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SERIES 3 : THE SYSTEMS OF AGRICULTURE PRACTISED IN UGANDA
Number 3

THE NORTHERN SYSTEMS

PART I. THE LANGO-ACHOLI SYSTEM

PART II. THE WEST NILE SYSTEMS

by

MS D. J. PARSONS, M.C., B.Sc. (Reading)
Senior Agronomist

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THE NORTHERN SYSTEMS

PART 1 - THE LANGO - ACHOLI SYSTEMS

BASIC INFORMATION

The parts of Uganda with which this memoir is concerned are those parts which are occupied by the Nilotic peoples of the Protectorate, in particular the Acholi and Langi, wherever they may occur both inside these two districts and in parts of the West Nile and other districts. Sudanese peoples practise somewhat different systems and the systems found in the West Nile district will be dealt with in the second part of this memoir.

History

Driberg (1923) in outlining the history of the Langi peoples traces their origin to the Shilluk tribe of the Sudan. He quotes Westermann as follows :- "The Shilluks emigrated in three directions....From the Gang a number of smaller divisions have branched off into the south-west, south and south-east: The Lur (Aluru), Jafalu (Jafaluo, Japaluo) Lango, Ja-Luo (Nyifwa Kavirondo), Wagaya". Other authorities agree in general with this hypothesis but Driberg himself puts forward the suggestion that the Langi are a separate tribe who migrated after the Acholi move, and are not an offshoot of that tribe. The Lur mentioned above are presumably the present Alur tribe of the West Nile district, while the Jaluo of Nyanza province of Kenya are now widely accepted as the spearhead of the migratory stream of these Nilotic peoples who entered the area now known as Uganda in comparatively recent times, between 100 - 200 years ago, to find uninhabited country. This stream appears to have been cut across by the Nilo-Hamitic Teso people, but there are pockets of Nilotic peoples left in Bukedi between the main groups of Acholi in the north and Jaluo in the South.

The language of the Langi differs somewhat from the Acholi language for although they are largely alike in vocabulary and structure, there are certain developments in syntax and parts of speech as well as in vocabulary in the Lango language that can be attributed to more intimate relations with certain Hamitic tribes in the past. Nor have the relations between Langi and Acholi always been entirely friendly. Southall (1953) is inclined to the view that the Langi are in fact closer to the Nilo-Hamitic Iteso and Karamojong, who due to close association with the Nilotic Acholi have adopted the Lwo language. He admits the alternative possibility also. The two tribes today have very similar systems of agriculture, and fit well into one group which may be termed the Lango-Acholi systems.

These Nilotic peoples of Uganda have a long tradition of cultivation. Hoes formed an article of trade from very early times. Driberg (loc.cit.) comments that in spite of the large amount of cultivation undertaken, the Langi are at heart a pastoral people. Although they obtain good crops, he states "... this is due rather to the fertility of the soil than to their own skill as agriculturists, which can in no way compare with that of the Akum." This is strange as the Akum are the Kumam of Teso, a people whom we now know to be semi-Hamites with a tradition of pastoralism in their not very distant past, and a people who, if anything, have greater ties with their stock than would be customary with purely Nilotic people. Driberg continues - "They are agriculturists from necessity and not from deliberate choice, and though industrious, are to a certain extent handicapped by the long hoe (for they evince no disposition to adopt the handier type used by the Akum), which makes deep tilling difficult." This long hoe is still in common use in Lango.

The crops grown in these areas from early times are finger millet and sorghum with simsim and pigeon peas, together with cow-peas and beans, as important protein and oil crops. Sweet potatoes were added to the diet after contact had been established with the Bantu tribes of Uganda, in particular the Banyoro with whom the Langi entered into contact shortly after their arrival in their present areas. Such was the popularity of this crop shortly after its introduction that its use rapidly spread throughout the area and when "it was first discovered and brought back from Bunyoro, a bundle of runners for planting was actually sufficient dowry for a wife" (Driberg loc.cit.) Cotton and cassava are recent introductions, the latter crop being unmentioned in Driberg's list of crops grown by the Langi in 1923. Groundnuts also were not universally grown in that year, while maize was said to be grown little and irregularly. The northern peoples live mainly on the ground flour of finger millet with added seasonings of vegetables and simsim together with pulse crops. An important part of their diet is also the beer made mainly from finger millet and also from sorghum. Milk in various forms is also consumed.

Although living mainly off the produce of their fields, these Nilotic peoples all own cattle and a great deal of importance is attached to the family herds. In the case of the Langi, Driberg states that their attachment to their cattle is not only due to the fact that they are the most valuable form of currency and the means of obtaining wives and progeny, but also that a genuine affection for the animals is felt, such as is accorded to their stock by the Hamitic peoples. Cattle are kept wherever possible, but parts of the area are precluded from any form of cattle keeping by the presence of tsetse fly.

Climate.

The north of Uganda, in general, experiences a single growing season with severe dry-season conditions for three to four months at the turn of the year. The rains are however, of sufficient length to enable the growing of two crops during the season in most parts. The advent of the main rains being associated with the movement of the inter-tropical convergence zone, it is natural that usually the southern parts of the area are the first to receive the main rains in March or April, while as one proceeds northwards, the arrival of the rains is progressively delayed. Similarly the southwards movement of the zone later in the year, brings dry weather conditions to the north first, so that the dry season is normally of greater duration and severity in the northern areas.

The districts of Lango and Acholi are traversed by a belt of high rainfall running in a north-westerly direction across the middle of the two districts, centred on the district headquarters of Lira and Gulu. The annual average rainfall figures show that Kachung in the south-west of Lango receives over 56 inches annually, Ngetta in the centre of Lango receives over 55 inches, while Gulu itself, in Acholi, receives the highest totals recorded in the whole Province, the average for 47 years being just over 60 inches. To the west, towards the Nile, rainfall drops to 38 inches annually at Pakwach in Acholi and to nearly 42 inches at Ibuje in western Lango. Towards the eastern borders with Karamoja too, the rainfall drops sharply to the east of Kitgum (where the wet belt is at its widest) so that at Rom on the Acholi-Karamoja border an annual total of 35 inches only is recorded. In the east of Lango rainfall does not drop below 45 inches. A rainfall map of the area is given by Langdale-Brown (1960) and other maps showing monthly distributions are available from the Lands and Surveys Department, Entebbe.

Although there is a slight drop in the rainfall monthly totals during June and July, nevertheless the northern rainfall

distribution can be considered to be monomodal with the highest totals occurring during the month of August. The main rains do not usually commence until the month of April, and dry season conditions set in during the month of December.

At the present time there is a second-order meteorological station at Gulu, those at Lira and Kitgum having ceased to record since 1954. From the 1953 records from all these three stations, it can be seen that temperatures are highest during the end-of-the-year dry weather. In each case February is recorded as the hottest month with mean monthly maximum temperatures of 94° at Gulu, 98.6° at Kitgum, and 97.8° at Lira. In that year absolute maxima exceeded 100° F. at Kitgum during February and March. Mean minimum monthly temperatures fall to 61.6° at Gulu during July, 65.3° at Kitgum during the same month, while at Lira during 1953 the monthly mean minimum for all months from July to October is recorded as 61.9° , with a drop to 61.8° in November. The mean maximum temperatures during the cooler months vary from 80° to 85° F. while the highest mean minimum temperatures usually occur during March and vary from 65° at Gulu to 74° at Kitgum. The mean daily range in temperatures is highest during the dry season, and varies from just under 20° to just over 30° . Relative humidities at 14.30 hrs. are given as about 60% during the height of the rains. These figures fall considerably to nearer 30% in the dry weather. As in Teso (which is described in Memoir 1 of this series) the turn-of-the-year dry weather is invariably hot with cloudless skies and high desiccating winds. This severe dry season detracts greatly from the value of the high annual rainfall received in the wet belt, and has a great effect on the systems of agriculture practised in these areas, as well as on the variety of crops that can be successfully grown.

Geography

Lango and Acholi districts form part of the Northern Province of Uganda and lie between the latitudes of $1^{\circ} 30' - 3^{\circ} 54'$ North and longitudes $31^{\circ} 22' - 33^{\circ} 44'$ East. In the north, Acholi borders the Sudanese Republic. In the east both districts have a common border with Karamoja. To the west lies the West Nile district and Bunyoro, while to the south, Lango district borders across Lake Kyoga to Buruli County of Buganda. The Kaberamaido County (Kumam) of Teso district borders Lango on the south-east.

The land area of Acholi, which is the second largest district in Uganda after Karamoja, is 10,783 square miles and of Lango 4,464 square miles, making their total area over 15,000 square miles in extent.

The high rainfall belt which lies across the centre of the two districts of Lango and Acholi in a north-westerly direction coincides with a ridge of higher ground of between 3,800 to 4,000 ft. which, although very ill-defined and not easily discernible on the ground, nevertheless maintains Lira and Gulu at roughly the same altitude as Soroti, although the surrounding Acholi plain has dropped to a general altitude of no more than 3,000 ft. before descending the escarpment to the Nile which runs along the western Acholi boundary at about 2,000 ft. Most of Lango lies at an altitude of about 3,500 ft. Apart from this central ridge, the only features of note are the high ranges on the northern boundaries of Acholi, and the mountains in the east astride the Acholi-Karamoja border. The northern range lies mainly in the Sudan with outlying hills in Acholi. These mountains are known popularly as the Imatongs, but the two main features which reach into Acholi are the

Agorro mountains of Lomwaga, 8,649 ft. and Modole, 9,352 ft. The range astride the Karamoja border rises to 7,512 ft. at Lonyili which marks the border of Acholi and Karamoja with the Sudan, while Rom hill itself in Acholi rises to 7,603 ft. An elevation map is given by Langdale-Brown (1960).

Both districts are divided administratively into counties, sub-counties, parishes and villages on the Buganda model.

There are no railways within this northern area, communications being based upon all-weather gravel roads and dry-weather tracks. The network of the former is fairly comprehensive when one considers the population of the area, although on the map it would appear that there are many square miles of country in Acholi that are not served. Townships where traders are situated are moderately well distributed in Lango, but again in Acholi, there are vast spaces between the scattered trading centres.

Industry in the north consists mainly of cotton ginneries with one oil mill which operates only spasmodically. Centred on Gulu itself there is also a centre for the flue curing of tobacco run by the East African Tobacco Company, together with four other such centres within a radius of 20 miles of Gulu.

Soils

The full survey and description of the soils of the Northern Province has been published recently (Ollier, 1959). The following summary is abstracted from this work, and is designed merely to give a brief idea of the main soil types in the northern area, with a note on their agricultural potential.

Ollier gives some 24 soil units in the Northern Province of which ten units occur most frequently in Acholi and Lango. Most of the Acholi plain is part of the African erosion surface and is of only poor fertility and low productive potential. Soils of the Buruli catena, similar to those which occur in the north of Buganda, stretch through most of southern and western Lango and occur as islands of medium fertility as far north as Gulu. To the north of these soils in north Lango and east Acholi the fertility is less on the Amuria soils similar to those found in north Teso. These soils are, however, broadly interspersed with alluvial clays of the Pager series which rise to medium fertility, and stretch into north-east Acholi along the drainage lines. The Amuria soils give way to the soils of the Pajule series to the north-east - around Kitgum, while in the far north-east corner of Acholi soils of the Kiten catena are to be found interspersed with small areas of Metu soils. Both these soils are of low productive potential. To the north-west of Kitgum, centred on Palabek a shallow, brown infertile loam rests on the alluvium which is to be found mixed with rock and coarse sand along the river Aswa and its tributaries. This Palabek soil continues on the west of the Aswa and forms a deep belt across to the Nile and down its banks southwards almost to Paraa. At Paraa itself an area of deep reddish-brown soils on grey sands are to be found. These soils are derived from Kaiso sands on clay and are again of low potential. The Buruli soils of Gulu are situated in a surrounding belt of brown sandy soils on laterite. These are soils of the Anaka complex and are of low productive potential.

In Lango, a further soil type occurs on the features surrounding Dokolo in the south-east. These soils are deep grey-brown sandy soils over thick reddish-brown clay loam subsoils formed from old lake deposits, and are the most

highly fertile soils in the area. The valleys and swamps in Lango contain alluvial clays of poor fertility.

In general it can be seen that in Lango many of the soils and much of the surface is of somewhat greater productive potential than in the neighbouring district of Teso. On the other hand, much of the Acholi plain consists of sandy soils of low productivity with some increase in fertility in the drainage lines in the east and around Gulu itself and in places along the Lango border.

Vegetation.

The vegetation of the Northern Province has recently been described in detail by Langdale-Brown (1960) upon which publication these notes are based. As was done for the soils of the areas, it is intended to give a very brief summary of the differing vegetation types to be found in Lango and Acholi, together with their significance to the agricultural potential of the area. Langdale-Brown summarises the main vegetation types in the area as follows: "The most important vegetation boundaries are those separating the moist savanna communities of the Gulu-Lira ridge (Terminalia glaucescens, Combretum gueinzii, Albizia zygea, Hyparrhenia rufa, Beckeropsis uniseta, Panicum maximum, from the drier savanna types found elsewhere in Lango and Acholi (Combretum spp., Acacia spp., Hyparrhenia dissoluta, H. filipendula)..... These "moist" communities are associated with both higher rainfalls and more retentive soils." The occurrence of the lowland bamboo (Oxytenanthera) in the northern Acholi hills and near Kitgum is worthy of mention, while the borassus palm belt stretching from north to south throughout the area is a well known feature.

Vegetation types are divided by Langdale-Brown by area and show that by far the greatest proportion of land is under well-drained savanna vegetation types. The communities in this type consist of deciduous trees and perennial grasses, with occasional annual grasses in the drier areas where Acacia spp. are also common. Terminalia spp., Butyrosperum parkii and Combretum spp. predominate in the wetter areas. The seasonally waterlogged tree and grass swamps consist of broad-leaved trees and perennial grasses. The woody cover is never heavy. There are small areas of forest in the northern districts. The main areas occur in Acholi where in the north on the Sudan border the Imatong mountains support a dry montane forest of Podocarpus, while in the south-west of that district there may be outliers of the Budongo forest type. The Zoka forest occurs in Madi which lies in the West Nile district, but can be considered here as part of the Acholi plain. This is a strip of riverine forest fringing the river Zoka. In the south of Acholi there is much woodland under forest transition communities. Aquatic grasslands are found in valleys subject to varying periods of flooding and drying, while herb swamps occur only under conditions of permanent waterlogging such as lake fringes and in some of the major valleys in the south of Lango. In Kyoga county of Lango, large areas under Acacia thicket preclude any form of utilization.

Langdale-Brown summarises the areas of differing agricultural potential. For this purpose a very useful map is given of physiological potential in which five classes of land have been recognised. This shows that large areas of these northern districts, where high rainfall is allied to the better soils, falls into the "intermediate" class in which it is stated "Semi-perennials and bananas are grown throughout.... and other perennial crops might be grown successfully with suitable management." These areas comprise most of south-west Acholi and much of Lango. There is no land classed as "perennial" in this area owing mainly to

the length and severity of the dry season experienced. The east of Acholi is classified as "annual" land with parts suitable only for grazing.

Population

At the time of writing, the 1959 census figures for the population of Uganda have just been issued in provisional form by the Uganda unit of the East African Statistical Department (1960). In this census the population is given on a sub-county basis and population densities are also given. Table 1 is extracted from this provisional census, and gives the populations with areas and densities by sub-counties in 1959 in the districts of Lango and Acholi.

TABLE 1
1959 Census Figures

<u>Acholi</u>				
<u>County</u>	<u>Sub-county</u>	<u>Population</u>	<u>Land Area</u>	<u>Density per sq. mile</u>
Aswa	Gulu	14,626	11 sq. miles	1,330
	Paico	13,037	219	60
	Patiko	14,793	293	50
	Atanga	11,298	358	32
	Total	53,745	881	61
Lamwo	Padibe	13,002	524	25
	Palabek	10,215	964	11
	Agoro	5,648	208	27
	Madi Opei	6,796	381	18
	Total	35,661	2,077	17
Agago	Adilang	13,837	406	34
	PaderPalwo	13,595	334	41
	Paimol	9,320	373	25
	Parabong	6,148	400	15
	Total	42,900	1,513	28
Kilak	Lamogi	14,435	436	33
	Anaka	11,434	1356	8
	Alero	9,934	103	96
	Pabbo	9,852	186	53
	Attiak	11,723	679	17
Total	57,378	2760	21	
Chua	Naam Okora	6,453	251	26
	Obyan	14,110	447	32
	Pajule	10,729	479	22
	Labongo	13,871	177	78
	Orom	6,977	701	10
Total	52,140	2055	25	
Omoro	Awere	9,325	385	24
	Koich	13,549	552	25
	Koro	6,942	117	59
	Bobo	7,758	134	58
	Lalogi	7,443	309	24
Total	45,017	1497	30	
TOTAL				
ACHOLI		286,850	10783	27

LANGO

<u>County</u>	<u>Sub-county</u>	<u>Population</u>	<u>Land Area</u>	<u>Density per sq.mile</u>
Oyam	Aber	9,077	203	45
	Aboke	9,770	56	174
	Iceme	8,398	157	53
	Aloro	5,815	93	63
	Minakulu	9,273	121	77
	Ngai	9,107	83	110
	Acaba	7,409	81	91
	Otwal	8,342	64	130
	Total	67,191	858	78
Maruzi	Akokoro	5,052	216	23
	Ibuje	6,662	178	37
	Apach	5,836	80	73
	Chegere	6,647	96	69
	Total	24,197	570	42
Kwania	Aduku	12,070	177	68
	Napieso	8,239	67	123
	Inomo	4,661	86	54
	Chawanti	3,916	156	25
	Total	28,886	486	59
Eruti	Adekokwok	12,582	78	161
	Alito	15,740	107	147
	Amach	10,806	118	92
	Ayer	9,213	60	154
	Bala	8,142	37	220
	Bar	8,574	126	68
	Lira	10,636	25	425
	Akulu	5,608	47	119
	Agur	13,479	119	113
	Total	94,780	717	132
Moroto	Adwari	10,050	174	58
	Amugo	6,250	51	123
	Aloi	11,362	178	64
	Apala	7,388	78	95
	Omoro	11,007	155	71
	Orumo	8,407	188	45
	Abako	9,771	92	106
	Oilim	9,260	187	50
	Total	73,495	1,103	67
Nyoga	Aputi	6,627	48	138
	Awelo	11,145	98	114
	Muntu	7,533	114	66
	Namasale	4,155	87	48
	Total	29,460	347	85
Dokolo	Agwata	7,132	127	56
	Bata	7,246	73	99
	Dokolo	9,837	65	151
	Ekwera	5,799	48	121
	Kangai	6,288	70	90
	Total	36,302	383	95
<u>TOTAL</u> <u>LANGO</u>		354,311	4,464	79

The 1948 figures for these two districts gave a total population of 215,655 in Acholi, and 265,480 in Lango. It can be seen that the increases have been considerable over the last eleven years. In Acholi the increase of 71,000 or nearly 33% over eleven years is above average for Uganda. In Lango the increase of 88,831 is once again 33%. These increases compare with 31% over Uganda as a whole, in which the population has risen over the past eleven years from 5 million to 6½ million.

From a study of Table 1 it can be seen that in Acholi the distribution of the population is fairly even when it is considered on a county basis. Within counties, however, there is considerable variation in densities owing to the presence of national parks, tsetse fly or alternatively, the lack of water. The highest density is recorded in Gulu which is mainly urban. In the predominantly rural areas the highest density is that found in the sub-county of Alero in Kilak county. Here the density of 96 persons per square mile means that there is still well over six acres available per head of population. As will be seen later in this Memoir, as only 1.6 acres per head is at the moment being cultivated each year throughout the district, even where a cropping ratio of three years cropping to three years rest is adopted, there is no danger of overpopulation.

In Lango, the population densities are considerably higher and there is much greater variation between areas. The highest density in this district is that to be found in the areas surrounding Lira, and here again many of these can be considered suburbs of that township. The overall density in the most heavily populated county is 132 persons per square mile in Eruti. Within this county there are rural areas such as Bala with populations in excess of 200 per square mile. In all the districts there are six sub-counties with densities above 140 per square mile, and in all 17 over 100. At a population level of 200 to the square mile there are just over three acres available for cultivation and grazing per head of the population. In the light of figures which will be given later in this memoir, and which show that in Lango the present area utilised for cultivation every year is very nearly two acres per head, this density must be considered too high to allow of a sufficient resting period for the regeneration or maintenance of soil fertility. Based on a 3:3 cropping ratio, without the use of manure, the area required per head to enable the continued utilization of the soil without mining its inherent fertility would appear to be in the region of 4 to 5 acres. This figure is obtained at a density of about 140 persons to the square mile. It must also be remembered that cattle must have uncropped areas upon which to graze, and these latest figures of population in Lango must give some cause for the problem of over-population to be considered as a factor in the district for the first time. Further increases at this rate within the next ten years will bring about a state of over-population and, under the present system of agriculture, consequent decrease in the fertility of the soil in some areas.

