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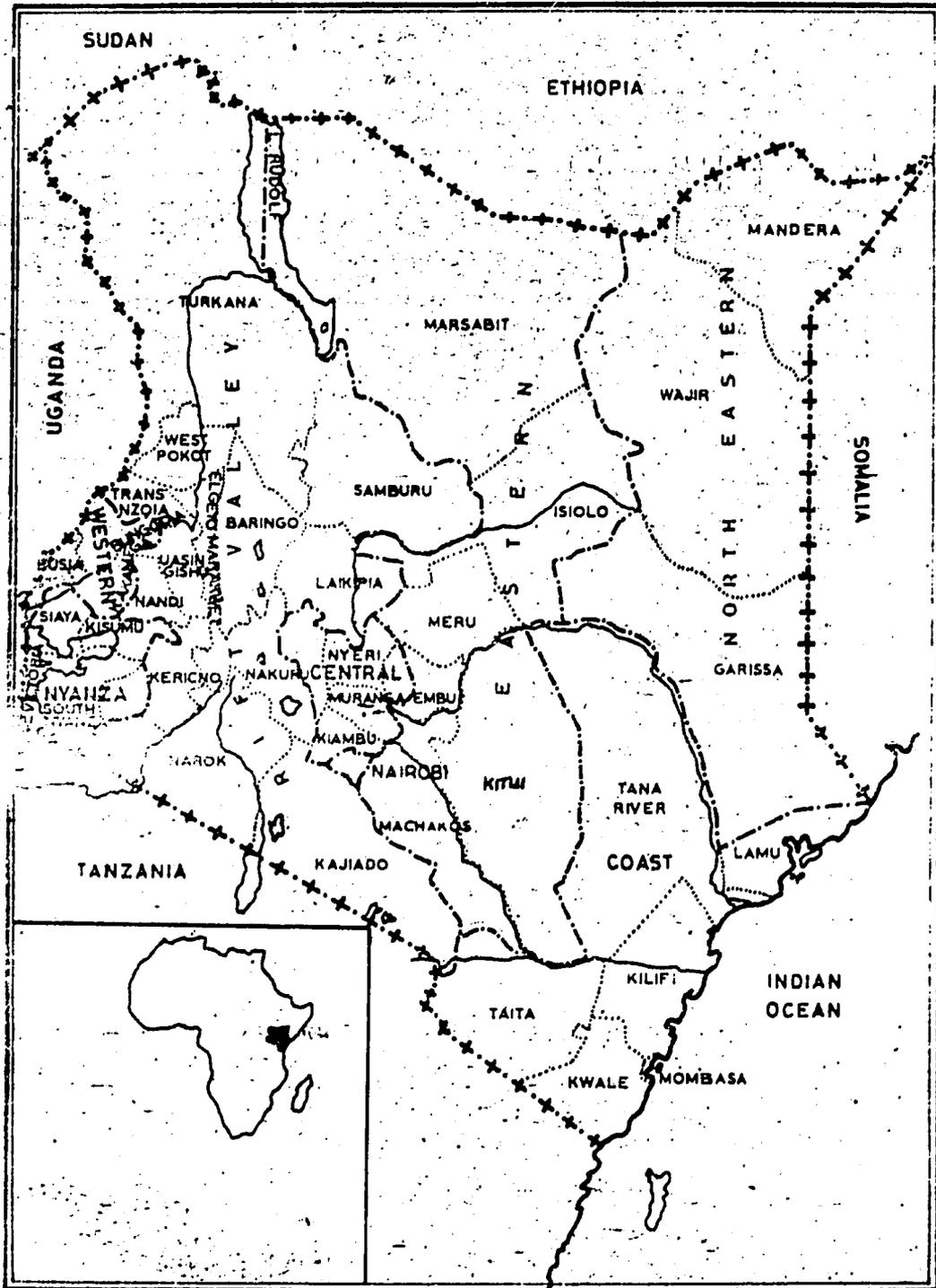
MINISTRY OF WORKS
ROADS DEPARTMENT

**RURAL ACCESS ROADS PROGRAMME
EVALUATION OF ROADS IN BUSIA
REVISED**

JAN. 1979

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RURAL ACCESS ROADS PROGRAMME

EVALUATION OF RURAL ACCESS ROADS IN BUSIA DISTRICT

Ministry of Works, Roads Department

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I	INTRODUCTION
II	A QUICK IMPRESSION
III	ACCESS - INDICATOR
IV	POTENTIAL FOR DEVELOPMENT
V	CONSTRAINTS ON DEVELOPMENT
VI	IMPACT OF THE ROAD ON RURAL DEVELOPMENT
	1. The rural access road construction
	2. Short term effects of the rural access road
	3. Long term effects of the rural access road
VII	DISCOUNTED COSTS AND BENEFITS OF THE ROAD INVESTMENT
VIII	DEVELOPMENT OF RURAL INCOME

Appendix I Description of proposed roads

Appendix II Gross Margins

Appendix III Letter from DDO - BUSIA

- | | |
|-------------|--|
| Map 1. | Busia District, Scale 1:25,000 |
| Map 2. | Classified roads in Busia District, scale 1:250,000 |
| Map 3. | Busia District depicting selected rural access roads |
| Map 4. | Social Services |
| Map 5. | Mean annual rainfall |
| Map 6 - 14. | Selected roads with zone of influence
scale 1:50,000. |

EVALUATION OF RURAL ACCESS ROADS IN BUSIA DISTRICT

I. INTRODUCTION

This report pertains to the evaluation of 142 km of rural access roads within Busia district. These roads were selected by the D.D.C. as being roads needed to give access into economically high potential areas of the district. In selecting the roads the D.D.C. used the guidelines laid down for this purpose.

The roads were inspected as from 14th to 18th February, 1977 and 2nd to 6th October 1978 by a member of the Planning Section staff, Roads Department, Ministry of Works, Nairobi. During this inspection it was clearly stated to district officials that under this rural access roads programme no land compensation would be paid.

