already operating in Mitoma and Kashari, Nyabushozi and Kajara. 29 dips will be provided.

4. In the area of the Semliki plains beyond the Ruwenzori mountains the isolated 17,000 head herd of cattle will be treated at the 4 dips to be provided.

5. Another isolated area, this time Bugungu county of Bunyoro, will receive 2 dips to serve the 6,000 head of cattle (28).

The work of spraying and dipping will be accompanied by a programme of extension work to show herders how to maintain the calves they are protecting. Herders will also be taught how to use the spray and the limitations of spraying or dipping.

TABLE 23.

EAST COAST FEVER VECTOR TICK ERADICATION PROJECT.

PHASE I (1966/70)

Effect on size of herds of reducing calf mortality from 20% to 5% per annum

AREA	Cattle population 1965	Cows 1965	Male stock (5 yrs. old available for sale during 10 yr. period 1966/1975. at 20% calf mortality (a)	at 5% calf mortality (b)	Increase (c)	Total number of additional cows and immature heifers, steers and bulls available at the end of ten year period due to tick control.
(a) High Potential (Kyandondo, Busiro, Bugerere, Kyoga and Butembe-Bunya Counties)	89,000	32,000	58,816	72,352	13,365	106,690
(b) Karamoja border zone	390,000	137,000	251,766	309,757	57,991	481,205
(c) Ankole/ Masaka	100,000	40,000	73,520	90,440	16,920	130,200
(d) Semiliki plains (Toro)	17,000	5,500	4,411	5,426	1,015	7,812
(e) Bugunga (Bunyoro)	6,000	500				
TOTALS:	602,000	215,000	388,513	477,975	89,282	725,807

F.A.O. 1967

Note: Calculations based on a 90 percent calving rate per annum, 10 percent wastage of breeding cows per annum, 50/50 sex ratio of calves and heifers calving at three years of age.

In the first year of the programme (1966) the number of animals being sprayed rose 5% in 1965 to 12%. It is hoped eventually that the proposed 'clean' areas will have twice weekly spraying enforced by law and that the area clear of ticks will gradually expand outwards until .E.C.F. is eradicated. In Busoga alone, the number of cattle being treated against ticks rose from 30,406 in 1965 to 72,000 in 1966. (29).

Another rather older tick control programme is conducted by the Veterinary Department on the borders of Pian (Karamoja) and Teso. Along the line of the border the Veterinary Department has constructed dipping tanks in which animals may be dipped free of charge. Interest concentrates, however, on the return journey at the beginning of the wet season when the grasses in Teso are beginning to become tall and the humidity favours the development and breeding of ticks. The Veterinary Department tries to ensure that all animals moving back to the wet season grazing area are put through the free dips and ticks destroyed. In 1966 250,737 animals were treated by the Pian Scheme. By killing off the ticks at this stage, which dipping does quite effectively, the dangers of carrying both ticks and East Coast Fever into wetter parts of Central Karamoja are reduced. It was seen earlier how the area around Kadam mountain was infected in this way.

ENCLOSURE, TENURE AND THE IMPROVEMENT OF PASTURE AND STOCK

It is clear that a great deal of basic work needs to be done before pasture improvement and livestock upgrading can take place in the traditional sector. Apart from attention to water and disease problems, pasture and stock improvement would require an acceptable form

of tenurial security. If an area of improved pasture or a herd of upgraded cattle are to be effectively protected then some form of enclosure, or at least legal protection of the herder's area is essential. Unfortunately, over most of Uganda freehold and leasehold rights are absent and the traditional attitude towards pastoral land is communal rather than individual. If an individual were to grow crops in an area, although the land *per se* would not be regarded as his, the standing crops would provide him with inviolable rights over the area so long as the crops remain, and possibly for some time afterwards. With cattle this is not so. Keeping a herd on an area does not give the herder exclusive rights to that pasture, but only a shared stake in a communal holding.

Even where crude leases or 'forms of acceptance' are issued it is quite another problem to have these accepted by neighbours. Improved pasture attacts a neighbouring herd in times of shortage and artificial water supplies cannot be withheld from a member of the same tribe. If the developer tries to claim his improvements as his own, by fencing them, then he is likely to see his fences torn down. Customary law and the modern statute books are very much at variance here. Speaking at a meeting in Ankole recently a deputy commissioner of Veterinary Services felt obliged to state that if the tearing down of fences continued on the present scale he would 'withdraw the veterinary staff from the district'. At present, fenced pastures for improvement programmes account for less than ½% of the total national pastures.

The improvement of natural pastures in Uganda has, however, taken place without the fencing of large areas and has concentrated on reducing production constraints such as overstocking plans. Before any direct attempts can be made to improve grasses, it is often necessary in parts of Uganda to establish a working balance of animals to grazing. Where areas are overstocked, such as in Karamoja, some means of reducing cattle numbers has to be found to prevent degeneration of the grasses. Then an improvement plan can be considered. The Karamoja Cattle Scheme (K.C.S.) became an attempt at planned destocking.

The K.C.S. grew out of a military programme for obtaining cheap meat from Karamoja as part of the 1939-1945 war effort. After the war it was seen that the K.C.S. offered a means of keeping down the excessive growth rate oc cattle on the already diminishing pasture of the north-east. Some 10,000 animals were bought on average annually by the local government for the scheme and sold at rail-head auctions in the townships of the south. Pressure from southern butchers caused the scheme to be abandoned in 1964 as they thought they stood to gain if they bought directly from Karamoja. The offtake, throughout the Scheme's existence, proved insufficient to prevent the downgrading of pastures principally because the number of cattle offerred was too small and consisted of non-breeding stock.

In Lango, in the 1950's, the overgrazed nature of some parishes led to concern over declining pasture and on the advice of the District Veterinary Officer selected areas were rested. This scheme too, was later dropped, proving ineffectual, as response was slight.

Over much of Uganda various 'burning programmes' have been drawn up to prevent the degeneration of natural pasture resources and control the random firing of grasses. The programme is generally worked out by the district team, sometimes on the basis of expert recommendations. Thus for Pian county in Karamoja, the services of a member of the Veterinary research team from Entebbe were acquired to prepare a report which included the place of burning. Often the programme is the result of evaluating the place of burning in the environmental conditions prevailing locally. Thus, where there is little problem from bush such as in Bugungu (30) an early burn is recommended to provide dry weather grazing. A similar recommendation was made for the Kafu littoral. In Acholi a late burn is favoured once every 3 to 4 years in order that bush may be controlled and with it, tsetse (31). The value of a late burn lies in the accumulation of much dry material and consequently a more intensive burn when the area is finally fired (32). Much of Nyabushozi, Mitoma, Kashari Isingiro and Rwampara in Ankole have been recommended for a bush controlling late burn (33), but more valid advice awaits the results of intensive experimentation with natural grassland and burning at the Muko Pasture Station near Mbarara (34). An early burn can cause damage to grasses since at that time grasses are still actively growing and nutrients are being used up for the formation of leaf. Heavy grazing at that time could be serious and encourage the expansion of coarser grasses (35). For areas which have been mismanaged, it is recommended that they be closed for one or two years and then burned over late in the dry season. Over most of Karamoja a late burn is recommended for bush and ant control, but as was seen earlier the grasses are burned early to provide a green flush for the wandering

herds and there is little prospect of the two outlooks being reconciled.

Since the drawing-up of the district burning programmes in the mid-1950's there have been some changes of attitude as the severity of the burning problem has increased in certain districts. In Ankole, a bye-law now expressly forbids the burning of grassland (36) following the serious over-burning of 1965 and imposes heavy fines on those breaking the law. Toro has followed suit and forbidden the traditional practice of grass burning, though it will allow the scientific burning of enclosed pastures. It almost goes without saying that these improvement laws are ignored on a widespread scale. As yet the improvement of pastures and production by burning control awaits a fuller understanding of the merits and demerits of burning in different physical and cultural environments and the means to enforce the eventual programme whilst pasture upgrading awaits a suitable form of tenure acceptable at the Improvement level.

At the end of the improvement programme comes the introduction of crossbred, improved or exotic cattle. As the more sophisticated beef animals generally require 50-75% more water, are extremely sensitive to disease and must be isolated from breeding with inferior animals it is essential that the holding be fenced, equipped with sprays or a dip and provided with adequate water. These three requirements are enforced by law in Uganda for the Veterinary Department will withold permission from any smallholder wishing to range exotic or better strain cattle unless he can fulfil all these needs. It is clear that at present very little of the groundwork has been done at the improvement level and the dissemination

of improved stock is not practicable on anything but a small scale. Although communal water supplies are widely provided these require movement from the enclosed holding and this is unsatisfactory. Thus the holder must have his own water supply if disease is to be fully prevented. By early 1966 the number of exotic and improved cattle on private holdings outside ranching schemes was only a little over 100.

Recently, the Uganda Government has been importing herds of the hardy Northern Frontier Borans from Kenya. 5,098 were imported in 1967 to provide the nucleus of a national breeding herd. Animals from this source can then be sold when conditions permit, to improve holdings all over Uganda. One nucleus herd has been established at Ruhengeri in Ankole and another in Bunyoro. The Bunyoro herd has already provided animals for the cooperative livestock programme in Bunyoro (Chap.12). Most of the improved animals will however, go to the developing ranching schemes where the Veterinary Department can be assured of their careful supervision and treatment.

The Improvement of Supply

Attempts to improve the supply pattern from the traditional sector are aimed at ensuring enough animals to meet the seasonal changes in rural demand and ensuring a steady supply of fresh meat to the townships. Efforts at improvement have been directed at two main aspects of supply: encouraging the sale of more animals in the source areas and, the gradual development of a better infrastructure between seller and consumer. There has been no attempt to influence the quality of animals. All organised efforts at improvement have so far, been directed at the local government and resale

markets and not down to the village buying level. To date also, almost all governmental work has been directed at the market infrastructure and not at encouraging further sales. Even so, after thirty years of organised marketing less than one fifth of the estimated annual offtake passes through gazetted markets.

As was mentioned earlier, attempts to influence directly the sellers of cattle are extremely rare because no official agency or government department considers such action as being within its scope. Some Expatriate officers find themselves in no position to offer advice of this nature because of the very short duration of their stay in Uganda. Local government staff is all too frequently moved from one district to another before they can fully understand the motives of the people or gain their confidence. Some government work may, in fact, operate against the sale of slaughter cattle. The indiscriminate allocation of famine relief may for instance prevent cattle sales if those herders with a genuine surplus of cattle are able to receive free handouts.

Some of the larger stock areas such as Teso now have a Livestock Marketing Officer, part of whose job it is to stimulate cattle sales in the area. Local meetings are addressed in which stock owners are told to regard their animals as a form of capital, to cull their herds, to sell the surplus and to use the money for production improvement.

The development of an organised cattle market network over much of Uganda in the 1930's was the first step in improving supplies. It was impossible to purchase

animals individually in the bush in sufficient quantities to meet the needs of townships or the growing cash crops areas. Since the inauguration of county markets, a programme of change and adaptation has attempted to match the market infrastructure to a changing distribution of cattle and the changing social outlook in some areas. New markets and new forms of marketing are tried wherever an improvement seems possible. Although F.A.O. stated in 1966 that 'inadequate markets still inhibit the commercialisation of livestock (in East Africa)' it is difficult to apply this statement widely in Uganda. For although the network of markets may appear thin in areas such as parts of Acholi and the West Nile/Congo borderlands, the absence of markets is more an index of the attitude towards sale rather than a shortage of marketing facilities. Selling places were established at Warr and Paidho in West Nile, but failed to gain any popular response in the local area. Similar problems faced the cattle markets recently closed in Acholi.

In 1956, a new market was opened at Nkonge, Ankole (37) in order to provide a railside market and source of trade for the newly-opened Western railway extension to Kasese. It was intended that the market should become a new source of stock for Kampala and the early response was encouraging. Once the Bahima had disposed of all unwanted stock, sales fell back drastically. Another new market in the Western Region was opened at Rwamwanja in Toro to provide an outlet for refugee livestock belonging to Batutsi being resettled in the district. Veterinary policy is now to try experimental marketing wherever the prospects appear good and present facilities

seem inadequate. This reasoning lies behind the planning of new markets in Buddu county of Masaka.

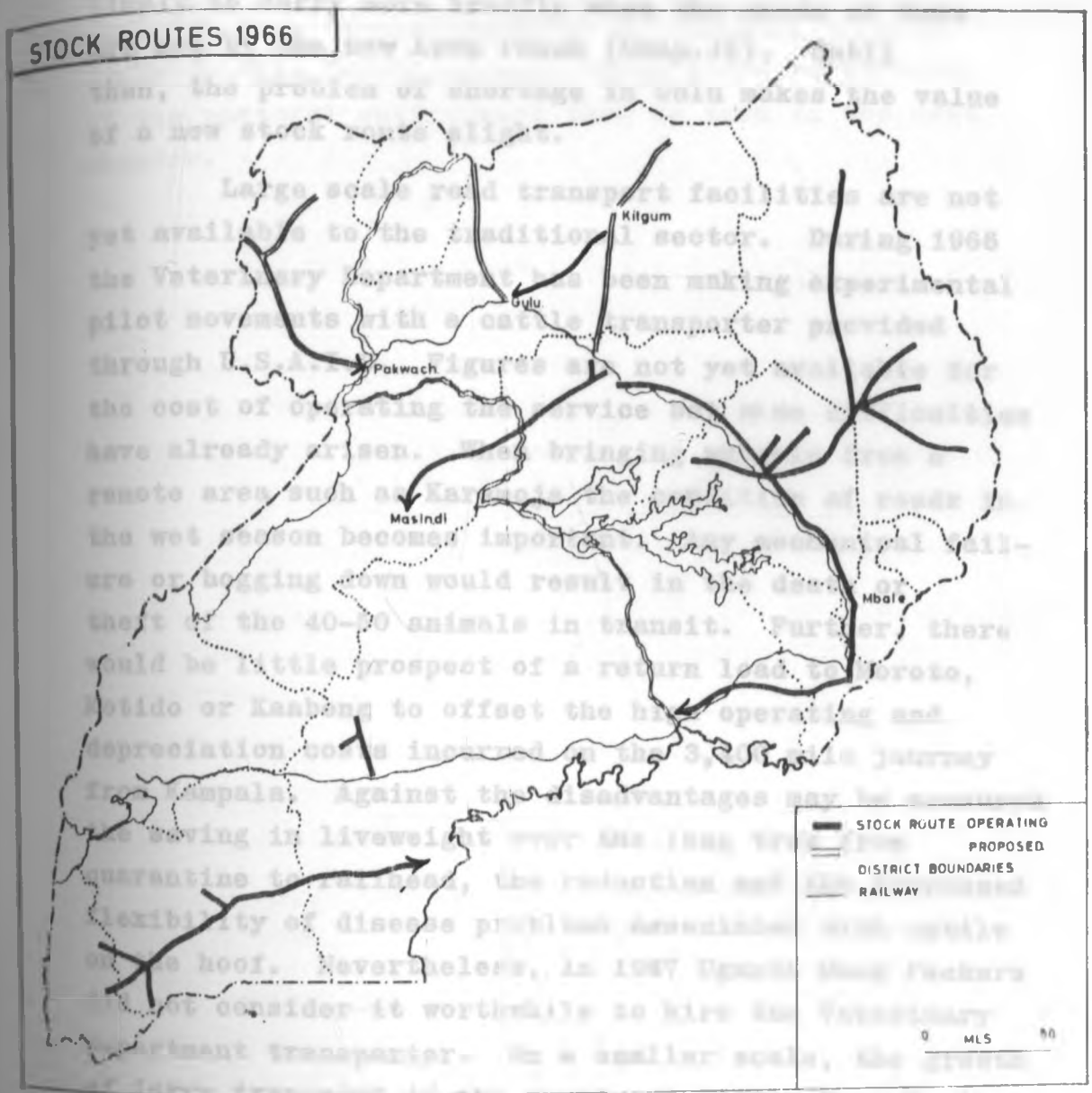
With the closure of the Karamoja Cattle Scheme in 1964 direct government activity in the cattle buying field ceased. To counter any fall in sales and also to revitalise sales in Karamoja the county markets were transformed into auctions in the same year. Under this system it was hoped that the tedious haggling would vanish and the destocking effects of large scale purchases such as those made by Uganda Meat Packers would be more likely to occur. Sales and prices certainly increased in Karamoja after the introduction of auctions but the impact of a drought soon afterwards in 1965 upset the marketing pattern and a clear assessment of auctions is not yet possible.

The building of new holding grounds and quarantines is designed to improve the flow of cattle from the source areas to the consumer areas. Increasing the number of quarantines in a district, ensures that a point of exit is left open when another part of a district has been closed by an outbreak of disease. Teso has built up its number of quarantines to six for this purpose. New holding grounds allow cattle to be kept until required for consumption and helps to iron out the differences in seasonal demand and supply. Organised holding grounds exist officially at Siroke (Bugisu), Nakaloke (for Mbale) Saaka (Toro), Namalu (Karamoja) and unofficially around many townships.

Between leaving the quarantines and delivery to the consumer lies the problem of movement. Although economics have a part to play in how the cattle travel and to where, the pattern is very strongly influenced by Veterinary control. Only reluctantly will the Veterinary Department accept the opening of new stock routes to

connect source and consumer areas. New stock routes mean more hoof movement through new areas and the threat of disease. With the extremely low capital resources at present available in the traditional supply sector there is often little alternative to moving cattle on the hoof. Some new stock routes have been suggested and are shown in the atlas accompanying the East Africa Livestock Report (F.A.O.) (Map 24). All these routes are designed to feed the recently completed northern extension of the railway to Gulu and Pakwach. One route originates at the Congo border in West Nile and will serve to move Congolese cattle to the railhead at Pakwach or the proposed new terminus at Okollo. A further route starts at the Sudan border near Nimule and continues to the Gulu station at Opit. A third route is designed for cattle from eastern Acholi moving to the railhead at Aloi, Lango. Quarantines are planed at the extremities of these routes.

The first two stock routes pose a considerable threat for they are designed to tap sources notorious for infection. In both the eastern Congo and the southern Sudan law and order have been absent for over five years and the maintenance of bovine disease control has collapsed. Cattle moved along either of these stock routes would require intensive examination and continual scrutiny. Despite this, it was seen in Karamoja that it is possible for infected animals to be illegally introduced into a trade movement. It seems unlikely that the benefits of increasing the numbers of cattle could outweigh the threat from disease which would accompany the opening of these two new stock routes. The needs of the new canning factory at Soroti (chap.12) may override this problem.


STOCK ROUTES 1966
Kitgum
Gulu
Pakwach
Masindi
Mbale
STOCK ROUTE OPERATING
PROPOSED
DISTRICT BOUNDARIES
RAILWAY
0
MLS
50

Map 24.

The third route, from Acholi to Lango, is likely to carry more traffic when the needs of Guau are met by the new Aswa ranch (Chap.12). Until then, the problem of shortage in Gulu makes the value of a new stock route slight.

Large scale road transport facilities are not yet available to the traditional sector. During 1966 the Veterinary Department has been making experimental pilot movements with a cattle transporter provided through U.S.A.I.D. Figures are not yet available for the cost of operating the service but some difficulties have already arisen. When bringing animals from a remote area such as Karamoja the condition of roads in the wet season becomes important. Any mechanical failure or bogging down would result in the death or theft of the 40-50 animals in transit. Further, there would be little prospect of a return load to Moroto, Kotido or Kaabong to offset the high operating and depreciation costs incurred on the 3,400 mile journey from Kampala. Against the disadvantages may be measured the saving in liveweight over the long trek from quarantine to railhead, the reduction and the increased flexibility of disease problems associated with cattle on the hoof. Nevertheless, in 1967 Uganda Meat Packers did not consider it worthwhile to hire the Veterinary Department transporter. On a smaller scale, the growth of lorry transport in the supply of cattle from Bugisu-Sebei to Mbale has partly resulted in the decline of Bukwa and Kaburoron markets which are isolated by the poorer mountain roads.

The extraordinary difficulties of meeting demand from traditional sources has encouraged the townships to turn increasingly to more reliable supplies from 'transformation' or ranching schemes. It is to this fairly recent, large scale reappraisal of the pastoral environment that we turn in the next chapter.