Apart from the two areas which contain the urban populations of Lira and Gulu, the highest populations are to be found in the south of the area in the Dokolo and Kyoga counties of Lango, and in the headquarters county of Eruti itself, together with some high densities in parts of Oyam county in the north-west of Lango. In no part of Acholi, outside Gulu, do densities reach 100 per square mile. The overall district figure of 27 to the square mile can but point to an overall problem of under-population, with 24 acres available per head of population. In Lango overall there are 8 acres available per head.

Based on the 1948 census, the presence of foreigners in these areas is not significant. In Acholi only 6% of the inhabitants belonged to tribes other than Acholi, of whom

half were people from Lango. In Lango, foreigners comprised 9% of the population, made up of Iteso, Baganda, Banyoro and Banyankole, most of whom reside in the south of the district, with some Acholi and Chopi.

Livestock

Table 2 gives the distribution of livestock by counties, and the overall cattle densities. These figures were obtained from the Veterinary Department census for 1958 and the areas are taken from the 1959 census figures.

TABLE 2

ACHOLI

<u>County</u>	<u>Livestock</u>			<u>Land Area</u> <u>Sq. Miles</u>	<u>Cattle Density</u> <u>per Sq. Mile</u>
	<u>Cattle</u>	<u>Sheep</u>	<u>Goats</u>		
Aswa	27,660	22,394	26,911	881	31
Lamwo	12,561	9,689	13,207	2,077	6
Agago	34,186	8,307	21,415	1,513	23
Kilak	11,648	24,064	27,182	2,760	4
Chua	38,865	21,757	84,957	2,055	19
Omoro	7,460	19,031	24,794	1,497	5
Total	132,335	105,242	198,466	10,783	12

LANGO

Erute	83,908	14,799	44,255	717	117
Moroto	110,986	10,083	30,874	1,103	101
Oyam	45,265	12,138	38,007	858	53
Maruzi	5,674	2,144	5,875	570	10
Kwania	27,686	18,197	34,246	486	57
Kyoga	45,902	2,344	10,318	347	132
Dokolo	51,350	4,774	17,552	383	134
Total	353,338	81,368	215,895	4,464	79

As can be seen from these figures, Lango is very much more heavily stocked than Acholi, although as in the population figures, the overall averages do not by any means convey the full picture. In this northern area there are still very large tracts of country under the rule of the tsetse fly, and cattle are unable to live in these areas. Obviously therefore, those areas which are settled are stocked at a higher rate than the county average indicates. However, once again it is quite obvious that there is no overall overstocking problem in this northern area, although it may be that there are localities in both districts where observations for signs of overgrazing and pasture deterioration should be maintained, notably the Patiko area of Acholi and parts of Moroto county together with the southern counties of Lango.

Where cattle are unable to live due to tsetse infestation, the importance of small stock can be plainly seen. As is usual among Uganda peoples, the numbers of goats exceed sheep and, in general, in the north as in other areas of the country the goat can be considered the more important animal.

It is interesting to note that Driberg writing of Lango in 1923 differentiates between the types of cattle to be found in the district at that time. He describes the common beast as belonging to what is now known as the Small East African Zebu, but goes on to describe other types as "one being much larger in build and frequently having artificially crossed horns; but this strain seems to be dying out, although a few are still to be found in the north-east. Past raids into and beyond Bunyoro resulted in a few of the large Ankole cattle being taken back as spoils of war and to them is to be traced

a third and very characteristic strain which is now but rarely observable."

This describes what was a relic of the Large East African Zebu or Boran type of beast now to be found in Karamoja and the arid areas of the north of Kenya. These beasts are to be seen in the approaches to Karamoja, but generally die out as the country becomes wetter and more suitable for ticks, the original material seeming to bear little immunity to East Coast Fever. The third type persists today as the "Kyoga" type cattle to be found mainly in south Lango and the Kaberamaido county of Teso, near the lake. These are not accorded breed status by Mason (1951) or Faulkner and Epstein (1957) but are described by Ross (1958) and Driberg's account of their origin is probably correct.

The social importance of cattle to the peoples of the north is described elsewhere. Cattle are progressively more and more being utilized as the source of draught power for ploughing and cultivating the land.

Livestock in Acholi and Lango contribute to the family income mainly through the sales of slaughter stock in the local markets. In Acholi there is no export trade in cattle but in 1958, 750 head of cattle were sold in the markets and the following numbers were known to have been slaughtered for local consumption :- Gulu - 960, Kitgum - 257, other village sales - 2,042. The price of meat in Acholi varies from 95 cents to Sh.1/10cts. per lb. In Lango the trade is much larger. Table 3 gives the numbers of animals exported from the district in the last few years.

TABLE 3

Livestock and Products Exported from Lango in 1950 -59

<u>Year</u>	<u>Cattle</u>	<u>Sheep</u>	<u>Goats</u>	<u>Hides</u>	<u>Skins</u>	<u>Average price at cattle markets.</u> <u>Shs.</u>
1950	10,370	310	2,019	17,464	29,884	143
1951	8,173	81	1,729	23,067	45,736	223
1952	10,702	155	1,829	20,156	38,537	238
1953	15,601	328	11,520	16,955	49,045	262
1954	9,265	42	823	21,222	73,000	281
1955	10,904	216	2,248	15,465	63,265	335
1956	11,063	136	1,891	20,901	60,186	368
1957	11,531	2,048	6,126	22,974	92,248	343
1958	9,635	635	3,082	23,409	94,190	347
1959	11,961	295	4,276	26,432	112,434	-

It is estimated by the District Veterinary Officer that about 75% of the hides and skins originated in Lango, the remainder being from Acholi but sold in Lango. He also considers that some Lango products are sold through the Teso markets in the south, so that the figures for hides and skins given in the table can be considered a fair estimate of the cattle and goats sold and slaughtered within the district. At this level of exports, Lango has exported more cattle since 1950 than any other district in Uganda except for Teso, including Karamoja. Indeed in the past, Lango was a very great supplier of cattle for the down-country markets, for in 1942, no less than 40,000 head of cattle were exported from the district. Since those times the numbers of cattle in the district have decreased considerably due to tsetse and other causes. If we consider the figures for hides and skins as 75% Lango origin, then a rough calculation of the value of livestock sold, gives a figure of Shs. 9.5 million during 1958, not including the value of hides and skins. This compares with the income from cotton, the major cash crop of the district

which in 1958 was £1,013,282. The Lango goatskins are of high quality and are well known in the trade for the production of glacé kid.

Social background

As has been recorded in the chapter on history, the northern peoples of Uganda are Nilotic with a long tradition of both agriculture and cattle keeping. As in most African societies, cattle play an important part in the social customs of the people, although in this case their owners are not dependent on them for their diet, their main food being finger millet.

As in Teso and most other areas of the country outside Buganda, the employment of outside labour on the farm is not common. However, there is one custom of the north that is unique in Uganda, and which very ingeniously helps to get over the labour shortage which is bound to exist in an agricultural community living in such scattered groups. This is the system known in Lango as "Wang tic" and in a slightly different form in Acholi as "Wang Kweri." Driberg describes the Lango custom as follows :-

"Only in cases of extreme poverty or when famine has consumed all supplies does a man cultivate unaided. Assistance is procured from his friends and neighbours in return for food and drink after the day's work and the extent of the assistance thus procurable is conditioned by the size of the reward, regularized by custom and designated by a standard terminology. Hard work and long hours are expected of these assistants and are ungrudgingly accorded, with the result that cultivation by this semi-communal method far exceeds the possibilities of individual work. These groups or associations for cultivation are more or less permanent and are called Wang tic."

Driberg further describes the system by defining five differing methods of communal cultivation. The first known as "Pur kongo" consists of a large party of 15 to 20 men who gather together to cultivate a large area, beginning work at dawn and continuing to dusk. Men work individually without apportioning tasks under this method, and the reward invariably consists of liberal supplies of beer at the end of the day. Other methods involve far fewer men and the reward for the day's work varies. In some the tasks are apportioned between workers and tasks are set; another example is given in which two men make a mutual arrangement to help each other without payment. At the present time, these customs persist but are changing under the influence of ox ploughs and mechanical cultivation.

For the following account of the parallel system in Acholi I am obliged to Professor Wilson of Makerere College for making available to me a report submitted as a special project for his Diploma in Agriculture by Wilson O. Lutara (1956). Lutara states "In certain localities in the district digging, weeding and harvesting are no longer done single-handed. In these localities a number of men in a village and perhaps all the men from the smaller villages bind themselves together in what is locally called "Wang kweri" - a body formed by men who have agreed to work together when called upon to perform any agricultural operation within the group. A "Wang kweri" is usually headed by a man appointed from amongst the members themselves..... It is to him that any member of the group would go if he wants the group to work on his field. After the "Rwot kweri" (as the head of the group is called) has satisfied himself that the owner of the field on which the work is to be done is prepared to give enough food or beer.... to the group in return for their work, he then appoints a date with the members of the

group for doing the work. It should be made clear....that only edible things are given to the group since the aim of the group is to help the members and not to make money from whatever it does."

As described by Driberg for the Langi, so Lutara goes on to say that " In certain parts of the district the self-help groups are very much more developed. Instead of the members of a group doing everything..... together, the work is divided up and everyone given a piece to do individually. The "Rwot kweri" is not given a piece to do. His work is to see that the work is divided up..... This idea is much developed in Lango and it seems that we (the Acholi) are importing the idea from there."

Usually the work done by these groups of "Wang kweri" is carried out on plots situated a good distance from the homesteads in the cultivation areas known as "Aker" or "Kitara" land. In Lango the work of the "Wang tic" is similarly carried out on communal areas at some distance from the village centres. The allocation and usage of these lands will be described in the next section dealing with land tenure. It is common for plots to be allocated to the women of a family although in a large polygamous household the husband may also obtain a plot. As in many other parts of Uganda, the food produced from these plots is the property of the women to whom the plot was allocated. In the case of the husband's plot the food will go into a "husband's" granary and be kept for famine reserves, or for beer parties.

The division of work by sex was quite strongly maintained in the past, and has been continued to the present day with less change than in many other parts of the country. Owing probably to the large number of trees to the acre in many parts of Acholi and Lango, the men still monopolise the task of opening land from bush. Very often trees of any size are ring-barked rather than felled, and it is common to see crops growing in fields which still contain large numbers of dead trees standing among the crop. Both sexes partake in the weeding of crops although this tends to devolve mainly on the women and children, except in cotton which is done communally by males. Harvest likewise calls upon all hands when the season's main crops of grain are ready to reap, but in general other produce is left to the women, in particular the root crops. It is more than likely that the differentiation of work in the fields by sex will rapidly break down on the introduction of row cropping techniques.

While these northern peoples are grain eaters and their staple diet is finger millet to which may be added sorghum and the pulses with simsim as a major ingredient, nevertheless they are exceedingly fond of meat and in the olden days were great hunters. Where game exists in any numbers to-day also, much hunting is carried on, and cattle and small stock are frequently killed for meat on ceremonial occasions or for sacrifice. Men appear to be almost omnivorous even being known to favour crocodile meat in some parts of Lango, but women may not usually eat chickens or sheep or guinea fowl. Honey is also well liked and the Acholi in particular are known to be fearless robbers of wild bees.

Although fine hunters by tradition, the northern tribes do not have any custom in fishing. Only in the south where the Langi live in close proximity to the larger lakes is fishing carried out on any scale, although, even here, the Langi do not make very good watermen, and most of the deep water catches can be credited to the Bantu Bakenyi people.

The social customs and observances attached to cattle are such that a trained sociologist would be well occupied in investigating and recording them. Cattle and small stock are still invariably part of the bride-wealth payments throughout the area and as such are looked upon as the all-important means of obtaining further labour and progeny for the family. In Acholi the bride price is frequently 10 to 15 cattle, in some cases less, or cash payment in lieu. They are also widely used in customary payments for various social purposes and for sacrifice in some cases. As in other areas, the ownership of any one animal can rarely be clearly defined as socially many may have interests in the one beast. As to the manner of keeping stock in these areas, Driberg (loc.cit.) comments that when families only owned a few head of stock, they very frequently placed these animals with a neighbour to save themselves the trouble of building a kraal and herding them. In many cases also he records that it was common practice to draft cattle to friends' kraals even when large numbers of cattle were kept in order that heifers and cows could be served by outside bulls. There was a social reason also in that in times of constant raids and warfare, this scattering of the family herds was an insurance against total loss should a village be attacked and razed to the ground. He comments that cattle were in these days (1923) never used for draught purposes.

Land tenure in the north will be discussed in the next chapter. It is interesting to record, however, that in 1923 in Driberg's time in Lango, the practice of shifting cultivation, whereby villages migrated a few miles to new lands when the soil in their fields became worn out with cropping, was considered normal; and in Acholi Lutara (1956) comments that: "Of all the indigenous practices in the district that of shifting cultivation is the most prevalent and important." In Lango the custom is now starting to die out due to permanent housing and in some places, pressure on the land.

Land Tenure

All land in the Northern Province is Crown Land. As such its tenure is dependent upon local custom in each district. According to Driberg "... property in land is held communally by the village, the land being held to include the grazing and water rights. Even these communal rights are of the vaguest, owing doubtless to the long period of tribal migration and to the general habit of local migrations every three or four years." He is here referring to the system of shifting cultivation referred to previously. It is further explained that "Being without a central authority, the tribe has little corporate consciousness, but that in the past some system of tribal ownership of land was recognised is indicated in the occasional disputes which arise at the present time between the Langi and their neighbours..... the former supporting their claim by the assertion that the land has always been in possession of the Langi - the tribe as opposed to an individual similarly, though clans... have become much scattered and broken up, indications are not entirely wanting to show that in the remote past land was held communally by the clan within the sphere of tribal occupancy, and that such clan-land was at the disposal of the individual members of the clan for their use so long as they required it. This clan tenure, however, is by now almost non-existent..." It has however, persisted to a certain extent to this day.

" Any village is at liberty to build on or to occupy uncultivated land, or land which has once been cultivated but has since been abandoned. Such occupation does not imply permanent ownership, but grants the usufruct for such period as it is required and utilized; but during its occupancy both

the village and the individual have complete and irrefutable rights in the land occupied."

One further extract from Driberg will be given as it is of interest to record the customs of tenure as they affected the land under shifting cultivation. He states that "On migrating a village may, and generally does, retain its right to cultivate its old land and site for one year, or at the most two years, as crops are planted in well-manured areas now no longer required for sanitary or other purposes, and naturally give a heavy yield. Beyond this however, it has no claim, and the land is open to occupancy by others."

Where population is sparse, the tenure of the land to this day is no problem agriculturally. Indeed in many areas of Acholi it is common to find that a man has no clear-cut boundaries to his "farm", but that he cultivates in his "area" wherever he likes until he comes into contact with his neighbour, who may be some miles down the road. Shifting cultivation is still generally practised in these areas. In the more thickly populated areas boundaries are recognised. . . . Although no freehold titles are yet available in any district of the Northern Province, tenure of land is, in fact, secure during the lifetime of the holder, while being cultivated. Cases have occurred in recent years where local courts have upheld a claim to land after ¹⁰ years' absence. It would not appear that inheritance of land is in any way codified as land is always available to anyone who asks for it.

As in other parts of the country, unoccupied land is free for all to graze upon. Resting land in a sequence of cropping near households, is not normally grazed by cattle due to the danger of crop damage, and such is the abundance of common land available for grazing that, to date, no pressure exists which may make such a course necessary. Swamps are not normally allocated for any purpose but are considered to be common land, normally being reserved for dry season grazing, and water rights are in all cases communal.

Other rights, according to Driberg, include rights over ant-hills and shea butter-nut trees. "These belong to the man who first discovers them or cultivates round them, and they continue to be his personal property, even should he migrate to another locality, unless he publicly renounces his rights." These rights in shea butter-nut trees still persist, and although the dietary value of termites, with their cultured mushroom fungi, is not now so great relatively as it was, such rights over ant-hills are also recognised. There remains the custom of rights over hunting land. In sparsely settled areas, the country is divided into "Arum", each one of which is owned by a "Won arum". The "Arum" is his hereditary property and no one may hunt on this land without his permission. He is responsible for its upkeep, which means in fact that it is his responsibility to see that the area is burned as required for the hunt, and that fire is not allowed uncontrolled ingress to the area. Should anyone be caught setting fire to an "Arum" without the permission of the owner, he may be fined. Permission to settle and cultivate within the area also has to be obtained from the owner, but this is merely courtesy as he may not refuse permission since he does not own the land, but only the hunting rights over it. It can be added that the powers of the owner do not extend to the control of individuals netting and spearing, or snaring and trapping, but only to the large-scale communal hunting parties held usually in the dry season. Lutara (1956) states that in Acholi on the "owner's" death these hunting rights are inherited by his eldest son or nearest relative.

The custom of communal hunting in Lango persists although, in general, the "Arum" has died out. Much shooting is carried out these days.

There are two points in this account of the tenure of land that differ from the customs in other parts of Uganda already studied in this series. The first is the very short time that custom decrees ownership can exist after shifting from the site of cultivation. Secondly, it is interesting to note here some control over the firing of common lands. Both these points will be discussed further in so far as they affect systems of agriculture.

There is a further extension of land tenure in the northern areas which is unique in Uganda, and which has a very great effect on the agricultural systems of the area. It is, in effect, derived from the system of agriculture adopted in these parts which has been modified to overcome as much as possible the inherent shortage of labour which is more pronounced than ever in situations where land is plentiful, population sparse, and the general environment relatively harsh. As we have already noted, in Lango the system of "Wang tic", and in Acholi the system of "Wang kweri" have been developed for this purpose. These, as we have seen, are methods of communal cultivation where men are grouped together to cultivate as a body with "headmen" to ensure full participation of all concerned. In both districts it is usual for the land thus cultivated by these parties to be situated at some distance from the participants' homestead areas, on land which is considered to be suitable for cultivation of such crops as cotton, millet and simsim. These large areas are situated outside the sphere of any individual tenure, in "common" land, in fact. An interesting and very clear account of these lands is given by Lutara (loc.cit.) He describes this "Aker" system as follows :- "It is a system.... the underlying feature (of which) is to allow controlled burning to do the work of clearing the ground for cultivation, and reducing subsequent weedings. The normal procedure is that a man or a group of men from a village mark out an area of land before burning takes place and so preserve it from the general conflagration which occurs almost every year, between the months of December and March. The area so preserved is called "Aker". Each village or a group of small ones usually has an "Aker" of its own every year. The protection of "Aker" is an important village obligation. Once an "Aker" has been marked out by clearing fire lines all round the area, it is made known to everyone in the village and even in neighbouring ones, because the rights of "Aker" are very strictly respected. Anyone who indiscriminately ... sets fire to the grass reserved in this way will have to pay heavy compensation..... The proper burning of the "Aker" is normally done after the rains have come and the dormant weed seeds have germinated." This means that a very late and fierce burn results, which will also retard bush re-growth as well as burning of germinating weed seeds. It also means that at this time there is not much other long grass remaining in the area at the time of the burn in the "Aker", and the fact that much small game will have retreated to the long grass of the "Aker" is taken into account at the time of the burn, and the populace turn up for these affairs armed with spears, clubs and nets in order to slay the various escaping animals. Lutara continues : " A few days after the burn the men who had marked out the "Aker" together with the elders of the village, apportion out areas to the members of the village. The giving out of allotments is done as a rule in the presence of the majority of the people concerned.... A family would normally have its land in one block. Once the "Aker" area has been cultivated, its name is changed to "Kitara". Rights in the "Kitara" persist so long as cultivation is undertaken in the area.

Similar systems occur in Lango where the "Wang tic" groups operate similarly in areas of land away from the village, known also as "Wang tic" areas. Here the areas are usually chosen by the village chief, but the allocation of individual plots within these areas is done by the "Rwot wang tic", there often

being 20 or more "Wang tic" areas and groups in the area of the "Paco" or village. In south Lango and Erute, i.e. in the areas of heavier population pressure, these communal areas are giving way to larger fields of cotton and millet, cultivated separately near the individual household; work on these fields may still, however, be carried out by "Wang tic" groups.

Water Supplies

More than in any other region, with the exception of Karamoja, the northern areas of Uganda are limited in the availability of surface water. Vast areas of Acholi are unsettled due to the lack of water for humans and stock, and the borehole programmes in these areas are of the greatest importance in the opening up of the country for settlement and cultivation. The main rivers of the area such as the Aswa are free flowing for some periods during the rains, but dry up in the dry season into sporadic water holes in the rocky bed. These holes may persist depending on their size and the season, but often dry up by the end of a severe dry season. Water is very short for cattle in the Palabek area, where cattle are sometimes watered once in two days.

In Lango, there is little natural surface water away from the lakes and larger rivers and swamps of the south-west of the district. Before drilling for water commenced, population was sparse in the north-east and in the inland parts of the Maruzi-Kwania peninsula and Kyoga County. Elsewhere water was relatively plentiful. Today this is a factor limiting settlement, and so production, only in small areas, which are normally catered for by the bore-hole drilling programme.