The roads proposed for inclusion in the Rural access roads programme including other relevant details such as location and approximate lengths are as shown below:

ROAD NUMBER	MAP NUMBER	DESCRIPTION OF THE ROAD	APPROXIMATE LENGTH OF ROAD (KM)	DIVISION	LOCATION
1	6	Likoli - Simba	4	Northern	South Teso
2	5 6	Kotur - Kochlia	7.5	"	"
3a	6	Simba - Apokor	6	"	"
3b	6	Kwangamor - Kotur	7	"	"
4	7	Tangakona - Busibwabo	10	Central	Bukhayo
6	8	Bukhalire-Khuluchina	5	"	Marachi
10	9	Luchululo-Rembo-Funyula	10	Southern	Samia
12	10	Chanasiri - Angurai	6	Northern	North Teso
13a	10	Malakisi - Amagoro	14	"	"
13b	10	Chelelemuk - Amagoro	6	"	"
13c	10	Katakwa - Aboloi	4	"	"
14	6	Ekisoko - Shidelewa	5	"	South Teso
15	6	Kwangamor - Akombait	4	"	"
16	11	Malanga - Namisi	9.5	Central	Bukhayo
17	11	Bwaliro - Buhuyi	12	"	Marachi
18	12	Madibo - Buyofu	6.5	"	Bukhayo
19	7	Bogendi - Musoma	7	"	"
20	13	Bukhalalire-Matayos	11.5	"	Marachi
21	1/;	Siebuka - Nambengere	7	Southern	Bunyala

Vicinity maps 6 to 14 depict the location of all the proposed roads with the zones of influence.

Map No. 2 depicts the classified road network in Busia District.

For other relevant information pertaining to the rural access roads programme in Busia district see appendix III, containing a letter from the DDO Busia.

II. A QUICK IMPRESSION

In order to get a quick impression of the selected 19 Rural Access Roads some indicators which are useful for comparison are given in the table below:

T A B L E 1

ROAD	LENGTH	ZONE OF INFLUENCE (ha)	POPULATION DENSITY P/KM ² 1979 (Estimated)	POPULATION IN ZONE OF INFLUENCE	ZONE OF INFLUENCE IN HA/KM RD	POPULATION PER KM ROAD
1	4	475	145	689	119	172
2	7.5	900	96	864	120	115
3a	6	525	118	620	88	103
3b	7	950	118	1121	136	160
4	10	1800	120	2160	180	216
6	5	375	215	806	75	161
10	10	1225	138	1690	122	169
12	6	650	119	774	108	129
13a	14	1500	119	1785	107	128
13b	6	550	119	655	92	109
13c	4	525	119	625	131	156
14	5	275	127	349	55	70
15	4	500	127	635	125	159
16	9.5	1200	139	1668	126	176
17	12	1525	217	3309	127	276
18	6.5	625	110	688	96	106
19	7	750	139	1043	107	149
20	11.5	1525	217	3309	133	288
21	7	750	147	1103	96	158
TOTAL	142	16625	144	23893	117	168

III. ACCESS - INDICATOR

The Access indicator is a criterion by which the adequacy of the access system to the local residents and Government administrative officers is measured.

Only those social service facilities for which a road is relevant are taken into account. The social services which will be supplied as part of another service (e.g. telephone services which is part of Post Office) have not been taken into account.

Four social service facilities have been selected. These services include:

- Hospital (H.)
- Post Office (P.O)
- Divisional Headquarters (D.HQ.)
- Health Centre (H.C.)

The relative importance of the above stipulated services are determined by the frequency with which they are utilised. The following subjective weights are attached to each facility of service. The scale is chosen between 1 to 10 indicating higher rating for increasing frequency.

- (a) Hospital (low frequency) - 2
- (b) Post Office (medium frequency) - 5
- (c) Div. Headquarters (high frequency) -10
- (d) Health Centre (medium frequency) - 5

The actual distance from a Zone of influence to a social service facility will be multiplied by the weight attached to that facility. The sum of the weighted distances gives the total weighted distance for the Zone of influence and this total weighted distance gives the access-indicator for the zone.

Table 2 below shows the calculated Access Indicators for each selected road and within each zone of influence.

The location of the various social service facilities is also depicted on Map. No. 4.

TABLE 2

ROAD NO	POPULATION IN ZONE OF INFLUENCE 1	AVERAGE DISTANCE (IN KM)				WEIGHTED DISTANCE				TOTAL WEIGHTED DISTANCE 11	ACCESS INDICATOR 1 x 11	PRIORITY RATING BASED ON ACCESS INDICATOR
		H	P.O.	D.H.Q	H.C.	H	P.O	D.H.Q	H.C			
1	689	25	15	15	15	50	75	150	75	350	241150	12
2	864	40	22	5	5	80	110	50	25	265	228960	13
3a	620	33	13	13	13	66	65	130	65	326	202120	15
3b	1121	43	23	23	23	86	115	230	115	546	612066	4
4	2160	18	8	8	8	36	40	80	40	196	423360	7
6	806	7	7	16	7	14	35	160	35	244	196664	16
10	1690	6	6	17	6	12	30	170	30	242	408980	8
12	774	48	48	21	21	96	240	210	105	651	503874	6
13a	1785	42	42	7	7	84	210	70	35	399	712215	3
13b	655	38	38	3	3	76	190	30	15	311	203705	14
13c	625	37	37	2	2	74	185	20	10	289,	180625	18
14	349	28	10	10	10	56	50	100	50	256	89344	19
15	635	29	12	12	12	58	60	120	60	298	189230	17
16	1668	32	12	12	12	64	60	120	60	304	507072	5
17	3309	13	13	28	14	26	65	280	70	441	1459269	2
18	688	38	18	18	18	76	90	180	90	436	299968	11
19	1043	10	10	17	10	20	50	170	50	290	302470	10
20	3309	25	25	33	25	50	125	330	125	630	2084670	1
21	1103	24	24	4	24	48	120	40	120	328	361784	9

IV. POTENTIAL FOR DEVELOPMENT

The potential for development is directly related to the agricultural development projects within each zone of influence. The data on present and future land utilization are calculated from the Annual report 1975, of the Ministry of Agriculture, on Busia District and same data provided by the D.A.O.

As no accurate data on livestock were available, this subject is omitted.