NOTES

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3. Karamoja District Plan (1958 revision) + maps (Government Printer, Entebbe, 1958.
4. Wilson J.G., 'Opportunities for Pasture Improvement in the Various Ecological Zones of Karamoja' E.Af.Ag. & For.Jnl. spcl.edn. March 1962.
5. Pasture Agronomist, Veterinary Office, Mbarara, 'Work in Progress at Muko Range Station,' cyclostyled.
6. See Sessional Paper No.4 of 1956 for an earlier view regarding the introduction of exotic blood into Uganda.
7. Harker and Breedon, 'The Effects of Elephant Grass Feeding and Maize Supplementation on Indoor Fed Bullocks Trop.Ag. Vol.40, p.310 1963.
8. F.A.O. East African Livestock Survey, cyclostyled draft 1966.
9. The efforts of Veterinary staff in various parts of Uganda such as Ankole, Buganda and Bunyoro to get work translated into the local vernacular is a big step towards the transforming research findings into development programmes in the field.
10. International Bank for Reconstruction and Development, 'The Economic Development of Uganda' Government Printer, Entebbe, p.161 1961.

11. The Report of the Commissioner Enquiring into Land Tenure in Ankole, Government Printers, Entebbe, 1962.

12. Mr. Ndebesa, a Kenyan progressive farmer living near Mbarara, pers. comm.

13. District Veterinary Officer, Lira, pers. comm.

14. Veterinary Department, Annual Report, 1955, p.11.

15. Balmer, R.N. Water Development Department, pers. comm. Kampala 1967.

16. District Veterinary Officer, Mbarara, letter to Veterinary Headquarters.

17. See an essay by J. Olupot in the 1968 edition of the 'Geographer', the publication of the Makerere Geographical Students' Association on Teso.

18. Western Regional Veterinary Office, suggestion to Headquarters, November, 1966.

19. This total is based on the throughput of dipping schemes in Kajara, Ankole.

20. Regional Veterinary Office (Northern Region) letter to Headquarters, November, 1966.

21. Ibid.

22. Thomas and Scott 'Uganda' - see section on 'Livestock', 1935.

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24. Wooff R., 'Notes on the Methods of Consolidation in Uganda' (cyclo) available from the Tsetse Control Department, Kampala.

25. See Annual Reports of the Veterinary Department for years 1960-1966.

26. Mann I.D. a paper read to the F.A.O. conference on 'Crop and Livestock Processing in East Africa' dealing with the Livestock Industry in Uganda', Kampala, 1967.

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28. Ibid. (printed version) volume 1, page 100, F.A.O. Rome 1967.

29. Veterinary Departments, Busoga Reports for years 1965 and 1966.

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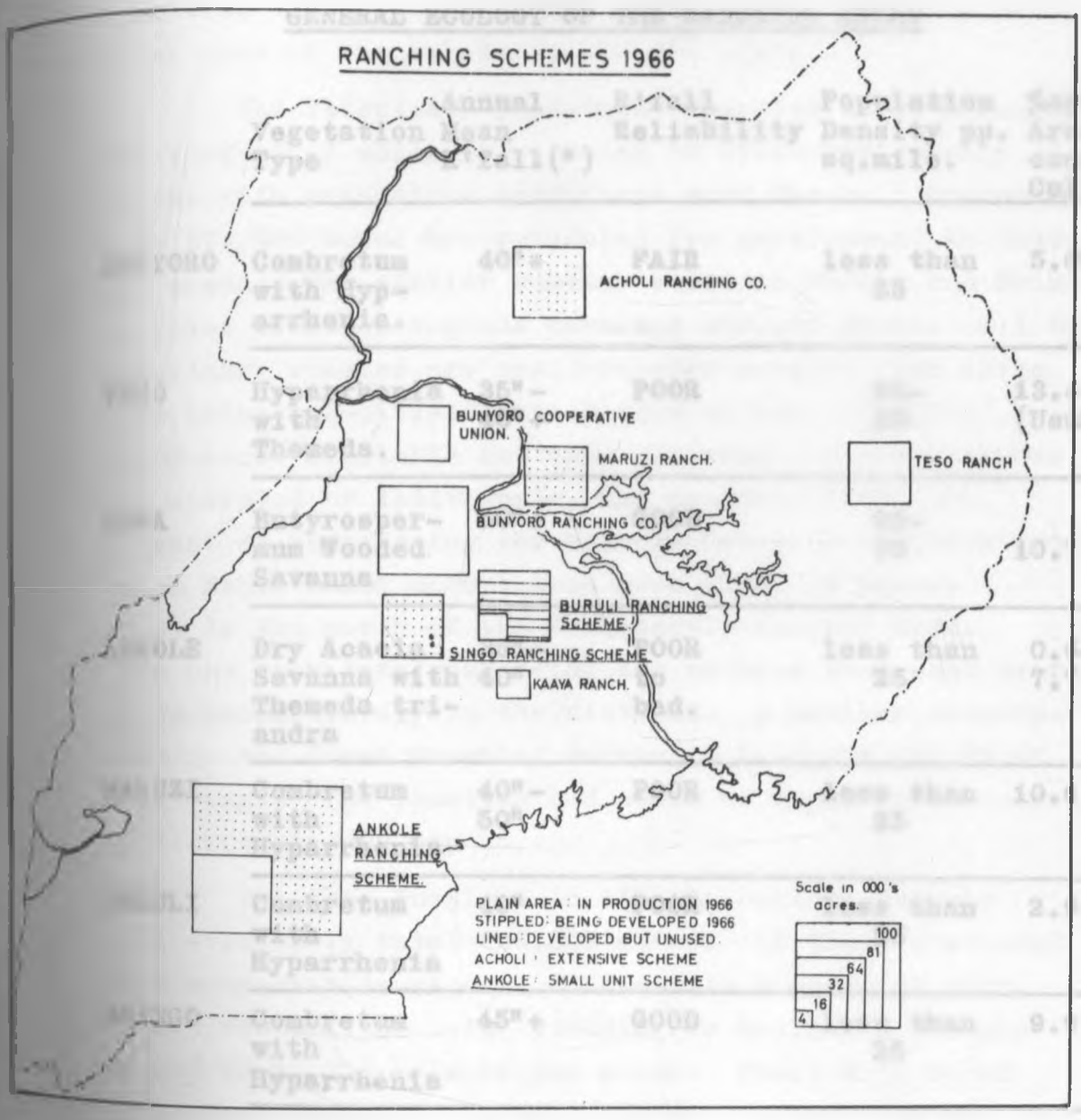
Chapter 15

TRANSFORMATION

Transformation schemes are designed to produce a rapid increase in the pastoral productivity of an area through the unhindered application of scientific techniques, strong management and large amounts of capital. The supply of stock to the market is also rationalised and related to location and level of prevailing market prices, and quality requirements. Although both 'Improvements' and 'Transformation' achieve the same end product eventually, a developed ranch, the methods of development differ greatly. Whereas 'Improvement' attempts to introduce development gradually into the existing systems of stockholding, 'Transformation' starts by ensuring that the development area is cleared of both local stock and local people. The process of 'Transformation' then in theory operates rapidly to bring the area up to a high level of production and productivity without the continuous burden of working through traditional techniques and ideals. Though this is the process in theory, it will be seen that problems of the physical and human environment have often checked the speed and thoroughness of ranch development in Uganda.

There are ten major ranching schemes at present in Uganda operating under various systems of management and at various scales and levels of development. All are located in the wooded or dry savanna belt. (Map 25). A holding company, Uganda Livestock Industries Ltd., operates schemes at Aswa River, Acholi, southeast Bunyoro, the Maruzi area of Lango, in Usuku county of


RANCHING SCHEMES 1966
ACHOLI RANCHING CO.
BUNYORO COOPERATIVE UNION.
MARUZI RANCH.
TESO RANCH
BUNYORO RANCHING CO.
BURULI RANCHING SCHEME.
SINGO RANCHING SCHEME.
KAAYA RANCH.
ANKOLE RANCHING SCHEME.
PLAIN AREA: IN PRODUCTION 1966
STIPPLED: BEING DEVELOPED 1966
LINED: DEVELOPED BUT UNUSED.
ACHOLI: EXTENSIVE SCHEME
ANKOLE: SMALL UNIT SCHEME
Scale in 000's acres.
100
81
64
32
16
4

Map 5.

TABLE 24

GENERAL ECOLOGY OF THE RANCHING AREAS

	Vegetation Type	Annual Mean R'fall(")	R'fall Reliability	Population Density pp. sq.mile.	%age Area of county Cultivated.
BUNYORO	Combretum with Hyparrhenia.	40"+	FAIR	less than 25	5.6%
TESO	Hyparrhenia with Themeda.	35"-40"+	POOR	25-50	13.4 (Usuku)
ASWA	Butyrospermum Wooded Savanna	50"+	GOOD	25-50	10.7
ANKOLE	Dry Acacia Savanna with Themeda triandra	35"-40"	POOR to bad.	less than 25	0.6-7.7
MARUZI	Combretum with Hyparrhenia	40"-50"	POOR	less than 25	10.6
BURULI	Combretum with Hyparrhenia	40"	POOR	less than 25	2.9
SSINGO	Combretum with Hyparrhenia	45"+	GOOD	less than 25	9.9

Sources: Uganda Atlas, 1962
International Bank Report p.10 1967.
E.A.Royal Commission Report, 1955.

northeast Teso. These schemes are operated on the American or Australian system of extensive management involving division into large blocks and paddocks. The total area of the scheme is 225,000 acres.

The Veterinary Department operates three schemes, the largest of which is situated in Nyabushozi county of Ankole with extensions into north west Masaka. Currently some 375,000 acres are scheduled for development in these two areas. Two smaller schemes exist in Buruli and Ssingo counties of north Buganda covering 132,000 acres. All the Veterinary schemes are small-rancher schemes, the large area being sub-divided into blocks of approximately 3,000 acres available on lease. Several private schemes are operated by individuals, and co-operatives, the largest of these being the Bunyoro Grower's Co-operative Union Ranch which occupies an area of sixty square miles to the north of the Nakasongola-Masindi Road. This has been developed using the returns from cash crops grown cooperatively in the district. A smaller development is the Kaaya Ranching Scheme in Bulemezi county of West Mengo. The location and scale of these operations is illustrated on Map 25.

The area involved in all the various schemes will eventually total 705,000 acres. If this is stocked at a conservative rate of 1 animal to 6 acres, a total of 119,166 will be held, yielding an estimated offtake of 20% or 23,833 animals per annum. These will be of a consistently higher grade than the Ugandan animals entering the trade in livestock at present and may be directed to the markets of nearby townships or the Kampala-Mukono-Jinja belt. As well as slaughter animals, the ranches will also provide the nucleus of a good quality

breeding herd for development in other areas. The present need for the ranches to build up their own breeding herds will necessitate a large buying programme and could lead to a decline in the number of Ugandan animals being transferred to the consuming areas over the next few years, cattle being directed instead onto the schemes. The Uganda Livestock Industry's ranches require 15,000 head each year for the first two years and then 13,000 head in the third year. The Ankole scheme hopes to provide a minimum of 200 animals per unit and, therefore, for 125 units they will require a basic minimum of 25,000 head. Many of the animals for the Uganda Livestock Industry's schemes are, however, being brought from the gradually declining European ranching area of the Kenya highlands, the north of Kenya and the Sukumaland area around Mwanza in Tanzania. The Ankole Ranch, however, hopes to provide its stock from the local area and gradually upgrade from a nucleus of imported Kenyan breeders. Wherever the cattle are obtained it is essential that these breeding requirements are met quickly for: 'experience has shown that, to be successful, ranches must be fully stocked at the outset' (1).

It is hoped that, as well as providing a regular supply of high quality animals, the ranches will also relieve overstocking in some parts. The proposed scheme for fattening immatures in Teso could provide a valuable means of absorbing the large numbers of cattle offered in the dry season in Karamoja and in the cotton "off-season" in Teso, and thus ease the pressure on traditional natural pastures in these districts.

The ranching schemes are all located in areas which are, or were until recently, in the Low Stock

Density zone, zone "D". The reasons for the low density included tsetse, water shortage, and security; factors which have been critical in jeopardising much of the subsequent ranch development. These three factors operated as conservators of the natural resources so that tsetse clearance and water development opened long ungrazed areas of considerable pastoral value, which had a considerable attraction for ranch development. The low human population density often found in these areas allows the introduction of scientific improvements with the minimum of opposition or danger from traditional pastoralism, and at the same time, the payment of compensation is minimised. The need to avoid heavy compensation costs in populous areas has dominated much of the planning and has already led to the choice of unsuitable ranch sites in Teso and Acholi, to an increased expenditure of development capital and a cutting down of the proposed scale of operations. The problem of compensation arises from a necessity at the outset to remove the local populace and, more particularly, their animals. After the initial stages of development, the policy regarding the re-introduction of local people differs. Uganda Livestock Industries continues to operate exclusive of the local population, under a system of extensive block ranching. The Ankole, Buruli and Masaka schemes selectively re-introduce people onto the smaller ranch units, but they are responsible to strict central control and management. The ranches at Buruli, when operated by the Kabaka's Government, were indiscriminately allocated and many lie idle as a result of an early speculative purchase and then a hold up arising from lack of capital, management and initiative.

Most ranches are in the five million acres cleared of tsetse since 1945. This is not only for reasons of management, capital and compensation mentioned above, but also to provide an economic return on the approximately £100-£200 per square mile total fly-clearing costs. Opinions differ considerably on the merits of this economic activity as a follow-up in Uganda. In a report, the International Bank for Reconstruction and Development stated: "organised ranching is an effective and economical means of consolidating these gains and preventing re-infestation".(2) The F.A.O. East African Livestock Report took a more pessimistic outlook: 'The high costs of clearing tsetse from these areas cannot be justified in terms of ranching as the eventual form of land use. Moreover, the bush regeneration problem in cleared areas is usually so severe, and the answer to it so expensive that cattle are a doubtful economic proposition' (3). The present policy of the Tsetse Control Department is briefly 'to reclaim from tsetse only such land as is needed for economic use' (4).

Other factors influencing location include the desire to diversify the regional economy of Uganda and reduce the concentration of development investment in the southern 'Fertile Crescent'. This led to the introduction of a canning factory at Soroti and had a part to play in the locating of the schemes in Acholi and Lango. In detail some of the locations have proved ecologically unsuited to ranching. The Aswa ranch has been located in an area of "Good" prospects of receiving 30" (Map 3), suited to arable cultivation. The very low population

density over much of the area makes the marketing of cash crops a slow and expensive process. For this reason, livestock has been considered a suitable investment for large scale development. The ecology of ranching in wetter areas such as Aswa or Bunyoro is not fully understood and has led to many problems. The Veterinary Department has recently noted that 'the management and utilisation of pasture land in the high rainfall areas of Acholi and Lango requires investigation'. (5)

Attempts to increase pastoral production and productivity by 'Transformation' schemes in Uganda have all too often been frustrated by factors of poor site and situation, inadequate preparatory surveys and, sometimes bad management. Four principal ranch areas: Teso, Bunyoro, Aswa and Buruli, have already faced severe problems arising from the local physical or social environment. This has caused the prolonged economic failure of the Bunyoro, Buruli and Teso ranches, threatened the Bunyoro unit with closure in 1963, and necessitated a relocation of the Aswa Scheme. The locational and related management factors are examined in the following local studies.

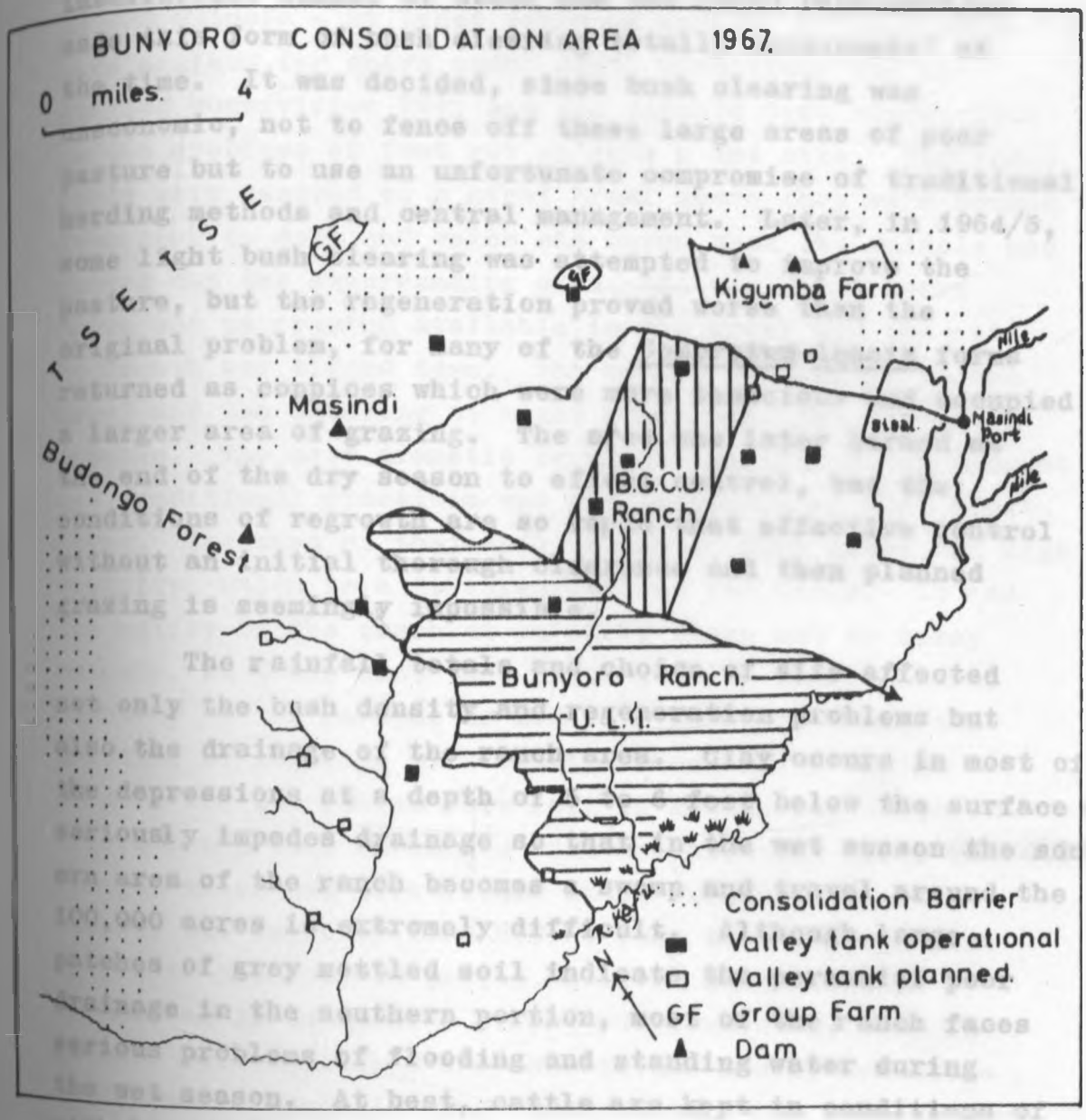
PHYSICAL AND HUMAN FACTORS INFLUENCING PRODUCTION ON RANCHING SCHEMES IN UGANDA.

The Bunyoro Consolidation Area (6).

The region of south-east Bunyoro has become an area of beef and dairy livestock development in an attempt to provide a return from land cleared of tsetse fly. G.morsitans and G.pallidipes were driven back to the north and west of the area in the period 1950-1955

by hunting, spraying and selective bush clearing, resulting in 600 square miles of tsetse free land in Bunyoro. The reclaimed area is bounded on the east and south by the rivers Nile and Kafu, and to the north and west by a broad "consolidation line" of settled agriculture (Map 26). A 100,000 acre "ranching" scheme was established in 1956 by Agricultural Enterprises, a daughter company of U.D.C., but failed to produce a commercial return on investment until 1964/5. The off-take reached only 12.4% (1965) against the estimate of 11% (7) for unimproved herds, losses were exceptionally high and eventually it wassuggested that the ranch be closed. The idea was resisted because of the depressing effect it might have had on other ranch development projects. Sinch 1966, the ranch has shown considerably e/ signs of improvement despite physical inadequacies, and other ranching areas have mushroomed in the consolidation region. The reasons for early failure lay principally with the poor choice of site, but this was severely accentuated by unfortunate mismanagement practices a lack of experience, an unfortunate compromise with local methods and the eventual return of tsetse and other diseases.

Bunyoro Ranching Company: Most of the production problems on the Bunyoro Ranch originate from the wetness of the site. The area receives over 30" of rain in 9 years out of 10 and the mean annual rainfall recorded for the area is over 40". This encourages a woody savanna typified by Combretum, in which bush occupies up to 40% of the area (8). The stocking rate therefore remains low and the cost of fencing high unless thorough bush clearing methods are used and then followed by heavy stocking to keep bush down.


BUNYORO CONSOLIDATION AREA 1967.
0 miles. 4
TSETSE
GF
GF
Kigumba Farm
Masindi
Budongo Forest
B.G.C.U. Ranch
Nile
Masindi Port
Bunyoro Ranch.
U. L. I.
Consolidation Barrier
Valley tank operational
Valley tank planned.
GF Group Farm
Dam
N

Map 26.