Mention should be made here of the indigenous system of irrigation employed in two areas of north-east Acholi. Here valleys are utilized for the maintenance of planting material, and for out-of-season production of crops. More details of this practice will be given in another chapter.

Tsetse.

Following intense work to eradicate the tsetse fly by the Tsetse Department in Lango, the fly now only persists in the thickly wooded river valleys in the west of the district, notably in the Tochi River. Small pockets also occur in the south, although this area is now officially free. The National Park borders in both districts are fly areas, and sleeping sickness is known to exist in north Lango and south Acholi, near the large river beds. Parts of Agago and Chua counties in Acholi are also tsetse ridden.

AGRICULTURAL SYSTEMS

Crops.

On average, the largest area under any crop in the two districts of Lango and Acholi is devoted to cotton. Finger millet is the most important food crop of the area. This crop is invariably interplanted with pigeon peas, except in the north-east of Acholi. Following these crops, in order of area cultivated, come the two crops simsim and sorghum. Cassava is the most important root crop in all areas. Groundnuts and mixed beans, including cow-peas, augment the protein part of the diet, while sweet potatoes are grown in small plots near to the homesteads. Other crops grown include small areas of maize and plantains; with a few plots of bulrush millet in the north-east of Acholi and the odd plot of rice in the swamps. Flue-cured tobacco is grown as quite an important crop in Acholi, with a small production in Lango also, although the area of this crop is very small in relation to the other crops grown. Table 3 gives the five-year average of crop acreages in the two districts.

The cotton acreage in Lango does not indicate any clear trend within the last seven years, but in Acholi the increase in acreage in recent years is more persistent. In Lango, the area under finger millet appears to have been slowly, but quite steadily declining since 1954, which is difficult to understand when the annual increase in population is considered. There does not seem to have been any marked corresponding increase in the sorghum acreage. In Lango, the sorghum crop varies considerably in area from year to year. This reflects both the increase in plantings in a dry year when finger millet can be seen to be yielding poorly together with the increased plantings of this crop in the year following a poor harvest as an insurance against a second dry year. In Acholi, on the other hand, the crop is much more steady as to area planted, and together with bulrush millet is the main crop of the drought-stricken north-east. The crop recorded as beans is a mixture of beans and cow-peas. This crop varies considerably in a dry year. In Acholi in 1957, for instance, only 9,489 acres were planted compared with the five-year average of 22,636 acres. Sweet potatoes likewise exhibit great variations in the area planted from year to year, whereas cassava remains steady showing the greater importance attached to a root crop that can remain in the ground for some length of time and act as a famine reserve in these areas where drought is common.

The very small area planted to tobacco is controlled each year by the East African Tobacco Company who buy the green leaf and cure the crop at their headquarters in Gulu. There are a few growers who cure their own leaf in Acholi, while the Lango acreage is grown by a co-operative society and cured in their own barns.

The times of planting the various crops will be discussed when the husbandry of each is considered later in this memoir. Lango, is in general, a very uniform district in which there are no marked differences in agricultural systems and cropping practices. Minor differences are observed between counties in so far as crops are concerned. In Dokolo and Kyoga counties which contain Kumam people from Teso and where customs are affected to some extent by the proximity of the neighbouring district, cow-peas assume greater importance in the system, being planted after the millet and replacing pigeon peas to some extent. There is also a greater proportion of early-sown sorghum in these areas. Similarly there is a marked difference in the time of planting of sorghum and simsim in the western areas of Lango. In Kwania, Maruzi and Oyam counties there is little or no early-planted sorghum or simsim whereas in other parts, planting is more or less evenly divided between the April and the August rains. This is thought to be a result of the presence of tsetse in the past and the present paucity of oxen for the early and timely opening of land in these areas. There is no significant difference in the rainfall records or soils to account for such variation in planting customs, although local opinion has it that the rains arrive earlier in the east of the district.

Table 5 gives the figures for cotton production from Lango and Acholi over the past six years from 1953 - 1958.

TABLE 5

<u>Seed Cotton Production from Lango and Acholi 1953-58 (Tons)</u>							
	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1956</u>	<u>1957</u>	<u>1958</u>	<u>6-year Average.</u>
Lango	12,797	15,656	13,924	16,819	13,836	16,127	14,860
Acholi	7,158	8,352	10,309	13,234	9,186	15,472	10,620
Total	19,955	24,008	24,233	30,053	23,022	31,599*	25,480

* The value of this 1958 crop to the grower amounted to £1,979,493.

For comparison with these cotton figures, those of the only other cash crop in the area, tobacco, are given in Table 6. As in recent years both cured and green leaf is sold, figures are given as value to grower.

TABLE 6

Flue-cured Tobacco Production 1953-58 Lango and Acholi
Value to Growers

	1953	1954	1955	1956	1957	1958
	£	£	£	£	£	£
Lango	500	793	541	188	238	327
Acholi	4,447	6,305	10,371	9,498	19,074	8,346
Total:	4,947	7,098	10,912	9,686	19,312	8,673

Crop Rest Ratios

Information based upon individual examples is very scarce in this area as in most other parts of the country. On the basis of overall acreages it is quite obvious that there is very little pressure on the land at the present time in most parts of the area, and that in these sparsely settled areas the period of resting after cropping is considerable. In many cases in Acholi the system of shifting cultivation is far from dead, and it is common for cultivators to move their homes at intervals of up to ten years in order to cash in on the fertility of virgin land after a period of cropping has depleted the reserves in the area around the homestead. In Lango each village has a certain number of "Aker" plots which are used from year to year. Local opinion gives a period of 6 to 10 years as a normal rest for these areas before resuming cultivation with three years' cropping. As to the small plots farmed by the women near the houses, no definite rotation of crops is followed, and information on crop-rest ratios on these plots is not available.

On the basis of individual measurements it is necessary once again to refer to Tothill (1938). In this publication there is only one area from the Northern Province included. This is a village in Erute county of Lango called Adwaa, surveyed by Badcock. He reports that of the total area of cultivable land in this village of 3,401 acres, only 517 were under cultivation at the time of the survey. No further information is given as to the period of the crop-rest ratio directly, except that later in the report a common rotation is given as one of three or four years after which the land is allowed to revert to bush. If all the cultivable area were used in this way, this would hypothesise a cycle of three years cropping to nearly 20 years rest based on a ratio of 1:6.5

Area Cultivated per Head

On the basis of dividing the total area under crops by the number of people in the districts, the following figures are obtained. Based on the population at the time of the 1959 census and the record acreages during 1958, the Lango figures are 354,311 people and 692,926 acres.* This gives an average of 1.95 acres per person but it should be remembered that this is on a basis of double cropping and although this acreage was actually planted during the year, the area of land utilized would not have been so great. This figure compares with a figure of 2.4 acres cultivated per head of population in Teso district where ploughs are in universal use, and with a figure

* Taken from the Department of Agriculture's Annual Returns for 1958 but excludes pigeon pea acreage which is inter-sown with finger millet.

of 1.4 acres per head in the plantain and robusta coffee areas where all work is done by hand and much of the cultivation is concerned with perennial crops. In Acholi the equivalent figures are 286,850 head of population and 545,241 acres cultivated, giving a figure of 1.90 acres per person. These figures show that the northern peoples cultivate fairly large acreages with the use of hand tools, and that the systems of communal cultivation already described increase the overall area per head cultivated. The size of family groups in Acholi are often greater than in many other parts of the country, and this area cultivated when multiplied to a taxpayer basis will be as high, if not higher, than the equivalent figure given for the Iteso of 9 acres. The ratio of tax-payers to total head of population in Lango is 1:4.8 giving an area of 9.36 acres cultivated per taxpayer. This figure is fairly constant throughout the Lango counties.

Badcock (loc.cit.) reports that at Adwaa 379 acres of cultivation (in November) were measured while the total population of the village was 436. This gives an average of 0.87 acres per head, while in May the following year there were 323 acres under crops of which only about five acres could have been the same crops as were measured during the preceding November. This gives a further 0.73 acres per head cultivated during the twelve months, making a total of 1.60 cultivated during the year. In this village there were 82 families, so that it appears that each family cultivated 8.5 acres during the year. Only one plough was in use in this village at that time. Davidson (1933) gives the figure of 5 to 6 acres cultivated per family in that year. This was before the advent of ploughs and was at a time when "luwalo" labour to chiefs was enforced.

Rotations

Badcock, when reporting on Adwaa village in Lango (Tothill, loc. cit.) gives "the main rotation.....as follows :-

- 1st year.....Cotton
- 2nd year.....Wimbi and pigeon peas
Mtama
- 3rd year.....Simsim
Rest

After the above rotation the land is sometimes planted with sweet potatoes or cassava before reverting to bush." He adds that other crops listed such as beans, groundnuts and cow-peas are grown in small plots near the homestead, but that no sequence of cropping appeared to be practised in these plots. Driberg (loc.cit.) states that the Langi " appear to have but the slightest knowledge of the theory of rotation of crops..... When cotton is grown millet always succeeds to the patch with excellent results." Nowhere does he mention the interplanting of pigeon peas in the millet, but there is good reason to believe that this is a practice of long standing in Lango. He does mention however, that the only crop regularly planted twice a year was sorghum, " apart from the small early sowing of simsim", so that it appears that the third year's cropping given by Badcock could in parts at least be modified by the addition to the third year of a spring crop of sorghum and the splitting of the autumn cropping in the second year into sorghum and simsim. In fact, the following is at this time a very common rotation in the Northern Province generally :-

- 1st year..... Cotton *
- 2nd year..... Finger millet with pigeon peas
in the autumn..... Simsim or beans or cow-peas
in the standing pigeon peas
- 3rd year..... Sorghum or groundnuts or
sometimes simsim.

* Sometimes simsim if land preparation is late. If so, this will be followed by cotton.

Ofcourse there are many alternatives to this sequence, more especially after the second year. The first two years' cropping are, however, widely practised with perhaps more attention being paid to the sorghum crop in Acholi than in the south.

Davidson (1933) gives the following Lango rotation which seems to have stood the test of time well. He states that it was common in 1933 to open to cotton and continue thus :-

	1st year.....	Cotton
Spring -	2nd year.....	Finger Millet and pigeon peas
Autumn	" " $\frac{1}{2}$ Sinsim $\frac{1}{2}$ Sorghum
		and
	5rd year.....	$\frac{1}{2}$ Sorghum $\frac{1}{2}$ Sinsim

He also states that in that year it was known that a separate groundnut rotation existed. This was usually carried out in small plots of about 1/6th acre in the alluvial soils at the bottom of the cultivated slopes where harvest was simplified. These groundnuts were followed by the "Okama" variety of finger millet which is said to prefer these soils, and in turn this was followed by sweet potatoes after which the plot was abandoned. Badcock (1936) later confirmed this practice. It does not seem to be commonly known today, however, but is doubtless followed in some parts. In the north-west of Acholi, a longer term sorghum makes its appearance which, when planted in the later rains in about August, will survive the dry season and give a very early crop in the next year during May and June. This would appear to be almost a ratoon crop as growth ceases completely during the dry season, but no crop of any dimensions is ever obtained from it during the year of establishment. In Lango the August-planted ratoon sorghum, known as "Amera" yields its main crop in December and is often ratooned to provide a small crop in the hungry months of May-June. This is often the last crop in the series. In many cases also in this area crops are interplanted, and although the rotations here given list alternatives, often all these crops are grown together with the one or the other dominating the mixture. Finger millet for instance, even when interplanted with peas, will often have sorghum also mixed, and even sometimes cow-peas and other vegetables.

According to Driberg in the early 1920's, when cotton was being introduced to the area, the Langi people were not considered by him to hold much promise of a large production "due partly to the fact that immense quantities of sinsim are cultivated annually for export." Millet in these days commonly followed sinsim which has obviously been replaced almost directly by cotton in the above rotations.

As we have already pointed out, the cropping in the northern areas can be considered to take place in two quite separate parts. The main cropping sequences given above are those commonly followed in the areas of communal cultivation. In places the area will be opened to sinsim. On the smaller plots to be found nearer the houses, where cultivation is mainly the concern of the women, it is the practice to grow the minor crops of which large acreages are not required, and those crops which if planted away from habitation would suffer unduly from loss by theft or wild animals. Such crops are sweet potatoes, maize, groundnuts, the sweet cassavas and vegetable marrows and gourds. Tobacco is normally grown in the larger fields of the main crop rotations, and recent developments of famine foods have led to the planting of sweet potatoes, cassava and groundnuts undersown in the communal areas.

Having described the division of plots in such a clear manner, it is perhaps necessary to add that it is also quite common to find cultivators with large plots of main crops near their homes and outside the communal cultivation areas. The

practice of leaving the Wang tic groups and cultivating cotton and millet in large plots near the homestead is slowly spreading, particularly in areas of heavier population pressure and less spare land. In this case the same sort of rotation is followed in these fields as in the communal fields and in fact, communal labour on them by Wang tic groups is commonly undertaken where the owner can supply sufficient beer. Also, it is convenient, due to the differing names given to this system of cultivation in the two districts to refer in future to the "communal cultivation" areas when distinguishing the two types of plots. It should, of course, be clearly understood that these areas are "communal" only in the sense that work is done together in gangs with leaders. In all cases individual plots are owned within the area and the produce is in no way treated communally.

Agricultural Implements

Lango district is unique in Uganda not least in that the people have for many years used a type of hoe which is not seen in other areas. This is the heart-shaped hoe to which is fitted a long straight handle from 5 to 10 feet in length, and in line with the hoe blade. This implement is not very suitable for deep digging. Its normal mode of use is by standing upright and digging or weeding backhanded as it were, while at times it is used while kneeling in which case the shaft is grasped low down, held away from the body, and the strokes are applied inwards. This type of hoe appears in a few places in Acholi (near to the Lango border), but it is not the normal implement of the Acholi who prefer the more normal type of imported hoe which is used with the blade at right angles to the shaft with a chopping motion.

Lutara (1956) states that there are, however, various other forms of hoe in Acholi, apart from the long handled "Urok" and the more normal "Kweri maboc" or "crocodile" type hoe, (known as "Adima" in Lango). He describes a form of hoe which is a cross between these two, known as "Kweri pur" or "Lagot" ("Agote" in Lango) which consists of the same heart-shaped blade as the "Urok", but fitted on a shaft bent backwards at about 70° and 3 to 4 feet long. This is commonly used throughout Acholi for digging. The indigenous hoe known as "Kweri keny" or matrimonial hoe has long been a part of the brideprice payment, and is fashioned locally in the shape of a pointed shovel, with upturned shoulders. It is, however, disappearing from use nowadays.

In addition to these digging and weeding implements the use of a forked wooden stick as a rake is common in Acholi and Lango. In Lango weeding sticks about 1 foot long and flattened at the end are used, usually for weeding millet and simsim.

In recent years the use of the plough has expanded in both districts, although there are still far more ploughs in Lango district than in Acholi. In Acholi, ploughs are distributed throughout, but there are more in use in Agago county than elsewhere, where some Iteso settlers have introduced them. In Lango ploughing started in the south but is well distributed with large numbers in the north. People who do not own ploughs hire from others at Shs.40/- per acre. Maruzi and Western Oyam, owing to the scarcity of cattle, do not use the plough to any great extent.

Table 7 shows the growth in numbers of ploughs in Lango since 1930.

TABLE 7

<u>Years</u>	<u>Nos.</u>	<u>Ploughs</u>
1930		68
1931		156
1932		203
1938		2,250
1947		5,722
1948		6,056
1949		9,138
1960		14,484

Apart from axes and knives for harvesting grain crops, there are not usually any other implements used in agriculture, although the spread of ox-drawn weeders to follow up the plough is being encouraged. The use of mechanical means of cultivation is moderately widespread in the area, the tractor hire services of the Agricultural Department being in demand in the north more than in any other part of Uganda. In Acholi also certain large farmers, and in Lango a few groups of farmers, own their own tractors and implements and it is quite possible that this area will, in due course, adopt mechanization in a big way. More will be said about this subject later in the memoir. Generally, tractor use is limited by the difficulties of clearing land with tree densities in the region of 400 per acre.

Crop Husbandry

Cotton: (Lango, Acholi: Jaro or Pamba *Gossypium hirsutum*)

The husbandry of cotton differs little throughout the Protectorate, and has been given in detail in so far as Teso district is concerned in No.1 of this series of memoirs. As has already been mentioned in the chapter on rotations, cotton in the north is the first crop to be grown in a cropping sequence, after the land has been cleared from bush or from a period of rest under grass, usually in the communal cultivation areas. Owing to the fact that the rains do not normally break as early in the year as in Teso, the usual planting dates in the north of the country are somewhat later than in that district. The early planting campaigns of the last few years, however, have had the effect of persuading growers to bring forward their planting to May, so that in 1958 over 13% of the total Lango crop was planted in that month, while in Acholi east, over 17% was planted during May. These figures compare with the 5-year averages of 5% and 8% respectively. During 1958 the bulk of the crop (about 60%) was planted by the end of June, but this is unusual, and in previous years July has been the month of peak plantings in both districts. Plantings are completed during August. There is little or no planting of cotton as an autumn crop after a spring crop in this area. However, in some years, when the preparation of the land opened for cotton is delayed beyond the time when it is considered a good cotton crop will result, late simsim is planted and then often cotton will follow this in the next season.

The method of planting is similar to that employed in other parts of the country, the lines being demarcated with string at three-foot intervals and the seeds dropped into holes spaced roughly one foot apart along this line. The seed is covered by foot. The standard of planting in the north, and the spacing is moderately good, more so when compared with the standard in the south of the country. Weedings are accomplished in Lango with the long-handled Lango hoe previously described, while in Acholi it is normal for the usual "crocodile" type hoe to be used. Due to the thickness of the bush in many parts of the area, the plots of cotton are interspersed with a number of trees, and the lush growth of the very strong growing tufted grasses during the rains makes the weeding of the crop an operation that is very expensive on labour. No case histories or recent village surveys have been done in this area

of the country, and no exact figures can be quoted for the costs of production in the north. Weeding is normally done by communal groups. As can be seen in the table given previously showing crop acreages, there is a total of some quarter of a million acres grown in Lango and Acholi, while the area of the whole country runs into something like 15,000 square miles. It is obvious, therefore, that there is no pressure to grow cotton on sub-marginal land in this area, and in general it can be said that the soils upon which cotton is grown in the province are better than those available in many parts of the Eastern Province. Yields are consequently higher, the average over the past five years being 210 lb. per acre of seed cotton in Lango, 231 lb. per acre in east Acholi, and as high as 327 lb. per acre in west Acholi. The equivalent figures for north Teso are 193, and for Mengo, 397 lb. per acre of seed cotton. In Lango from 50 to 60% of the cotton is interplanted with beans.

Since 1952, the variety grown in this area has been S.47, the same variety that is grown throughout the east and north of Uganda. The variety DE/715/6M (or S.53) was introduced in south Lango in 1957 and waves designated by years as S.54 etc. are now introduced annually. Variety trials exist at five centres in the two districts, but the work at these centres is centred mainly on the comparative yields of different varieties rather than on the agronomy of the crop. The application of planting-date data, in particular that obtained from other parts of the country, to this area of mono-modal rainfall distribution may not be sound.

Due to the later arrival of the main rains in the north and the necessity to deal with the millet crop first, land preparation for cotton cannot often take place until late April or early May at the earliest. Clearing can, of course, be done during the dry weather. This means that often in these areas planting is done on newly dug land without the recommended interval of six weeks between digging and planting to allow the grass cover to rot down. As can be seen, this advice is purely empirical in these areas. The practice of burning late just before clearing as in "Aker" should also modify this item of departmental policy.

As in other grain-growing parts of the country, it is normal for a millet crop to follow cotton, which means that in many cases the last weeding of the cotton crop is done very late so that the ground may be free of grass growth for the planting of the millet following on the up-rooting and burning of the cotton plants. Alternatively, the millet is broadcast in the standing cotton and weeding is done at the same time as the cotton is uprooted, this operation serving to cover the seed lightly. Uprooting and burning is done by a certain date each year by law, in order that there shall not be carry-over of insect pests and diseases.

The marketing of the crop follows the practice of the rest of the country. There is no major problem in the system of marketing cotton now adopted. After ginning, government requisitions seed for planting the next year's crop, and this seed is dressed with a copper compound against seed-borne diseases, mainly blackarm, every year. The grower receives his seed free from distributing centres scattered over the area.

In recent years the spraying of the cotton crop against insect pests has been extended from the experimental stage into the field. As has been described in the Teso memoir, this campaign also extended to Lango and Acholi. In Lango, 800 acres were sprayed in 1958 with no loans sanctioned, while in 1959 over 1200 acres were sprayed, with loans issued worth £600. In Acholi in 1958, 400 tins of insecticide were sold for cash with another 600 tins sold on loans. In 1959, 60 acres were

sprayed in east Acholi and 540 acres in west Acholi.