The results are shown in the tables below:

CO = COTTON	T = TOBACCO
MI = MILLET (WIMBI)	O = OTHER CROPS (MOSTLY SUBSISTENCE)
MA = MAIZE	L = LIVESTOCK
CA = CASSAVA	P = PRESENT LAND UTILIZATION
S = SUGAR	F = FUTURE LAND UTILIZATION
SO = SORGHUM	
SU = SUNDEW	

TABLE 3

PRESENT AND FUTURE LAND UTILIZATION

	P ha	F ha	P %	F %	P ha	F ha	P %	F %	P ha	F ha	P %	F %
	ROAD NO. 1				ROAD NO. 2				ROAD NO. 3a			
CO	71	133	15	28	27	279	3	31	63	147	12	28
MI	33	66	7	14	9	126	1	14	31	73	6	14
MA	19	38	4	8	9	99	1	11	16	42	3	8
CA	5	10	1	2	9	63	1	7	5	10	1	2
SO	5	10	1	2		36	-	4	5	10	1	2
O	133	133	28	28	162	162	18	18	121	121	23	23
L	209	85	44	18	684	135	76	15	284	122	54	23
TOTAL	475	475	100	100	900	900	100	100	525	525	100	100
	ROAD NO. 3b				ROAD NO. 4				ROAD NO. 6			
CO	114	266	12	28	54	360	3	20	45	82	12	22
MI	57	133	6	14	18	108	1	6	15	26	4	7
MA	28	76	3	8	18	198	1	11	26	45	7	12
CA	10	19	1	2	18	216	1	12	26	49	7	13
SO	10	19	1	2	18	108	1	6	15	26	4	7
O	218	218	23	23	414	414	23	23	98	98	26	26
L	513	219	54	23	1260	396	70	22	150	49	40	13
TOTAL	950	950	100	100	1800	1800	100	100	375	375	100	100
	ROAD NO. 10				ROAD NO. 12				ROAD NO. 13a			
CO	61	220	5	18	52	91	8	14	120	210	8	14
MI	24	74	2	6								
MA	25	98	2	8								
CA	37	110	3	9								
S						19		3		45		3
SO	25	110	2	9								
SU					45	46	7	7	105	105	7	7
T						39		6		90		6
O	318	318	26	26	195	175	30	27	450	405	30	27
L	735	295	60	24	358	280	55	43	825	645	55	43
TOTAL	1225	1225	100	100	650	650	100	100	1500	1500	100	100

TABLE 3

	P ha	F ha	P %	F %	P ha	F ha	P %	F %	P ha	F ha	P %	F %
	ROAD NO. 13b				ROAD NO. 13c				ROAD NO. 14			
CO	44	77	8	14	42	73	8	14	33	77	12	28
MI									17	39	6	14
MA									8	22	3	8
CA									3	5	1	2
S		16		3		16		3				
SO									3	5	1	2
SU	38	38	7	7	37	37	7	7				
T		33		6		31		6				
O	165	149	30	27	158	142	30	27	63	63	23	23
L	303	237	55	43	288	226	55	43	148	64	54	23
TOTAL	550	550	100	100	525	525	100	100	275	275	100	100
	ROAD NO. 15				ROAD NO. 16				ROAD NO. 17			
CO	60	140	12	28	144	336	12	28	183	427	12	28
MI	30	70	6	14	72	168	6	14	91	213	6	14
MA	15	40	3	8	36	96	3	8	46	122	3	8
CA	5	10	1	2	12	24	1	2	15	30	1	2
SO	5	10	1	2	12	24	1	2	15	30	1	2
O	115	115	23	23	276	276	23	23	351	351	23	23
L	270	115	54	23	648	276	54	23	824	352	54	23
TOTAL	500	500	100	100	1200	1200	100	100	1525	1525	100	100
	ROAD NO. 18				ROAD NO. 19				ROAD NO. 20			
CO	75	175	12	28	22	150	3	20	183	335	12	23
MI	37	87	6	14	7	45	1	6	61	107	4	7
MA	19	50	3	8	7	83	1	11	107	183	7	12
CA	6	13	1	2	7	90	1	12	107	198	7	13
SO	6	13	1	2	7	45	1	6	61	107	4	7
O	144	144	23	23	173	173	23	23	396	396	26	26
L	338	143	54	23	527	164	70	22	610	199	40	13
TOTAL	625	625	100	100	750	750	100	100	1525	1525	100	100
	ROAD NO. 21											
CO	30	90	4	12								
S		112		15								
SU	7	22	1	3								
O	262	300	35	40								
L	451	226	60	30								
TOTAL	750	750	100	100								

V. CONSTRAINTS ON DEVELOPMENT

1. TYPES OF CONSTRAINTS

The constraints on (agricultural) development fall into two categories:

(a) Natural Constraints

- the constraints which can not be removed by man such as soil, rainfall and topography characteristics).

(b) Resource Constraints

- the constraints which can be removed when enough capital is available (such as land registration, agricultural credit, agricultural inputs, marketing of produce, agro-industry, road infrastructure, attitude of the people towards modernisation and agriculture).

2. CONSTRAINTS AS THEY EXIST NOW

(a) Soil

The Soil along the roads is mostly sandy/Clay type of soil.

(b) Rainfall:

Rainfall increases with altitude, exceeding 1500 mm in the higher areas and falling away to under 1100 mm in the lake shore area. Map 5 gives a rough indication about the rainfall distribution.

(c) Topography

Altitudes increase from the lake level (1250 m a.s.) to approximately 1600 m a.s. to the North and East of the area.

The temperature varies between a mean maximum of 26° to 30°C and a mean minimum of 14° to 18°C within the whole District. In general the area is mostly rolling country with a few hills.

(d) Land Registration

In Busia District approximately 85% of the area is registered. But not everyone has a title deed. If somebody has a title deed then it is easier for him to secure a loan to improve his land.

(e) Agricultural Extension Service

The development of farming over the years has been hampered due to the missing or not functioning extension services.

(f) Mechanization On The Farms

The chief means of preparing land in crop production is the oxen plough. The few Tractors in the district can not be used most of the time due to poor management and lack of spare parts.

(g) Marketing of Produce

Some 26% of the area is under cash crop. As stated in the District Development Plan there is a prior need for all weather agricultural access roads; i.e. for roads which will mainly be situated in high potential agricultural areas and which will go a long way to build up a satisfactory road network for remote rural areas.

(h) Road Infrastructure

All the proposed rural access roads will be linked with the classified road system.

(i) Attitude of the People

There appears to be a positive attitude on the part of the the local population towards modernizing their agricultural production and they seem to realize the great advantages of cash cropping as new way of life.