The small amount of capital available to develop Bunyoro and the problems of following up with an insufficient number of stock and the rapid regeneration made this form of bush clearing 'totally uneconomic' at the time. It was decided, since bush clearing was uneconomic, not to fence off these large areas of poor pasture but to use an unfortunate compromise of traditional herding methods and central management. Later, in 1964/5, some light bush clearing was attempted to improve the pasture, but the regeneration proved worse than the original problem, for many of the Combretum-Acacia forms returned as coppices which were more tenacious and occupied a larger area of grazing. The area was later burned at the end of the dry season to effect control, but the conditions of regrowth are so rapid that effective control without an initial thorough clearance and then planned grazing is seemingly impossible.

The rainfall totals and choice of site affected not only the bush density and regeneration problems but also the drainage of the ranch area. Clay occurs in most of the depressions at a depth of 5 to 6 feet below the surface and seriously impedes drainage so that in the wet season the southern area of the ranch becomes a swamp and travel around the 100,000 acres is extremely difficult. Although large patches of grey mottled soil indicate the perennial poor drainage in the southern portion, most of the ranch faces serious problems of flooding and standing water during the wet season. At best, cattle are kept in conditions of high humidity, but at worst some areas degenerate into quagmire. As a consequence, losses of calves, floundering in the mud were very high in the early years of the ranch.

This situation was worsened by the retention of traditional management practices. Herders often grazed groups of up to 800 animals - at least twice as many as the workable safe maximum for a herd under muddy conditions and unskilled supervision (9), and all animals were susceptible to the problems of foot rot on such a wet site. The large herds were centred on a night kraal where they were housed from dusk to dawn and which was moved when the animals had grazed out the surrounding area. In the night hours there was no grazing available in the kraal and the rate of growth was slowed down. The manure was wasted in the kraal and the crowding at night encouraged the spread of disease. The most dramatic result of central mismanagement and traditional practices was the incidence of East Coast Fever. The area of the ranch is one of high grass and high humidity, which is a favoured habitat for ticks. It was the policy of the ranch at an early stage not to spray animals, in order that they might 'develop their natural immunity to the ravages of E.C.F.' Added to this, the practice of stealing milk continued among the Bahima herders and the calves were left in a weakened state. Also animals were exchanged with neighbouring herds in illegal sales and tick-ridden stock brought in. As a result, the fatality from E.C.F. rose to a serious peak of 17% in the 1959/60 period, a level comparable to conditions in unimproved herds. Consequently, very few animals were available for sale to the nearby townships of Hoima and Masindi. Teso Zebu animals had been introduced on the ranch as having a fair degree of natural immunity, but they were unable to withstand the pressures of both the humid environment and mismanagement.

By 1963 the ranch had still not made a profit, and

it was discussed whether or not the enterprise should continue. USAID reviewed this briefly (10) but came to the conclusion that it would have a depressing effect on future developers if the first Government-sponsored ranching scheme collapsed. To make matters worse at this time, the viability of the ranch was threatened by tsetse. Tsetse, which had until now been quiescent, broke through the consolidation line and trypanosomiasis threatened the ranch. The several incursions, which occurred in the early 1960 period, were successfully combated but the effectiveness of the consolidation line had to be seriously questioned if the production of the Bunyoro Ranch was to be protected. The consolidation belt is three miles wide, and extends from the Nile via Masindi to the Kafu. The original intention was that intensive cultivation and clearance would keep the fly away by destroying its habitat. Although group farms, resettlement schemes and plantations were developed or integrated within the consolidation line, the smaller farms were not successfully occupied. The very low population density and abundance of good land in Bunyoro did not encourage movement to the line by local farmers. Consequently, refugees and immigrants were settled in the area. These included the Vukusu from Kenya, Watutsi from Rwanda and Lugbara and Alur people from the West Nile. The strip was mechanically cleared again in 1964 to ensure its effectiveness when it was found that the settlers had been given too much land, often in excess of 20 acres, which they were unable to keep effectively cleared and consequently bush had regenerated and the fly broke through. It was this which necessitated the mechanical reclearance. If these efforts seem out of proportion to the poor results on the Bunyoro Ranch, it must be remembered that the consolidation line also protected a development scheme in

Buruli (Buganda) and that money had been expended in clearing the area originally which would be wasted if the region was reinfested.

By 1964/5, new management had been introduced on the Bunyoro Ranch and marked improvement resulted, despite the unsuitability of the site. The animals were regularly sprayed and the E.C.F. mortality dropped from 17% to 4% so that by 1965 a surplus of 1,000 animals was available for sale. This represented an improved, but low offtake of approximately 12%. The large herds were reduced to a larger number of smaller units, though predators still made night kraaling necessary. The size of the ranch was reduced to 30,000 acres which tripled the stocking rate. A programme of bush clearance was introduced and has been mentioned above and the area was regularly cut over by hand. Several paddocks were fenced and some 100 Boran breeders were brought from Kenya.

In 1966, the ranch was transferred from Agricultural Enterprises to the livestock holding company: Uganda Livestock Industries Ltd., and a new phase of development began. Further Boran were brought from the unsuccessful Teso Ranch bringing the number on Bunyoro Ranch up to 1,000. An outbreak of Brucellosis resulted in the Ranch being temporarily closed, but the effects were minor. It was decided to keep the ranch closed in order to build up the herd, and make available breeder animals for development schemes in Bunyoro. An improved offtake of 19% per annum at 675 lbs. is anticipated soon under close management. The whole area has been expanded again to 100,000 acres and is to be subdivided into the standard U.L.I. block and paddock system with 5,000 acre blocks. (Map 28). To combat the problem of bush, a novel and experimental system has been introduced. Goats are to

be ranged with the cattle on the Bunyoro ranch. These animals are browsers and do not therefore compete with cattle for grazing, but at the same time, they represent an increase in the total biomass and may form an effective means of controlling bush. A market preference already exists in Bunyoro for goat meat, and it commands a premium over the price of beef. The production of the Bunyoro Ranch should at least double if the present plans are successful.

Bunyoro Growers' Co-operative Union Ranch: On the northern side of the Masindi-Kampala road, opposite the Bunyoro Ranch, an areaof sixty square miles has been reserved for beef ranching. The development is sponsored by the B.G.C.U. and the money has been provided from the cash crop returns of the 100 constituent cooperatives in the Union. Although the area reserved is considerable, at least 25% is swamp and of little value to commercial ranching. It is hoped, that the remaining area will eventually be stocked with a minimum of 3,000 local animals to be crossed with 200 Boran breeders. The maturing time for these animals should be three years, which is one half the current rate in local traditionally ranged herds. Already three 750,000 gallon tanks have been provided by the West German Government assuring the cattle of constant water supplies free of parasites. At present, money is not available to develop the entire area and so a plan of working out from a core area has been suggested. In the core area, bush will be cleared by ranch hand-labour and cattle will be sprayed and fenced and put under the supervision of a veterinary-trained manager. To assist in the programme of bush clearing a late burn is to be used. By stocking very heavily, the area is cleared, and the problems of the Bunyoro Ranch may be avoided and regeneration overcome. In this way

an increased level of productivity may be realised over a gradually expanding area.

Group Farms and Smaller Enterprises in Bunyoro: To the north of the B.G.C.U. Ranch are two smaller schemes based on group farms. Both these developments are situated within the consolidation line and face some threat from the nearness of tsetse, but so far this has not proved serious. The group farm system of centralised skilled management allows for rapid, scientific development to be applied to the member's small-holding. All the small holdings are grouped together into one planned unit. In the case of livestock, however, the herd is to be treated as one unit and not dispersed among the members or their smallholdings and the profits will be used for the benefit of the scheme. Fifty Borans have been purchased with the profits from coffee and cotton on the Akumulikire Group Farm. These animals are grazed on fenced pastures near a swamp, but a better site will be available as 200 acres are fenced off and a rotational grazing system introduced. This will benefit the cultivation through manuring, and the livestock through the availability of better and controlled grazing. It is hoped that some form of supplementary feeding (maize?) may be introduced from the waste arising from cash crops. Kigumba Group Farm, is currently experimenting with Angus, Hereford, Boran and Zebu animals to assess which will show the highest level of productivity under the humid conditions of Bunyoro.

The Kamese Ranch is adjacent to the Akumulikire G.F. and has introduced a novel system of pasture improvement without using any expensive scienfific

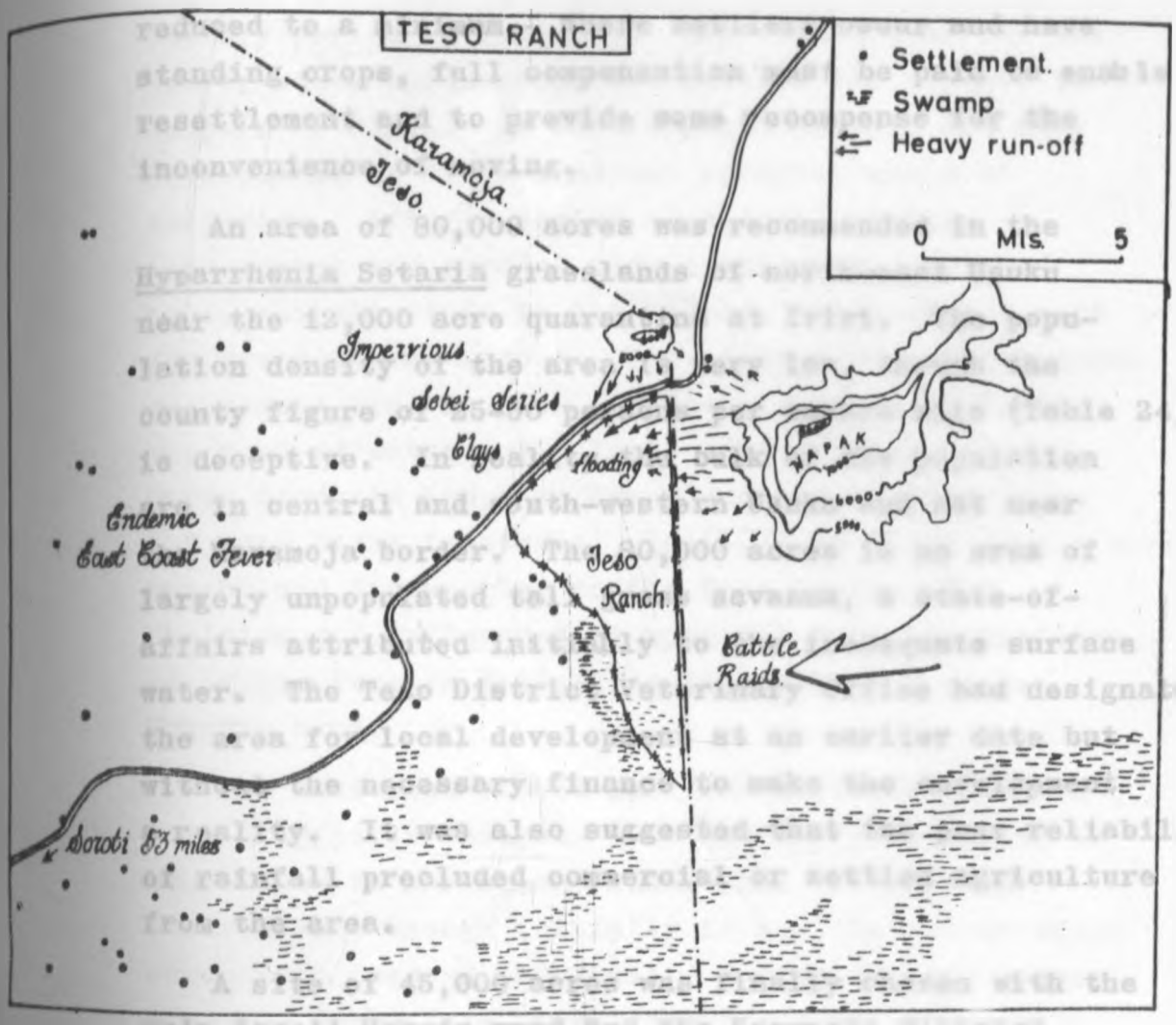
techniques. The fenced area is being deliberately overstocked with local Zebu in order to get the grass really short and to eradicate the tick habitat prior to the introduction of grade Boran animals. Continual spraying of the current zebu herd is also effectively reducing the tick population and creating a healthy environment for the improved stock.

The Bunyoro Consolidation Area, after an unfortunate early start is now entering a new phase of livestock development. It now seems that an economic return on tsetse clearance is probable in the near future, though the suitability of the high rainfall areas to livestock development is still in need of much research.

The Teso Ranching Co. (Uganda Livestock Industries Ltd.)

The Teso Ranch is situated along the Karamoja-Teso border and the Soroti-Moroto road in Usuku county. After a period of heavy financial stock loss, in 1966, the assets were transferred from Uganda Meat Packers, the original owners, to Uganda Livestock Industries. Many of the cattle were transported by road to an alternative location in Bunyoro. The poor choice of site and situation were again largely responsible for the commercial failure of the ranch, though this time human factors and the problem of security were paramount.

Under the management of Uganda Meat Packers (U.M.P.) the Teso Ranch was intended to supply high-grade carcases for freezing at the new processing plant near Soroti. In order to reduce weight loss and transport costs to a minimum and eliminate the threat of disease in transit, a site was required as near to Soroti as possible. It was also required that the pasture be


TESO RANCH
Karamoja
Teso
Settlement.
Swamp
Heavy run-off
0
Mls.
5
Impervious
Sobei Series
Clays
Flooding
MAPAK
Endemic
East Coast Fever
Teso
Ranch
Battle
Raids
Soroti 53 miles

Map 27.

suitable, or potentially suitable, but most important it was specified that the chosen site have as few people as possible on it in order that compensation might be reduced to a minimum. Where settlers occur and have standing crops, full compensation must be paid to enable resettlement and to provide some recompense for the inconvenience of moving.

An area of 80,000 acres was recommended in the Hyparrhenia Setaria grasslands of north-east Usuku near the 12,000 acre quarantine at Iriri. The population density of the area is very low, though the county figure of 25-50 persons per square mile (Table 24) is deceptive. In reality the bulk of the population are in central and south-western Usuku and not near the Karamoja border. The 80,000 acres is an area of largely unpopulated tall grass savanna, a state-of-affairs attributed initially to the inadequate surface water. The Teso District Veterinary Office had designated the area for local development at an earlier date but without the necessary finance to make the development a reality. It was also suggested that the poor reliability of rainfall precluded commercial or settled agriculture from the area.

A site of 45,000 acres was finally chosen with the main Soroti-Moroto road and the Karamoja district boundary as two parts of the perimeter. The western boundary is extremely irregular and reflects the increasing population numbers towards central Usuku and the need to exclude all small areas of settled agriculture from the development area. The site was later fenced and divided into 5,000 acre blocks and smaller paddocks. It was decided that production would be related to environmental circumstances and would start off by

concentrating on the fattening of 5,000 Karamoja immatures over a 1½ year period. These would be purchased during the low price/high sale season of the dry period in Karamoja. They would also buy the poorer stock which would not survive the journey to Kampala or Jinja. As the Karamoja animals are very susceptible to ticks constant spraying would be necessary. After a period of natural pasture improvement and gradual tick eradication, better grade animals could be introduced, fattened and sent for freezing and export. The process of environmental adjustment was, however, suddenly dropped by U.M.P. who took advantage of a large sale of high grade Boran Stock in Kenya to buy a nucleus breeding herd and many Boran immatures. Inall, some 3,500 Borans were bought and transported to the Teso Ranch. The decision was influenced by approval from the Ministry of Agriculture in Britain to import better grade Ugandan meat.

The site soon proved far less suitable than had been originally thought. The emptiness was found to be related to the human rather than the physical environment, though initially it was the latter which encouraged 'second thoughts'. During the wet season (April - September), heavy storms occur, especially around the volcanic cores of Akisim and Napak. This water then runs rapidly down on to the encircling plains. The soil of these plains on which the ranch is situated, is principally a heavy calcareous clay of the Sebei series, and seriously impedes drainage. In parts of the ranch area, the land is so flat that large lakes of standing water result. In the rains of

1966, parts of the ranch were entirely submerged and the southern area was found to be a seasonal swamp. The site soon proved to be an exercise in water control, for in the dry season there was a general absence of surface water and the first boreholes were not meeting expectations.

Despite the problems of water, the herd showed the potential of the area. The trampling and manuring of the ground encouraged the development of better creeping grasses such as Brachyaria. Night kraaling was still necessary because of the large numbers of predators, lion included, in the nearby controlled hunting area. The problem of bush proved slight and, at worst, the incidence of bush rarely exceeded 15% of the total land area.

Before production development could be reflected in supply, it was halted by stock theft and raids. Although it is true that water is a problem for the local people and that the prospects for settled agriculture are not particularly good, the general emptiness of the area reflects overwhelmingly the tribal insecurity and constant hostility between the Iteso and Karamojong. The area has been described earlier (Chap.1) as a tribal marchland and the cause of earlier hostility was cattle raiding. When the ranch brought cattle into this area, they also introduced a great temptation and in August 1966 the problem came to a head with the theft of 119 animals. The procedure was repeated in September with the loss of another 63 head. Once the animals had been stolen they were invariably taken to Karamoja. Some contracted East Coast Fever en route, a disease to which Boran have no natural immunity, and

and from which they had been protected by regular spraying. Consequently losses were high. In Karamoja the cattle faced the danger of Pleuro-pneumonia and even when recovered by security forces, were put into enforced quarantine at Iriri by the Veterinary Department. This often resulted in the wastage of good quality beef cattle. Before the ranch changed hands, the loss had reached some £5,000. The introduction of the Special Force into the area did nothing to prevent the raiding of cattle as the Karamojong operate by night and the Special Force do not. Eventually, the Ranch failed as a commercial proposition and in 1966 was transferred to the new holding company, Uganda Livestock Industries Ltd.

The new policy included the transfer of animals of the Boran breeder type from Teso to the sister scheme in Bunyoro to salvage some of the investment. It was then decided to aim at a lower class of animal to revert to the original plan of fattening Karamoja beasts for canning. This was despite permission from the British Ministry of Agriculture, Fisheries and Food to export to Britain quantities of processed and inspected meat. Plans were drawn up for an extension to the south of 80,000 acres and to the north-west through the Iriri quarantine of 30,000 acres. Permission was obtained from the Teso Land Board, but the Ministry of Animal Industry, Game and Fisheries intervened and vetoed the extensions on grounds of insecurity. At present the ranch remains with 45,000 acres and an uncertain future.

The Acholi Ranching Co. (Uganda Livestock Industries Ltd.)

The Acholi Ranching Co. at Aswa is an attempt to stimulate development in the relatively underdeveloped

district of Acholi. Earlier attempts to introduce cash crops such as tobacco met with only limited success because of the problems of transport, extension inspection and marketing in relation to a small population scattered over a wide area (12). The Ranch, though employing few local people, will help to provide a source of meat and income to the district in general, and Gulu in particular. Although the low density of population had proved a disadvantage to the tobacco concerns in the area the density was found unfortunately after the commencement of the scheme to be too heavy for extensive ranching. This led to a forced relocation of the ranch, heavy overspending, a wastage of time and capital, and a resiting in a tsetse belt.

The site was originally suggested by the District Veterinary Officer and lay between the seasonal Pager River and the perennial Aswa and occupied some 90,000 acres. It was decided to introduce livestock development into this area despite the high and reliable rainfall and the good arable potential for the reasons mentioned above. In an early survey (13) U.S.AI.D. recommended the ranging of goats and sheep in Acholi rather than cattle as there is a considerable danger from the nearby Glossina morsitans belt and the problem of bovine trypanosomiasis. The recommendation was bypassed and cattle were chosen. The natural climax vegetation of the area chosen has long since been replaced by a fire-climax tree savanna but is strongly influenced by the rainfall, and is more woody and bush-covered than that of the tall-grass savanna of the Teso area. It was decided that, although the

woody cover reached 60% in some localities bush was a minor problem and selective clearing could be performed 'economically and successfully'. The regeneration problem in the other heavy rainfall area, Bunyoro, casts some doubt on this reasoning, unless the 'core' principle is used. The nature of the grassland and heavy bush cover required the establishment of 10,000 acres blocks instead of the normal 5,000 acres on the other U.L.I. ranches and a lower stocking rate.