The peoples of the north grow cotton not only to obtain cash. An important function of the crop is to help prepare millet land. In a season of drawn out rainfall the plants will often be dug up while some cotton remains so that the millet can be timely planted. It should be realised that the value of a few pounds of cotton cannot be equated to the well-being of the main food supply in these areas.

The general problems attached to cotton growing throughout the north and east are similar, and these have been outlined previously. (Parsons, 1960)

Much damage is done by game in Acholi, in particular guinea fowl and francolyn are pests of newly planted plots from which seed is eaten. In some areas children are detailed off to guard these newly planted plots.

Finger Millet: (Acholi-Lango: Kal) Eleusine corocana

As in other parts of the country, this crop is sown broadcast on a firm and fine seedbed. Often no preparation of the land is carried out before sowing but the seed mixture is sown into the standing cotton which invariably precedes it and is then covered lightly when the cotton is uprooted and burned. At the same time weeding is done and weed residues are collected by means of a wooden rake "Lagwar" and wind-rowed either on the field boundaries or around trees and anthills within the plot. When dry, these are burnt. This helps to kill the trees and the ashes are known to grow good crops. The seed rate used is generally thought to be in the region of four pounds to the acre, but when thus sown in the north, it is probably higher.

As already described, this crop is the main food crop of the area and is grown with the first rains of the year following the cotton crop which has been grown on the newly opened land the year before. It is sometimes also grown in later years of the cropping sequence but almost always on the large communally cultivated fields of the "Kitara" or "Wang tic" areas. Before the advent of cotton to the area, millet was sown following the opening crop of simsim, and this is still sometimes the case. As it is the major food crop of the peoples of the north, it naturally assumes the greatest importance in the planting programmes, and all farm work is centred on this crop. It is the first crop sown with the advent of the first rains of the year and its weeding is considered to be of greater importance than the planting or care of any other crop grown. It is invariably sown together with pigeon peas in Lango and in many parts of Acholi. Sorghum is sometimes mixed also and, in fact, whenever finger millet is grown in these northern areas it is preferable to refer to the crop as the finger millet mixture, as it is rarely sown in pure stand. Millet is sown from February (usually dry-sown) to May throughout the area with peak plantings taking place in March and April.

The number of varieties known to the people of the north is large, and it is common to find many varieties growing together in the field. Weeding can be done with hoes but is usually accomplished with small knives made from baling hoops and also large snail shells. As is usual where this crop is sown broadcast, weeding takes up much time and family labour and women can be seen kneeling in the millet fields for many long days during the weeding season of the year. As the somewhat primitive weeding implements used are only suitable for the eradication of seedling weeds, the weeding is always done early, and often only once in the drier areas. These days men will be found helping in this laborious task, but traditionally this is the work of

women only. As has been mentioned previously, when row cropping is introduced, as has been done in other districts, the weeding operation becomes much less labour consuming and the division of labour by sex soon disappears.

As the grain ripens, losses from birds increase and bird-scaring platforms are erected in the same way as is described when discussing the sorghum crop. Harvesting is done in the normal way, by cutting off the head of the plant with a short part of the straw attached. As in Karamoja, but unlike other parts of the country, the practice of erecting temporary granaries in the field at harvest is common. These granaries are made of grass, and are built on poles at some height above the ground before the commencement of harvest each year. They are used until such time as the harvest is complete after which the millet still in the head is carted to the homestead, and after thorough drying in the sun, it is stored in the large millet granaries of the individual women concerned. Time to maturity varies with the variety between four and six months. The crop is normally cut dead ripe in these areas, and the practice of allowing the grain to heat up in a large pile after cutting as is done in Teso is not normally practiced (Kerkham 1953). As in other parts of the country, seed selection is carried out by the women before harvest, large heads of the chosen varieties being cut and bound together and hung over the fire to prevent insect attack. The yields that can be obtained from experimental stations are recorded in annual reports, and can vary from over one ton of grain in a good year to as little as 800 lb. of heads to the acre. Average yields are in the region of 1,500 to 1,800 lb. per acre in the head. There is no factual information concerning peasant yields in the north.

The pest and disease problems of finger millet are few and almost identical with those described for Teso. In the north of Acholi in some years there is more of the parasitic weed Striga to be seen in the fields than is usual elsewhere. Due to the more scattered nature of the population and the rather wilder countryside, damage by game animals and birds is more widespread. The custom of leaving the grain until it is dead ripe before harvest causes losses due to shedding as well as from birds.

When required for consumption, the heads are taken from the granaries for thrashing, sufficient for about a week being prepared at one time. Heads are thrashed by being beaten against the hard earth with a stick, and winnowed in the wind. As in the days of the windjammers at sea, the women of the north of Uganda also believe that a wind can be raised for this operation by whistling at their work.

Pigeon peas: (Langi -Apega; Acholi-Lapenda) Cajanus cajan

This crop is almost never to be seen in pure stand. It is invariably intersown with the finger millet in Lango, and often in Acholi also. The peas are mixed with the finger millet at the time of sowing, and the mixture is broadcast as one. The resultant stand is very definitely dominated by the grain crop, with the plants of pigeon peas spaced at intervals of about six feet. When the mixture is young, it is not always easy to see the peas in the growing millet, but as the crop matures, the pigeon peas overtop the millet for which reason they must be sown at this spacing if the main crop, millet, is not to be reduced in yield. After the millet has been harvested the peas are undersown with the autumn crop, often sorghum or simsim, as they take from six to eight months to mature. It is then sometimes left over into the next cropping year and harvested as the peas become mature. Harvesting is

done by picking individual pods by hand. This crop is grown sporadically in Buganda where owing to the heavy infestation of the flowers and seed pods with insects, little seed is set and the main importance of the plant is as a supplier of green leaves for use as a vegetable. It does not seem to be used for this purpose in the north. Planting dates coincide with those of the finger millet crop, and weeding is as carried out for the millet and the crop following.

Yields are given by Kerkham as 400 to 600 lb. per acre when intercropped, but information from farmers' plots is not available. It is a crop that can grow and produce regularly on poor soils and is fairly drought resistant. It also possesses a long deep taproot which, together with its potential ability to fix atmospheric nitrogen in the soil, makes it a plant that helps to retain fertility. There is also a certain amount of leaf fall which helps to cover the ground and protect the soil from pulverising rain storms.

In the northern areas seed is not normally attacked by insect pests except if harvest is delayed. The foliage is, however, highly nutritious and a favourite food of goats and wild herbivores. Apart from forming a very important part of the people's diet, this crop can also be easily sold to Indian tradesmen as it is a well-known article of Indian diet, known as "dhal".

Sorghum: (Lango - Bel; Acholi - Gaya) Sorghum vulgare

This grain is of secondary importance to finger millet in all parts except the very driest areas in the north-east. It is, however, very widely grown throughout the area as a crop that can be used for food or brewing, and one moreover that can form an insurance against drought as it is far more drought resistant than the smaller millet. Most varieties grown in the north are bitter and bird resistant and are, therefore, more suited to the making of beer than for eating. Some sweet varieties persist and are utilized to augment the finger millet flour throughout the year. In a year of good finger millet yields most of the sorghum crop will be used for beer. When harvests are light, the sorghum grain will be used to make up the shortfall of grain for consumption. When the early crop of finger millet is poor, a larger crop of late-sown sorghum will result, and where food supplies are short at the beginning of the year, a larger percentage of sorghum is invariably grown in the next rains. It is usually grown either with the main finger millet crop in the first rains of the second cropping year, or in pure stand in the later rains of the same year, in either case in the communal cultivation areas. The pure crop is grown in smaller fields from divided finger millet fields. It is sometimes also grown in the spring of the third cropping year, either on its own or in mixture with other crops. Varieties are very numerous and many are grown together in the field. Plantings take place in April and May and again in August to October. The lack of an early crop in West Lango has already been mentioned in the chapter on crops. The crop is sown in the same way as finger millet and the requirements are similar throughout the growing season. When grown in pure stand it is, of course, more able to hold its own against the growth of weeds than is the shorter millet, and weeding is not done so thoroughly. Harvesting is accomplished in the same way with small knives of various designs and for the late crop the previous field granaries erected for finger millet are utilized if they have remained undamaged. The heads are thoroughly dried before storing. Recently introduced varieties which are not yet commonly grown mature within three months, but the normal varietal range of native material takes from four to seven or eight months to mature. Long-term sorghums are grown, and after

and after planting in the late rains are not harvested until the following year when they contribute to the family food supplies during the hungry months of May and June before the harvest of the new year's finger millet is general. The ratooning sorghum called "Awera" in Lango is planted in August and gives the first crop in December with a smaller crop the following May or June. Pests include birds which are a serious problem in the north. Children are to be seen in the season constantly on guard in the sorghum fields with mud pellets on the end of whippy sticks and empty tins to beat. They take their stand on high platforms built in the fields and are on duty from dawn to dusk. Only the very bitter varieties are immune from birds, and these also are more resistant to weevil and insect damage during storage. In general, the crop suffers seriously from stored-product pests and this is one reason why the smaller grained finger millet is preferred, as a main food crop. Other pests of importance particularly in the long-term and ratooning varieties are stem borers. These pests do not contribute directly to crop losses as, in most cases, tillers are produced and the final crop may even be increased for this reason if the weather is favourable. However, their main danger lies in the fact that they delay maturity very seriously, and in conditions where early maturity is important a severe attack by stem borers can, in fact, contribute to severe crop losses due to the late production of heads from tillers when the main growing rains have finished. The only important disease of sorghum is smut, and in general the local varieties show fair resistance to this. Where the crop is grown regularly, for instance in the women's fields near to the house, then the parasitic weed Striga can be serious.

Yields recorded from government farms vary from 500 lb. per acre grain in dry areas up to 3,000 lb. per acre grain from more fertile fields.

Simsim: (Lango - Nino: Acholi - Nyim) Sesamum indicum (S. orientale)

This crop has persisted in the north as the most widely grown oil crop. In other parts of the country it has invariably been superseded by the higher yielding groundnut crop, but here, although groundnuts have been introduced, nevertheless simsim retains its popularity. In Lango simsim used to be grown as a cash crop as well as for family use, and was used for trade with the Bantu peoples to the south and west of the Kwania/Kyoga lake systems. In those days it was invariably planted late as an opening crop in the communal cultivation areas, and to some extent this practice is still followed particularly when cotton planting is delayed, when simsim is planted in its place. In this case the crop serves as a preparation for the finger millet which follows, or in some cases it will be followed by cotton.

Today simsim is commonly grown in the August rains of the second cropping year. It either follows the finger millet and is sown broadcast among the pigeon peas which remain growing in the plot, or is sown on new land at this time. In Acholi also it was utilized as a cash crop until very recently. As late as 1943 nearly 800 tons were sold in markets throughout the district. It is still grown largely on new "Aker" land in this district. It is planted in most months starting in May and extending to September, with a peak in August. In south Lango it is planted only as a spring crop, its place in the autumn rains being taken by cow-peas, as is the Teso custom. Being a small-seeded crop it requires a firm and clean seedbed, and it cannot stand severe weed competition. It would seem therefore, that this is not an entirely suitable crop for planting directly after opening land from bush. The full value of the practise of "Aker" can be appreciated here, and the effect it has on the

control of weeds well demonstrated. Weeding during growth is undertaken in the same way as for the grain crops, by the family.

Most varieties of simsim mature in four to five months and all local varieties are shattering types. Driberg (loc. cit.) lists at least eight varieties of the crop known to him in Lango, although he adds that there did not appear to him to be any great difference between the varieties; there are also many local variety names given in the Lango district book. Sometimes varieties are grown mixed, and sometimes they are to be found growing separately in different areas. When the colour of the pods has changed from green to yellow, and before shattering starts, the crop is ready to harvest. This is a somewhat laborious task. Each plant is cut about a foot below fruiting level, and bundles are made which are tied together and tied on drying racks which have previously been prepared in the field. These racks are quite large affairs measuring anything up to ten feet in height and perhaps some ten to twelve feet in length. The bundles are stoked by tying on to the rack so that air can percolate through the heads and allow the crop to dry off. At the same time stocking is done so that much of the rain falling onto the rack will run off without soaking into the bundles. The crop may in this way be given considerable field room, and thrashing is done when convenient, often during the dry season. The bundles are shaken or beaten onto a prepared floor and winnowing is completed in the field, the clean seed only being transported to the homestead. There the seed is stored in granaries, which are usually used only for simsim, called "Tua", and often sealed against loss. Normal granaries are also used.

Yields are known to be low on experiment stations where work on the crop has not been exhaustive. Kerkham (loc. cit.) gives 500 lb. per acre as a fairly good yield. Peasant production has not been measured in terms of yields per acre. Pests and diseases do not affect the crop seriously, but periodic re-drying is desirable as the seed becomes damp in store, and is then freely attacked by moths.

Simsim is normally roasted and ground after which it is used as a sauce on other foods. The practice of obtaining oil from the crop for cooking has died out as the pure oil is now obtainable in local trading centres. It is sold in small amounts.

Cassava: (Lango - Mogo; Acholi - Mogo) Manihot utilissima

In recent years the importance of this crop has grown very rapidly in the Northern Province. It is now, when measured by acreage, the most important root and famine reserve crop in the area and covers almost twice as much land as the potato crop. As in other parts of the country, it has been found to be an extremely easy crop to grow, and one moreover that will yield a large quantity of food regularly on poor soils and in drought years and at the same time can be left in the ground until required for consumption. With all these advantages it is hardly surprising that its popularity is great, and that the poor quality of the food produced not greatly considered as a deterrent to its cultivation. Although many acres are now grown to the introduced varieties which are resistant to mosaic disease, yet in the north more than in other areas, the old bitter varieties persist, in particular one or two varieties which are known to be very high yielding although showing symptoms of mosaic throughout their growing period. The advantage of these old types over the new introductions are two-fold. Firstly, they are usually long-term varieties which remain palatable after lengthy residence in the field, and as such are of more

value as a true famine reserve than short-term varieties that have to be constantly replaced. Secondly, their very bitterness is almost a sine qua non of successful cultivation in areas where pigs and monkeys abound. Without the protection of bitterness, the sweet varieties are eagerly sought after by many kinds of wild game, and losses are considerable.

Cassava is frequently planted as the only crop of a sequence in special communal cultivation areas, but is also to be found growing in small plots near the homestead where it is used for piecemeal harvest as required for food.

Planting is carried out as in other districts at almost any time of the year except in the heart of the dry season. Short lengths of stem are used as planting material and the spacing adopted is often according to departmental advice. i.e. 4 ft x 4 ft. (Plots can be seen where other measurements are adopted.) As well as planting by sticking the stem cutting in the soil at an angle as is frequently done in other parts of the country, a common practice in this area is to prepare the field by digging a series of shallow dish-shaped holes in the field at the requisite spacing, and the cuttings are placed horizontally in the holes and covered lightly with soil leaving half the cutting uncovered. Inter-planting is common as with the wide spacing used there is much soil available for other crops. In fact, cassava is often planted into the millet mixture as a third or fourth ingredient and allowed to grow right through any subsequent crops which are planted following the millet. When planted as a plot mainly for cassava, groundnuts, beans and/or cow-peas are commonly inter-planted.

When interplanted the crop is not weeded but at the harvest of the interplanted crop advantage is taken to clean up the plot. Cassava is often grown through a dense re-growth of grass and weeds, and in these circumstances is often referred to as a "resting" crop. Astonishingly high yields of cassava have been obtained from plots which were virtually bush, and even couch grass does not appear to be able to affect yields greatly. Harvesting can take place at any time after eight to ten months in the earliest of the introduced varieties, and must be completed if the roots are to remain palatable by 18 months to two years at the most in the longest term varieties so far introduced. Roots which remain longer than this are (as is common in Lango) usually dried and used for flour or beer. Among the local varieties on the other hand, some long-term types cannot be considered fit to harvest before a full year is completed, and maximum yields are obtained after a much longer period. As a famine reserve some of these varieties can remain in the ground for many years, although after a certain time their palatability becomes relatively poor. No very definite information is available on the exact length of time to maturity of the more popular of these local varieties.

Harvesting can be carried out piecemeal as and when required, or the whole crop can be lifted from the field together and dried in the sun for storage. Because of the resistance of the cassava roots to damage by fire, drought, locusts, game and weevil attack after maturity, the wholesale lifting of the crop, as is done for potatoes, is not common, and harvest is more commonly performed in bits and pieces when required. It is the custom in Acholi that the first roots to be harvested from any plot are always given to domestic poultry. This custom is said to ensure high yields from the rest of the plot. Yields from government farms are known to vary between four and fifteen tons to the acre of fresh roots. This is normally when the whole plot is harvested in one operation. Yields from peasant plots when the crop is harvested piecemeal are not known.

There are various methods of utilization of this crop in Lango and Acholi. Roots are often roasted whole without peeling and are then used as a portable meal to be eaten on a journey or during the day when working in the fields. A more elaborate method of preparation consists of peeling the root and boiling it in water before serving it at the main meal of the day together with other food. When required for making flour, Lutara (loc.cit.) describes two methods commonly adopted. The first is to peel and slice the tubers and immerse the slices in water for some days and allow to ferment. On drying a moderate amount of mould growth is encouraged as these organisms impart a flavour to the product which is well liked. After drying, the slices are ground into flour, and this is mixed together with flour obtained from finger millet and sorghum. Flour can also be made by grating the freshly peeled roots against the roughened side of a paraffin tin, and drying the resultant product in the sun. This is then ground down to a fine flour when required. It is possible that the first method is necessary when very bitter varieties are being used in order to bring about a decrease in the amount of toxic hydrocyanins present. Leaves are not commonly eaten as a vegetable.

Of pests and diseases, the main one is mosaic virus. Although the introduced varieties are resistant, the popular local types are able to give good yields even though symptoms of the disease are obvious throughout the life of the plant. Otherwise game animals are serious pests of the sweet types and the variegated grasshopper Zonocerus at times defoliates a plot completely. Cassava scale is sometimes found, being quite common in Lango.

Sweet Potatoes (Lango-Icok; Acholi- Layata) Ipomea batatas

The advent of this crop to the area and the value given to it in its early days of cultivation in Lango has already been described. It is without doubt the most popular root crop from the point of view of the consumer as it is more palatable than either cassava or yams. It is of more importance agriculturally in Lango and the western parts of Acholi than in the drier areas of the north east, but even in these semi-arid areas it has a place to itself where it is grown in irrigated valleys in the Agoro and Paloga areas. Apart from this irrigated area, it is grown mainly in the women's plots close to the homesteads, but is also grown in valley bottoms for the purpose of maintaining planting material over the dry season or as a famine reserve, and in recent years has been planted by men in the communal cultivation areas, as $\frac{1}{4}$ acre per taxpayer is required by law. When grown in homestead plots, there is no customary sequence of crops into which it can fit. It is, however, often the first crop to be grown in such sites. When cultivated in valley bottoms, the mounds for planting are made up after the grass has been burned. When designed for the carrying over of planting material for the next rains, the mounds will be planted up towards the end of the rains. When required as a food or famine reserve, these swamp plantings are made so that the crop will come to harvest in the hungry months of April to June, before the new millet crop is due to be harvested.

The small plots near to the homestead areas are planted up throughout the rainy months of the year with peaks of planting to coincide with the periods of less work on the major crops. Planting is carried out by means of pushing cut portions of the vine into the prepared mounds with a forked stick. The vines are cut into the requisite lengths a few days before planting and allowed to lie under the shade of a tree to wilt. In the drier areas it is considered important to bury the cutting fairly deeply and to leave only a few inches above the ground. In the larger mounds of

of west Acholi, as many as five cuttings are inserted into each mound, but in the drier areas to the east, the mounds are usually smaller, and one to three cuttings are planted in each. The system advocated by the Department of Agriculture of planting in ridges to help control soil and water run-off is not widespread. As in other parts of the country, it is thought to increase losses due to mole-rats.

Many varieties of potato are known to the women of Lango and Acholi. The Lango district book gives many local names for these. Varietal variation gives differences in colour, size and shape of the tubers, as well as differences in the shape of the leaves, and the various varieties differ greatly in their keeping qualities, and to some extent in taste. There is also a difference in the time to maturity between varieties which varies between four and six months. Weeding is carried out by working up the mound with a hoe, and is only carried out once, or until the leaves cover the ground. Harvesting can be done piecemeal or can be completed in one operation. As with cassava in Acholi, the first roots are dug out from a few mounds some time before the harvest is general, and given, after being cooked, to the domestic poultry. Towards the end of the rains, this crop must be harvested in toto as unlike cassava, it will not remain in the ground during the dry weather. When conditions start to become dry, damage from the weevil Cylas sp. quickly becomes serious and the remaining crop must be dug up forthwith, and dried in the sun after slicing.