VI. IMPACT OF THE ROAD ON RURAL DEVELOPMENT

1. THE RURAL ACCESS ROAD CONSTRUCTION COST COMPONENTS

Cost estimates of the selected roads have not yet been prepared by the Rural Access Roads engineer in Kitale. Based on past experience for similar roads the following assumptions have been made:- cost per kilometer is approximately £.2,000. A break down of this total cost into the different components will roughly comprise of the following items:

<u>COST COMPONENT</u>	<u>%</u>	<u>COST £/KM ROAD</u>
Wages Permanent staff	8	160
Wages casual Labour force	40	800
Tools and equipment	27	540
Sand, Ballast and Cement	6	120
Construction materials	7	140
Transport	10	200
Others	2	40
	<u>100%</u>	<u>£2000</u>

- Wages of the casual labour force will all be spent in the rural area adjacent to the selected access roads;
- Wages of the Permanent staff will be spent within the district at large;
- Sand, ballast are available within the district
- Tools, equipment, vehicles for transportation will all be imported and as such have little bearing on the rural and district economy;
- The maintenance expenditures are estimated at £ 80/km. road. Out of this amount about 75% is paid to the casual labour force each year. Table 4 shows a breakdown of the relevant cash component for the selected access roads.

T A B L E 4

ROAD NUMBER	CONSTRUCTION COSTS £	MAINTENANCE PER ANNUM £	CONSTRUCTION WAGES £	CASUAL LABOUR MEN DAYS £	MAINTENANCE WAGES £	MEN DAYS	PERMANENT STAFF WAGES CONSTRUCTION £
1	8000	320	3200	9449	240	1032	640
2	15000	600	6000	17720	450	1940	1200
3a	12000	480	4800	14175	360	1550	960
3b	14000	560	5600	16500	420	1800	1120
4	20000	800	8000	23620	600	2580	1600
6	10000	400	4000	11810	300	1300	800
10	20000	800	8000	23620	600	2580	1600
12	12000	480	4800	14175	360	1550	960
13a	28000	1120	11200	33000	840	3600	2240
13b	12000	480	4800	14175	360	1550	960
13c	8000	320	3200	9449	240	1032	640
14	10000	400	4000	11810	300	1300	800
15	8000	320	3200	9449	240	1032	640
16	19000	760	7600	22439	570	2451	1520
17	24000	960	9600	28350	720	3100	1920
18	13000	520	5200	15300	390	1700	1040
19	14000	560	5600	16500	420	1800	1120
20	23000	920	9200	27169	690	2971	1840
21	14000	560	5600	16500	420	1800	1120

2. Short Term Effects of the Rural Access Roads

The short term effects of opening up of rural access road will be substantial for the mobility of the divisional officers. The roads will provide the agricultural, educational, and health officer etc. an all weather mobility to the areas which will enable them to carry out their duties more effectively.

3. Long Term Effects of the Rural Access Road

The long term effects stem from the development of the agricultural potential within the Zones of influence.

The potential for the expansion of cash crops within the Zones of influence is shown in table 5:

TABLE 5

POTENTIAL FOR CASH CROP EXPANSION (in ha)

ROAD NO	COTTON	MILLET	MAIZE	CASSAVA	SUGAR	SORGHUM	SUNFLOWER	TOBACCO	TOTAL
1	62	33	19	5		5			124
2	252	117	90	54		36			549
3a	84	42	26	5		5			162
3b	152	76	48	9		9			294
4	306	90	180	198		90			864
6	37	11	19	23		11			101
10	159	50	73	73		85			440
12	39				19		1	39	90
13a	90				45			90	225
13b	33				16			33	82
13c	31				16			31	78
14	44	22	14	2		2			84
15	80	40	25	5		5			155
16	192	96	60	12		12			372
17	244	122	76	15		15			472
18	100	50	31	7		7			195
19	128	38	76	83		38			363
20	152	46	76	91		46			411
21	60				112		15		187
TOTAL	2245	833	813	582	208	366	16	193	5256

14

The gross margins for Maize, Cotton, Millet, Cassava, Sugar, Sunflower Tobacco and Sorghum are shown in appendix II.

North Teso, South Teso, Bukhayo, Marachi and Samia Locations are included in the Integrated Agricultural Development Programme Phase I. Bunyala is not included in the IADP - programme

The present value of the agricultural production is calculated over a 20 year period between 1979 and 1998. It is assumed that the prices over this period will remain reasonably constant.

The development of the agricultural potential will take 10 years. It is assumed that the potential will develop equally during the 10 years starting in 1980. Moreover the value of the subsistence crops has not been taken into account in the economic analysis as well as the value of the development of cattle.

The total increment in agricultural production will be K£ 667000. Whereas only part of the increment can be set against the investments in rural access roads, from the increments only 60% will be discounted. The total discounted increment will be K£400,200. During the first 10 years (from 1980 up to 1989) the agricultural potential will develop equally with a discounted increment of K£ 40,020 annually.

TABLE 6

EXISTING AND FUTURE CASH CROP AREAS

ROAD NO.	EXISTING CASH CROP AREA							
	COTTON	MILLET	MAIZE	CASSAVA	SUGAR	SORGHUM	SUNFLOWER	TOBACCO
1	71	33	19	5		5		
2	27	9	9	9				
3a	63	31	16	5		5		
3b	114	57	28	10		10		
4	54	18	18	18		18		
6	45	15	26	26		15		
10	61	24	25	37		25		
12	52						45	
13a	120						105	
13b	44						38	
13c	42						37	
14	33	17	8	3		3		
15	60	30	15	5		5		
16	144	72	36	12		12		
17	183	91	46	15		15		
18	75	37	19	6		6		
19	22	7	7	7		7		
20	183	61	107	107		61		
21	30						7	

TABLE 6.