As the process of development advanced, the original choice of site proved to be quite unsuitable and inadequate. As a result the ranch had to be moved and reduced in area by one third. Early consultations with the local Land Board had suggested that the population of the 90,000 acres was as small as thirty persons, and it was decided that compensation was no problem. No local survey was, it should be added, ever made of the area on the ground. During the course of clearing a mile wide strip along the Gulu-Kitgum road, 5,000 persons were found with planted crops on small holdings. Compensation, at this rate threatened to swallow all the development costs, and in many cases the individual compensation level was increased by famine crops such as cassava which doubled the compensation per acre. The World Bank, who were financing the loan firmly refused to pay compensation to this number of people and a change of ranch boundary was required. To avoid writing-off earlier capital development in water and road development, it was natural that the Acholi Ranching Co. should try and incorporate as much of the original area as was possible. The density of population in the east of

the ranch required a large reduction in that area and eventually the total acreage was reduced from 90,000 to 60,000. The only direction for extension was north of the Pager, but this involved establishment in a G.morsitans belt and the threat of trypanosomiasis. It was therefore necessary to enlist the assistance of the Tsetse Control Department to eradicate the favoured hosts of morsitans and later to spray 700 square miles of the Aswa in a precautionary drive (Map 2).

Other production problems discovered at the original location centred mostly around water. The ranch is located over a major southeast to northwest-trending Sheer-Zone of mylonite which reduced the water retaining capacity of the substrata. It was decided to concentrate more heavily than usual on water supplied by dams on the Aswa and small portable pumps floated on rafts in the rivers. Sites were chosen for these developments. The incidence of the major rivers on the ranch is beneficial in this way, but also poses as a threat. The seasonal paucity of water supplies in the area around the ranch encourages the movement of stock-holders across the ranch in search of water. These bring with them their diseased cattle carrying bovine parasites. Currently, the absence of fencing makes this movement particularly easy and as a precaution, six dams are being built around the perimeter to control the movement of cattle.

It is hoped that some of the other more sophisticated ecological problems which may arise during the

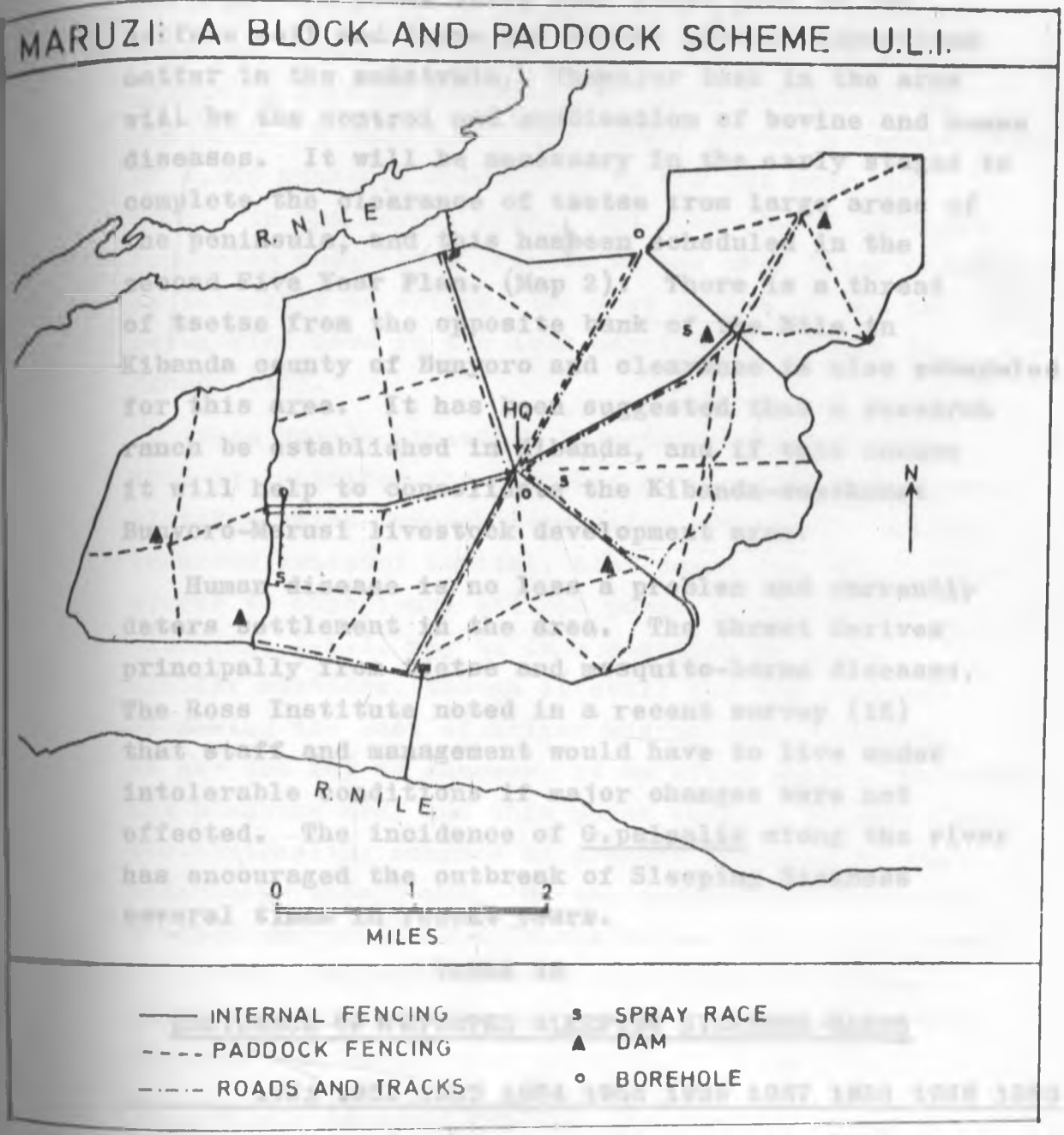
development of the ranch will be tackled by the United Nations Development Programme Ranch or 'Fact-Finding Unit' situated on the scheme. The problems of ranching in such a wet area are many and as yet largely unknown in Uganda. The original production level of a 20% offtake from 20,000 head of stock has been frustrated by the problems of compensation and disease. Later problems may be tackled before they become a heavy burden by the fact-finding unit.

THE MARUZI SCHEME (Uganda Livestock Industry Ltd.)(Map 28)

The fourth and least developed U.L.I. scheme is situated on a 37,000 acre site at the western end of the Maruzi peninsula in Lango. Though there are no cattle on the ranch at present it is possible to foresee the need for ecological modifications before the area is suitable for commercial ranching.

The chosen situation of the ranch partly reflects an attempt to introduce development into Lango District, but the site has again been chosen because of the extremely low human population. The presence of tsetse, malaria, biting flies and an unreliable rainfall have precluded people from this area. Prior to the Uganda Livestock Industry plans, suggestions had been made by the local agricultural office (14) that the area be developed for growing tobacco. The climatic conditions and extremely low population density makes tobacco growing unlikely in the area.

The principal problems involved in bringing the area up to a high level of livestock production are centred around water and disease. The western part of


MARUZI: A BLOCK AND PADDOCK SCHEME U.L.I.
R. NILE
HQ
N
R. NILE
0 1 2
MILES
INTERNAL FENCING
PADDOCK FENCING
ROADS AND TRACKS
SPRAY RACE
DAM
BOREHOLE

Map 28.

the area is a swamp where clay forms much of the surface soil and there are layers of other impervious matter in the substrata. The major task in the area will be the control and eradication of bovine and human diseases. It will be necessary in the early stages to complete the clearance of tsetse from large areas of the peninsula, and this has been scheduled in the second Five Year Plan. (Map 2). There is a threat of tsetse from the opposite bank of the Nile in Kibanda county of Bunyoro and clearance is also scheduled for this area. It has been suggested that a research ranch be established in Kibanda, and if this occurs it will help to consolidate the Kibanda-southeast Bunyoro-Marusi livestock development area.

Human disease is no less a problem and currently deters settlement in the area. The threat derives principally from tsetse and mosquito-borne diseases. The Ross Institute noted in a recent survey (15) that staff and management would have to live under intolerable conditions if major changes were not effected. The incidence of G.palpalis along the river has encouraged the outbreak of Sleeping Sickness several times in recent years.

TABLE 25

INCIDENCE OF REPORTED SLEEPING SICKNESS CASES

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
LANGO	9	3	10	-	12	29	289	222	48	3
OTHER DISTRICTS	21	15	120	98	96	77	196	170	176	253

Ross Institute, Nairobi.

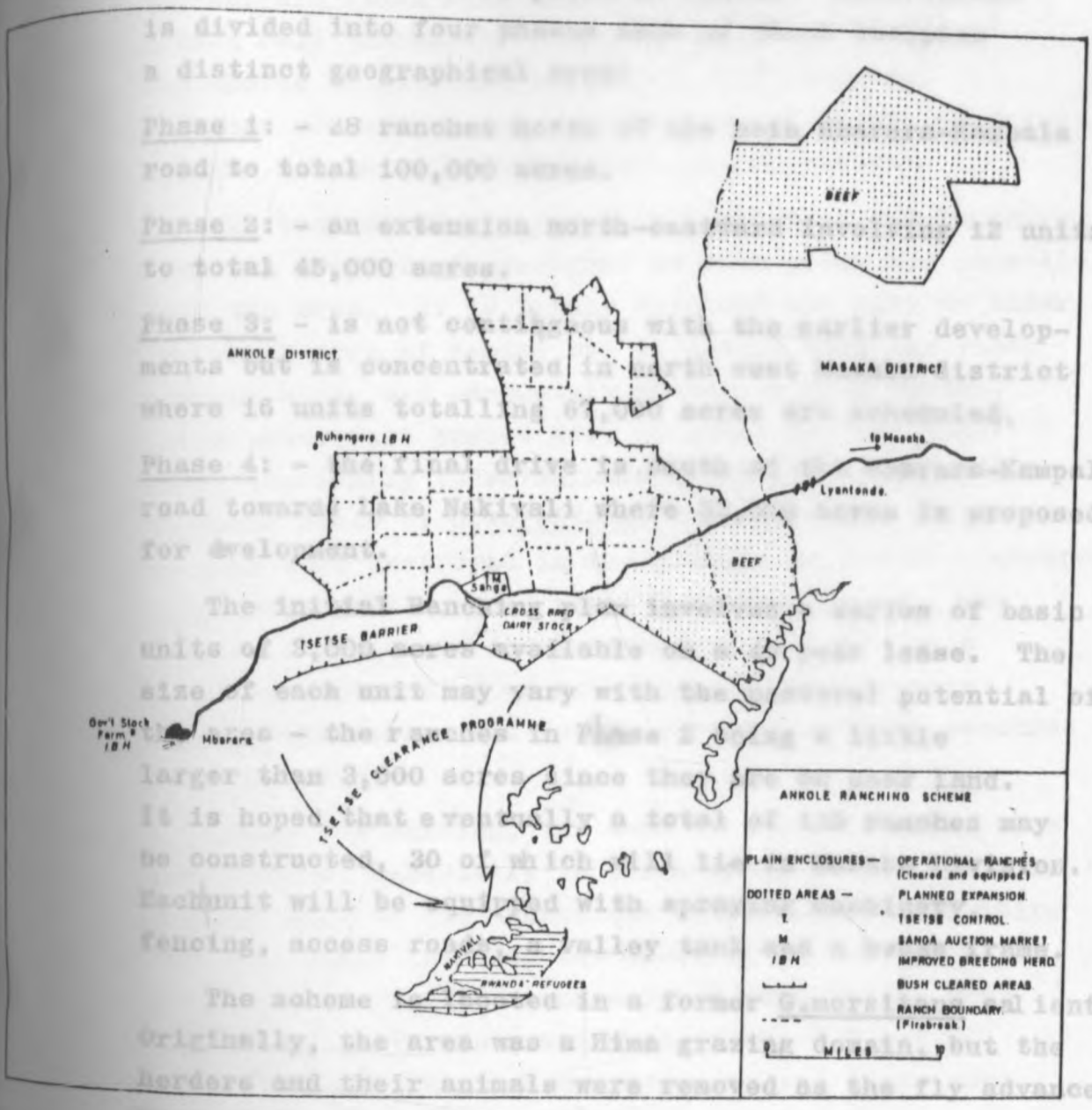
The problem of mosquitoes is not confined to Anopheles

and the spread of malaria but extends also to Mansonia varieties breeding in swamps and recently submerged grasses. These Mansonia forms are fierce biters and present a serious deterrent to human settlement in the area. A Ross Institute survey quotes a record catch of 4,000 Mansonia mosquitoes in one hut near Lake Kwania in the Maruzi area. The presence of infected Anopheles mosquitoes results in the area being classified as intensely malarious: the most severe of the four categories used in the 1962 mapping of malaria in Uganda (16).

When Uganda Livestock Industries was formed in 1966 it inherited the mistakes of previous developers, mistakes which through poor sites and situations had incurred losses of capital, confidence and time. With access to experience and the power to coordinate planning, I.L.I. may be in a position to avoid similar mistakes, though it still has the problems of making the best of earlier misfortunes. Capital is not the key to success, it so often seems. Research and planning are, and this point emerges clearly from two contrasting schemes at present operated by the Veterinary Department. On the one hand the carefully planned and controlled Ankole Scheme and on the other the tragic failure of the Buruli Ranching Scheme, inherited from the Kabaka's Government in 1966. To these we now turn.

THE ANKOLE RANCHING SCHEME

The Ankole Ranching Scheme (Map 29) is operated by the Veterinary Department, is financed largely by the U.S.A.I.D., and is organised on a small-holder system. At present it is the largest and most successful


BEEF
ANKOLE DISTRICT
MASAKA DISTRICT
Ruhengere I.B.H.
to Masaka
Lyantonde
BEEF
Sahge
CROSS BRED DAIRY STOCK
TSETSE BARRIER
Gov't Stock Farm I.B.H.
Mbarara
TSETSE CLEARANCE PROGRAMME
L. MANYALI
RWANDA REFUGEES
ANKOLE RANCHING SCHEME
PLAIN ENCLOSURES — OPERATIONAL RANCHES (Cleared and equipped)
DOTTED AREAS — PLANNED EXPANSION
T TSETSE CONTROL
M SANGA AUCTION MARKET
I.B.H. IMPROVED BREEDING HERD
BUSH CLEARED AREAS
RANCH BOUNDARY (Firebreak)
0 MILES 10

Map 29.

single livestock development in Uganda. Development is divided into four phases each of which occupies a distinct geographical area:

Phase 1: - 28 ranches north of the main Mbarara-Kampala road to total 100,000 acres.

Phase 2: - an extension north-eastward involving 12 units to total 45,000 acres.

Phase 3: - is not contiguous with the earlier developments but is concentrated in north west Masaka district where 16 units totalling 67,000 acres are scheduled,

Phase 4: - the final drive is south of the Mbarara-Kampala road towards Lake Nakivali where 33,000 acres is proposed for development.

The initial Ranching plan involves a series of basic units of 3,000 acres available on a 49 year lease. The size of each unit may vary with the pastoral potential of the area - the ranches in Phase 2 being a little larger than 3,000 acres since they are on poor land. It is hoped that eventually a total of 125 ranches may be constructed, 30 of which will lie in Masaka Division. Each unit will be equipped with spraying machinery, fencing, access roads, a valley tank and a house frame.

The scheme is located in a former G.morsitans salient. Originally, the area was a Hima grazing domain, but the herders and their animals were removed as the fly advanced. Most of the area (Table 24) is unsuitable for agriculture because of a low and unreliable rainfall and after the clearance of the tsetse in the 1960-1965 period, the scheme was intended to provide a commercial follow-up to clearance which would also involve the local people. Largely due to the intensive preparatory surveys and a

long history of experimental work on livestock at the Mbarara Stock Farm and the Land Use Investigation Unit (Ruhengeri)progress has been steady and the choice of site and situation, satisfactory. Problems of pasture and disease have of course occurred, but the scheme is proving extremely successful.

The control of morsitans in Nyabushozi and Isingiro involves four stages designed to both clear and consolidate the area. It is firmly intended not only to clear the ranch area of tsetse but to ensure that the ranch remains clear and adequately protected from tsetse. Large areas were hunted over to shoot-out the small game, especially those animals which are known to be favoured hosts of G.morsitans. An estimated 68,000 head of game were destroyed in the process of tsetse clearance. Being very mobile, game poses a serious threat, not only as a reservoir for trypanosomiasis, but as a means of introducing or reintroducing the disease into 'clean' areas and for this reason drastic measures were necessary.

After the hunting, the core of the reclamation area was sprayed, especially in parts known to be haunts of tsetse, such as the undersides of branches. The third and next stage involved the clearing of the tsetse habitat to ensure the continuation of a tsetse free condition. With the assistance of the U.S.A.I.D., a team of 'D8' tractors was provided and these were used to chain-drag the bush and shrubs from the ranch and its environs so that over 175,000 acres had been cleared using this means by April 1967. The process was very rapid but quite indiscriminate, destroying all forms of bushy vegetation and it was not possible to introduce a large number of cattle quickly to reduce the

regeneration problem. This was largely a consequence of the very careful selection of ranchers and a policy that 'no rancher is better than a bad rancher'. Consequently, in a similar fashion to Bunyoro, the coppicing of Acacia hockii and related forms became common as much of the land remained unoccupied and unallocated. A suggestion was made (17) that, despite the lighter bush cover than that of Bunyoro, it would still have been better to have adopted a more cautious and discriminate process of bush clearance. It was noted that in Zambia, the same problem had been treated differently and there, the ranching development expanded behind a moving frontier of tsetse clearance which expanded only as fast as complete consolidation could follow. In this way gains were sure of being followed-up. The problem of unallocated ranches forms something of a headache in Ankole as there is no control over the regeneration without resorting to continued and expensive cutting over. By 1966, 28 of the 40 ranches north of the main road had been allocated but only 4-5,000 head of cattle had been brought on to the scheme.

The fourth process of control involved the creation of effective barriers against the re-entry of tsetse. To the west, north and north-east, settlement and cultivation were considered heavy enough to exclude the fly, but to the south, the dense bush of Isingiro and southern Nyabushozi posed a threat which was accentuated by the presence of much small game. It was necessary to drive tsetse southward toward some natural barrier and the area south of Lake Nakivali was chosen as the barrier. A large number of Rwandan refugees and their stock had been settled in this zone south of the lake

following extensive bush clearance operations and 36 water tanks provided for the needs of the cattle in the dry season. This grazing area will now protect the development further north. A strip some 3-4 miles wide was sheer-cleared south of the Mbarara-Lyantonde road and burned over. This will eventually form the final expansion area of the ranch, but at present acts as a temporary consolidation barrier.

Following clearance, the area of the scheme was divided into small ranch units and provided with the basic capital equipment and access roads. A minimum size of 3,000 acres is thought suitable not only to attract the better type of rancher through the income it offers, but also to ensure a reliable catchment for water as it is estimated that to supply a standard 1½ million gallon tank a catchment area of at least 2,000 acres is required. Some 39 valley-tanks of 750,000 gallons were constructed on the scheme and the dependence on natural water supplies was reduced to nil in most cases. However, it was found that the tanks depended heavily on local storms and these may be very localised so that by mid 1967, not all the tanks had filled. Tanks were chosen in preference to dams after previous experience in the terrain of Nyabushozi had shown dams susceptible to silting, serious weed growth and constant trampling. The tanks will be protected, fenced and properly maintained and water fed into a nearby trough.

After the preparatory work on capital equipment is completed, it is essential that the ranch is stocked as rapidly as possible, but to date, this stocking drive has not met with much success. A condition was made that each occupant brings 200 animals, 100 of which

should be breeders, but in reality this is not always possible. As uncontrolled burning is strictly forbidden on the ranch it was hoped that an adequate stocking rate achieved quickly would perform the work of keeping bush down, but in the absence of sufficient stock a possible late controlled burn every four years may prove more convenient. To protect the improving pastures from the serious problem of indiscriminate burning by outsiders, each ranch is surrounded by a firebreak ploughed or hoed to a safe width, and it is a condition of the lease that this is adequately maintained. How the cessation of burning on the ranch will influence a basically fire sub-climax grassland such as the Themeda area of Nyabushozi remains to be seen. At present the principal pasture problem emerging in the ranch area is the spread of Cymbopogon afronardus. This problem has been discussed previously, but at the moment as much as 25% of the ranch area is under this grass. Since the removal of the grass would increase the return per acre by 10/= to 15/=, it is considered worthwhile to dig the grass out.

Concurrent with development, pasture research on the ranch is directed towards finding the best rotation system and the highest yielding stocking rate. Early results are suggesting that a figure as low as 1 head per 3 acres may soon be achieved. For example it was found in a trial at Muko (18) that 58.2 lbs. per acre/year liveweight gain could be expected from the following system: a two year cycle with a stocking rate of 1:3 acres for 1 year and in the second year leaving the area unstocked for 6 months and then having the paddocks burnt and double-stocked for 6 months. This gain was 15 lbs. better than any other stocking rate

and system. The work, however, is in early stages and no recommendations regarding burning will be made until the long term effects are better understood. Although the animals stocked at 1:6 acres gained more weight individually, the greater number of animals at a 1:3 stocking rate makes for a greater productivity per unit area of the Ankole grassland.