Yields of potatoes at experiment stations are slightly lower than cassava, but yields of 6 tons per acre have been recorded at Aler. Once again these figures have been obtained from crops that have been harvested at one time and estimates of yields from plots which have been harvested piecemeal are not available. The main pests of the crop are leaf-eating caterpillars, usually of the butterfly Acraea acerata together with the weevil Cylas already mentioned. The only disease which effects the crop is a virus which causes various symptoms on the leaves and decreases yields considerably. In storage the dried slices are heavily attacked by various insect pests.

Groundnuts (Lango-Amaido: Acholi-Pal) Arachis hypogea

Although simsim is still the most important oil crop in the north, the groundnut acreage has grown considerably in the last fifteen years or so. Within the last five years there is no persistent trend, but considerable fluctuation in the area grown to the crop. It would appear from this that simsim is holding its own at this time and that groundnuts are still considered to be a luxury crop whose area will depend on the practicability of planting in any one year after the more important crops have been dealt with. However this may be, the crop is widely grown and liked throughout the area.

As in most districts there are two main varieties grown which are only differentiated as being spreading or bunched. The bunch variety has been introduced by the department in recent years and is a type with large nuts which are readily picked from the haulms and which mature in $3\frac{1}{2}$ - 4 months. The spreading types are known to have been in the country for many years and can be said to have been introduced previous to 1910. They are generally longer maturing and not such good yielders. They also require more labour at harvest. Planting is done most frequently in the spring of the third year of cropping, but also to a certain extent on new land. It is a crop that may be planted in pure stand, but mainly in a mixture with other crops, primarily in newly planted cassava fields, and also with maize or sorghum. It is however, always planted near to the house. Planting is normally done

by the "chop and plant" method at a close spacing as the correlation of rosette disease with wide spacing is well known. It often happens however, that at the time of planting seed is scarce and so, as in other districts, the crop is planted wider than is desired. Lutara (loc.cit.) tells of the strange fact that at the time of planting one of the major pests of this crop, besides rats, are jackals which come and devour the seeds if dry planting is carried out. Seed is selected from a hand shelled sample directly previous to planting.

Planting occurs throughout the rains but mainly during the months of April to June. Weeding is carried out once only as a rule. Harvesting takes place in two parties. The men and boys dig the crop, while the women and girls pick the nuts. The whole operation is usually timed to be completed in a day and the nuts are not left in the field to dry but carried home for drying. After drying they are always stored in the shell, often in granaries but also, more commonly in the north than elsewhere, in the traditional Boo (Acholi) which is accomplished by tying the nuts together in a cocoon made of grass and lashing this to a long pole which is set up in the compound with the cocoon of nuts high in the air. Yields are between 600 - 3,000 lb. of unshelled nuts per acre as measured at departmental stations, with average yields of about 800 - 1,000 lb

In these areas this crop is grown mainly for consumption and very little is sold.

Apart from jackals, ground squirrels and monkeys are serious pests of groundnuts. Rosette virus is common on all widely spaced plots, and as in other areas Cercospera spot only appears to attack the plant at the end of its life. There is some considerable loss from weevil when stored in granaries, although this loss is lessened by the practice of storing the nuts unshelled.

Cow-peas and beans

These pulse crops form a valuable part of the diet of the northern peoples, but unlike the crop in Teso and other parts of the country in the east and south, they are not the only protein foods available. Pigeon pea is without doubt the major pulse crop of this area, and cow-peas and other forms of bean, play a secondary role. Cow-peas are valued not only for their seed but also for the contribution they make to the vegetable diet of the people as the leaves are much used for this purpose. It is an important crop in the parts of East Acholi where pigeon peas are not common, and in the south of Lango near the Teso border.

Cow-peas are grown in small plots almost invariably inter-sown with other crops. A heavy seed rate is normally used and thinnings from the crop provide an early source of green vegetables. Planting dates range from April to October with the peak plantings taking place in August in most areas. The seed is harvested both by picking individual pods and by uprooting the plant and thrashing with a stick on a thrashing floor. The dried peas are stored in granaries or in Boo in the same way as groundnuts.

Phaseolus beans are grown in the wetter parts in small areas near the home, often planted on potato mounds where they mature before the ground is covered by the potato vine. In Lango beans are in fact grown more widely than cow-peas, mainly in cotton or other crops.

Tobacco

Although the area planted to this crop is very small, nevertheless it is a crop of importance in the areas where it is grown, i.e. near Gulu and at Anyeke in Lango.

It is a crop that is grown under strict control, all growers being registered with the East African Tobacco Company, the sole buying agent. The Company prepare seed beds and produce seedlings for issue to the registered growers in accordance with the area allotted to each. Seed is sown during the dry weather and the seedlings are ready for issue from the time of the breaking of the rains onwards. Planting is carried out from April through to July.

There does not seem to be any general rule as to which part of a cropping sequence is used for this crop. It is often planted in the first year of opening, but is also commonly grown during other years of the cropping sequence. In recent years the company has operated its own tractor hire service for the ploughing of tobacco land and in some cases for ridging up also. Growers are advised to grow the crop on ridges.

Weeding is carried out once only as the crop is quick growing and will be ready for picking within three months of planting out. Topping is not carried out efficiently but yields are moderately good with the standard of maintenance adopted. As all leaf is purchased by the company and areas are recorded against each registered grower, this is one of the crops where yield figures are known to be accurate. Yields of cured leaf vary from just under 200 lb. per acre in 1952, a very poor year, to the very high figure of 607 lb. cured leaf per acre from the Acholi crop in 1959. This latter figure is said to be due to the fact that some 700 poor growers were eliminated from the register in that season, and that the remaining better growers were allocated smaller acreages so that husbandry was improved. The ratio of green to cured leaf varies considerably from year to year, between the limits of 7.5: 1 and 12 : 1.

Recent trends in Acholi are for individual growers to grow their own crops from seedlings to curing. There are large individual growers who base their farming system on the tobacco crop and produce large areas annually. Others who are keen to carry the whole process from seedbeds to curing are now termed "master growers". Together these men now hold almost half the quota for the Acholi production. Curing in the case of the smaller master growers is done in specially designed small barns which are built cheaply and provide sufficient room for the curing of small areas. The quality of most of the leaf produced in this area is high, and although the area is extremely limited, nevertheless where the crop is grown it has a very important impact on the farm. Profits to be obtained from tobacco are generally well in excess of the expectations from cotton growing, more especially so when the crop is cured on the farm. It appears that the only limitation to the large expansion of this very suitable crop is the limited market available.

Details of the agronomy of the crop together with the pest and disease complex and curing techniques are given by Purseglove (1951).

Miscellaneous Crops

Plantains are grown more widely in Lango than in Acholi and the acreage has grown considerably in recent years. Much of the material planted is of the sweet varieties.

Nearly 7,000 acres of maize was grown in Lango in 1958 with an almost equal acreage in Acholi. Most of this is eaten green. A few plots of rice (particularly in Moroto County) tepary bean and grams are to be found in scattered areas, while yams and pumpkins are grown singly in favoured sites. All these crops are to be found in small

acres planted near to the homestead, often mixed with other crops. A few coffee trees have been introduced in recent years as a trial.

Storage of produce

As in all other areas of the country, where the staple food crop is an annual, the storage of produce from harvest to harvest is one of the major factors affecting the supply of food to the family throughout the year. In Lango and Acholi, as in Teso (Parsons, 1960) all crops are stored in granaries made either with basket work or hardened mud. ("Dero" and "Goga" granaries for grain are the two main types.) In the north of Uganda however, the system adopted with certain crops of tying in grass and lashing the bundle to the top of a high pole set in the compound is still practised. In no case is advantage taken of the use of insecticides, although the system of storing produce in granaries is ideally suited to their use.

Details of the storage of individual crops has been given in the account of the husbandry of the crop concerned.

Pests and Diseases

Apart from the crop pests and diseases which affect the different crops grown in the north which are identical with those affecting these crops in other areas, the main pests have been mentioned under the chapter dealing with the husbandry of crops. The major problems of this area under this heading are, in summary, as follows. More than in other parts of the country, the deprivations of birds as pests of the major grain crops of the area is serious. Considering the scattered nature of much of the cultivation it is surprising that more effort is not made to control the deprivations of wild game within the growing areas. The construction of thorn fences around crop fields is the exception rather than the rule.

Amongst the disease problems mentioned, perhaps the most interesting is the local cassava variety which by all accounts can yield heavily while at the same time showing all the symptoms of mosaic disease. There would appear to be a tolerance exhibited here which could well bear study by plant breeders, more particularly because, if the high yields are proved, this is a variety in much demand as it is long term and bitter.

Livestock Management

The special importance of cattle to the peoples of the north of Uganda has already been described. The numbers of the various types of stock within the area and their distribution has also been given. Cattle are kept mainly as the means by which the welfare of the family is ensured, and in no way are they looked upon as a profit-making project of farming activity. The same applies to small stock. We have also seen that in no area is the concentration of cattle such as to constitute over-crowding. As in other parts of Uganda, it is no surprise to find that animal husbandry in the north is barely considered to impinge upon the subject of agriculture, and the term parallel husbandry can here also be used to describe the system of cattle keeping whereby stock are kept by agriculturists, but completely separately from the arable parts of the farm, and the two never meet. Indeed in areas such as this where there is no pressure on the land, cattle are normally actively discouraged from approaching the arable fields owing to the danger of crop damage in an unfenced country, and grazing areas are selected annually well away from

cultivation. In no parts of this area are resting fields normally grazed, all grazing being done under the supervision of children or herdsmen on the common areas which remain unallocated. The grass swamps are used for dry weather grazing.

Traditionally it is the duty of the young boys to herd cattle. Driberg informs us that "The village herd is let out to pasture in the morning at about 8 a.m. in the charge of the small boys of the village who are admirable herdsmen and are entirely understood by the cattle, though sometimes older men will take turns in acting as cowherds, especially if the herd is a large one and the locality is inhabited by lions. They return to be milked at noon and spend the afternoon under the shade trees... They are all brought back and driven into the kraal between 5.30 and 6 p.m." He adds: "Cattle are never used for draught purposes." Today, as in other parts of Uganda, the large number of children of herding age who attend school seriously affects the system of cattle management. Where there are no boys to take the herds out in the early mornings they often have to remain in the night kraal until some of the men have finished their work in the fields before the grazing day commences. Cattle can often be seen in the kraals as late as 11 a.m. due to this. This seriously affects the amount of time available for grazing, more so where water is at some distance from the home and cattle must walk many miles during the day to the waterhole and back. Furthermore, when dry conditions prevail, and due to a long drought keep is becoming scarce, this limitation of the time available for grazing assumes very great importance and is probably the major factor in the loss of condition and the subsequent lowering of resistance to disease which invariably results at this time of the year.

All the work to do with cattle is man's work, and women are by custom not permitted to milk or have any contact with the beasts. Recent changes in this custom have been observed. As we have seen when discussing the social background of the peoples of the north, it is common for the owners of only a few beasts to ask neighbours with kraals already established to herd and tend them together with their own. Large communal herds are common in east Acholi where cattle numbers and concentration are high. Individual herding is more common elsewhere, but there is no clear-cut division of areas on this basis. Kraals are still prepared in the manner of old with a site selected which is free draining, such as that afforded by the presence of a large anthill which will be encircled with a strong fence of large logs up to six feet in height. These sites are changed infrequently and in the rains it is common to see animals standing up to their bellies in mud despite the attempts to provide a well-drained site. After the kraal has been moved, there is commonly no attempt made to cultivate the area, and the old kraal sites in the districts are invariably found to be covered in a luxuriant growth of Cynodon dactylon. Recently cases are known where old kraal sites have been used for maize growing after two or three years.

The custom of employing foreign herdsmen has grown up in the past with the result that many herds in south Lango, and the larger herds near Gulu are now given out to these men who herd cattle belonging to many owners, sometimes together with their own. This system is open to many abuses and does not encourage good husbandry. The herdsman and his family live to a large extent on milk, which is looked upon as payment in kind for his services, and often this results in the calves of the "absentee" owners being starved of milk in their early months. Where each man possesses his own bull or bulls, such composite herds will, of course, comprise many

serving bulls and the basic requirements for improvement by selection are not present. The indiscriminate running of a number of bulls in a free herd results in the early mating of heifers that have been stunted in the first place, and the resulting progeny, after surviving a very high rate of calf mortality will, in all probability, again be very poorly done in such surroundings. At least under this system the herd will probably be let out to graze earlier in the morning than those herds that are maintained in the villages, as the immigrant herdsman does not cultivate and himself herds the cattle all day, depending upon the cattle owners to supply what little he requires of agricultural produce and to pay his taxes. Under both of these systems calves are separated from their dams all day, either living in a separate shed or in the house of the owner. They are allowed access to the mother twice a day at milking in the morning and evening, and in very few cases are they fed any sort of supplement even in the form of cut grass. The incorporation of trained working oxen as part of the bride-price payment operates to the great disadvantage of the plough owner who is thus often left with the implement and no animal to draw it. In such a case he must set to work and train other animals, but often this factor interferes with the timely opening of land. Similarly the transfer of good female stock in such transactions makes improvement by selection difficult.

This rather depressing picture of the livestock management in the north is lightened a little by the emergence of a few progressive individuals in the last few years. Paddocks are to be found in both districts and the Veterinary Department carry out a large number of castrations each year. The campaign to encourage owners to withdraw their cattle from the immigrant herdsman and tend them on their own farms meets with a certain amount of success. The greatest hindrances to the outright acceptance of cattle as a cash earning project are threefold. Firstly, the traditional place of cattle in the social system. Secondly, the low productive potential of the local breeds, and thirdly the lack of markets for milk. As we have seen, in Lango considerable income accrues to cattle owners by sales of stock as a product of the present "ranching" system of cattle keeping. Both in Gulu and in Lira local dairies exist, the former drawing 8-10,000 gallons a month from the large herds belonging to the richer owners which are run in the area of Patiko, while private sales are known to augment this total. At Lira the local dairy handles a small amount of fresh milk, but the market at present is severely limited. There is also a small dairy in Kitgum where a certain amount of butter is sold and ghee exported to Gulu and Lira.

The recent development in the wiring of paddocks in the north has not proceeded very far. The local antagonism to anything that may be construed as having anything whatsoever to do with land registration militates against enclosure of any sort, and the few paddocks that have been fenced are used mainly as holding areas where cattle can be kept during the day without the necessity of a herdsman. Grazing management within the paddocks has hardly yet evolved and cases where the paddocks have been subsequently ploughed for cropping are very rare. As we have seen, the utilization of cattle for draught purposes is growing within the area. The extent of ox-cultivation as measured by the number of ploughs in use in the area is discussed in the chapter on agricultural implements.

Although we have seen that in the north there are various customs controlling the burning of grass, such as in Arum hunting areas and in the "Aker" sites, yet there is no tradition of controlled burning for the production of grazing, anyone being able to fire the area whenever he feels so inclined.

GRAZING

There are no sown leys on private farms anywhere within the area. Ngetta Experiment Farm has been carrying out trials on ley grasses for many years. The composition of the natural grasslands has been surveyed in detail by Langdale-Brown (1960)

As we have seen in earlier chapters of this memoir, the practice adopted by cattle keepers to exploit the natural grasslands of the area consists of the uncontrolled grazing of the hill commons during the rainy months of the year, while during the dry weather when the dryland grazings have been exhausted, the cattle turn to the grass swamps for nourishment. Throughout the area the burning of surplus grass at least once during the year is common practise and apart from the burning of the hunting lands (Arum) and the "Aker" areas set aside for cultivation, there is no control over these burns.

It is normal for the peoples of northern Uganda to set aside grazing areas on a village basis from year to year. These areas are chosen after consideration has been given to the choice of communal cultivation areas for that year, and are so chosen that there will be no danger of damage to the crops grown on this area. Within this area the land is entirely communal and anyone may graze on it with as many cattle as he likes and with no sanctions whatsoever as to how he utilizes the area.

In late years there have been cases of individuals who have erected fences on the land utilized by them for the purpose of grazing cattle within these fields. Originally it was hoped that these fields would form part of an alternate system of husbandry, but to date it appears that in very few cases has the land so enclosed been turned over to cropping. In some cases the expense incurred in erecting considerable length of fencing has been said to have been worthwhile, as it has prevented cattle from trespassing on neighbours' crops and court fines have thus been avoided. This may be so in the more crowded areas or where individuals have large herds. In general however, as in other districts, it is difficult to see any justification in fencing unless the land be subsequently put to the plough and the expenses recovered in the improved cotton crop that can be grown on the grazed paddock.

In much of the area of Lango and west Acholi, the natural grasslands are of high quality, or can be made so if correctly managed. In these areas possibly the most that would be required to establish high-producing leys of good quality would be the addition of a legume to the natural regeneration. As a result of the work at Serere seed of the strong-growing legume Stylosanthes can now be obtained without great difficulty. In the drier parts of the area and on the less fertile soils, the inclusion of grass in the mixture to be sown where leys are required would be necessary. Experience at Serere once again could provide a guide as to which species would be preferable, but the difficulty of seed supply would be considerable were large areas to become involved. The economic practicability of sowing leys in these areas can be questioned, however and the returns to be expected from such a practice with the present stock available, and under present arrangements for marketing livestock products such as milk, would not be great. Once again the main returns may lie in the increased crops to be harvested following the growing of a legume in the ley mixture and from the manure obtained from grazing.

Farm Management

As in Teso, so in the northern areas of Uganda this can be described as a relatively simple practice. Management of

the farm is not looked upon as a skill or occupation, but rather is the practise and management of cultivation a product of the individual's experience superimposed upon tribal custom in the use of the land. As was recorded in the memoir on the Teso systems, "It is true to say..... that what one farmer does, all farmers do as this is the tradition of the country." In Lango in particular, it is very true that "the man who departs from customary practice in any way is looked upon with dire suspicion by his neighbours."

However, there are certain methods of cultivation which are followed which can be looked upon as the rudiments of a more elaborate management technique. For instance, the adoption throughout this area of the system of communal cultivation which has already been described in detail is obviously a management practice that has been evolved to overcome the inherent shortage of labour at peak periods of the year which is such a great limiting factor in peasant agricultural production. As has been pointed out the selection of these communal areas on common lands at some distance from any occupied land is already becoming modified to suit present-day conditions of greater population pressure on the land in some areas, and where these communal areas have perforce to be positioned at any great distance from the homestead, people are undertaking the cultivation of all crops on plots near to their own homes. Communal labour can still be drawn upon for the cultivation of these fields.

The introduction of the plough must also have a great effect upon the age-old systems of agriculture adopted in the north. Once ox-drawn implements are introduced into the system, and of course even more so when the implement is drawn by mechanical means, the large number of trees in the area become a matter of some concern for the first time. Whereas under a regime of hand cultivation the ring barking of trees in cultivated plots is a satisfactory way of reducing undue competition, once ox- or tractor-drawn implements are introduced the physical presence of these trees is a great hindrance to their efficient use. In places, the number of trees can exceed 400 to the acre and this density of bush provides a great deterrent to the use of improved cultivation methods. However, where the plough is now in use, a great saving of family and communal labour results, with a corresponding saving in the costs of production, as communal labour cannot be considered in any way free. Although no cash payments are made under the system of "Wang tic" or "Wang kweri" the actual cost of the grain that must be provided for the manufacture of beer is considerable. Where plough owners have neighbours without ploughs there is much hiring out of ploughs at the rate of Shs.40/- per acre.

The details of the defferentiation of labour by sex has also been described. Land clearing was done by the men and it was normal for the man of the house to sow the major grain crops after which most of the weeding operations were allocated to the women in the family. Harvesting fell to the whole family. Communal weeding of cotton is commonly practised throughout the area. Each woman in the household is allocated a plot of land in the communal cultivation areas and is entirely responsible for the food crops planted on these plots as well as for the plots near the house. The produce of the food plots is entirely hers and when she is sure that the food supply for the year is sufficient for the family requirements, she may sell or barter surplus supplies in the local markets (known as "Lacan wilo") without reference to her spouse. In the case of cash crops the produce is entirely at the disposal of the husband, and he will in most cases share in all the work attached to the cultivation of the purely cash crops.

In large families there is often allocated a plot on the communal areas to the husband himself. The work on this plot is mostly carried out by the women but the produce is destined for the "husband's granary" where it is kept for famine reserves. Apart from the communal systems of the area, the employment of outside labour on the farm on a paid basis is rare. In more crowded areas near the larger townships a form of "Leja-leja" employment is often to be found where there is no beer available for "Wang tic". In this system a man's neighbours may agree to work on his fields for a specific task in return for cash or cigarettes. Where the reward is in the form of food this is, of course, very akin to one of the various systems of Wang tic described by Driberg (loc.cit.) known as Pur gweno. There are very few cases known of labour employment on a work ticket, and these are almost entirely restricted to the very large farmers in the proximity of Gulu.

The incorporation of cattle cannot be said to enter into the subject of farm management as practised by the people of the north today. Women may not own cattle.

Under the heading of farm management mention should be made of the small number of large farmers who have emerged into the sphere of economic farming, as opposed to subsistence cultivating, in the neighbourhood of Gulu. These men have, of their own initiative, established farms based on tobacco production and curing which support considerable capital and equipment and in which the management factor is one of considerable importance. That profits can be made under these conditions has been amply proved and these farms are shining examples in the area of what can be done and how production from the area can be increased once the attitude of mind to agriculture can be adjusted and the knowledge of economic methods of production supplied.