ROAD NO.	FUTURE CASH CROP AREA							
	COTTON	MILLET	MAIZE	CASSAVA	SUGAR	SORGHAM	SUNFLOWER	TOBACCO
1	133	66	38	10		10		
2	279	126	99	63		36		
3a	147	73	42	10		10		
3b	266	133	76	19		19		
4	360	108	198	216		108		
6	82	26	45	49		26		
10	220	74	98	110		110		
12	91				19		46	39
13a	210				45		105	90
13b	77				16		38	33
13c	73				16		37	31
14	77	39	22	5		5		
15	140	70	40	10		10		
16	336	168	96	24		24		
17	427	213	122	30		30		
18	175	87	50	13		13		
19	150	45	83	90		45		
20	335	107	183	198		107		
21	90				112		22	

T A B L E 7

EXISTING AND FUTURE GROSS MARGINS

ROAD NO.	EXISTING GROSS MARGINS K£								TOTAL
	COTTON	MILLET	MAIZE	CASSAVA	SUGAR	SORGHUM	SUNFLOWER	TOBACCO	
1	3351	884	576	131		98			5040
2	1274	241	273	237					2025
3a	2974	831	485	131		98			4519
3b	5381	1528	848	263		196			8216
4	2549	482	545	473		353			4292
6	2124	402	788	684		294			4292
10	2879	643	757	973		490			5742
12	2454						1948		4402
13a	5664						4546		10210
13b	2077						1645		3722
13c	1982						1602		3584
14	1558	456	242	79		59			2394
15	2832	804	454	131		98			4319
16	6797	1930	1091	316		235			10369
17	8638	2439	1394	394		294			13159
18	3540	992	576	158		118			5384
19	1038	188	212	184		137			1759
20	8638	1635	3242	2814		1196			17525
21	1416						303		1719
								T O T A L	112782

20

TABLE 7

ROAD NO	FUTURE GROSS MARGIN K£									
	COTTON	MILLET	MAIZE	CASSAVA	SUGAR	SORGHUM	SUNFLOWER	TOBACCO	TOTAL	
1	15348	3478	2846	350		443			22465	
2	32197	6640	7415	2205		1595			50052	
3a	16964	3847	3146	350		443			24750	
3b	30696	7009	5692	665		842			44904	
4	41544	5692	14830	7560		4784			74410	
6	9463	1370	3370	1715		1152			17070	
10	25388	3900	77340	3850		4873			45351	
12	10501				1900		4549	20424	37374	
13a	24234				4500		10384	47133	86251	
13b	8886				1600		3758	17282	31526	
13c	8424				1600		3659	16235	29918	
14	8886	2055	1648	175		221			12985	
15	16156	3689	2996	350		443			23634	
16	38774	8854	7190	840		1063			56721	
17	49276	11225	9138	1050		1329			72018	
18	20195	4585	3745	455		576			29556	
19	19310	2371	6217	3150		1993			31041	
20	38659	5639	13707	6930		4740			69675	
21	7317				11200		1564		20081	
									Future Total	779782
									Existing Total	112782
									Increment Total	667000

VII. DISCOUNTED COSTS AND BENEFITS OF THE PROPOSED INVESTMENTS

The road construction has many impacts on the rural economy and rural welfare. Many of these impacts can not (yet) be measured, let alone quantified in monetary terms. For this reason the present monetary evaluation criteria for rural access road investments can be considered as an art rather than a scientific approach.

Since it is rather unrealistic to calculate the internal rate of return of each road in view of the very short lengths involved the internal rate of return of the whole package of roads has been calculated. The cost of road construction and maintenance and the benefits of agricultural development are discounted to the base year 1979. The project gestation period has been assumed as 20 years (up to and including 1998).

The total costs shadowprices for the construction of the roads are: $142 \times 2000 \times 0.83 = \text{K}\text{£} 235,720$ to be spent wholly in 1979.

The yearly maintenance costs are in shadowprices: $142 \times 80 \times 0.61 = \text{K}\text{£} 6930$ annually, starting in 1980.

The yearly increment in agricultural production during the first 10 years to be discounted in $\text{K}\text{£} 40,020$ starting in 1980. From 1989 onwards the full benefits of $\text{K}\text{£} 400,200$ will be gained annually.

In table 8 are indicated the discounted costs and benefits for various discounting rates.

The benefits/costs - ratio is as well given in the same table

The I.R.R. for the whole package of roads is: $\text{I.R.R.} = 48.6$

On the basis of the analysis, the calculated internal rate of return is almost three and half times the opportunity cost of Capital (14%) and as such the investment is highly beneficial to undertake. From table 8 it can be deduced that even if the benefits that materialise are only 19% of the estimated total benefits then the I.R.R. will still be above 1%.

TABLE 8

TOTAL PRESENT WORTH OF COSTS AND BENEFITS (K£)

Discounting Rate	10%	14%	20%	30%	40%	50%
Costs	293,683	c 281,132	269,290	258,664	253,017	249,579
Benefits	2,050,945	1,463,892	944,432	528,584	336,768	235,798
B/C - ratio	6.90	5.21	3.51	2.04	1.33	0.94

22

VIII. DEVELOPMENT OF RURAL INCOME

Given the development of the agricultural potential and the growth of the population within the zones of influence of the roads, the rural cash income per capita can be calculated.

The income per capita has been calculated for the year 1990 when the agricultural potential is full developed. For the purpose of his submission it is assumed that the gross margin of the agricultural output is equal to the income of the farmers. The population growth over the period, 1979 - 1990 is assumed to be 2.2%. The results are as shown in the Table below.

Given constant prices for agricultural products, the income per capita will diminish after the year 1990 at a rate equal to the population growth rate. In addition, more land will be needed for the cultivation of subsistence crops, at the expense of the area under cash crops.

TABLE 9

RURAL PER CAPITA INCOME IN 1990

ROAD NO.	GROSS MARGIN AGRIC. PROD. IN 1990	POPULATION IN ZONE OF INFLUENCE		INCOME PER CAPITA IN 1990 K£
		1979	1990	
1	22465	689	875	25.7
2	50052	864	1098	45.6
3a	24750	620	788	31.4
3b	44904	1121	1424	31.5
4	74410	2160	2744	27.1
6	17070	806	1024	16.7
10	45351	1690	2147	21.1
12	37374	774	983	38.0
13a	86251	1785	2268	38.0
13b	31526	655	832	37.9
13c	29918	625	794	37.7
14	12985	349	443	29.3
15	23634	635	807	29.3
16	56721	1668	2119	26.8
17	72018	3309	4204	17.1
18	29556	688	874	33.8
19	31041	1043	1325	23.4
20	69675	3309	4204	16.6
21	20081	1103	1401	14.3

APPENDIX I

DESCRIPTION OF THE PROPOSED ROADS

(1) LIKOLI - SIMBA CHAI

The road branches off from the Nambare-Amukura road, follows an existing track and is on a sandy/loam type of soil.