Disease is and must be carefully controlled on the ranch to combat the problems of ticks in the tall grass area and the threat of tsetse. Each ranch is equipped with a spray-race and the rancher is obliged to spray regularly, though as yet, the area is not tick-free and the introduction of exotic stock or cross-bred animals must await the thorough clearance of ticks from each ranch. In reality the incidence of East Coast Fever is slight and on the nearby Livestock Experimental Station at Ruhengeri work hasproved that losses from this disease can be eliminated by thorough spraying alone, if the herder is dilligent.

The threat of tsetse is not quite past, for occasional cases of Trypanosomiasis have occured, but this has been blamed on the few remaining game animals that enter the Ranch to escape burning in the grass-fires of the dry season. Hunting and clearing activities to the south of the Mbarara-Masaka road will eliminate this menace.

Trials involving Red Polls, Borans, Angus and local stock have been in operation for some time at Ruhengeri to evaluate the best animals for the environmental conditions of Ankole pastureland. Further trials have been in operation for many years at the Mbarara Stock Farm, and the fruits of this experience are now proving extremely valuable. The local animal, unimproved, has

little to offer the Ranch for it would seem that the process of selection in Ankole has operated in reverse, encouraging the least productive beef animals to survive. This down-breeding has been encouraged by the process of selective crossing conducted by the Bahima to produce the characteristic broad spread of horns, a favourable colour, etc. Cross-breeding Sanga with Angus stock has, in contrast, produced animals with a liveweight of 408 lbs. at the end of only nine months from unimproved pastures in Ankole. A turnover of this sort represents a 67% improvement over the indigenous stock. The Boran which is a hardy and productive animal, is considered to have a great potential in this area and may represent a 20% improvement in the meat yield per acre over local animals, and for these reasons, 750 have been purchased from Kenya for later sale to ranchers and for cross-breeding. It is hoped that eventually twice the weight of animals will be produced from half the area in half the time (8-900 lbs. in 2½ years at 1:3 acres). This represents an enormous increase in per beast and per unit-area productivity over the traditional system of cattle raising. As important, all these animals will have a market value since they are being raised for sale and not for aesthetic purposes or subsistence, and will be of a relatively high quality.

The pastoral resources of Nyabushozi have remained for many years under the 'protection of tsetse'. To continue the protection of the pasture it is necessary to control the ranchers very rigidly at this early stage. Control is accomplished by a long and detailed lease which each rancher is obliged to understand, sign and obey. This led one sociologist to term the Ranching Scheme: 'a bureaucratic and technocratic exercise'.

(19), but in reality the lease is necessary if the large amount of scarce capital and skills are to be adequately protected. As part of receiving the benefits of a fully equipped, high productivity unit, the rancher must be prepared to accept the responsibilities of pasture management, disease control, ranch maintenance, tenancy and advice and only in this way will a core of trained ranchers become available to pass on their skills to others, and the difficult years of development be overcome before a cadre of skilled herders and ranchers emerge. At present the local level of traditional management is quite inadequate. The individual ranchers must accept that the pastoral environment is currently being held in trust by experts in the fields of range management, veterinary science, and marketing. The standard of many of the applicants, financed by growers co-operatives, private businesses and grazing schemes, is encouraging and their willingness to accept and act on advice augurs well for the future. This is a happy contrast to the decaying Buruli and Singo schemes.

THE BURULI AND SSINGO SCHEMES.

Both the Buruli and Ssingo ranching schemes are situated in the Combretaceous Savannas of north Mengo in country traditionally occupied by Hima herders. The ranch development was initiated in 1961 by the Kabaka's Government, but after the political crisis of 1966, (the 'Buganda' crisis) the projects were taken over by the Veterinary Department of the Ministry of Animal Industry, Game and Fisheries. Both schemes were intended to provide a stimulus to small-scale private ranches, for the overall areas are divided into 24 and 20 ranches respectively, and to assist in the supply of cattle to Kampala/Mengo. The size of

each unit compares with that on the Ankole-Masaka Scheme, approximately 3,000 acres. However, there was little preparation of the area before leases were given and, disastrously, there was little scrutiny in the allocation of leases. Consequently, the area has remained in the hands of people anxious to take advantage of the very low rental of only 10 cents per acre, yet lacking either capital, knowledge or initiative to develop the ranches to their anticipated production level. The unoccupied ranches, which form the bulk of the scheme pose a major threat to the investment of those few people who have proceeded with large scale development.

The area of Buruli was amongst the first to be cleared of tsetse by the newly formed Tsetse Control Department after 1947. Once the fly had been driven across the Kafu river and the process of consolidation completed in Bunyoro in 1960/61, it was considered safe to develop the area for livestock. Cattle were a natural choice for development in Buruli as the region is not well suited to crop agriculture, having a very low reliability of receiving 30" of rainfall. To help overcome the long dry season - a 500,000 gallon valley tank was constructed on each ranch. Access roads were driven through the bush and at this point the ranches were considered ready for leasing. It remained to the new occupant to clear the bush, construct spraying equipment, fence the area, and build a house - no mean expenditure. The leases were quickly snapped up, though there was little to no vetting of the applicants, and consequently by 1966 a mere five of the ranches were fenced and only three had actually gone into production. Two of these ranches belonged to an Asian trader from

Kampala who had capital and experience and the other to a former official of the Kabaka's Government. On the remaining ranches, the occupants found that the low cost of leasing bore absolutely no relation to the heavy expenses involved in making the area commercially productive. Few knew what to do anyway. Consequently, most of the units were either grazed traditionally with Hima herders and no developments started, or they were simply abandoned, with the lease remaining in the hands of the absentee. Thus, after five years, the Buruli Scheme was producing only 150 animals per annum from 72,000 acres against a commercial offtake anticipated at 2,400. The problem of absentee speculators has ensured that most of the area has reverted to tick infested grass and bush, contributing nothing to the national economy.

Further, the facilities provided for supplementary water are proving inadequate and water remains a serious limiting factor on two of the developed ranches. Whilst the number of stock remained small the problem was minimal, but as the number was increased and Borans were introduced onto the Asian ranch to bring the area up to full production, the volume of fresh water available from artificial supplies proved totally inadequate. The small valley tank cannot possibly provide for the 1,500 Borans now grazed on the two Asian ranches in Buruli during the long dry season and consequently, the owner is forced to take his animals to the Lugogo river to drink. As the river forms part of the perimeter of this particular ranch it is possible to reach water without leaving the enclosed, tick-free area. But still, there are great dangers in drinking from a stream which is also used by local cattle, and likely to be infested with parasites and the threat of carcase

condemnation is considerable, partially eliminating the benefits of spraying, improved pasture and better stock. The ranch units away from the river would find it impossible to utilise fully the natural pasture potential, for the number of cattle is limited by the size of the valley tank. To take the animals off the ranch and walk them several miles through tickridden grass to the Lugogo would make absolute nonsense of the attempt to ranch Buruli commercially. Given adequate water, the Panicum, Chloris, Hyparrhenia and Themeda pasturesprovide a really excellent sward and will carry a stocking rate of 1 head per 2 acres. But the amount of dry matter consumed by cattle is related to the quantity of water available, and this will limit the benefits of increased weight-gain from the natural pasture.

Other problems facing the development of the three ranches currently operating on the Buruli Scheme, revolve around ticks and burning. Most of the area around these ranches remains unsprayed, and the large tick-free region anticipated has not materialised. The few cattle which are kept on other allocated ranches are not sprayed for fear that they lose their slight immunity. It is essential to keep the developed ranches well fenced and the grass short, but efforts in this direction are continually frustrated by the local Bahima who break down fences, thereby reintroducing ticks to clean pastures and allowing the grade stock to escape. Development in the area was described by one rancher as 'an island surrounded by hostile Nature and hostile people'.

Despite all laws and efforts to the contrary - the area around the Buruli Scheme is annually burned over,

and in 1967 fire spread onto one of the developed ranches which has a perimeter boundary. Where the ranch is well stocked, the burning of pasture causes serious hardship, for it is not possible to take the cattle off the ranch until pasture has regenerated.

In total the Buruli scheme has failed to meet expectations. The Ssingo scheme was not opened until 1965/6 and it is too early to determine the progress of the individual units or the scheme as a whole. It is situated in an area of high and reliable rainfall though a low population density currently favours livestock development. The contrast of Buruli with the Ankole Ranching Scheme is striking, for careful vetting of the applicants is designed to prevent the recurrence of another Buruli in the west.

PRIVATE SCHEMES:

Kumi The production level on the various private schemes scattered throughout Uganda varies with the level of management and the choice of site and situation. The most outstanding individual development occurs in the Hyparrhenia savannas around Kumi in Teso where a ranch is based on and run by a leprosy centre and has managed in the space of a few years to transform an area, considered locally to be poor bushland, into highly productive pastures. These pastures are stocked at almost 1 acre per beast with excellent Red Polls, Zebu and Boran animals showing liveweights commonly around 1,000 lbs. Although assisted by a £25,000 grant from 'Oxfam', success has been attendant not on capital but on careful evaluation of the correct methods to be used under the conditions of disease, pasture potential and climate prevailing. Development has been

enacted in a series of carefully planned stages consisting of bush clearance, pasture upgrading, disease control and, eventually, stock improvement. These stages, which formed the basis of 'Improvement' programmes, have been carried out swiftly and thoroughly under skilled central management using only local hand labour to provide a source of food and income for the Leprosy Centre and later, for commercial sale.

Initially, each area was cleared of unwanted bush by hand labour. The cut bush is then stacked and burned and thorny material rooted up and destroyed. After this stage, burning never again features on the pasture area. After three months the area is cleared once more and a 'tick-clearance' herd is introduced. This herd of unimproved animals keeps down the long-grass favoured by ticks, and is regularly sprayed so that eventually the area becomes 'clean'. With the removal of the herd, a process of reseeding is carried out to improve the local Hyparrhenia pastures. Chloris and Panicum are introduced, and to combat the long dry season, the leguminous Stylosanthes is included. Experience has proved the Teso area deficient in phosphates and this mixture will help in overcoming the shortage. The pasture is then closed for six months to allow unimpeded growth and after this, stock improvement may be commenced. Adequate water is available from nearby lakes and is pumped direct to the pastures. Fifty acre paddocks are fenced off and rotations may be introduced and night kraaling abolished. The contrast at the perimeter fence between the improved and local pasture and stock is one of the most

striking examples of progress in the livestock sector in Uganda. Productivity has been increased 7 to 8 fold over local conditions. A similar scheme has been suggested for the Kuluva Medical Centre in Arua, West Nile.

Kaaya Ranch: In contrast to Kumi a scheme north of Kampala in Buruli County illustrates the problems of good intention frustrated by lack of skilled management. The ranch is a private African development financed from profits from the piece goods trade. An area of 20 square miles was leased and this proved far too great an area to develop with the limited capital available. The use of Hima herders, and a reliance on these people to perform sophisticated tasks of spraying and control led to heavy losses and little improvement over the local conditions.

It was impossible to fence the 20 square miles and so the animals were split into 12 grazing herds grazed in the traditional manner by employed Bahima, much in the fashion of the early practice on the Bunyoro Ranch. 2,000 head of cattle were herded in this fashion, and were regularly sprayed against ticks. Despite this, in 1967 losses were amounting to 30% of births - which exceeds the rate prevailing in unimproved Hima herds! The herders were extremely negligent in spraying the animals, and the humid conditions, long grass, heavy tick population, all necessitated careful attention to tick control. What little immunity there was to East Coast Fever was undermined by spraying so that the disease became potentially more dangerous. In common Hima fashion calves were starved of milk and stunted by continual milk theft by the herders. In the dry season each year the

animals faced a 10 mile walk to the swamps when the small valley tank went dry.

Recently, careful advice from the Veterinary Department has reduced the losses. A 1,000,000 gallon tank is to be provided and the size of the unit reduced so that it may be successfully developed with profits from improved sales. The previous area of the ranch was at least three times bigger than it should have been, and the money saved could have been better spent on improving a small fenced unit and employing better management. The establishment of a British-financed veterinary dispensary at Nabiswere will ensure more careful attention to extension advice in future.

Kamuli: A novel but unsuccessful scheme for providing the pastoralists of Busoga with the benefits of improved disease control and pasture management was initiated by the District Veterinary Office, Jinja, An area near Kamuli was reserved for a 'ranged herd'. Local herders would bring their animals to the Kasozi site and leave them there for fattening and for a fee of 5/- would ensure their regular spraying and supervision. This was an attempt to by-pass the pastoralist, and simply to use his animals and ensure him of a guaranteed return. Theoretically, the cattle would be brought at 3 years of age, fattened for one year and sold to the Christmas market at Jinja, reducing the congestion in the transfer trade at this peak time. It was also hoped that the scheme would reduce the movement of animals between the districts and with it, the threat of disease. Internal dissention and the Hima desire to be with their animals caused a breakdown in the scheme and the anticipated working minimum throughput of 700 head was never achieved.

the maximum throughput being only 300.

Bugungu: The Bugungu area of Bunyoro is a former royal grazing ground and although cattle keepers for many generations, most of the people of the area have an interest in the fishing trade of Lake Albert. With the decline of this trade other fields for commercial activity have been suggested, one of which is commercial co-operative ranching, using money from trade and fish to finance the ranching infrastructure. The extremely low rainfall and its unreliability (Bad prospect of 30") excluded commercial agriculture. Though the point is disputed, it is claimed that the very thin bush cover excludes tsetse from the area and for this reason the cattle have survived the epizootics which destroyed most of the Hima herds of Bunyoro.

To ranch the area successfully would require the provision of considerable water supplies. At present there is a daily trek to the shores of Lake Albert, but this walking would be undesirable if the stock is to be improved. Fencing the area is too expensive for the cooperative at the moment, as the stocking rate is so low (1:8/10 acres) (20). The problem of burning would have to be overcome as it is common in the hard conditions of the dry season. It seems unlikely that anything more than a cooperative grazing project will be feasible in the near future unless considerable capital is forthcoming.

All the ranching schemes in Uganda whether U.L.I., Veterinary Department, or private, reveal the need for and benefits of a thorough understanding of the physical and social circumstances prevailing in a development area. Where the preparatory work is adequate, management skilled and limitations understood

as at Kumi, then a considerable increase in productivity from the pastoral resources has been achieved in a short space of time. The enormous rise in total ranch acreage under scientific management since 1960 from 100,000 acres to 640,000 acres (1966) is bound to effect a considerable influence on the pattern of supply in Uganda. This influence, and the possible overall changes in supply form the substance of the last chapter.

NOTES

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8. Op.cit no.2 annexe III.

9. Thimm B. op. cit. No.7.

10. U.S.A.I.D. 'Report on the Ankole Ranching Scheme' ref. P.10/T 617-A-14-AA-2-30001, p. 125, 1963.

11. Op.cit no. 2 annexe III.

12. The problems of marketing tobacco from a dispersed population were emphasised in conversation with B.A.T. and formed part of the reason why Rothmans were unsuccessful in Uganda. Where the human population density is greater, the movement of crop to curing is less, as in West Nile where there are ten times as many curing centres over the same area as are found in Acholi.

13. No.10 page 126 Op.cit.

14. Minor R. District Veterinary Officer, Lira, pers. comm. 1967.

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Chapter 16.

RANCHING AND CANNING IN RELATION TO THE FUTURE PATTERN OF SUPPLY

The gradual entry of the ranching schemes and the canning factory at Soroti into the cattle trade of Uganda can be expected to have a major impact on the present patterns of slaughter movement and supply. Imports of high grade meat and better grade slaughter cattle from Kenya could be eliminated and a considerable rise might be expected in the importation of poorer quality slaughters from Tanzania, Kenya and possibly the Congo and Sudan. Urban self-sufficiency in beef will be the aim in the districts having ranching schemes and the smaller, private beef movements from one district to another may be eliminated. The transfer trade at present in private hands from Teso, Lango and Ankole will face serious competition from the ranches, and traders may be forced to accept and pay lower prices to undercut this, or simply stop trading if profits fall too steeply. The total production of the present ranching programmes will not be sufficient to meet the 65-100,000 animals required for consumption and freezing in the 'Fertile Crescent', and demand may be expected to rise. Simple substitution by ranch animals will not always be possible or desirable, since many of the Karamoja animals are of a poor quality and are purchased because of their low price in contrast to improved, premium-price ranch stock. Changes in the pattern of supply will, therefore, be strongly influenced by the prices prevailing in different consumer areas, the overall level of demand, the establishment of a quality preference for better meat

and after 1969, the impact of the canning factory at Soroti.

Many of the ranching schemes aim at eliminating shortages in nearby urban areas. In this way many of the smaller hoof movements may be eliminated and this has the strong support of the Veterinary Department for reasons of disease control. The district self-sufficiency pattern is illustrated by the marketing schedules for the U.L.I. ranches:

Ranch	Markets: in order of preference.
TESO	Soroti, Mbale, Tororo, Jinja, Kampala.
ASWA	Gulu.
MARUZI	Masindi/Hoima, Nakasongola, Kampala, Masaka.
BUNYORO	Masindi/Hoima, Nakasongola, Kampala, Masaka.

Movements within the districts would be achieved as far as possible by trucking. This would help to avoid contact with or the dissemination of disease, to reduce weight loss, and eliminate theft. All ranches are situated on main roads and will have their own on-site auctions to which it is hoped the butchers will eventually bring their own transport. Initially, this will prove difficult as few butchers have the necessary trucking facilities and animals will have to be walked to their destinations. Walking is already the common mode of stock movement from the Bunyoro Ranch and there is a considerable weight loss involved in the hurried trek to Hoima. At present, the Maruzi Ranch is isolated, but an International Bank project will eventually link it with the Masindi/Hoima market via a ferry from Mayuge to Masindi Port. This will reduce the distance to Masindi by just under 100 miles to 54 miles. The need to be relatively close to Masindi arises from the very competitive situation in Lango which has a large cattle population and is

largely self-sufficient.

Early trial sales in the local areas have proved a considerable success on the ranches. The Bunyoro ranch was able to sell all its production to Hoima and Masindi despite early grumbles at the higher prices. Fears arising from the municipal control over meat prices seem to have been allayed, for the butchers are willing to pay for a high and steady quality. This quality guarantees the butcher a safe purchase and reduces losses through condemnation after slaughter. A quality price operates de facto if not de jure in most areas. A preference for ranch cattle from Ankole is already evident in Masaka where the Divisional Veterinary Officer was being pressed by local butchers to request more frequent sales.