Marketing

The marketing of the main cash crops, cotton and tobacco, are well organized, and have been described elsewhere. Cattle markets are also growing each year of late and the trade in cattle, hides and skins is well developed by the Veterinary Department. Small surpluses can always be bartered in local produce markets, or sold in small lots for a few cents a handful. Uncontrolled crops such as maize, simsim, groundnuts and pulses are not produced in any large surplus from this area, but wherever such produce is available for sale there is usually little difficulty in disposing of it at the local trading centre to Indian traders. The trader shows more readiness to trade on these terms in Lango than in parts of Acholi where transport of produce does much to reduce its value in remote areas.

Apart from the limited sales of fresh milk in Lira and Gulu, and the even more limited sales of processed milk from Kitgum already described, there is no market for milk in this area. Likewise the production of crops with no established trade channels is heavily handicapped by the lack of an organization to handle small quantities.

As in other tobacco producing parts of the country, the production of tobacco is limited at the moment solely by the market. Agriculturally this is a crop that fits admirably into the systems of agricultural at present practised in the north, and the expansion of the crop would be a comparatively simple process if the market could be expanded to cope with the increased production that could so easily result.

The paucity of trading centres, the long distances between them and the poor selection of goods offered for sale at most of them contribute in no small way to the

general lack of incentive for the accumulation of cash amongst the peasant farmers of the area. With a greater range of goods to stimulate consumer demand, a far greater urge would be born for the possession of worldly goods than is at the moment exhibited, and consequently it is felt that greater efforts would be put in to the increased production of cash crops.

The position as to cotton buying zones in the area is as follows. The county of Kaberamaido in Teso district is included in the Lango Zone. The Minakulu division of Lango is included in west Acholi. Acholi is divided into Acholi East and Acholi West zones. Karamoja is included in Acholi East. Cotton produced in any of these zones must be sold within the zone. It does not seem that this division is in any way operating against production and it would appear to be quite satisfactory. There are 13 ginneries (11 working in 1959-60) and 48 cotton markets in Lango and 5 ginneries with 54 markets for cotton in Acholi.

The Agricultural Year

From this study of the systems of agriculture in the north of Uganda, a good idea has already been gained of the activities of cultivators in the area from month to month of the calendar year. The following brief account serves to summarize these activities and to show the busy times of the year which condition production due to the limited supply of labour.

JANUARY Hot and dry.

Cotton harvest is in full swing during this time and much time is also spent in the markets, at ginneries and stores in the sale of cotton. Although the land is too hard to attempt any opening at this time, a certain amount of activity in clearing is common and grass fires are to be seen over the whole area. In general these dry months are much taken up in social activities such as weddings, and the building of houses and collection of poles. There is little agricultural activity.

FEBRUARY Hot and dry with grass rains in many years.

Cotton harvest is completed during this month and selling continues. If the grass rains are adequate there will be considerable uprooting of the cotton and sowing of the millet mixture. Once again agricultural activity is not normally very great at this time, and social activities continue with hunts and house building.

MARCH Main rains break during the latter part of the month. Hot and dry until they do.

Cotton uprooting and burning are completed by now. Many plots of millet mixture are planted both dry and with the advent of the rains. Some small plots of other crops such as maize may be planted near the homesteads with the rains.

APRIL Wet.

This is the month of great activity when as much as possible is planted of most of the crops grown in the area. The finger millet mixture plantings are completed and this receives the first priority both as to planting and weeding of the earlier plantings if they have germinated satisfactorily. Cotton land is opened in the Kitara or Wang tic communal cultivation areas following the burning of the Aker, and the allocation of plots within the area. After this a few plots of such crops as sorghum, maize, sweet

potatoes and cassava manage to get planted before the month closes.

MAY Wet.

Great planting activity takes place during the month, while the women are very busy weeding the millet mixture. Cotton, simsim, groundnuts, the last of the millet, sorghum, maize, potatoes, cassava, beans and peas are all planted during May. Plots planted at the beginning of the month will also require weeding before the month ends, and these together with the early millet fields keep the whole family very busy at this time.

JUNE Wet.

Cotton planting reaches its peak in this month in recent years, and all other crop plantings continue at a high level with the exception of finger millet which is by now completed. As the grain starts forming the children must take up their task of bird scaring, and the weeding of all the April planted crops now assumes a large proportion of the work of the family. This is the peak month for the planting of potatoes and cassava in many areas, and in the spring-sown simsim areas in the south for this crop also. It is also a month in which groundnut plantings reach their highest.

JULY Wet.

At the start of the month weeding will still be taking up most of the family's time, with the children busy from dawn to dusk with mud pellets and empty tins in the grain fields. In most years the largest area of cotton is planted during this month. Towards the end of the month, the early grain will start ripening. Root crop plantings continue at a high level, and some simsim and groundnuts plots will also be planted as in the north this month does not promise dry weather in the same way as in the south of Uganda. Precipitation is normally only slightly less in June and July than in the peak planting months of April and May. Temporary field granaries will be prepared in preparation for the grain harvest.

AUGUST Wet.

Often the wettest month of the year in the north of Uganda. Finger millet harvest will start. This brings most of the communally performed works of the year to an end, and other food crops which will be planted in the communal areas for the rest of the year are normally tended by the family. In addition to this most important task of the year, cotton planting will be finalized during August, and a large area of simsim is planted following on the millet harvest or in new land which it has not been possible to plant to cotton. Groundnut plantings also continue together with many plots of roots and pulses. The late sorghum plantings will also commence in this month.

SEPTEMBER Wet.

Many of the spring-planted food crops as well as the later planted millet plots will come to harvest now. In addition there will be large plantings of simsim and sorghum together with the continuation of root crop plantings. Weeding cotton together with the tending of the August-planted simsim and sorghum are the main tasks this month.

OCTOBER Wet.

Plantings are now becoming limited to the long-term sorghums and swamp plantings of potatoes. Weeding and harvesting of the later planted food crops is now taking place, together with the last weeding of the cotton. Towards the end of the month, the May-planted cotton will often start to open. At this time of the year when work starts to fall off in the fields and grass growth is at its maximum, thoughts turn to the more social chores, and this is the time that thatching grass is collected and stored. Simsim racks are built ready for the harvest of the large August-sown acreage.

NOVEMBER Starting to dry up.

Cotton harvest starts and most plantings cease. There may still be a small amount of weeding necessary on the late-planted crops, and a certain amount of harvesting will take place. Swamp plantings of potatoes are carried out. Towards the end of the month slicing and drying of potato tubers commences and it is a common sight to see the roofs of houses all over the area covered with the white slices drying in the sun.

DECEMBER Dry.

Cotton marketing starts and this, together with continued cotton picking takes up much of the family's time at this part of the year. Simsim and other August-planted food crops also come to harvest at this time, and money and food is usually plentiful for Christmas. The weather is now beginning to warm up and the growing season for crops can be considered at an end. Potato slicing and drying continues and at this time of the year prices for stock are high in the down-country markets which encourages the increased sales of stock.

It should be remembered that in a peasant family there are the daily household chores throughout the year such as the collection of wood and the daily journey to the nearest water hole. These tasks employ the women of the house for a very considerable portion of their time while the daily attention required by cattle and other livestock will also make inroads into the time available for purely agricultural pursuits in the fields.

Factors Limiting Production

Having described in detail the systems of agriculture practised in the northern districts of Uganda it is pertinent here to take stock of the agriculture of the area and to isolate the varying factors which make up these systems and to separate those which it would appear are operating in such a way as to hinder or limit production from the area.

As in most parts of Uganda, perhaps the most serious factor operating against the maximum economic production from the area is the attitude of mind of the majority of cultivators in the area who literally look upon agriculture as a "way of life" rather than as a business or profession from which it is possible to make as good a living and income as from paid employment. It cannot be expected that this attitude, springing as it does from the history of the tribes concerned, can be changed overnight. It would appear that the necessity to continue providing food for the family and to be self-supporting in the staple crops will continue for many years. It may well be questioned whether the mass of peasant producers will ever really become aware of the economic "facts of life".

The low standard of farm management and of farming business enterprise generally is probably the major limiting factor which we have to consider.

Particularly in Acholi where land is in almost unlimited supply, the proposition of large-scale farming is attractive. The shortage of labour will immediately turn attention to the application of machinery to production of all kinds. The second difficulty encountered here, (the first being lack of economic thought already discussed) is the density of the bush. In many parts of the area in the north tree density is in excess of 400 trees to the acre and although these are not normally trees of any great size, they are large enough to form a physical obstacle to the use of machinery on the farm. Before it is practical to consider the use of tractors and mechanical aids to cultivation generally on any large scale, it is necessary to consider the ways and means to enable the easy and economic clearing of bush.

Much of this memoir has been occupied in describing the system, unique to the Nilotic peoples in Uganda, of communal cultivation practices. That these customs are an ingenious method of overcoming the labour shortages inherent in peasant agriculture, has been accepted. There are, however, certain inherent defects in the system which should not be ignored. Although there is no title involved in the holding of the plots which are allocated annually in the communal areas, nevertheless their allocation does constitute a form of land fragmentation in that the family have holdings scattered at some distance from their households, as well as the homestead plots. Normally there are at least three communal cultivation areas under cultivation in any one year by one family. Each of these may be up to three or more miles distant from the house in different directions. Although much of the work done on these areas by the men is done communally, nearly all the women's work on the plots are individual labours, and the amount of time taken in walking from one to the other from the homestead must be considerable. This system suffers, therefore, from all the well-known disadvantages of land fragmentation in other areas. These disadvantages include the inability of efficient ox work on areas that are situated far from the kraal; the impossibility of utilizing the cultivated area as a ley for grazing or night paddocking of cattle; the impossibility of persuading cultivators to thoroughly stump their allocated portions (of particular importance if mechanical cultivation is to be considered) or indeed to do anything to improve them such as sowing improved leys or dunging the plots, when it is not normal for the same parcel to be allocated to the same person when next the communal area is cultivated after a number of years.

As in other parts of the country, the social ties to the keeping of cattle operate very strongly against any improvement in the beasts themselves and also against their rational use in the farming system. Any attempts to improve the family herd by selection are doomed to failure under a system that demands the constant giving and receiving of breeding stock for dowry purposes. Similarly the present system of ranching cattle on the common grazings denies them their proper place on the farm. Where a small number of cattle are involved, as is usually the case, the keeping of these stock at home under a system of tethering would appear to give the greatest hopes of successfully introducing them into the farming system. Their low productive potential and the difficulty of establishing a paying milk market often preclude the widespread fencing of arable or resting fields, to allow controlled grazing.

In Lango particularly the intense suspicion of activity in any way out of the normal behaviour for the society is a serious obstacle to agricultural progress. In addition

the suspicion attached to any move by government concerning land is in many ways acting/progress. Any enclosure by paddocking or hedging is looked at with great suspicion, and the suggestion that advantage should be taken of local customs by bringing together the communal cultivation areas into an integral whole on which rational systems of agriculture could be introduced, would be looked upon as nothing but an attempt to interfere with the local system of tenure. It is possible that more success may be achieved in Acholi.

It has been stated from the time of Driberg to the present day that the Langi are hindered in efficient cultivation by their adoption of the long-handled hoe. With this implement it is indeed impossible to dig deeply, and it is in all respects an implement more fitted to weeding than cultivating. However, experimental evidence of the benefits to be obtained from deeper cultivation in these areas is not to hand, and in the areas where the plough has been introduced the first operation of opening is at least done to a somewhat greater depth. That the Lango hoe is, in fact, the handicap that it is said to be is not proven.

The dependence of many parts of the northern province on hand cultivation must certainly be a great factor in the limiting of production. That ox ploughs are now common in both Lango and Acholi makes it difficult to explain why their use is not spread more widely. The presence of tsetse fly over large areas of the north in the past is one reason. However, much of the erstwhile tsetse country is now free, and cattle are kept in many areas where the use of the plough is not universal. In addition to the adoption of the ox-plough the use of follow-up implements such as weeders is in its infancy in these areas today. The lack of knowledge of, and the requisite implements for row-cropping is a factor allied to this. The practice of broadcasting not only finger millet and sorghum, but also the large areas of simsim that are grown throughout the area gives rise to formidable weeding problems and the inefficient use of labour that is at most times very scarce.

Of the purely physical factors limiting production, the most important in the north is the length and severity of the dry season. The poor reliability of the late-season rains which is such a marked part of the Eastern Province environment is not felt in the north, nor is the mid-season dry spell in evidence. Information on the optimum times of planting in the north is not extensive, but it would appear that in what is virtually one rainy season extending over seven months from April to October that the time of planting for optimum yields would not be so critical. The dry season limits the production of perennial crops. In most areas the soils and the total precipitation would not preclude the growing of many other crops in the area.

As has been described the northern peoples are mainly dependent upon the cotton crop for their requirements of cash. It has been shown that although tobacco is a very important crop in the economy of those that grow it, and that it has in fact, given rise to the large-scale economic farms in the Gulu area, it is nevertheless very sparingly grown, and the area to the crop in the two districts is negligible.

Other physical factors to be considered in this appreciation are the low rainfall received in the eastern parts of Acholi, and the lack of water supplies in these same areas. It is true also that in these areas the soils generally are of low fertility and on the face of it, it would seem that the low productive potential of these areas must be accepted, and a form of land use suitable for such conditions be devised.

The market situation has been commented upon. Most of the well-known produce will find a market in the local trading centres, but these are mostly at some considerable distance from producers, particularly in Acholi, and the channels for the disposal of new crops and livestock products other than the hides and skins are difficult. Similarly it has been stated that local opinion has it that the desire for more cash could be better stimulated among the population of the north if a greater range of consumer goods were made more readily available in the trading centres.

As in other parts of the country, there does not seem to be any control in the burning of grazing areas. In the same way it is true that damage is being done to the natural grasslands by uncontrolled burning. In the north however, this cannot be considered serious damage as it is not allied to overgrazing except in very limited localities, and is generally practised only once in the year at the most. It is also possible that where control is thought to be necessary, the customs of controlled burning described in the chapters on the Arum and the Aker areas could be transferred to bring about control of the grazing areas.

Finally, as in all other areas, and more so than in some of them, the criticism that there is little or no basic information on peasant agricultural techniques holds good in the north. There is only one village, in Lango, where the Tothill survey was carried out in 1956. Since that time there have been no surveys done in the area, and there does not seem to have been any basic data obtained from peasant farmers. Naturally it would have made the task of analysing the agricultural systems of the area much easier had there been such figures and facts available.

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PART II. THE SYSTEMS OF THE
WEST NILE DISTRICT

Introduction

The West Nile district of Uganda includes the sub-district of Madi, and lies, for the most part, to the west of the Nile adjoining Acholi district in the north of Uganda. It is a district which has been created quite arbitrarily it would appear, presumably to satisfy some administrative requirements, although it is difficult to see what these could have been even at the time of the original delineation of the boundaries, and its inclusion in modern Uganda in 1914. It includes within its boundaries the whole or part of no less than four distinct tribes together with a few inhabitants from other groups mainly resident in the Sudan or the Congo. It has, therefore little in the nature of a continuous history behind it as a district, and it would seem more logical to discuss what history is apparent when discussing the different peoples of the district under the chapter on population.

Geography.

The West Nile district together with the sub-district of Madi form part of the Northern Province of Uganda and lie between $2^{\circ} 10' N$ and $3^{\circ} 50' N$, and $30^{\circ} 45' E$ and $32^{\circ} 03' E$. The Nile forms the eastern boundary with Acholi district in the south until just south of the third degree of latitude after which the East Madi boundary with Acholi travels east and then north up to Nimule. The northern boundary of the district is one with the Uganda-Sudan border, and the western boundary with the Congo-Uganda border. The land area of the west Nile district amounts to 4,147 square miles with a further 1,717 square miles comprising the sub-district of Madi. With a total area of 5,864 square miles, it is the fifth largest district in Uganda after Karamoja, Acholi, Mengo and Ankole.

West Nile itself is divided in the Buganda model into counties, sub-counties, parishes and villages. This is an arbitrary division for the sake of administrative convenience, except in the case of the county divisions some of which are based on tribal boundaries. Due to the influence of the nearby Sudanese, county chiefs were here called "Sultans" while sub-county chiefs were known as "Wakils". Parish chiefs are known by the Swahili word "Mukungu". There are now-a-days differences in nomenclature from tribe to tribe in the district.

In altitude the district varies from barely 2,000 ft at Nimule where the Nile flows through to the Sudan, to hills of over 5,100 ft. in West Madi, and others of just under 5,900 ft at Zeu in the southern highlands. In general, the district rises from the Nile in a westerly direction by a series of "steps" which are arranged in lines from north to south. This gradient is steepest in the south of the district and as the Nile falls away to the east in its northwards journey, so the gradient away from it becomes less. The highest plateau is found in the south-west where much of the country lies above 5,000 ft. Arua, the district headquarters, lies centrally at an altitude of just over 4,000 ft. with the plateau rising to the western border with the Congo to little above 4,500 ft. The Congo border northwards then falls slowly to 4,200 ft., where it meets the junction with the Sudan. From here eastwards the country again falls slowly to the Nile, with the Otzi massif rising to 5,100 ft. in the north-east corner of West Madi. East Madi lies to the

east of the Nile and is physically part of the Acholi plain. It does not rise above an altitude of 3,200 ft. except for isolated hills in the south-east which rise to just over 3,500 ft.

Communications within the district by means of all-weather roads are fairly comprehensive and the standards of roads good. This applies more to the plateau areas than the lowlands alongside the Nile where the standard of the existing roads is not good, and the network limited. Communications from the district with the rest of Uganda are sparse, and in general this area can be considered remote from the rest of the country in so far as communications affect markets. There are two main road entries into the district from Acholi at Pakwach and Laropi, both of which utilize a powered ferry service for the crossing of the river. The East African Railways and Harbours Administration operate a steamer service from Butiaba to Pakwach, Rhino Camp and Laropi. The airstrip at Arua is used by the East African Airways' inter-communications flight from Entebbe twice a week.

Industry in the area is represented by one ginnery at Rhino Camp. This has recently been purchased by the local government and plans for the construction of an oil mill in the area have been mooted. Until recently there were two non-African estates in the district, but at the time of writing there is now but one, growing coffee and sugar.

Climate

The rainfall map of the district closely follows a contour map, the Nile valley being generally dry, while as the altitude increases to the west, so the rainfall totals rise. As for topography, so in rainfall, the gradient from low to high is steepest in the south, and least in the north. Rainfall maps for the area are available from the Lands and Surveys Department, and from Langdale-Brown (1960). Average annual totals range from 38.3 in. at Pakwach and the Nile to over 55 in. at the top of the escarpment for most of its length, the highest annual average being recorded in the south-west from Nyapea with a total of 59.6 in. To the north rainfall reaches 50 in. at Moyo with 45 to 50 in. being recorded annually in the intervening areas, away from the river. Rainfall distribution is typical of the northern parts of Uganda. As has been described for Lango and Acholi, so in the West Nile distribution can be considered monomodal, with the arrival of the rains in April. Thenceforward until November, with only a slight diminution in monthly totals during June and July, the rains continue, with the peak month being August in most years. From December until March it is usually dry, giving at most four months dry weather in the year. In the Nile valley this pattern is, of course, modified by the total fall, and in this low-lying area droughts are of much more consequence and rainfall itself more chancy at any time of the year.

The only second-order meteorological station in the district at present is that at Arua. Records from Moyo, other than for rainfall, ceased in 1948. Arua rarely experiences temperatures of over 90°F. Monthly mean maximum temperatures vary from 88° during the hot weather of January to March to as low as 77° in the cool months of July and August. Monthly mean minimum temperatures drop to 61° during the same period and rarely exceed 65° at any time. Absolute minimum temperatures drop to between 56° and 62° throughout the year. Relative humidity figures at midday drop to as low as 32% during the dry hot months at the turn of the year, but at Arua are normally between 50% and 70% during the remainder of the year. Moyo at an altitude of below 3,400 ft. as against the altitude of Arua of over

4,000 ft is considerably hotter. Maximum temperatures of 99° were recorded in most years prior to 1948 during the hot months of January to April while mean monthly maxima range from 79° to over 90°. Mean monthly minimum temperatures rarely drop below 64° and rarely exceed 70°. The relative humidity of the atmosphere appears to be much the same at Moyo as at Arua.

Although no further second-order station exists in the district, nevertheless, it is quite obvious that the climate along the Nile valley is very much hotter than that at Arua or Moyo. Temperatures in excess of 100° must be experienced quite frequently, and although the rainfall is light and the country in this area often suffers from severe drought conditions, the atmosphere, largely conditioned by the waters of the Nile, remains at most times at a high humidity.