(2) KOTUR - KOCHOLIA

This road branches off from the Malaba-Eldoret Road. It follows an existing track and is on a sandy/loam type of soil.

This road would give the people in the area south of the railway an easy access to their divisional headquarters in Amagoru. At the moment this area can only be reached via Kimaeti. Money and materials are available for the river crossing near Kokare School. Near the railway crossing some culverts will be needed.

(3a & b) KWANGAMOR-KOTUR AND SIMBA - APOKOR

These roads are more or less a link between road No. 1 and No. 2. They follow existing tracks on a sandy/clay type of soil. A few sections are already in a reasonable shape and need not so much attention. Work on the river crossing near Kwangamar started but was stopped again because of lack of supervision. Money and materials are again available.

(4) TANGAKONA - BUSIBWABO

This road follows an existing track on a sandy/clay type of soil. As yet no money was available for the river crossing. But by means of culverts a lot could be done. This road opens up an area in between two rivers and would connect it to the C31.

(6) BUKHALALIRE - KHULUCHINA

This road branches off from road C30. The road follows existing tracks on a sandy/clay type of soil.

(10) LUCHULULO-REMBO-FUNYULA

This road follows existing tracks on a sandy/clay type of soil. It joins the E149 in the Siaya district for a short distance before turning back to the Busia district. It opens up a very inaccessible area and would be of great assistance to the people to reach the major road system.

All the proposed rural access roads will be connected to classified roads.

Rural access road No.2 will be connected to an A - road (International Trunk road. Roads 1,3,13,14, 17 will be connected D-roads (secondary roads)

Roads 4,6,10,12, 16, 18, 19 will be connected to C roads (primary roads)

Road No. 15 will be connected to an to road (minor road)

All these classified roads are in a virtually all-weather easily motorable condition.

APPENDIX II

GROSS MARGINS FOR AGRICULTURAL
PRODUCTION IN K£/ha

PRODUCT	PRESENT	FUTURE WITHOUT PROGRAMME	FUTURE WITH IADP & RARP	FUTURE WITH RARP ONLY	SOURCE
COTTON	24.5	47.2	115.4	81.3	A
MILLET	18.2	26.8	52.7	39.8	C
MAIZE	15.5	30.3	74.9	52.6	A
CASSAVA	23.4	26.3	35.0	30.7	C
SUGAR	100.0	100.0	100.0	100.0	
SORGHUM	11.4	19.6	44.3	32.0	A
SUNFLOWER	24.8	43.3	98.9	71.1	A
TOBACCO	15.3	142.4	523.7	333.1	A

A: District Farm Management Guidelines M.O.A. (1977)

C: Ministry of Agriculture (1977)

Telegrams: "DISTRICTER", Busia

Telephone:

Office—Busia 14

House—Busia 10

When replying please quote:

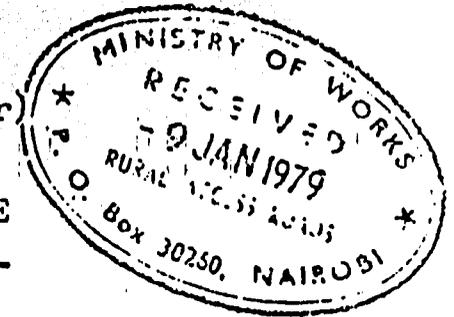
Ref. No. PW.8/2/1A/Vol.1/113
and date

OFFICE OF
THE DISTRICT COMMISSIONER
BUSIA DISTRICT
P.O. PRIVATE BAG
BUSIA, KENYA

4th January, 1979

The Permanent Secretary/Engineer-in-Chief,
Ministry of Works,
P.O. Box 30260,
NAIROBI. (Attention Mr. N.P. Radler)

RE: RURAL ACCESS ROADS PROGRAMME
BUSIA DISTRICT



Please refer to your letter Ref. No.R.9221/P85/22/1 dated 19th October, 1978 on the above subject. The delay in submitting the requested additional information is highly regretted.

Perhaps before I set on to comment on the points raised in your above quoted letter, I should point out that the 136.5 Kms of roads recommended for the Rural Access Roads programme in this District are only a part of 600 Kms of identified and existing earth tracks. This first batch of roads has been selected by the D.D.C. in accordance with the Ministry of Works Rural Access Roads Sections recommendations, and also in conformity with the D.D.C.'s priorities for opening up roads of access in various parts of the District which have greatest development potentials but which currently lack accessibility.

And now, on the points mentioned in your quoted letter:-

(a) Other Development Criteria along the roads:

Roads Nos. 1, 2, 3(a), 3(b), 12, 13(a), 13(b), 13(c), 14 and 15 measuring a total of 63.5 Kms. are situated in the Amagoro (Northern) Division, an area of very high agricultural potential. The population density of the area averages around 119 people per sq.km.

The main cash crops produced here include cotton, sunflower, tobacco and sugar cane in that order of importance. There is also a large population of Zebu animals (native cattle, sheep and goats). Relevant agricultural statistics have already been given to a Mr. A. Lahaye of Rural Access Roads Section of your Ministry on 28/12/1978.

Besides the promotion of farming activities in the division the roads will afford access to 19 primary schools, 3 Health Centres and 2 Dispensaries all of which are remotely situated in the hinterland of the division along the paths to be taken by the roads.

Future development efforts of the Government in this division will be directed towards intensification as well as expansion of cash crop farming through Small Holder Production services and Credit Programme and through Integrated Agricultural Development Programme. The Government also intends to improve quality of livestock in the area through Artificial Insemination Programme. For this programme to succeed, Artificial Insemination Run Routes will be required. Some of the proposed Rural Access Roads will fulfill the function among other needs.

Roads Nos. 4, 6, 16, 17, 18, 19, 20 measuring a total of 61.5 Kms. are situated in Nambale (Central) Division. This is again an area of high agricultural potential with cotton, sunflower, simsim and sugar cane as most predominant cash crops. Population density in the area is around 160 people per sq. Km., while average land holding per person is in the region of 2.5 hectares. Future Government aided agricultural development programmes are

However, special programmes on horticultural crops and Pond Fish Farming based on small farmer credit and service schemes are being planned for this area and as such roads for quick access to the main roads for marketing purposes will be greatly needed in the Division.

Besides serving agricultural interests, the access roads in this area, as planned by the D.D.C., will allow easy access to 18 Primary Schools and 4 Health Centres and Dispensaries situated along their routes.