As well as the local area, the ranches hope to participate actively in the urban high quality trade in the Fertile Crescent, eventually eliminating imports from Kenya. At present, the ranch at Aswa is not considering entry into this trade as development has been delayed and there is a considerable market for at least 600 animals annually in nearby Gulu. Aswa is, furthermore, very isolated from the main markets since it is 4 days journey by rail, and 2 by road. The other U.L.I. ranches plan to use a fleet of cattle transporters to despatch animals over long distances by road. This will allow considerable flexibility and permit movement wherever and whenever high prices prevail. The direct movement from source to slaughter point will by-pass the need for long delays in quarantine as quarantine regulations do not apply to animals transported directly by lorry and this gives the ranch stock a distinct advantage over

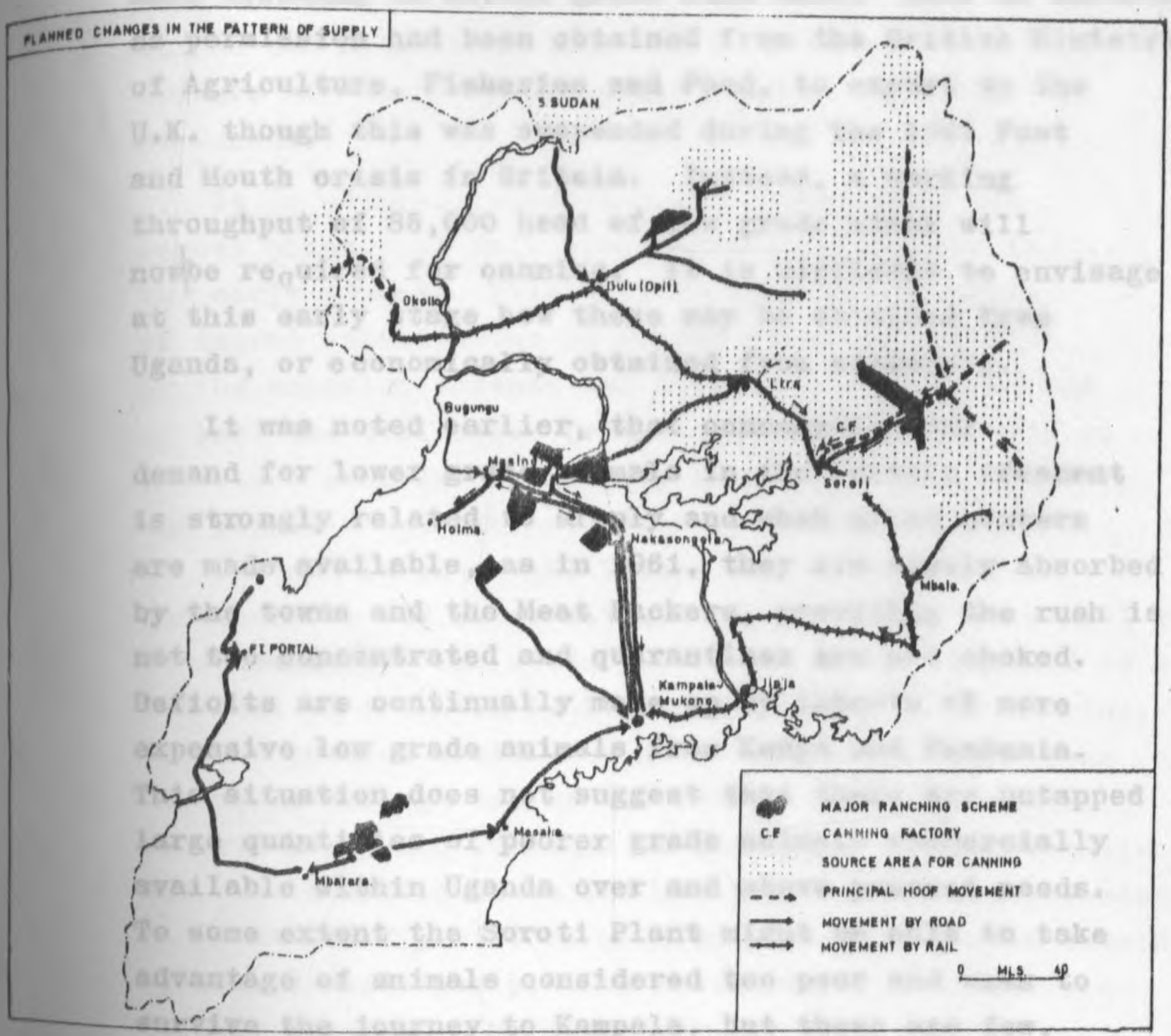
other local stock in transit. The costing of movement by road, as noted, has not yet been fully established, but considerable savings will be made over delays and weight loss involved in movement by rail and hoof.

By 1970-1975, when the ranches are reaching full production an annual offtake of about 25-30,000 animals should be released onto the market annually. This total does not allow for the expansion of the ranch sector beyond the units mentioned though this is, of course, possible. Some 5-7,000 of these animals should find their way into the local urban trade and the high quality meat sector of the bigger towns. The remainder of the animals will probably go to the high price market at Mukono, but the repercussions of this action on the Teso and Lango trade at that market is difficult to predict. Clearly the ranches have several advantages, such as steady supply and guaranteed quality, the latter becoming increasingly important with recent promises by the Veterinary Department to increase the scrutiny of carcases at Mukono. How the competition of the two sectors, ranchers and traders, will eventually work itself out into a new pattern of supply is both interesting and involved. The ranches and traders are attracted to Mukono by the high price prevailing there and to start a price war would achieve nothing, for at present both traders and ranchers must cover high costs. In one case the trader has to cover the high purchase price in the source area, in another the rancher has to cover his capital and recurrent costs and make a profit. If the traders

can act together and if they control enough of the trade they may be able to force the buying prices down in Lango and Teso and then undercut the ranchers. This cheaper meat would also find a greater sale as meat is an income elastic commodity where a free price prevails in the countryside and the butchers' profit margin would be increased in the townships. Economic moves will, however, be checked in the future by increasing Veterinary activity, the need to control cattle movement and more rigid controls on carcase inspection. It seems likely that the Teso trade may decline.

The movement of poorer stock from Karamoja to the urban areas of the south and to Uganda Meat Packers (Kampala) will not be influenced by the ranches. The present need for 30-40,000 low grade/low price animals each year will continue and the prices offered are quite unlikely to attract sales from development areas. The pattern of supply to the lower income groups in the towns and to Uganda Meat Packers (Kampala) is far more likely to be influenced by the canning factory and processing plant now being constructed at Soroti. (Map 30).

The Soroti Canning plant is being developed at a cost of £1m. with the assistance of the Yugoslavian Government. It is designed to handle an optimal throughput in excess of 85,000 head per annum to produce 5 million cans of meat. The plant was originally to handle 35,000 carcases for freezing and process 40,000 cattle for canning but the emphasis is now on canning. Problems arise concerning the location of the plant, and the availability of sufficient


PLANNED CHANGES IN THE PATTERN OF SUPPLY
S.SUDAN
Dulu (Opit)
Okollo
Bugungu
Lira
C.F
Soroti
Masindi
Holma
Nakasongola
Mbale
Ft. PORTAL
Kampala-Mukono
Jinja
Masaka
Mbarara
MAJOR RANCHING SCHEME
C.F CANNING FACTORY
SOURCE AREA FOR CANNING
PRINCIPAL HOOF MOVEMENT
MOVEMENT BY ROAD
MOVEMENT BY RAIL
0 MLS. 40

Map 30.

Ugandan stock to provide a working throughput. With the collapse of the related Meat Packers ranching scheme at Nariam, Usuku, which was to fatten cheap immatures, it now seems unlikely that there will be much freezing of better grade hind cuts. This is unfortunate, as permission had been obtained from the British Ministry of Agriculture, Fisheries and Food, to export to the U.K. though this was suspended during the 1967 Foot and Mouth crisis in Britain. Instead, a working throughput of 85,000 head of low grade stock will now be required for canning. It is difficult to envisage at this early stage how these may be obtained from Uganda, or economically obtained from elsewhere.

It was noted earlier, that consumption and demand for lower grade animals in the Fertile Crescent is strongly related to supply and when great numbers are made available, as in 1961, they are easily absorbed by the towns and the Meat Packers, providing the rush is not too concentrated and quarantines are not choked. Deficits are continually made up by imports of more expensive low grade animals from Kenya and Tanzania. This situation does not suggest that there are untapped large quantities of poorer grade animals commercially available within Uganda over and above present needs. To some extent the Soroti Plant might be able to take advantage of animals considered too poor and weak to survive the journey to Kampala, but these are few, and of an exceptionally low quality. If a scheme for fattening immatures, such as that suggested along the Usuku border were to become a reality then the situation would be eased by the proximity of a large reservoir of stock but at present this is not feasible at that site because of the security problem. Prospects for obtaining

cattle in Teso at the ceiling price of /33c. a lb. or below are at present very slight, whilst Mukono is offering 60-80c. Uganda Meat Packers has never achieved any success in buying cheap animals in Teso or Lango for the freezing plant in Kampala, and it seems unlikely that the Soroti factory will either, unless the Lango/Teso trade is ruined by large numbers of ranch animals monopolising the trade at Mukono.

It is natural, therefore, to assume that the Soroti plant will fall back heavily on imports in the early stages. This will nullify the benefits of import substitution of Kenyan stock achieved by the ranching schemes and several serious problems of location will arise from a continued dependence on imports. Lowgrade animals may be brought from Kenya and Tanzania but the rail journey involved to Soroti is long and large weight losses may be anticipated - particularly for those animals involved in a lake-rail journey from Tanzania. The costs and losses involved would be high for such an essentially low cost enterprise as canning, and the product would then have to be hailed back long distances through one of the source areas for export. As both Kenya and Tanzania have canning plants of their own, it is difficult to see how the canning and processing plant at Soroti will be able to sell its product outside Uganda, competitively. The F.A.O. mission emphasised this by stating: 'the livestock supply situation does not warrant an attempt to develop a substantial export trade from this factory in the near future' (3).

Alternative cheaper slaughter stock sources may become available if the present railway network is extended to

Nimule in the southern Sudan, or to Okollo in West Nile. Both extensions have been officially considered and in both cases the railhead would be near to large concentrations of cattle, but these cattle are known to have a high condemnation level (4). One suggestion for making up the throughput involved the dividing of carcases so that the hind quarters, the more profitable, higher grade area of the carcase, would be frozen at the Uganda Meat Packers in Kampala, and the forequarters canned at their installation at Soroti. This would allow the payment of a slightly higher purchase price for the cattle and possibly bring forth more animals. Importation of large numbers is nevertheless inevitable, unless the scheme is to follow the now defunct meat processing plant at Namalu, Karamoja. For importation, a site further south would possibly have proved more suitable, but the location at Soroti was partly political to add some industrial diversification to the northern economy. Africa is becoming the graveyard of canning enterprises. Already one Sudan project has met with failure being unable to purchase sufficient cattle, the Arusha plant of Tanganyika Meat Packers closed in 1965, the Beefex plant in Dar es Salaam was shut for much of 1968 and a large plant at Diego Suarez in Madagascar has never paid. It would appear that unless Uganda can develop a large home market for corned beef, the future for Soroti is not bright. A suggestion has been made that Soroti should become the nucleus of a frozen meat supply for Uganda providing a reservoir of carcases to even out the seasonal pattern of supply. The difficulties of retailing frozen meat are considerable when the capital limitations of the small butchers are considered. If alternatively, the Soroti factory is made to pay by being supplied exclusively

from Ugandan sources, unless a vast increase in available cattle through the eradication of East Coast Fever takes place, for many years it will be at the expense of the lower income groups in the urban areas or the freezing plant in Kampala. One solution is politically unacceptable, the other uneconomic.

NOTES

1. Uganda Development Corporation 'Wholesale and Retail Beef Prices in Uganda' part of a contribution to obtain a World Bank loan for ranching in Uganda, cyclo. 1966.

2. International Bank for Reconstruction and Development, 'A Report to the Uganda Development Corporation on a Project to develop Beef Ranching in Uganda' Report No. P.10, Nairobi, introduction 1966.

3. F.A.O. 'East African Livestock Survey' (printed edition) Rome Vol.1 page xxiii, 1967.

4. The condemnation of Sudanese cattle for pleuropneumonia and rinderpest has been very high at the emergency quarantines in Acholi and northern Karamoja. Most of the Sudanese animals show the familiar lesions of pleuro-pneumonia.

CONCLUSION

Research workers in the 'developing' or 'underdeveloped' countries often find that an understanding of problems is often clouded by insufficient data, an imperfect understanding of the factors at work and doubts regarding the application of sophisticated laws and techniques derived in entirely different circumstances. At the outset it was pointed out that this work is as much an illustration of a method of analysis as a study of specific problems in the pastoral sector. It is not a search for determinist 'laws', neither is it apiling together of data from various disciplines, but a search for significant relationships.

It is evident at many stages of the work that a great deal of the basic data gathered over a sufficiently long period of time which is the essential foundation of any improvement or transformation, is lacking. As a consequence the applicability of much planning has to be questioned, especially that involving large amounts of capital. The unfortunate histories of some transformation programmes stress the need for a fuller understanding of the basic variables: what they are and where they are, before large areas are 'developed' and large international debts incurred.

Previous planning has tended to be based on single factor analysis, usually the cost/benefit analysis by which statistics for a theoretical situation are projected forward to evaluate the feasibility

of a particular project. Many of the ranching programmes were of this sort. In other cases the accent was placed on a single element of the environment such as water, and,as was seen in Karamoja, the repercussions are sometimes worse than the original situation. No-one can decry the work done in developing the pastoral sector, instead it should have emerged that development departments are naturally geared to concentrate on their own specialist problems and rarely 'trespass' on other territories. What future is there for mixed farming when the Veterinary and Agriculture departments are administratively and geographically isolated?

Recent work, particularly that of the F.A.O. Livestock Programme in Tanzania, shows an acute awareness of the problems of non-integrated planning, so well discussed by Nayeh (1) and the programme puts together the findings of veterinarians, ecologists, economists and sociologists to formulate a 'balanced programme'.

By applying integrated environmental analysis some of the shortcomings stressed by Melville J. Herskovits may be overcome:

> "Traditional institutions, systems of value, types of economic motivation add a new variable to every equation. Without taking this into account, the conventional approaches lose much of their work ..."

> "The problem in not inconsiderable measure thus became one of communication between practioners of different disciplines that had little contact" (2)

NOTES

1. Nayeh S. 'The Need for Integrated Range Research in East Africa' Trop Ag. vol.43 no.2 pp.91-98 1966.

2. Herskovits M.J. 'Africa and the Problems of Economic Growth' in Economic Transition in Africa ed. by Herskovits and Marwitz pp.3.13.1964.

NOTES ON STATISTICS

Any work purporting to study a commodity such as beef cattle is aided or limited very greatly by the statistical evidence at hand. It may be that statistics simply are not available for a great sector of the study or alternatively, the statistics may be available but of a seriously unreliable nature. These problems were studied very closely for the Nigerian cattle trade by Ferguson and the limitations he mentions are considerable. If the statistics are known to be unreliable it is necessary to try and ascertain firstly how unreliable they are and, secondly, whether the unreliability is approximately the same over a wide area or whether it differs considerably from place to place. Unfortunately, so much of the available data is of a low reliability in Uganda that it often proved impossible to use such basic techniques as correlation coefficients in analyses. In using figures, the author has tried to draw attention to their limitation and use only methods which did not suffer too heavily from the inaccuracies, or try to convey a false impression of exactitude. A study at present being carried out by Mr. Donald Ferguson of the Agriculture section at Makerere University College is designed to examine the value of many of the livestock figures in Uganda, and will prove necessary reading as a follow-up to this or any previous study of the cattle trade.

In using cattle population figures, the author has used the figures returned at the sub-county level during the annual counts of the Veterinary Department. One exception to this is Karamoja District where the

problems of counting stock are more difficult. In this district a full census was made with the aid of F.A.O. in 1963 and appeared as Volume II of the Uganda Census of Agriculture. The F.A.O. study was used as the basis of data on Karamoja, but attention was paid to later counts made in the district. The Veterinary Department counts are not intended to be regarded as an annual census, for the level of accuracy is far below that. A note of caution was introduced by the publication of Volume I of the Census of Agriculture, for in that report the results of the census carried out for the Ministry of Agriculture and Cooperatives are often at variance with the Veterinary Department count. The major zone of error occurs in Buganda where a gross error of just under 50% enters the cattle returns so that the Ministry of Agriculture figures are a little over half those of the Ministry of Animal Industry, Game and Fisheries. In explanation the following factors are offered:

a) The suspicion with which the new enumerators may have been viewed by the Baganda, especially in the East Mengo cash crop area;

b) The under-representation of the nomadic population which occupies the northern part of the Mengo division of Buganda and;

c) The much smaller degree of planning which goes into the Veterinary Department annual counts.

For compatability, the Veterinary Department figures have been used throughout this work. An illustration from Nigeria will expand on the problems of enumerating livestock which were discussed at the Kampala F.A.O. conference on livestock statistics in 1966. For many

years there has been a cattle tax in Nigeria based on an annual count and for many years this averaged approximately 4,500,000 head. In 1963, a Rinderpest inoculation campaign was very successfully carried out after a promise was made that the data would not be used for tax revenue purposes. Some 7,500,000 cattle were inoculated!

Figures on the production of livestock in the traditional sector are all but non-existent. Figures have been gathered at various improvement stations such as group farms, district farm institutes and so forth, but mainly to show the results of some particular line of development. Basic data on disease mortality, liveweight, length of maturing period, calving average, etc., etc., are all largely absent. Cattle in Uganda are not sold by weight except at the Uganda Meat Packers plant where all animals are weighed on arrival. These, the only available figures beyond crude sight estimates at Mukono, are for the lowest grade of stock and distort the average national picture. Further, there are no accurate regional assessments of percentage of meat, quality of carcase by grade or loss of weight.

For the patterns of trade the problem of statistical evidence is even greater. At the village butcher level there is no accurate record of local turnover. Even though sub-chiefs are supposed to keep a record of slaughters the actual figures are discontinuous. Village butchers are not licensed either by the central or local government. As there is no record of all trade, there is similarly no accurate record of consumption. For many years the Veterinary Department has issued a

figure for meat consumption in Uganda based on hides. It is considered that hides are evidence of slaughter though naturally this must be qualified by figures for hides retained or spoiled and hides smuggled in from beyond the national borders. For many years before 1960 a gradual rise in consumption based on hide returns seemed reasonable in view of the development of the coffee and cotton economy throughout Uganda, for even though the coffee price fell in the mid-fifties the level of planting continued to be high, and the planting of cotton became in Teso what was described by a local agricultural officer as a 'mad desire'. However, after 1960 (~~graph~~) the figure for consumption rises dramatically and unreasonably in view of the fact that there was little in the national economy to stimulate such a dramatic rise from 450,000 to almost 700,000. As the figures are based on hides it is, maybe worthwhile to examine factors which could have influenced the hide trade. Work by Mr. Ferguson in Kigezi has illustrated how the number of hides traded rose from 2000 to nearly 70,000 over a similar period. This is quite absurd if we are to assume they came from the 65,000 (Agricultural Census) or 90,000 (Veterinary count), cattle in Kigezi. Findings of a similar nature occur in the district of West Nile. In 1960 the Congo became independent and civil strife soon followed, effectively isolating most of the eastern Congo. It became impossible to direct much trade towards traditional exits in the west and so hides began to flow into Uganda over the Congo border and, later the Rwanda border. Discussions with smugglers in the northeastern area of Rwanda have convinced the author that the trade is conducted on a relatively

extensive scale. Work by Good in Ankole suggests also that some of the cattle marketed in that district originate in Rwanda.

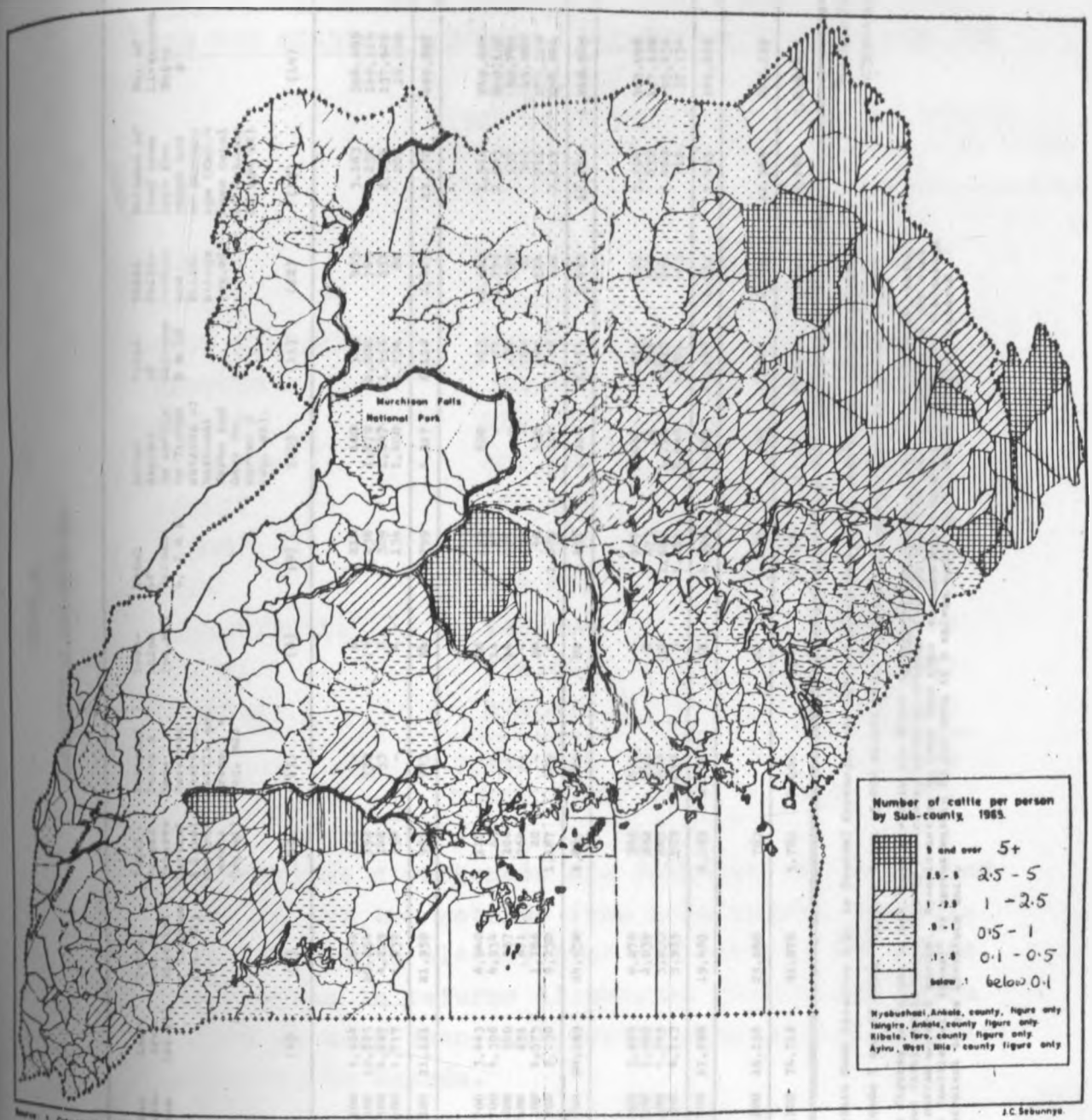
At the inter-district level, a greater statistical reliability may be achieved in detailing the cattle trade. Movement from district to district requires a permit from the Department of Veterinary Services and records of all such permits are kept and used for later records of movement. Rail receipts for livestock traffic have to be used with caution, as they record the number of cars rather than the number of cattle. A standard charge exists for 17 animals, whereas the truck will hold, possibly, 23.