Soils

The soils of the Northern Province of Uganda, including the soils of the West Nile have been surveyed and described in detail by Ollier (1959). They are often of higher productive potential than soils in other areas of the province, more particularly in the southern highlands and on the plateau in general. These are mainly the soils of the upwarped African Surface and are derived from Basement Complex rocks, mainly in this area schist, gneiss, amphibolite and granite. Other soils within the district are of low potential, with the exception of the alluvial soils of the river valleys which flow eastwards to the Nile, which are of medium and high productive capacity. There is also a patch of moderately fertile soils along the Nile banks at Laropi. Most of the East Madi to the east of the Nile has a soil similar to the common soils of the north Acholi surface. These are termed by Ollier the Palabek Complex, and are of low fertility. Around Pakelle this soil changes to an alluvial complex of brown, sandy clay swamp soils and sandy loams, which are also considered to be of low potential.

Vegetation

The vegetation of the West Nile district has been surveyed and described in detailed by Langdale-Brown (1960). As is to be expected, the areas of vegetation showing good land-use potential follow fairly closely the areas of high rainfall and good soils. The main differences lie in the classification given by Langdale-Brown to the Lugbara uplands and the eastward-draining valleys flowing into the Nile from the plateau. Although these valleys contain alluvial soils of moderately high fertility, nevertheless in their present form they are classified as suitable for grazing only, with no cultivation at all within their boundaries. The vegetation within these valleys is not uniform. For instance, the large river valley of the Ora, which flows into the Nile in Jonam county, supports savanna woodland and tree savanna communities and contains as its dominant species Acacia seyal and Hyparrhenia rufa. Other valleys of this nature contain Combretum ghasalense and Acacia drepalolobium as their tree constituents with various Hyparrhenia spp., Bothriochloa spp., and Sporobolus pyramidalis. Other valleys again are classified as aquatic grasslands from the vegetation they support, and these contain mainly Echinochloa grass and Cyperus spp. If the full potential of the soils of these valleys is to be realised, certain remedial measures would be necessary in each case. Some would need clearing, some draining, and some again contain heavy clays which although high in bases, would be hard to work.

In the case of the higher areas to the north of Arua, the fairly fertile soils and the high rainfall of these parts are classified as fit for annual cropping only on account of the vegetation they support. In this case the high density of population has conditioned the vegetative cover, and it would appear that despite the good soils and rainfall there would be considerable resting of the land necessary before conditions were suitable for any more productive form of land use. In fact, this area can readily be seen to be highly populated with an almost complete lack of trees in many parts, due to their having been cut for fuel.

From the vegetation survey it appears that there are areas in the hills of the Otzi range in west Madi which could support perennial crops. These are the valleys and hollows where soils are deeper and fertility has been accumulated by wash from the slopes above. Apart from this area the southern highlands are the truly perennial areas, with an intermediate form of land use being present or possible in other parts of the highland plateau area. The greater part of the district is classified as suitable for annual cropping with some areas fit only for grazing. The country falls almost entirely within the savanna woodland and tree savanna type of communities.

Population

Table 1 gives the total population of the West Nile and Madi areas together with the areas of the counties concerned and the population densities of each. These figures are obtained from the preliminary 1959 census returns from the East African Statistical Unit.

Table 1

Population and densities in the West Nile & Madi
by counties

<u>County</u>	<u>Land Area</u> <u>Sq. miles</u>	<u>Population</u>	<u>Density per</u> <u>Sq. mile</u>
Aringa	916	41,039	45
Ayivu	158	51,152	324
Jonam	336	25,375	76
Koboko	298	21,894	73
Madi (Okollo)	742	28,227	38
Maracha	178	47,636	268
Okoro	770	94,778	123
Terego	442	42,387	97
Vurra	302	27,390	91
East Madi	1,103	22,910	21
West Madi	614	27,827	45

It can be seen from this table that the population densities in the Lugbara counties are high, and that some parts of the Alur counties in the south are also fairly heavily populated.

The largest tribe within the district are the Lugbara who inhabit the counties of Vurra, Ayivu, Maracha, Terego and Aringa. These people number about 210,000. After the Lugbara, the tribe with the largest population is the Alur who dwell in the southern counties of Okoro and Jonam. The Alur in Uganda number 120,000 in all. There are 50,000 people in the sub-district of Madi, which together with the Madi (Okoro) give a total of nearly 79,000 for this tribe. The population of Koboko county numbers 21,894, of which the majority are of the Kakwa tribe. This tribe is resident mainly in the Congo and the adjoining parts of the Sudan. There are also present

a few representatives of the Lendu amongst the Alur and the Kuku amongst the Madi in the north of Madi sub-district.

These figures when compared with the 1948 census returns show very considerable differences. In the latter census the numbers given for the Lugbara tribe amount to only 160,000, giving these peoples an increase of 31% within the last eleven years. This is the average increase for the whole country. Among the Alur, however, the increase is considerably greater. The 1948 figures were 68,000 for Okoro county and 19,000 for Jonam giving a total of 87,000 persons in that year. The 1959 census shows this to have increased to 120,000, an increase of 38%. In the case of the three Madi counties, the tribe has increased by 32% from 60,000 in 1948 to 79,000 at the latest census. The significance of these population densities given in the 1959 census will be discussed later when the area cultivated per head of the population is discussed. It may be interesting here to compare them with some other parts of the country. The county average of 324 persons to the square mile in Ayivu when compared with other county average figures is seen to be high. Fairly heavily populated counties in Mengo, such as Busiro and Mawakota, have densities of 370 and 290 persons to the square mile respectively, although uncultivable areas such as the large swamps present in these counties affect these figures. Kyagwe, perhaps the most fertile and highly productive county in the country supports a population of 320 per square mile, although parts of this area are settled at a higher density. The heaviest population densities in Busoga on a county basis are given as 380 to the square mile. The average density in the highly populated district of Bukedi is 254 to the square mile, while in Bugisu the highest county figure reaches 431 per square mile. The highest densities in any county of Kigezi reach 580 per square mile in Ndorwa. From this comparison it can be seen that the counties around Arua in the Lugbara country are as highly settled as any rural part of the country, with the exception of parts of Bugisu and Kigezi.

In the Alur tribal areas also population pressures are considerable in certain areas. In Paidha the density of 230 to the square mile is recorded. In other parts of the area population densities are not very high.

Livestock.

The distribution of cattle throughout the West Nile is conditioned mainly by the presence of tsetse fly. There are also parts of the country without sufficient water supplies to support livestock. Table 2 shows the distribution of cattle and small stock by counties. Figures are from the 1958 veterinary census.

Table 2
Distribution of Livestock by Counties

County	Cattle	Sheep	Goats
Jonam	1,216	6,161	14,740
Madi	1,532	5,888	16,451
Okoro	23,071	15,536	56,375
Varra	6,215	1,447	10,304
Ayivu	15,172	2,425	10,606
Terego	14,805	2,793	8,591
Maracha	25,387	4,096	10,367
Koboko	10,722	1,408	2,871
Aringa	7,637	3,551	11,235
East Madi	4,695	6,598	8,935
West Madi	4,917	3,102	5,894

Much of Jonam and Madi counties are infested with tsetse, and the great importance of goats in these areas can be plainly seen. Also many parts of Aringa, and east and west Madi are likewise covered with game animals and fly. As is normal in Uganda, goats are present in much greater numbers than sheep.

There are two main types of cattle within the district. What are known locally as the Lugbara cattle are normally found in the upland areas of the Lugbara, and are characterized by their very small size. They are classed under the East African Shorthorned Zebu by Mason (1951) who identifies them as the Lugwaret type. This name he takes from an article by Leplae in the "Bulletin Agricole du Congo Belge" of 1926, who describes the indigenous cattle of the plateau around Arua under this appellation. They are not mentioned as a separate type by Faulkner and Epstein (1957) however. Cattle in other parts of the district are the normal small type of East African Zebu found throughout the Eastern and Northern Provinces of Uganda.

Livestock densities are given in table 3.

Table 3
Cattle Density by Counties, 1958

County	Total Head of Cattle	Land Area Sq. Miles	Density per Sq. Mile
Jonam	1,216	336	4
Madi	1,532	742	2
Okoro	23,071	770	30
Vurra	6,251	302	21
Ayivu	15,172	158	96
Terego	14,805	442	33
Maracha	25,337	178	143
Koboko	10,722	298	36
Aringa	7,637	916	8
East Madi	4,695	1,103	4
West Madi	4,917	614	8
Total	115,405	5,859	Average 20

As can be seen from this table the distribution is very uneven, and in general the areas with the greatest human population densities are also those with the greatest cattle population densities. If we study the county with the greatest density, i.e. Maracha, roughly 74 square miles were under cultivation during 1958. This leaves an area of 104 square miles of grazing for the 25,000 beasts in that county, or a stocking rate overall of 2.7 acres per beast. This is a high stocking rate, and this county may be overstocked in relation to the carrying capacity of the natural grasslands if these figures are correct. That all the beasts enumerated in the stock census are not adult must be considered, and if reduced to a figure of adult equivalents a more accurate measurement would be something in the region of 17,000 head. At this estimate of adult equivalents, the stocking rate of under four acres per beast obtained is not so high and could be possibly considered satisfactory at the moment, particularly as the adult animals themselves are very light.

Social Background

An account of the history of the various tribes of this district is beyond the scope of this memoir. In order to appreciate the background to the differing systems of agriculture found within the district however, it is necessary to state briefly the differences between them. As can be

seen from the account of the Lango and Acholi tribes in this memoir, the Alur people are closely associated with the Acholi, and appear to have sprung from the same parent tribe, the Shilluk of the Sudan. Alur peoples speak the same language as the Acholi. Southall (1953) states: "The Alur, however, exceed all Lwo tribes in the ethnic variety of the groups with which they have interacted, and in the degree to which they have been isolated among alien peoples. They have mixed with the Sudanic Okebo, Lendu, Madi and Bendi, with groups of Nyoro speakers and small aboriginal Bantu groups of the Nile Valley and Lake Albert and with the western Bantu Nyali and Bira." It seems that unlike some other Lwo tribes the Alur had developed "A degree of political specialisation in the form of chiefs with monopolised powers and embryonic administrative staffs." They are settled agriculturists, and cattle which are of social importance are kept where possible. Alur country today is cut into roughly two halves by the international boundary between the Belgian Congo and Uganda.

On the other hand the Madi and Lugbara peoples and also the Lendu are Sudanic tribes belonging to the Madi-Moro group (Seligman, 1932). The Madi formerly had many cattle, but these have been greatly reduced in numbers by tsetse for many years now. Seligman states: "The corn stores are of split bamboo, standing on four legs with a conical roof. Eleusine, sesame, millet, sweet potato, yams, beans and tobacco were cultivated in Emin's time and bananas had been introduced." The Madi-Lugbara tribes do not appear to have had well-defined political divisions nor any chiefs, and were consequently more difficult to administer in the early days than the Alur peoples. There appears to have been constant tribal warfare between them and the Alur, in which the Alur are said to have been the less warlike (Southall, 1953). The Madi and Lugbara, however, have taken less rapidly to education and general development than the Alur. Southall points out another interesting difference between the two groups. "The Alur have further shown their independent spirits and ability to fend for themselves in their reaction to the economic pressure to work for cash away from home. Their neighbours the Lugbara are recruited in thousands every year to go and work on the Uganda sugar and sisal estates, being contracted in their own country at Arua and transported at the expense of the companies concerned. The Alur have consistently refused to be handled in this way and often not a single Alur is recruited in the course of a year. Faced with the need for cash the Alur have developed their own system of going to Buganda, hiring land temporarily from the Ganda and growing cotton on their own account until they have raised the cash they need."

The Kuku tribe dwell to the north of the sub-district of Madi, being centred on Kajo Kaji in the Sudan, between the Madi and Bari tribes. The Kakwa live to the west of the Madi and Lugbara mainly in the Sudan and the Congo. These are Nilotic tribes with considerable Hamitic influence observable, and are in fact, classed as Nilo-Hamites together with the Bari people by Seligman (loc.cit.)

Land Tenure

All land in the district is crown land. The estate operated by non-Africans within the area is leased from Government with the agreement of the local government. As in other parts of Uganda, the tenure of agricultural land under tribal custom is quite secure so long as the land is being used. I am not aware that the principles of tenure in the West Nile differ in any important respects from those already outlined for other parts of the country in the memoirs dealing with Teso and other areas (Parsons, 1960).

Water Supplies

There is a bore-hole programme in operation in the district as in most other parts of Uganda. There are no dams in the area. Water is short and limits settlement in the escarpment areas between the upland plateau and the lowlands of the Nile valley. In other parts of the district there is no marked shortage.

Tsetse

There are considerable areas under fly in the West Nile and in Madi. Almost the whole of the Nile valley can be considered to be heavily infested and is abounding with game away from the settled areas. In the north also there are large areas in east Madi where cattle cannot be kept on account of the presence of tsetse.

Agricultural Systems

These form a complex within the West Nile where systems differ more than in any other district in the country. Map 19 gives a general idea of the differing areas where the systems practised can be said to differ significantly one from the other. From this map it can be seen that the Madi sub-district generally follows closely the Lango-Acholi system already described. In East Madi the system is close to that practised in the western parts of Acholi, while in West Madi county, the system is nearer to that to be found in the drier eastern parts of Acholi, with perhaps greater dependence on the ratoon sorghums than in the latter district and the more widespread growing of groundnuts. In the West Nile the areas have been divided into the riverine systems (No 2), the lowland systems (No 3), and two differing systems to be found in the upland plateau (Nos 4 and 5). Of these the lowland system is very similar to the Lango - Acholi system with a greater dependence on cassava for food and the omission of the autumn-sown simsim crop. The riverine system is characterised by the large cassava plantings and the dependence of many of the inhabitants of the area upon fishing. The two upland systems differ with both altitude and tribe. In the southern Alur highlands the main cash crop is arabica coffee and much maize is grown, whereas in the Terego and Kakwa country, the plateau grows tobacco and some robusta coffee with excellent groundnuts. Throughout the district cassava is very widely grown, and can be seen when crops are studied to have taken the place of finger millet as the main food crop.

Crops

Southall (1953) gives the main traditional crops of the Alur in the highlands as "Finger millet, beans, sweet potatoes and pumpkins" with maize and tobacco. Seligman (1932) referring to the Bari-speaking tribes of the west bank (Kuku, Kakwa) describes their crops as "A red millet sown at the end of one wet season and reaped in the following. Besides this maize, groundnuts, tobacco, beans, marrows and other vegetables..... are grown." Among the Madi crops he mentions "Eleusine, sesame, millet, sweet potatoes, yams, beans and tobacco" being cultivated in Emin's time, together with bananas.

Table 4 gives the distribution of the different crops by counties throughout the West Nile district during 1956. It is not possible to divide these crops into areas on the same system as already described, as many of the counties stretch from the upland areas down the escarpment into the lowland areas.

Table 4

Distribution of crops by Counties:
West Nile District, 1956 (Acres)

Crop	Jonam	Madi	Okoro	Vurra	Ayivu	Terego	Maracha	Koboko	Aringa
Beans	2,367	1,133	13,757	5,952	9,493	2,769	9,180	2,316	2,480
Cassava	7,483	8,853	24,201	3,845	8,550	7,367	11,957	3,386	10,249
Cow peas	876	7,256	927	225	70	1,238	1,203	503	2,178
Cotton	7,045	21,150	33,947	10,267	987	5,045	Nil	Nil	9,677
Ground-nuts	1,605	2,202	5,102	1,913	2,209	1,782	2,187	527	4,372
Maize	886	3,354	12,054	11,632	5,520	2,065	5,111	2,419	4,927
Sorghum	19	5,835	1,391	2,912	1,028	Nil	3,982	Nil	Nil
Finger millet	3,934	7,895	10,555	3,695	6,924	4,361	6,834	1,834	15,417
Pigeon Peas	Nil	996	1,186	3,206	1,763	27	1,537	Nil	Nil
Sweet Potatoes	1,961	2,626	8,729	5,147	6,460	4,525	7,973	2,377	8,586
Simsim	5,434	8,545	2,682	1,801	1,778	2,347	2,127	1,530	3,900
Tobacco (Air-cured)	Nil	Nil	Nil	28	321	60	259	83	Nil
Tobacco (Flue-cured)	Nil	Nil	Nil	Nil	190	758	378	Nil	Nil
Total	31,610	69,850	114,531	50,623	45,293	32,344	52,728	14,775	61,786

It can readily be seen from a study of this table, however, that in all counties with the exception of Aringa, the cassava acreage is greater than the area sown to finger millet in that year. In most years in Aringa also the annual plantings to cassava exceed the finger millet plantings. Table 5 gives the area under each crop within the district during the six years 1953 to 1958, together with the six-year average plantings to each crop. The large annual planting variation in the long-term cassava crop is noteworthy, and the steady annual decrease in finger millet plantings is evident.

Table 5

	West Nile and Madi						6-year Average.
	1953	1954	1955	1956	1957	1958	
Beans mixed	66,138	56,484	43,770	69,692	74,924	51,859	60,477
Cassava	129,864	110,056	98,594	99,538	85,465	112,513	106,005
Coffee, arabica	21	50	389	563	835	884	-
Coffee, robusta	-	15	15	66	101	220	-
Cotton	72,464	61,692	63,311	75,315	52,947	66,404	65,355
Grams	N.R.	3,492	4,664	2,364	303	1,011	-
Groundnuts	16,171	21,594	36,968	28,020	19,879	29,702	25,389
Maize	31,992	33,593	38,527	55,831	32,980	28,756	36,946
Sorghum	30,175	24,667	24,055	22,243	19,356	13,764	22,376
Finger millet	83,245	77,911	73,589	69,200	66,690	60,512	71,857
Pigeon peas	6,746	5,597	12,932	9,781	3,174	7,116	7,557
Plantains	N.R.	0	0	6,092	7,999	2,081	-
Sweet potatoes	49,868	39,446	50,866	59,028	41,033	20,086	43,387
Simsim	36,442	38,061	45,837	35,562	50,521	34,924	40,224
Sunflower	980	873	94	500	16	40	-
Tobacco (Air-cured)	1,256	1,285	1,198	1,268	1,078	1,415	-
Tobacco (Flue cured)	1,102	1,503	1,657	1,866	2,181	2,176	-
Total *	526,830	477,270	497,935	537,708	460,105	434,168	489,003

* Includes minor crops not mentioned above.

Area cultivated per head

Owing to the suspected accuracy of the planting records for this district, the figures given in this chapter must not be considered to be very accurate. They are however, the best that can be obtained from the data available, and will serve to give some idea of the differences between the systems which exist in the area. Table 7 gives the acreage figures for each county of the West Nile district averaged over the four years 1953 - 1956, together with the population figures for each county obtained from the 1959 census.

Table 7

Area cultivated per head in the West Nile District by counties

4-year Average 1953 - 1956

	<u>Jonam</u>	<u>Madi</u>	<u>Okoro</u>	<u>Vurra</u>	<u>Ayivu</u>
Area cultivated	36,391	64,530	99,016	39,610	39,316
Population	25,375	28,227	94,778	27,390	51,152
Area cultivated per head.	1.43	2.29	1.04	1.45	0.77
	<u>Tereso</u>	<u>Maracha</u>	<u>Koboko</u>	<u>Aringa</u>	<u>Total W.Nile</u>
Area cultivated	40,019	46,789	17,436	39,823	422,950
Population	42,837	47,636	21,894	41,039	385,025
Area cultivated per head	0.93	0.98	0.80	0.97	1.10*

* If, however, the six year average figures given in Table 5 are used, this overall figure becomes 1.27 acres per head of population.

It can be seen from these figures that the area cultivated per head of population is consistently lower in the upland areas where cotton is not grown. Some parts of Okoro and Vurra counties are in the lowland areas, while the whole of Madi and Jonam are either in the lowland area or in the riverine area. In both areas the major cash crop is cotton. Much of Vurra is in the upland area however, and the figure for this county appears somewhat atypical of the area in which it mainly falls. These areas are in general, much below the area cultivated per head in other parts of the country due to the absence of cotton and probably to the large export of labour from these areas. In the cotton areas the Madi figure is higher than the figures obtained in the Lango-Acholi areas, and nearly as high as those from Teso district. The lower figure from Jonam reflects the importance of the fishing industry in riverine areas where rainfall is sparse and soils in general of poor fertility.

Rotations

The sequence of cropping practised in the West Nile differs considerably from system to system. They are best considered under separate headings.