Roads Nos. 10 and 21 totalling 11.5 Kms lie in Hakati (Southern) Division. This Division consists of large tracts of high potential agricultural land (50%) currently completely under utilized. The average land holding per person is around 3 hectares while average density of population is in the region of 138 people per sq. km. Large parts of the Division (Dunyala)^{all} usually affected by recurrent floods arising from the overflow of banks by rivers Nzoia and Yala. The proposed access roads will, however, be confined to the higher grounds where there is permanently settled population and where agricultural potential is the greatest.

The main cash crops currently being grown in this area are cotton and sunflower. In future, however, there is a possibility of encouraging plantation of sugar cane in large quantities to feed a white sugar factory currently being planned for the area. There is also a large number of livestock mainly of the zebu type and a similar cattle improvement programme like the one planned for the Northern Division is being contemplated for this Division also.

Besides opening up fallow lands for agricultural use, the planned access roads are also intended to allow easy access to 4 primary schools, a Dispensary and a Community Centre.

(b) A Ranking of Priorities for the selected Roads:

As I have stated above, the 136.5 Kms batch are our first priority out of the possible 600 Kms which have already been identified. The priority of implementation of the said 136.5 Kms as suggested by the D.D.C. should be as follows:-

<u>PRIORITY NO.</u>	<u>ROAD NO.</u>	<u>FROM</u>	<u>TO</u>	<u>LENGTH</u>
(i)	1	LIKOLIS	SIMBA CHAI	4.0 Kms. The part towards Likolis has already been opened with the assistance of Rural Work Programme Fund
	2	KOTUR	KOCHOLIA	7.5 Kms.
	3(a)	SIMBA	APOKOR	6.0 Kms.
	3(b)	KWANGAMOR	KOTUR	7.0 Kms.
	15	KWANGAMOR	AKOBWAIT	4.0 Kms.
	14	EKISOKO	SHIPELEWA	5.0 Kms.
(ii)	13(a)	MALAKISI	AMAGORO VIA MWARI, ABOLOI AND KOCHOLIA	14.0 Kms.
	13(b)	CHELELEMUK	JUNCTION WITH 13(a) AT KOCHOLIA	
	13(c)	KATAKWA	ABOLOI	
	12	CHAMASIRI	ANGURAI	6.0 Kms.
(iii)	19	BUGENDI	MUSOMA	7.0 Kms.
	4	TANGAKONA	BUSIEWAEO	10.0 Kms.
	18	MADIDO	BUYOFU	6.5 Kms.
	16	MALANGA	NAMISI	9.5 Kms.

	17	BWALIRO	ISEKA/BUHUYI	12.0 Kms.
	20	BUKHALALIRE	MATAYOS	11.5 Kms.
	6	MURUMBA	KHULUCHINA	5.0 Kms.
(iv)	10	REMBO	BUDALANGA	4.5 Kms.
	21	SIEBUKA	NAMBENGERE	7.0 Kms.
				<u>TOTAL :136.5 Kms.</u>

(c) A Statement about the Length of the selected roads:

From the array of the roads selected, it can be noted that certain roads e.g. Katakwa to Aboloi, Likolis to Simba Chai, and Malakisi to Amagoro, Bukhalalire to Matayos etc., are either below 5 Kms. or are above 10 Kms. lower and upper limits recommended in the M.O.W.s selection criteria. The D.D.C. recommends that the roads be opened up as stated since the shorter ones are either vital links from the interior farmlands to the M.O.W. classified roads or form part of much longer access roads parts of which have been adequately opened up on self-help efforts by the farmers themselves. Such efforts have sometimes met with physical obstacles or the farmers themselves have been caught up with their farming activities each time they try to proceed with the work of digging the roads and have apparently surrendered or suspended the work.

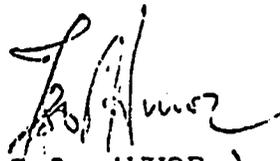
As far as longer roads are concerned most of them are mainly links between two or more roads segments omission of which would either cause under utilization of the selected access roads or would leave the selected access roads suspended in the air without linking up with any major or classified road.

(d) Additional justifications or reasons for unavoidable deviations from the set of guidelines

Topographically, the soils of the district consist mainly of yellow-red loamy sands and red to strong brown friable clays, interspersed with dark brown loams associated with light yellow-brown sandy loams. This therefore suggests that in a few cases the roads will have to go through patches of black cotton clay soil particularly in the Northern and Southern Divisions.