Another problem incurred in s tudying cattle sold at the county markets for later movement is that not all cattle transferred from one district to another pass through one of the local government markets. The figures for Teso in 1962 illustrate this, for a discrepancy of over 20,000 head exists in the two figures. A similar problem characterised Lango in the mid 1960's.

During the course of gathering material for this work a major problem was encountered in the interruption caused by the Buganda disturbances. During the hostilities the records of the Buganda Veterinary Service were totally destroyed, having been housed in the lubiri or former royal palace of the Kabaka of Buganda. As the field work had been arranged to commence in the most outlying areas and gradually work inwards towards Buganda, the fire at the Lubiri upset the collection of data very considerably. Figures presented for Buganda, are therefore, of less accuracy than those for other parts of the country as they were collected in haste.

A footnote should be added on nomenclature, for during the course of preparing this study, civil strife resulted in the later reorganisation of the former kingdom of Buganda. Buganda *per se* exists no more, but as new maps of the redesigned divisions are not available at the time of writing, the author has maintained the old divisional units of Masaka, East and West Mengo, etc. Correction was made in the figures collected at an early stage for the transfer of the 'lost counties' to Bunyoro district.

ANNEXE 1.



Source: 1. Calculations based on 1959 census.
2. Veterinary Dept estimates, 1965.
3. Corrected Karamoja cattle census, 1963.

J.C. Sebunnya.

DISTRIBUTION OF LAND USE IN UGANDA

Region, District or Kingdom	Human Population	Land Area (sq.mi)	Total Area of District or Kingdom (sq. mi)	Total Forest Reserve Central & Local Governments (sq.mi)	National Parks & Game Reserves where no cattle are present • (sq. mi)	Townships (sq.mi)	Total of Columns 6, 7 & 8	Areas denied to cattle by Tsetse outside of National Parks and Game Reserves ✓ (sq. mi).	Total of Columns 9 & 10	Total Cultivation and Plantations (sq.mi)	Balance of land area left for range use or pasturage (Col.4 less total of columns 11 and 12)	No. of Livestock Units #	No. of Livestock Units per square mile of rangeland.
(1) and (2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Northern Region													
Lango	412,200	4,464	5,054	212	-	6	218	100	318	963	3,183	396,695	124
Acholi	333,300	10,783	10,854	392	730	4	1,126	1,670	2,808	745	7,230	149,114	21
West Nile	440,300	4,147	4,219	248	53	3	309	1,147	1,456	637	2,054	137,928	67
Madi	59,400	1,717	1,832	130	-	4	134	1,400	1,534	80	103	16,160	157
Total:-	1,245,200	21,111	21,959	982	783	34	1,799	4,317	6,116	2,425	12,570	699,897	57 (Av)
Eastern Region													
Busoga	780,700	3,443	6,940	127	-	26	153	600	753	1,142	1,548	249,694	161
Teso	486,700	4,306	4,954	63	-	14	77	-	77	1,256	2,973	600,168	202
Bugisu & Mbale	373,600	940	957	206	-	18	224	-	224	559	157	82,784	937
Sebei	63,400	671	671	264	-	-	264	-	264	60	347	45,982	172
Bukedi	439,100	1,575	1,786	20	-	20	40	100	140	724	711	175,172	246
Karamoja	204,200	9,230	9,230	1,187	486	6	1,679	314	1,993	122	7,115	698,844	98
Total:-	2,347,700	20,165	24,538	1,867	486	84	2,437	1,014	3,451	3,863	12,851	1,916,965	149 (Av.)
Western Region													
Ankole	616,600	5,928	6,276	365	616	6	987	1,084	2,071	561	3,296	303,096	92
Kigezi	555,800	1,902	2,039	222	245	6	473	55	528	524	850	107,170	126
Toro	409,100	4,745	5,233	863	810	10	1,683	1,790	3,473	282	990	95,436	96
Bunyoro	139,200	4,723	5,935	715	1,060	6	1,781	2,440	4,221	183	319	37,134	116
Total:-	1,720,700	17,298	19,483	2,165	2,731	28	4,924	5,369	10,293	1,550	5,455	542,836	99 (Av.)
Buganda													
All Divisions	2,269,100	16,138	25,096	767	-	100	867	300	1,167	2,006	12,965	675,120	52 (Av.)
TOTAL UGANDA	7,582,700	74,712	91,076	5,781	4,000	246	10,027	11,000	21,027	9,844	43,841	3,834,818	87 (Av.)

• Certain Game Reserves i.e. in Central Karamoja, are omitted since they hold considerable numbers of cattle.

✓ Columns 7 and 10 taken together total 15,000 square miles of Tsetse-infested country in Uganda.

The figures in Column 14 are those given in the sheet "Livestock Population, Uganda 1964" Table IV, which shows total cattle population by Districts, which on average for the whole of Uganda includes 21 per cent of calves under 6 months. Re-calculation to take this into account would involve reduction of the column for "cattle (all types)" by approximately 15 per cent if 4 calves under age of 6 months are considered equivalent to one livestock unit.

AGRICULTURE DEPT
VETERINARY DEPT

ANNEXE III

COMPARISON OF VETERINARY DEPARTMENT COUNT FOR 1963 AND THE UGANDA CENSUS OF AGRICULTURE RETURNS FOR THE SAME YEAR

	VETERINARY DEPARTMENT ANNUAL REPORT FOR THE YEAR 1963.	UGANDA CENSUS OF AGRICULTURE TABLE IX:1
ACHOLI	136,882	135,000
ANKOLE	233,255	196,000
WEST NILE/MADI	120,075	143,000
BUNYORO	22,603	17,000
BUSOGA	214,971	195,000
KARAMOJA	605,350	604,000
KIGEZI	94,162	65.000
LANGO	373,837	371,000
TESO	578,812	660,000
BUGISU/SEBEI	143,396	209,000
BUKEDI	174,494	243,000
BUGANDA	678,376	326,000
	3,626,643	3,164,000

The greatest divergences are found in the south and west, whilst the returns from both counts resemble each other more closely over the north. The great differences in returns illustrate the caution which should be used when approaching statistical material on cattle in Uganda.

ANNEXE IV

1966 - COMPARISON OF DISTRICT HIDE RETURNS WITH VETERINARY CATTLE COUNT

	HIDE PIECES	CATTLE COUNT	% OFFTAKE
ACHOLI	9,989	177,110	5
ANKOLE	73,211	333,752	22
W. NILE/MADI	71,492	129,155	55*
BUNYORO	5,552	38,246	16
BUSOGA	50,526	218,501	24
KARAMOJA	31,305	741,600	4
KIGEZI	67,535	97.050	70*
LANGO	42,572	326,589	10
TESO	73,551	577,488	10
TORO	18,905	70,342	27*

* Figures for offtake at this level are clearly unreasonable.

ANNEXE V

CATTLE TRANSFERRED FROM MAIN PRODUCING AREAS

YEARS 1955 - 1966

Year	Teso	Lango	Bugisu/ Bukedi	Ankole/ Kigezi	Karamoja	Acholi
1955	32,682	10,904	1,437	6,402	9,309	-
1956	44,249	6,707	1,715	7,238	11,234	-
1957	47,391	11,531	2,255	8,984	11,605	-
1958	54,840	9,635	7,592	7,088	10,393	-
1959	57,662	11,361	6,312	8,391	9,570	-
1960	48,822	13,484	2,071	6,300	21,685	-
1961	38,655	9,764	2,887	5,927	36,217	-
1962	57,753	11,656	2,841	4,639	22,735	-
1963	33,396	11,122	1,888	3,667	14,181	-
1964	31,733	7,441	1,805	6,255	18,049	-
1965	24,407	7,184	7,130	6,549	21,044	-
1966	30,352	6,446	2,537	16,444	27,394	2,397

Veterinary Department.

N.B. The total transfers do not reflect the total volume of trade since a large proportion of the sales are consumed locally.

NOTES ON MAPS.

Map 1. The Cattle Distribution Map has been compiled from the Veterinary Department annual sub-county returns for the year 1965. Attention has already been drawn to the limitations of the count which arise from the varying methods used in different districts and to the discrepencies which exist between these returns and some of the figures returned in the Uganda Census of Agriculture. In plotting the dots, allowance has been made for tsetse belts, areas of difficult terrain, sleeping sickness zones forest reserves etc., within the various gombolola. The basic pattern of distribution emerges from the small unit (gombolola) used, the finer detail from subjective modifications. The 500 head unit chosen was the smallest which could be reproduced clearly after reduction.

Map 2. The Tsetse distribution was compiled from a manuscript edition of the map to be included in the 2nd. edition of the Atlas of Uganda. Consolidation lines referred to in the text have been added from Annual Reports. The areas to be cleared in the 2nd. Five Year Plan were taken from a manuscript map in the Tsetse Department.

Map 3. The Rainfall Reliability map needs to be used with caution. The information used by the East Africa Royal Commission Report, from which this map is derived, was based on very few recording stations and data of no great vintage. The zones are not clearly demarcated as this map might suggest

but merger gradually from one into the next.

Map 4. The settlement pattern for Map 4 was derived from the 1:50,000 series maps of the area and the East Africa Royal Commission map of 30" rainfall reliability. Again it must be stressed that the 30" line is a broad transitional zone, not a clear boundary.

Map 5. This map is a generalisation of the map which appears as Annexe 1. In the case of the latter the ratio of cattle population to human population was worked out for each gombolola on the basis of Porter's figures accompanying his population map of East Africa. The figures were modified to allow for the passage of time between the compilation of that map and the cattle figures used. In areas of exceptional change such as Bugerere, however, accurate figures for the recent growth rate are lacking and it is clear at the same time that they vary considerably from the national average figurex.

Map 6. The map is a simplification of that which accompanied the original article.

Map 7. Map 7. is a simplification of the map on the same theme accompanying Langdale-Brown I. et al in the 'Vegetation of Uganda', 1964.

Map 8. The Average Stocking Rate is the area of available range land divided by the stock population. The area of available rangeland in each district is taken from the figures presented in Annexe II.

Map 9. Map 9.is based on records of disease eradication programmes, physical limits on vectors and parasites and district veterinaary records. The boundaries of the various diseases are often not as sharp as lines on this map suggest and for instance, periodic isolated outbreaks of rinderpest occur in parts of Acholi, Pleuro-pneumonia in Teso etc. Trypanosomiasis is not illustrated on the map of disease distribution as the situation with regard to tsetse has been illustrated on Map 2.

Map 10. The Cattle Types are based on the grouping used by Mason and Maule in their work 'The Indigenous Livestock of Eastern and Southern Africa'. This has also been the basis of the map of Uganda reproduced in that publication, but for the purposes of this work the map has been modified to take account of changes in the distribution of cattle types in Uganda such as, for instance, the recent filling up of Buruli (Mengo).

Map 11. The location of county markets was determined in the field with the assistance of ssentalas and veterinary staff. The map represents the situation in 1966 only for the fortunes of individual markets may change rapidly. The position with regard to Buganda is rather difficult for in that area cattle are traded at normal produce markets as well as at the larger stock markets. Map 11. shows those markets advertised as functioning in 1966.

Map 12. The trade pattern in Karamoja was determined from individual market returns filed at the District Veterinary Office, Moroto, 1966.

Map 13. The hoof/truck movement of stock along the principal routeways was estimated by subtracting the total volume of rail tranfers from the total of all cattle transferred from that particular district. It is not possible to divide the number into a percentage travelling on the hoof and a percentage travelling by road except in the case of certain animals entering Buganda where hoof movement is forbidden. In some areas such as Karamoja the total movement is on the hoof, in other areas such as Ankole well over 50% travels by road.

Map 14. The volume of rail movement was obtained from the comparative returns of the East African Railways and Harbours by courtesy of the Traffic Superintendent, Kampala. There is some difficulty in using these figures, as mentioned in the text, as any animals in excess of 17 per waggon are not registered.

Map 15. The data on this map was derived principally from field records and material from the Tsetse Department reports.

Map 16. The map of 'Cattle Economies' was based on the ratio of cattle and human population, crop data from the Census of Agriculture and the Atlas of Uganda.

Map 17. The map of Karamoja is taken from 'Environmental Influences on Cattle Marketing in Karamoja' by the same author. Cattle movements were revised from those recorded earlier by N. Dyson-Hudson with the aid of Mr. D. Parminter, District Veterinary Officer, Moroto. Since compilation the activities of the security forces in the area may have had a marked influence on the migrations fown on this map, especially the southern movements which became involved with heavy raiding in the Sebei Plains area and the eventual destocking of the plains and the fleeing of the human population to the higher ground. Vegetation zones are adapted from the Atlas of Uganda, the Karamoja District Plan (1958) and the 'Vegetation of Uganda', I.Langdale-Brown et al (1964)

Map 18. The distribution of dams and tanks in Karamoja is taken from a survey of the district by the Water Development Dept. in 1964.

Map 19. As above.

Map 20. The income levels have been taken from A. O'Connor's 'Economic Geography of East Africa' and are, as the author points out, very generalised and based on data which is rather approximate. Population density has been taken from the Uganda Atlas.

Map 21. Figures supplied by Uganda Meat Packers, Kampala City Council and the Divisional Veterinary Officer, Mukono.

Map 22. The surveys conducted by the Water Development Dept., were used as the basis of Map 22. This survey accurately mapped the location of dams and tanks and noted whether they were operational or not. At the time of writing data on tanks was not as complete as that for the earlier dam programme. Tanks have been shown as concentrations without specific individual sites being shown.

Map 23. The Rinderpest Barrier Scheme (Joint Project No. 15 of the F.A.O.) was outlined by S. Onyait of the Veterinary Office. E.C.F. projects were outlined by the same source from information with the F.A.O. and Veterinary Dept. This was later presented in the East African Livestock Survey.

Map 24. The new stock routes are derived from the F.A.O. Livestock Survey Atlas and Regional Veterinary Offices.

Map 25. Information from Uganda Livestock Industries, the Veterinary Department and the Bunyoro Growers' Cooperative Union, Masindi.

Map 26. Tsetse Office, Masindi and the Bunyoro Growers'Union.

Map 27. Sketch map based on 1:250,000 sheet supplemented with field notes.

Map 28. Uganda Livestock Industries, Kampala.

Map 29. The ranch boundaries were taken from a series of 1:50,000 manuscript maps at the Veterinary Dept., Mbarara. Field data and Tsetse Dept. data was used to complete the map.

Map 30. Calculations based on the programme of Uganda Livestock Industries and the Ankole Ranching Scheme, Uganda Meat Packers and field data.

PROBLEMS OF TERMINOLOGY CONCERNING PASTURE LANDS.

Reference Maps 6 & 7.

In presenting problems relating to vegetation in Uganda, as in almost any part of Africa, a considerable confusion arises over terminology. It is, firstly, necessary to establish whether the vegetation classification or map is to be based on ecological or physignomic criteria. In the case of the former an attempt is made to indicate the climax vegetation which would result from an unimpeded interaction of physical factors such as climate, soil-type, slope etc. Such a grouping and, particularly, its presentation on a map, is limited by our knowledge of how far the visible assemblage of plants is man-induced or a sub-climax. Wilson (1) writing of Karamoja emphasised this problem: ' ..it is not possible to indicate which of the types (of vegetation) if any, can be regarded as the natural climax '. The second form of map or grouping, the physignomic, attempts to show the visible vegetation assemblage whether climax or sub-climax as it exists in the present landscape. The two systems may be briefly described as follows: ' ..two..systems have been devised, the first to indicate land potential, involving criteria that may have to be inferred and the second, to indicate present vegetation type ' (2).

Map 6 illsutrates the 'ecological' or potential zones of vegetation in Uganda, based to a great extent on climate, devised by Pratt et al (3). To a large degree the basic environmental data has been supplemented by the findings

of Langdale-Brown et al during their three-year survey of the vegetation of Uganda (4) as to what the possible climax forms and their extents may have been. Against this map of potential presented by Pratt may be set the present rangeland picture given in the map of 'Range Resources' accompanying Langdale-Brown's 'Vegetation of Uganda'. This range map (Map 7), although the reader is left in some doubt of the fact, illustrates the present extent of the physignomic range zones and a separate map is included of ecological zones. (~~Map ?~~).

Added to the confusion over classification criteria is the problem of detailed names for the various types of ecological, physignomic and other zones. Although, for example, Pratt et al are presenting a 'Classification of East African Rangeland' and state: ' "steppe" is meaningless' as a term in East Africa they then go on to include it in one of their ecological zones. As far as possible, the author of the present work has tried to keep to the terms used by the authors whose work provides the most useful reference on the topic under discussion. Thus, when dealing with Karamoja the terms 'Savanna, Steppe and Thorn Bush' are used as these are the terms employed by Wilson (5) in his works on the area. Standardisation of the terms for this work has some benefits but only adds to the confusion of an already confused literature should any point wish to be pursued at greater length. Throughout this work the author has tried to restrict 'Savanna' to areas of perennial grass outside the montane/elephant grass

areas, and 'Steppe' follows the Yangambi definition of an open area in which grasses tend to be xerophytic in form, annual predominantly and are thinly spread enough for fire to be a rarity.

Confusion commonly arises over terms related to vegetation such as, for instance, 'carrying capacity'. This is, especially in Africa, an imprecise and relative term for it is rarely if ever based on long observation and trials and can vary enormously under different levels of management. Thus, for instanse, in much of Teso the carrying capacity based on the ecological type (Map 6) is c.5-7 acres per head but on the Ongino Ranch, it has already been noted, the cattle are stocked at 1:1. Throughout this work, unless specifically stated otherwise, carrying capacity refers to unimproved management and is based on nothing more prcise than the estimates of veterinary staff, some local research and a few trials. Carrying capacity is not entirely dependent upon grass but is strongly influenced by the availability of surface water etc., though in this work carrying capacity is based on grass ceteris paribus.

Lastly, the term 'stocking rate' needs clarification. In some ways this is more precise than carrying capacity for it is based on a known number of animals in a given area. At the same time it should be pointed out that the stocking rate may be computed on land area, pasture area or several other criteria. In this work, unless specifically stated otherwise, it referes

to the area of available grazing.

Thus the terms may be defined briefly as:

'Carrying Capacity': The number of cattle which can be maintained on a given area at a given level of management without detriment to the grazing or other pastoral resources.

'Stocking Rate': The number of cattle maintained on a given area of land or grazing.

1). Wilson J. in 'The Vegetation of Uganda' , Landale-Brown et al, Government Printer, 1964 p. 90.

2). Pratt D.J., Greenway P.J. and Gwynne M.D. ' A Classification of East African Rangeland ', Journal of Applied Ecology, Volume 3, 1966, p. 370.

3). Ibid.

4). Langdale - Brown et al op cit no. 1.

5). Op cit no 1.

Literature on the Beef Cattle Sector:

In the same fashion as cash agriculture has dominated the fields of development and development planning in Uganda for so many years, it has dominated the literature. Studies on the raising and selling of beef cattle have been few until very recently, and geographical studies had been with one exception absent until 1966. The rapid increase in the interest shown by government in the pastoral sector has been reflected in a sudden rise in the number and scope of publications on cattle since 1961.

Before 1961 attention was focussed on the production and supply of beef cattle in Uganda, mostly through the publication of specialist articles in journals and the reports of the Veterinary and Tsetse Control Departments.

These studies concentrated usually on one particular and often narrow field such as East Coast Fever or cattle breeding. Some writers had studied the relationship of social attitudes towards the rearing and selling of cattle amongst pastoral peoples, for instance MacIntosh amongst the Bahima (1), or Dyson-Hudson in his report to the Protectorate Government on the 'Position of the Karamojong' (2) or Gulliver on the Jie and Turkana (3). For Uganda as a whole the only study of livestock remained the chapter in Thomas and Scott's 'Uganda' published in 1935 and the recommendations for the livestock sector outlined in E.B. Worthington's 1945 Development Plan for Uganda. Thomas and Scott provide a descriptive outline of the raising of cattle in various parts of the Protectorate, whilst Worthington, interested as he was in the economic aspect, provides a descriptive outline and brief analysis of the pattern of the cattle trade at the time. Worthington's study

is of particular merit to the geographer inasmuch as it contains a map of the pattern of cattle trade as it existed in 1940-45.