(a) Riverine cropping sequences (Area 2.) The system is based upon cassava and fish. The root crop can be cultivated with little labour requirements, and gives ample returns in a dry climate with little attention, allowing much time to be spent in the alternative occupation of fishing. The riverine areas generally, but more particularly in the south, are frequently drought stricken, and in some years complete

crop failures are experienced over quite wide areas. In such years there is little to be seen in the ground other than cassava. Together with cassava in a good year in Jonam, the cropping sequence is first cotton, which will be followed by spring-grown cow-peas and autumn-planted finger millet. In the north of the riverine areas, the more usual sequence of cotton followed by spring finger millet is followed. In the far north along the Nile at Laropi towards Nimule on the north bank, there is a very heavily cultivated riverine strip where it is not normal for finger millet to be planted at all. Here, together with cassava, the crops grown are sorghum and maize with large acreages of groundnuts. This reversion of the normal sequence in the Jonam county is interesting. Presumably in these low-rainfall areas the more certain and greater rains occur in the autumn of the year, while as the rainfall increases to the north, the spring part of the monomodally distributed rainfall becomes sufficient to support the more normal system of spring-planted millet. It is possible that the finger millet crop in the south is now regarded as of less consequence than the protein pulse crop since the bulk ration is now provided largely by cassava.

(b) Lowland cropping sequences (Area 3) These areas follow quite closely the sequence of cropping practised in the Lango-Acholi system. Cotton is the main cash crop, and is usually planted on new land. Once again the main difference is to be found in the large area under cassava, and its steady replacement of the finger millet crop. There is still a fairly large area of millet grown each year however, and this is normally planted in the spring rains following the uprooting and burning of the cotton. Towards the upland areas this sequence is variable, and towards the areas where tobacco is grown, as well as in the more western cotton areas in the counties of Terego and Aringa, the spring crops are maize and groundnuts with ratooning sorghum and a few cow-peas almost to the exclusion of the millet crop. A sudden change to spring-grown millet and the annual sorghums together with groundnuts and a little maize occurs at the East Madi border.

In this area where early millet is planted, there is some mixing with pigeon peas, but not to the same extent as is the case in Lango and Acholi. Simsim is also planted in the spring in this area, often on new land as used to be the custom in Lango and Acholi, and rarely in the autumn.

(c) Upland Lugbara cropping sequences (Area 4) This system is characterised by the lack of any major cash crop. Large areas are grown to cassava, millet, beans and potatoes with some maize, groundnuts and simsim and a little sorghum. There is no overall cropping sequence such as may be given for the Lango-Acholi areas, but the following rotations are widely practised, and are given by Lubwa (1959).

Typical in Terego areas :-

1. Simsim and ratoon sorghum (Open late)
2. Ratoon sorghum - Simsim
3. Finger millet (Early)

OR

1. Millet, long-term sorghum and pigeon peas
2. Simsim
3. Millet, long-term sorghum and simsim

Typical of Maracha areas :-

1. Millet mixture
2. Millet mixture
3. Groundnuts - Sweet potatoes. Beans.

OR

- OR
1. Late simsim
 2. Millet mixture
 3. Millet mixture.

- OR
- 1. Cassava with simsim
 - 2-4. Cassava
 5. Millet mixture
 6. Millet mixture

Typical of Koboko areas :-

1. Cassava with groundnuts
- 2-4. Cassava
5. Millet mixture
6. Millet mixture

- OR
1. Simsim and/or millet with ratoon sorghum
 2. Millet and/or simsim under ratoon sorghum

- OR
1. Late simsim
 2. Millet mixture
 3. Millet mixture

- OR simply
1. Simsim and cassava
 - 2-5. Cassava

The millet mixtures may contain any or all of the following crops: finger millet, long-term annual sorghum, simsim, pigeon peas, cow-peas.

In the Nadi country communal parties on common land often open land to groundnuts and/or cow peas during April, and follow this with planting cotton with, in the following year, the sowing of the millet mixture.

Beans may be interplanted with any of the above, and fairly large areas of maize and beans are fitted into these rotations which, as can be seen, are most elastic. In general, they are mainly of three years' duration. Homestead plots and plots near rivers are planted to potatoes and pulse crops are also commonly grown near to the home. Many of these food crops are used for sale or barter with the dwellers of the Nile valley who cannot economically produce their own food, but have cash from cotton sales and fish for barter. These food crops are thus cash crops in this area and together with the export of labour on contract to other parts of Uganda, form the means by which cash is obtained for tax payments etc.

(d) Highland Alur sequences (Area 5) Although the major cash crop in this area is potentially arabica coffee, there is as yet only a very small area under this crop. In general, reliance is laid upon the production of annual food crops, and as in the Lugbara areas, these largely serve the purpose of cash crops in that they are sold for cash or bartered with the inhabitants of the riverine areas for fish. Here also there is much export of labour and a great reliance upon cassava as the main food crop for consumption, whereas the main food crop for sale or barter is probably maize. Maize interplanted with beans forms the major spring crops, and finger millet is planted late in this area. It is common throughout the West Nile to find very complex inter-cropping, and here it is usual to find fields of newly opened land being planted to maize and beans with cassava plants interplanted, followed by the millet mixture sown in the cassava after the maize harvest. Millet with the spring-sown maize is also common. Indeed with the high rainfall of these parts and the even distribution throughout the months from April to November, the planting of all crops

is well staggered, and maize and millet can be spread throughout the middle months of the year, although generally the maize will go in before the millet.

Crop: Rest Ratios

There is no recorded factual information on this important agricultural factor. In fact, it appears that three years cropping is the maximum that most of the soils in the area will stand before yields drop and weed infestation makes the growing of crops not worth while. In areas where there is no pressure on the land the period under rest will be greater than in the crowded areas. In these latter, most cultivators try and rest the land for at least three years. Again, there has been no survey work in this district and factual information is lacking.

Cultivation Implements

The use of ox-ploughs in this district is not common, and is confined almost entirely to the few plough owners in the Madi sub-district. Nowhere is the long-handled Lango hoe used, the most usual implement of cultivation being the imported "crocodile" type hoe with the shaft fitted at right angles to the hoe blade. In the Madi areas the older type of heart-shaped hoe fitted to a shaft which is bent back at an acute angle is still in use, and for weeding hoes of this type, and of the square type, are used after they have been worn down and form a narrow "adzo" type hoe. In the Lugbara areas the indigenous cultivating stick is also in common use for cleaning land of annual weeds and for preparing a seed-bed before planting. These sticks are short and bent back at an acute angle being used with a downward motion and being drawn slightly back towards the user in the soil. The usual knives are in use for the harvesting of the grain crops.

Crop Husbandry

The actual husbandry of all the crops grown in this area has been given with the Lango-Acholi system. The main feature of cropping in the West Nile is the very great use that is made of intercropping in the district. It is common to find mixtures of four or more crops in one field at a time. Thus one planting operation can give rise to four or more separate harvests scattered over a year, and the longer term crops can have two or more series of other crops underplanted during the course of their growth. The millet mixture, for instance, which very commonly consists of finger millet, long-term sorghum and pigeon peas, will often also have cassava planted in the field before the mixture is broadcast, or just afterwards. In this case the millet will come to harvest during the middle of the year, followed by the pigeon peas and then the sorghum at the end of the year, while the cassava will not be harvested until the following year. If it has been planted at a wide spacing, it will very often have a further mixture of crops or simsim or groundnuts planted under it in the second spring, or even sometimes in the first autumn after the millet has been harvested.

In the Madi areas of the sub-district, the growing of the ratoon sorghums and the larger area under groundnuts form the main difference between this area and the Acholi system. Otherwise, these areas are very similar.

The presence of the tobacco crop has not so far been stressed in this memoir. This is because at the moment the crop acreage is strictly limited and its impact upon the system of the Lugbara uplands slight. As in Acholi, it is a very important crop in the limited areas where it is grown, and is there invariably grown in new land. High yields of

good quality leaf are obtained from the area, and once again it is only the restriction on the marketing of this crop that prevents a very significant extension into many other areas of the district.

In the Lugbara upland areas where at present the system of agriculture suffers from the lack of a major cash crop, groundnuts grow extremely well and very high yields are obtained. Yields from the farm school at Koboko, and reported yields from farmers in Vurra county, suggest that this is a very valuable potential cash crop for the area. Further, the introduction of robusta coffee and even cotton to all these areas would appear to be possible from recent experience. At the moment robusta coffee is grown in very small plots, and cotton not at all.

Although there is more cassava grown in this district than any other crop, there are practically no improved Amani varieties to be found outside the Agricultural Department stations. This is because the popular local variety, although suffering from the symptoms of mosaic virus throughout its life, appears to yield very heavily, and as well if not in excess of, the imported strains. This matter is at present being tested by experiment, but it would appear somewhat academic as the local type is very well suited to its purpose in this area, being bitter and thus safe from theft by wild animals, and long term, being able to rest in the ground for some years without becoming inedible. It is possible that for this reason the enormous year-to-year variations in the estimated acreage planted to this crop may not be entirely due to faulty estimation. It is possible that large areas are planted up as material becomes available, sufficient to last two or more years, thus obviating the necessity to plant every year. For this purpose a short-term variety would, of course, be useless.

As in Acholi, the long-term annual sorghums are normally planted in the early part of the year, and after being interplanted perhaps twice in their lifetime, come to harvest at the end of the year. The ratoon sorghums on the other hand, again as in Lango and Acholi, are planted towards the end of the year, and give a crop sometimes both during the end of the year dry weather and again early in the following year.

The sunflower crop in the south of the Lugbara uplands should be mentioned. This crop has varied widely from year to year, but in its time has produced for export some hundreds of tons of sunflower seed in a season from a relatively small area. The crop grown is a giant white-seeded variety and yields are generally good.

Storage of Produce

This is carried out in a similar manner to that practised in Lango and Acholi, the pole storage of pulse crops and groundnuts still being quite common in Madi and Lugbara areas. The importance of cassava in the diet of the peoples of the West Nile leads to a greater diversity in its methods of use than in other parts of the country. The bitter long-term varieties in use in the Lugbara and Kakwa areas are normally soaked for up to six days in streams or puddles, and then peeled and crushed on rocks, and allowed to dry. When dry this powder is swept up and stored as a flour. In the Madi country, and also among the Alur the more normal system is adopted whereby the roots are first peeled and then fermented in slices for 4 - 6 days to develop a taste. After drying, these slices are then usually ground and stored as a flour, although the slices themselves are also sometimes stored. According to Southall (1953) fresh cassava is also commonly eaten.

Livestock Management

The distribution of livestock within the district has already been described, and from this it can be seen that except in the heart of the heavily populated Lugbara areas there is no great density of cattle anywhere in the area. In most of the country then it is possible to keep cattle extensively, and the normal system of herding groups of cattle belonging to several owners during the day and kraaling them at night is practised. There are no foreign herdsmen in the West Nile, and herding is carried out by the family. Often small kraals are built near to the dwelling houses and the family herd is grazed individually by each family during the rains, near to the cultivated fields. In the dry weather when it is necessary to go further afield in search of pasture, then the herding may be done comunally, owners taking the task in rotation. The pattern of ownership in most areas is that of many owners each with a few cattle, rather than large numbers of animals being owned by the few although, of course, influential men will own large numbers of stock. In the more heavily stocked parts of the district stock are almost invariably looked after on an individual basis, and tethering of the few head owned in small fields of grass near to the homestead is sometimes practised.

Pastures

There are no known cases of sown leys in the district, all grazing taking place on common grasslands. Except perhaps in the most heavily stocked areas, there is no grazing of resting land. The constituents of the natural grasslands are mainly Hyparrhenia dissoluta and Hyparrhenia filipendula in the upland and mid-altitude areas, with Panicum and Chloris on the better soils of the riverine areas. A detailed description and the distribution of these grassland species is given by Langdale-Brown (1960).

Farm Management

The division of work by sex is still fairly strongly observed in the areas where there is no main cash crop. The main differences are to be found in the Lugbara tribe where it is customary for the women to do the sowing of the crops. In other areas the more normal custom of sowing being carried out by males is observed. Otherwise the normal divisions are practised whereby the hard physical work of opening is done by the men, while the weeding and harvesting of crops, in particular the pure food crops, is done almost entirely by women. In the case of cash crops the work is shared. Men are responsible for all work to do with cattle.

Among the Alur, the Nilotic practice of communal cultivation is carried on. There does not appear to be the same system of communal cultivation areas as in Lango and Acholi, but rather are the communal digging parties for beer carried on in individually owned fields. Among the Madi also these communal cultivation parties are usual, and in this case the cultivation is often done together in large areas. Among the other tribes communal cultivation is not normal.

The Lugbara tribe have one other custom that is not at all common among the peoples of Uganda. It is that in the Lugbara family, it is normally the lady of the house who is responsible for the keeping of the family's finances. It appears however, that this is done under the general control of the head of the household, and it would appear that any decisions on the adoption of new projects on the farm, or plans for the general management of the farm are still decided by the man of the house.

In general, as in other parts of the country, farm management is not looked upon as a subject of importance amongst the vast majority of cultivators of the district. Decisions as to the correct time to plant and the correct method of planting are taken almost entirely on a basis of tradition. It is interesting to note however, that the introduction of cassava as a famine reserve in recent years quickly led to the realisation that here was a crop that yielded heavily with very little work requirements, and its increase at the expense of the far more laboriously produced millet crop shows that some recognition of the principles of farm economics and management does exist. Attempts at the introduction of farm planning in this part of the country, which had to be discontinued for a variety of reasons, at least showed that there is no lack of men who would respond to economic advice in this area, as in other parts of the country.

Marketing

The problems of marketing primary produce other than the controlled crops such as cotton and coffee are intensified in a remote area such as the West Nile district. Sunflower seed marketing is organized to a certain degree, but other crops, in particular groundnuts which grow very satisfactorily in the area, are difficult to market. In other districts this primary marketing is made possible by the readiness of the Indian retailer in the trading centres to enter the lists as a primary produce buyer, but in the West Nile this is a risk that the local traders appear unwilling to take, and the experience of the primary producer with crops for sale is most frustrating. The major factor in both the availability of markets and the price obtainable where an avenue of sale is found is the remoteness of the areas from consumer markets. Bearing this in mind it would appear to be advisable to install processing plants within the district, so that the primary produce in its bulk form can be processed in the district and the less bulky and higher priced product from the processing plants can be more economically transported onto the local and world markets. The first plant of this nature could well be an oil mill for the processing of cotton seed, groundnuts and sunflower, with perhaps simsim also.

Livestock marketing in the area is based on the local markets and there is no export of cattle from the district.

Southall (loc.cit.) comments that : "Traditionally the Alur had no markets, and the first to be established was that at Paidha to assist in the distribution of food in the famine of 1919. Other markets were gradually set up in most counties of West Nile Alurland.... with the development of the African Local Government in Uganda market dues were introduced..... The dues charged consist of two cents a head for sellers of small quantities of vegetable food stuffs, twenty cents for sellers of fish, chickens or sacks of cassava flour, fifty cents for sellers of goats or sheep, and one shilling for sellers of cattle." These local markets are now widespread throughout the district, and serve, as in other areas to barter small surplus supplies or obtain a little cash for the purchase of supplies such as soap and sugar in the local trading centres.

The Agricultural Year

There are so many different systems of planting and cropping in the West Nile and Mafi districts that a list of the activities in each of the systems already described would be tedious here. From a study of the planting returns by months in the different counties the main activities can be discerned. For instance, throughout the district

although cassava is planted in almost any month of the year except January, there is generally a much larger area planted during the last six months of the year than in the period January to June. On the other hand, in all areas maize is planted as a spring crop in the early rains of the year, most of the plantings being completed by June except in the upland areas where plantings continue until July.

The finger millet crop plantings are much more scattered in the different areas. In Jonam and in the southern riverine areas this crop is planted entirely in the later part of the year from June through to September. In other parts the more normal practice of planting this as the main spring food crop is followed, and plantings range from April to June.

Potato planting is spread throughout the year in a more complete range of planting dates than even cassava. This is, of course, due to the necessity of preserving planting material (vines) over the dry weather, and the consequent planting of plots in the swamps and wetter areas during the latter part of the year and in the dry season itself.

Simsim is mainly planted in the latter part of the rainy season during the months of August and September. This may be after the harvest of the millet crop when the simsim is planted under the long-term sorghum and pigeon peas as in Nadi, or it may be in new land. The riverine areas are again different in this respect, much of the simsim in that area being planted by July.

In the case of groundnuts, the crop appears to be treated as a mid-season crop in all areas of the district, plantings being spread throughout the rainy months from April to September. The peak months for planting are May to July.

Beans are often grown in a mixture with other crops, but the returns of bean plantings show that they are planted in every month of the year, with peak plantings usually in the latter part of the growing season, although large acreages are also planted in the spring. Cow-peas are mainly grown in the riverine areas, and there they are planted during the first part of the rains. Tobacco is grown in the first rains.

From these details a working plan of the year's activities can be produced for all areas of the district, if it be remembered that in this part of Uganda, as in the other parts of the Northern Province, the rainfall is more or less evenly distributed throughout the months from April to October, and that planting can be continuous throughout this period.

Factors Limiting Production

Social. What has been said of other areas of Uganda concerning the desirability of social studies with an agricultural bias among the people of the country, applies to the West Nile with as great force as anywhere in the country. Perhaps of all parts of Uganda, agriculturally the systems of cultivation have changed least in the upland areas of the Lugbara where, as yet, a cash crop on any large scale has not been introduced into the indigenous practices.

The problem of overstocking and overcrowding generally is one that cannot be neglected in the Lugbara uplands. As we have seen the cattle density is one adult beast to under four acres of land available for grazing overall in the county of Maracha. This is a very close approach to the maximum possible density for this area. If we study the human population figures, the county of Ayivu has an overall density of 324 to the square mile, while within that county the sub-county of Pajule for instance supports a population of 554 to the square mile, which is equivalent to 1.16 acres per

head of population. As can be seen from Table 7, the cultivation per head of population in Ayivu amounts to only 0.77 acres per head, but this is the lowest of all figures for the district and if correct, reflects the fact that land is scarce in this area. In other parts of the district where a cash crop is grown, and in this area the only cash crop grown on any scale is cotton, the area per head cultivated amounts to over one acre in every case, and in the case of Madi county, to over 2 acres per head. It can be seen therefore, that the position in the most heavily populated parts of Lugbara-land, both from the point of view of stocking and population is approaching the maximum density commensurate with the maintenance of soil fertility, and it is possible that the uncontrolled introduction of a new cash crop into the area would tip the scales towards over-cultivation and over-stocking, and thus in due course, decrease of production.

A further social complication also arises in this context. Another reason for the low figures cultivated per head of population in the Lugbara areas is doubtless the fact that many of the able-bodied males leave the country every year in search of paid employment in other parts of Uganda. This means that only the women and children are left for most of the year, and the area cultivated per head is that area necessary for their subsistence. If a cash crop is introduced from which returns will be sufficient to compete with those obtainable from contract employment outside the district, it may well be that emigration would cease, in which case the resident population would increase considerably and together with increasing cultivation for food requirements, the new cash crop area would very definitely give rise to problems of over-cultivation of the available land in large parts of Ayivu, Maracha and Terego.

Agronomic As in the Lango-Acholi areas of monomodal rainfall distribution, so in the West Nile and Madi districts is there a need for much basic agronomic knowledge of such matters as optimum planting dates and different crop varieties at different altitudes. In particular, knowledge of the possible cash crops such as cotton, groundnuts, sunflower and simsim, together with robusta and arabica coffee is required.

The nutritional shortcomings of the cassava crop as a staple diet are well known. In some parts of the riverine areas, however, it is a crop that yields more regularly than any other, and it may be argued that it is better to have some food, even if of low quality, than no food at all, which would possibly be the case in drought years were finger millet to be the only bulk food grown. In other areas also where cassava is largely grown these days but where the danger of millet crop failures due to drought are not great, it is difficult to get away from the fact that greater food production with less labour requirements is possible from cassava than from millet. Furthermore, cassava will keep in the ground from year to year, and it is possible to exist on this crop while only planting up once every other year, and at the same time have a safe famine reserve of food available without having the troubles of storage. If therefore, cassava has come to stay in these areas, as seems probable, attention should be directed towards the increased production of pulse and oil crops which will in many ways make up the deficiencies of cassava as a food. In addition the breeding of cassava varieties with additional protein and mineral contents could be considered.

The utilization of oxen and the introduction of row-cropping into this area where cattle are in many places plentiful, and the system of agriculture throughout is based on the production of annual crops, would seem to be imperative if production is to be significantly increased

in the near future. A few farmers are already utilizing oxen with success, and the expansion of ox training together with the introduction of row cropping implements should be under-taken.

Economic. The greatest economic problems of the area are those connected with the distance of producers from consuming markets. This results in the inability of local traders to offer attractive prices for produce purchased in the raw state and in small amounts. It has been shown that the three oil-seed crops, groundnuts, simsim and sunflower, yield well in the upland areas. The erection of an oil-mill in the district would facilitate sales and reduce the transport cost element of exports from the district. In addition, the production of large quantities of cotton seed annually from the lowland areas would enable such an undertaking to operate on a fairly large scale from the start.

The problems of transport are an integral part of the difficulties of marketing crops which are not under direct government control such as cotton and coffee. It has already been shown that access to the district can only be attained via ferries or railway steamers.

The tobacco industry is at the moment restricted according to the markets that can be found for the crop grown in the West Nile in the same way as in Acholi and Lango. As in these districts, so in the West Nile also, production could be very greatly increased if the marketing situation could be improved.

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