The problems of pastoral peoples both in Uganda and East Africa received attention in the Royal Commission Report of 1953-1955. This treated pastoralism in two sections: firstly outlining the problems, though in reality predominantly social problems and overgrazing were treated, and then descriptively reviewing the developments in all fields which altered the customary use of the land. Unfortunately, the second section contained mostly material contributed by the various government departments responsible for these developments and there is little appraisal of the schemes from an objective or environmental standpoint. The material is still largely descriptive. A valuable series of maps accompanied the Report, one of which illustrated the prospects of receiving 30 inches and 20 inches of rainfall. This provided a useful basis for separating the climatically 'pastoral' from the climatically 'arable'lands. Reference was also made in the Royal Commission to a work by Hursh (4) proposing that Karamoja was becoming a 'desert' through overgrazing. It is significant that there was no tie-up between quoting this paper and studying the work of the water development sections in the Royal Commission Report, as the two are so closely connected.

In 1961, the outlook for pastoralism changed dramatically with the publication of the World Bank Report entitled 'The Economic Development of Uganda' which had far greater material results than the earlier Royal Commission Report (5). This study outlined, with

other aspects of the economy, the main features of and constraints operating within, the pastoral sector. The material presented was to form the foundations of the Uganda Government's first Five Year Plan. The study stressed that in the pastoral sector lay the most valuable key to economic diversification and many recommendations were made. In the same year a series of monographs by Parsons 'The systems of Agriculture practised in Uganda' was published by the Department of Agrculture station at Kawanda. These examined the various systems of agriculture practised in the main regions of Uganda and included a special monograph on the 'Pastoral Systems'. Each monograph however, includes material on the factors influencing patterns of cattle production, though not trade.

As a result of the World Bank enthusiasm, development was cleared for the Ankole Ranching Scheme in western Uganda. The assistance of the U.S.A.I.D. was secured for financing the project and in consequence a detailed study was made of the local area from all aspects of the environment from topography to management factors. A report of the findings as well as a detailed costing appeared in 1963 (6). By this time a map had appeared in the Uganda Atlas illustrating the distribution of cattle and stock routes in Uganda. Apart from actual errors in the map there were several other factors which made the map unsatisfactory. The size of dot unit was much too large in relation to Uganda's small cattle population and provided only the most general picture of distribution, and there was no attempt to show the absolute or relative volume of trade passing along the stock routes. The text accompanying the map did not explain the patterns illustrated, but concentrated

instead on the development of livestock and their part in the export trade of Uganda.

In 1963, a special report (the 'Mahadevan' Report) was published which gave a detailed description and analysis of the working of the Karamoja Cattle Scheme which was at that time operating in the district. There was no attempt at relating the trade problems to environmental factors in the area. In the following year however, a detailed and well mapped study of the 'Vegetation of Uganda' was published (7) which contained a short but excellent account of the declining pastures of Karamoja by Wilson, and several detailed maps of the range resources and general ecology of Uganda.

As part of an application to the World Bank for a loan to assist ranching in Uganda, the Uganda Development Corporation compiled a report entitled 'Wholesale and Retail Beef Prices in Uganda' which, though largely an economic outline, contained the first brief description of the marketing systems for beef in Uganda. By 1966, also, work had been completed on the draft of the F.A.O. East Africa Livestock Survey which was to appear in print the following year (8). The long awaited report did not contain detailed plan recommendations for the development of the livestock sector as had been anticipated in some quarters, but instead put together all the material collected in an intensive programme of interviews throughout East Africa. The survey thus performed a service in putting together material from all parts of the three territories, but gave neither a detailed analysis nor a development outline. Instead, the material already decided and outlined by the various government departments was described and reviewed. The accompanying 'Atlas' was also a collection of largely extant maps put together on a smaller scale

with little to no alteration. An interesting and valuable article by Nayeh (9) on the need for integrated research and planning in the livestock sector in East Africa appeared in 'Tropical Agriculture'. In the light of findings presented by Wilson in 1963 on the part played by water development in the destruction of grazing, this article by Nayeh serves a valuable purpose in attempting to encourage planned development of the pastoral sector by considering the whole environment and not sector by sector in a vacuum.

In 1967, two geographical studies of the pastoral field appeared. Dr. Turner published her findings on the ecology of a cattle ranch (10) based on an exhaustive programme of field work in Bunyoro in the early 1960's. Her findings on the impact of a changed grazing pattern on the vegetation assemblage, is particularly valuable for the detailed and informative maps which accompany it, and Dr. O'Connor gave a brief geographical description of the distribution of livestock and the part it plays in various parts of East Africa in his book on the economic geography of the region (11).

Studies of a similar nature to the present one have been rare in Africa and most of the geographical studies of beef production and the cattle trade have been confined to sections in general regional textbooks such as the section on livestock in Harrison-Church's "West Africa", or similar sections in Buchanan and Pugh's 'Land and People in Nigeria' or Boateng's 'Geography of Ghana'. Attention should, however, be focussed on three studies in other parts of Africa which help to place the present work in the context of the continent and show general similarities or differences with territories elsewhere. Hill's statistical study

of the relationship between cattle trade patterns and social factors has been summarised in an article in 'Markets and Marketing in West Africa' (12) and, with the aid of statistics, attempts to show the factors influencing sales patterns in Ghana. This work appeared in 1967, and provides a close and interesting comparison with the present study of related influences in Uganda. In the same publication, an article by Ferguson (13) illustrates the problems incurred in moving cattle from the north of Nigeria to the consuming areas in the south. Although most of the trade is conducted entirely on the hoof, in contrast to Uganda, many of the problems are similar and the method of dealing with low grade cull stock which suffers in transit and passage through the Trypanosomiasis belts are particularly interesting. Another study of Nigeria by Donald S. Ferguson is a study by a trained agricultural economist of the statistics of the cattle trade in Nigeria. In explaining the statistics, Ferguson gives a very full account of the cattle trade in the Nigerian beef industry including the production and marketing of beef, potential for increasing the supply of beef and a very detailed analysis of the merits and demerits of the various population and trade statistics.

Other works on Africa of direct interest to the geographer interested in production and supply of beef cattle are listed in the bibliography.

The literature falls into three main categories: firstly there are the specialist studies which analyse a single variable in detail, providing valuable data on this single aspect. Secondly, there are the reports and surveys which for lack of time have often gathered their material from official sources and have presented

compendia rather than integrated analyses. Thirdly, a small volume of literature is growing which attempts to find significant local factors and present a balanced overall appraisal of problems. This final category is the one to which this study is designed to contribute.

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EPILOGUE.

In August 1968, talks were started between the East Mengo Administration, the Kampala City Health Department, the Veterinary Department and other interested bodies with a view towards the closure of Uganda's largest cattle market at Mukono. The growing danger of disease to both cattle and humans which results from the cursory nature of Veterinary inspection is a threat to the dairy industry and the meat consuming public of South Mengo. There is, as well, a serious danger of infected meat being smuggled into the peripheries of Greater Kampala and even into the City itself.

Closing Mukono would spell the end of organised cattle trading from the districts of Teso and Lango to south Mengo in the manner that it is carried on at the moment and it would seem that the regular movement of traders and their stock would cease. It is unlikely that they would turn instead to Kampala for, there they would run the risk of having their animals condemned and would be in competition with the large scale urban wholesale butcher who buys his animals in Karamoja for c.150/= - 200/=. The Teso trader, buying at 250/= +, cannot possibly compete.

One possible future for the Teso/Lango traders lies with the Uganda Meat Packers concerns in Kampala and Soroti. As the price of low grade meat on the World market has fallen from U.S.$750 per ton to U.S.$370 per ton since 1964, the prospects for the meat freezing plant in Kampala seem gloomy. Meat of a quality high enough to break into the major world markets is obtainable only from the ranching schemes in very small quantities, and if Uganda Meat Packers wished to export this they would have to exceed the price of 2/50 lb. which this

meat fetches at the moment in the Kampala market. Since Kenya is already exporting better grade meat for 1/90 this seems unlikely. What does seem likely to happen is that Uganda Meat Packers will place progressively less emphasis on the export of low quality chilled meat and will serve the urban and high income rural environs in an abattoir function. Cattle could be bought and slaughtered in Teso and the forequarters canned in the district whilst the hindquarters would be sent for retailing in south Mengo through the Kampala branch of Uganda Meat Packers. Alternatively, the animals may be slaughtered and divided in Kampala. The advantages of this is that the freezing plant could be used to store meat for later sale and iron out something of the seasonal supply problem, though the storage capacity is rather limited at present and a prejudice against frozen meat would have to be overcome. The large scale movement of cattle would be reduced, and with it the threat of bovine disease. This picture could be influenced by the ranches which also intend selling to the urban areas, so that Kampala will have three main suppliers eventually: the ranches, the Uganda Meat Packers and Karamoja, though the varying quality will assure each to some extent of a separate sector of the market.

Karamoja - low income group - largely indiscriminating in general quality.

Teso hindcuts - middle income group - recognisable quality/price market.

Ranches - high income groups - substitute for Kenya Meat.

SOUTHWEST ANKOLE: The pasture lands of southwestern Ankole are dotted with the traditional kraals of the pastoral Bahima. This area continues in Ruzhumbura county of Kigezi.

BUNYORO: In this open space cattle are confined for the night by the Muhima. A smudge fire burns to keep away predators and dogs maintain a steady vigilence against man and leopard.

BUKEDI: The burning over of pastures is common to all parts of Uganda though the timing and purpose may vary regionally. Here, on the Bukedi swamps, the burning is to encourage a 'green flush' during the dry season.

BOKORA: The 'Steppe' belt of Karamoja seen during the 1965 drought. The amount of grazing is negligible and the annual grasses have died back. The shortage of grazing in this 'homestead' zone encourages the movement of people and stock westward to the perennial belt.

MADI OPEI: Despite the 30 or so acres of available grazing per head in Acholi, the neglect of animals is often marked and hardships result. These zebu animals were left untended in front of the local administration headquarters. This indifference contrasts sharply with the attitude of the Bahima.

S. KYAGGWE: A small Muganda tends his father's animals on some of the very limited pasture in this area. The animals are small and thin and typical of the 'Nganda' cross raised on any available patch of grassland.

BUKEDEA: This market in Teso is one of the largest of the county or local government markets in Uganda. The site is fully enclosed and equipped with water. A considerable trade in fresh meat is conducted around the peripheries. The cattle are typical of the Small East African Zebu.

USUKU: A herd of cattle belonging to Uganda Meat Packers leaving the Iriri quarantine on the Teso/Karamoja border for the railhead at Soroti - 50 miles away. In the background is one of the volcanic inselbergs, "Napak", which characterise the scenery of Karamoja.

KARAMOJA: Some of the bigger and heavier boned "Karamoja Zebu" or "Karamoja Boran" animals en route for Iriri. The animals are quick-marched from market to quarantine and quarantine to railhead.

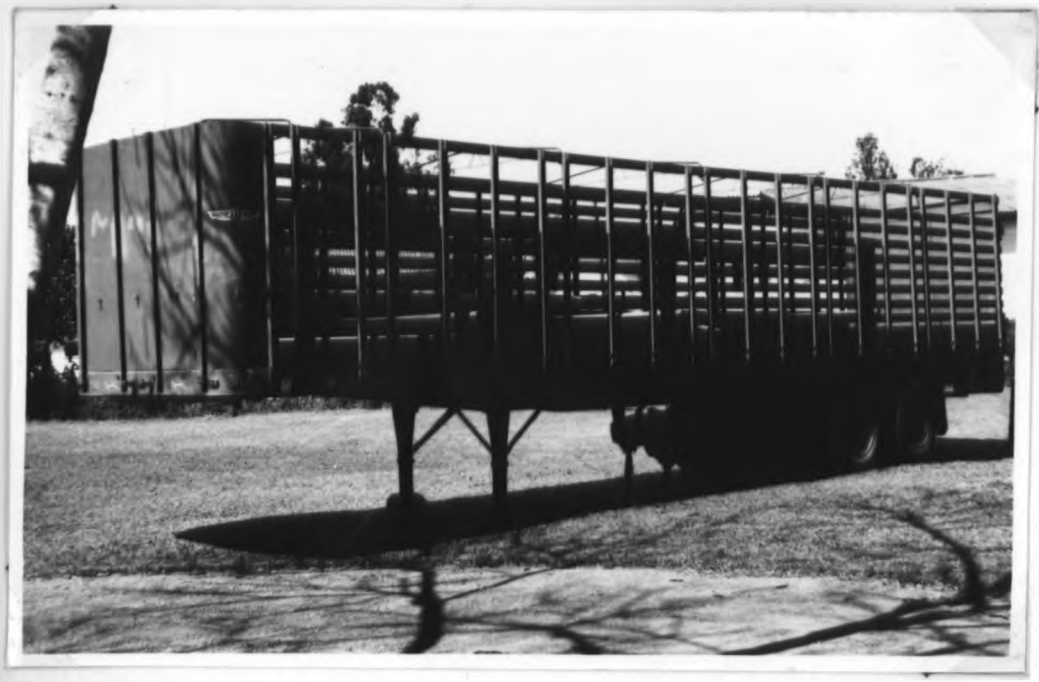
USUKU, TESO: At this quarantine at Iriri, Karamoja cattle are held and inspected before being allowed to trek through Teso to the railway at Soroti. These measures are designed to contain rinderpest and pleuropneumonia.

SOROTI: The loading 'boma' at Soroti railhead is the last pause for cattle going from Karamoja or Teso to the south. The severe lack of grazing in the boma does not allow the holding of animals in large numbers for any length of time prior to departure.

MBALE: En route from the markets of south Teso to the consumers of Bugisu and Mbale, cattle are stopped at this compulsory night stop to prevent exhaustion and weight loss. Such areas may also be used as municipal holding grounds.

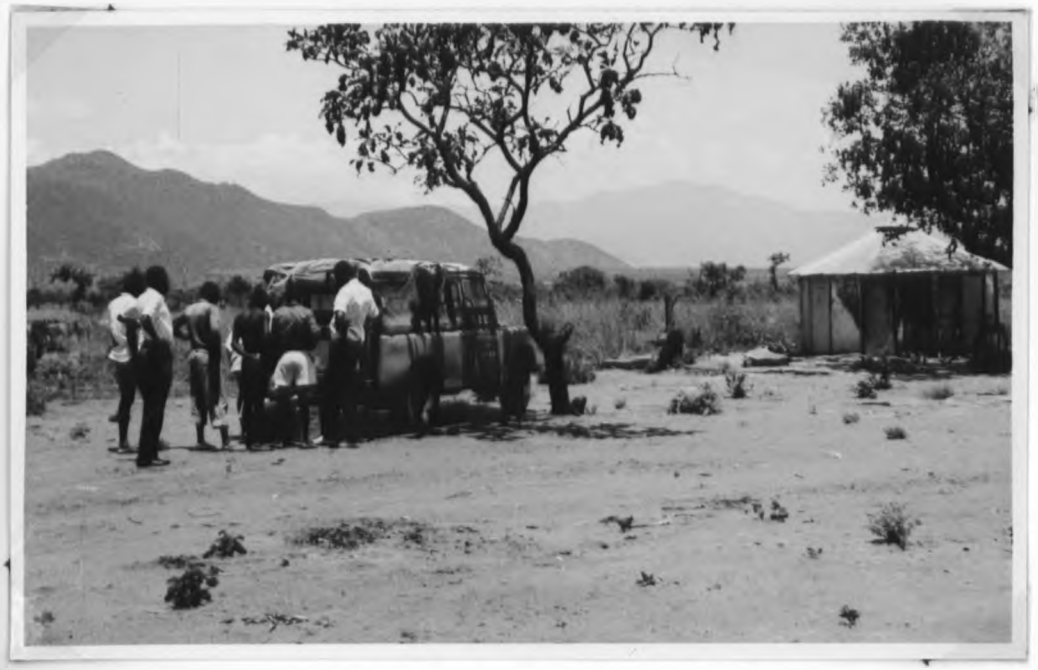
MUKONO: Inside the railhead resale market at Kyetume traders from Teso and Lango meet butchers from south Mengo. Cattle held at the market for any length of time suffer the effects of the almost total lack of grazing.

MUKONO: The killing field at Mukono lacks even the rudiments of proper slaughter facilities though this is by far the largest market in Uganda. Fears for the quality of meat originating from Mukono have had a considerable part to play in determining the pattern of



This road transporter donated by U.S.A.I.D. is currently being used by the Veterinary Department to establish the economic and physical feasibility of moving slaughter stock by road. The road transporter holds from 40 - 50 head.

MADI OPEI: This thorn-fence enclosure is used to kraal Sudanese refugee animals at night. Finance is not available for an enclosed quarantine but night enclosure is vital because of theft and predators.



ACHOLI/SUDAN BORDER: A Veterinary Department Official confers with scouts over movement of Sudanese refugee stock over the border which is marked by the hills in the distance. Such illegal movements carry the threat of rinderpest and pleuropneumonia.

ACHOLI: A 'crush' built for inspecting and treating animals in transit from the county markets of south-eastern Acholi. Animals are driven through slowly to be inspected and innolculated in order that disease may not be spread by trade movements.

MBALE: Notices such as these at Mbale explain as simply as possible the basic requirements of improvement in the traditional sector. The dates of the local county markets are announced for butchers and sellers to note in advance.

BURULI: During the wet season large areas of the Hima region of Buruli become swamps and cattle move back to higher ground. In the dry season the swamps however, provide valuable additional grazing.

W. BOKORA: Natural water holes such as the one shown above draw cattle westwards from the central manyatta or ere belt each dry season. Cattle may wait two or even three days before gaining access to the water and in the meantime graze out the areas around the water holes.

WANSEKO: BUNYORO For the cattle of Bugungu county lake Albert provides almost the only source of water. Cattle, after being walked three miles are seen here on the lakeshore at midday.

SOUTH TESO: This herd, belonging to several owners is in the care of a Muhima herder who has brought them towards the swamps around Lake Bisina during the dry season. At the end of the day they will be kraaled and at the end of the wet season, returned to their respective owners.

BUNYORO: One of a series of 750,000 gallon valley tanks being built with the assistance of the Federal German Government. Tanks are rapidly replacing dams as the main form of artificial water supplies for cattle in Uganda. The tank shown above is situated on the Bunyoro Growers' Cooperative ranch.

BUNYORO: In order to prevent contamination of the water source, the water from newly-built valley tanks is fed continually into concrete troughs. Animals are prevented from drinking directly at the tank, in the manner that water is obtained at dams. Thus the structure of the tank is protected and the water kept as pure as possible. Contaminated water is a common cause of carcase condemnation.

NYABUSHOZI-ANKOLE: Area of bush outside the clearance zone contrasts sharply with the areas sheer-cleared by chain.

NYABUSHOZI ANKOLE: An area sheer cleared of bush and tree vegetation. The indiscriminate nature of the chain clearing method does not allow selective destruction of the tsetse habitat.

NYABUSHOZI: Cymbopogon afronardus a resilient blue-green tufted grass which has been colonising areas of Ankole in recent years.

KIMENGO, BUNYORO: A night enclosure or kraal in which cattle are protected from dusk to dawn. This one, made of thorn bush is on the Bunyoro Ranching Scheme.

KIMENGO: The interior of the same kraal showing a total absence of grazing. By kraaling cattle can lose from 10-25% of their total grazing time.

BUNYORO RANCH: Constant hand labour is needed to keep grass as short as this unless a sufficient number of animals are available immediately to stock the area at a sufficient rate. This pasture of Panicum maximum and Brachyaria brizantha provides excellent grazing for the Boran herd.

BUNYORO RANCH: This area was intensively bush cleared by hand in 1964 and the inadequacy of stock numbers allowed rapid regeneration. The grass ispredominantly Panicum though long and mature and not short and sweet as seen above.

RUHENGERE FIELD STATION-MBARARA: These Boran cattle, at present in poor condition have been bought as the nucleus of an improvement herd initially for the Ankole Ranching Scheme and later for local progressive herders.

TESO RANCH - USUKU: The impervious Sebei clays pond up large areas of standing water which originate as storms over the nearby inselbergs. In 1966 large areas of the ranch were submerged.

SOROTI: An improved Boran/Zebu cross seen grazing one of the experimental Chloris/Stylosanthes/Panicum mixtures on the Arapai Agricultural College.