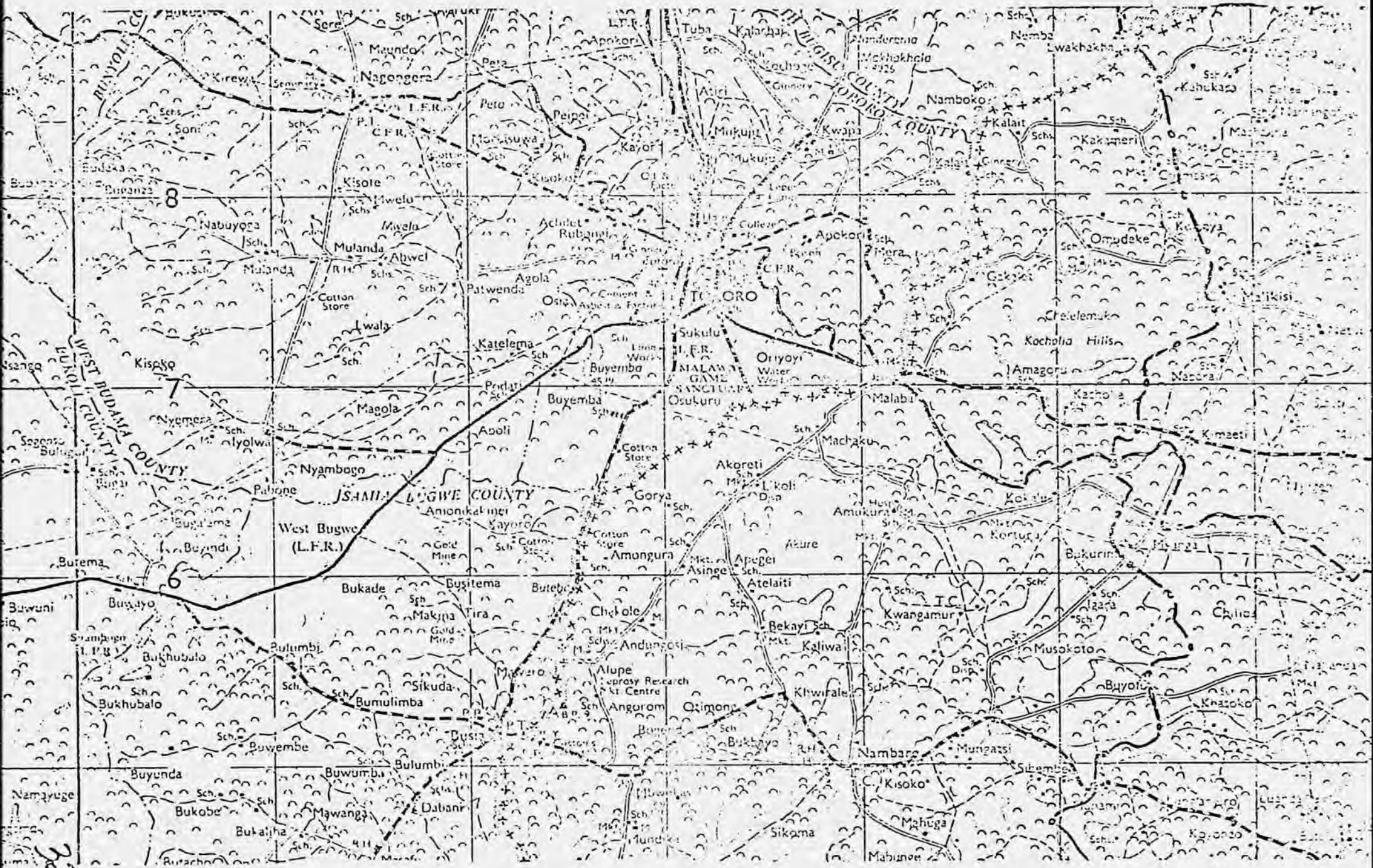
May I now express my gratitude to you for the patient and understanding manner in which you have helped our D.D.C. to select the type of roads most advantageous to the District. With similar understanding and co-operation from your office, I am confident that the implementation of our selected roads will start immediately so that Busia is not left behind in the programme.

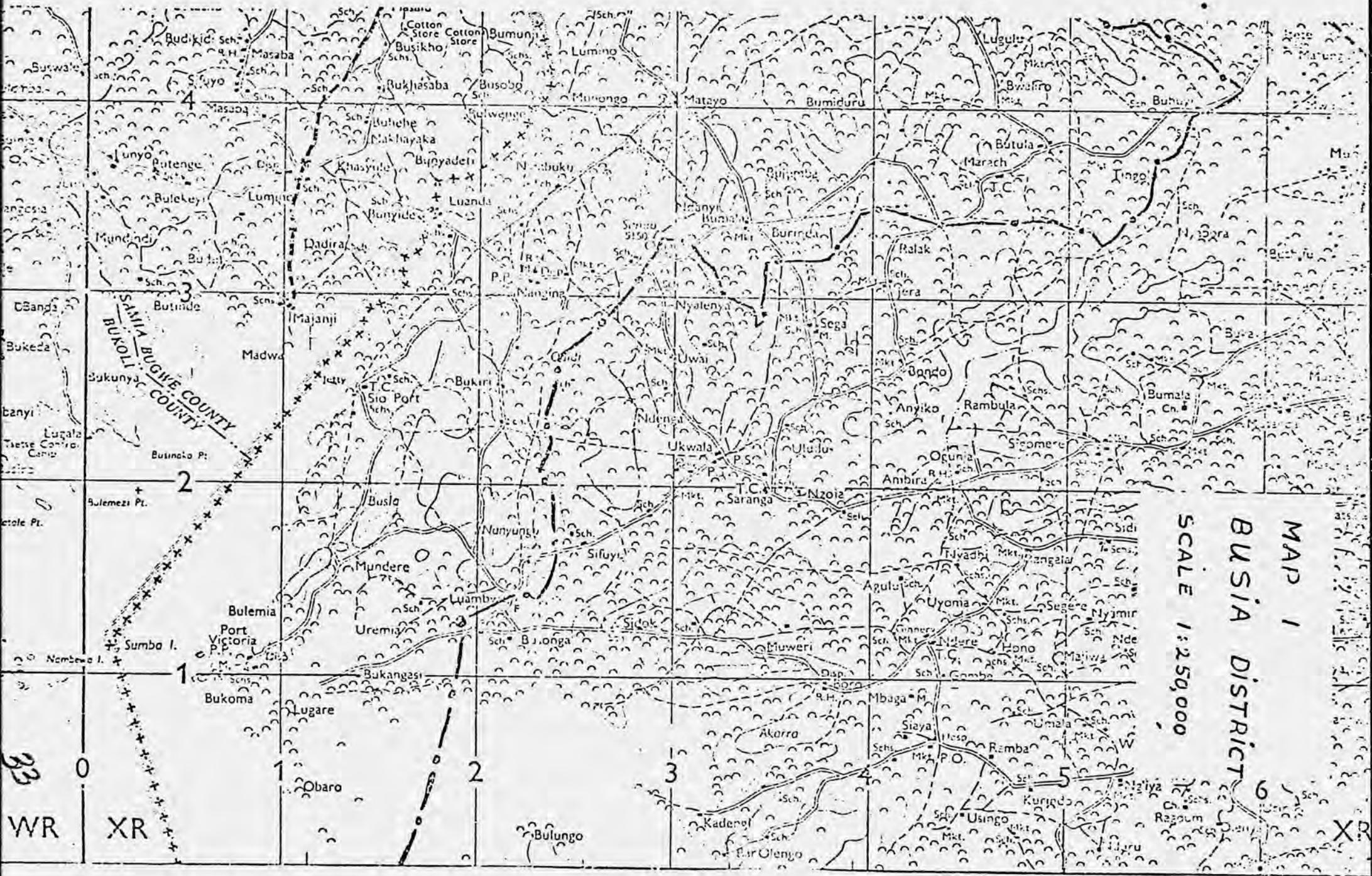
for:


(F.S. ANWAR)
AG. DISTRICT COMMISSIONER
BUSIA.

FSOA/rnn

c.c. The District Agricultural Officer,
BUSIA (K).

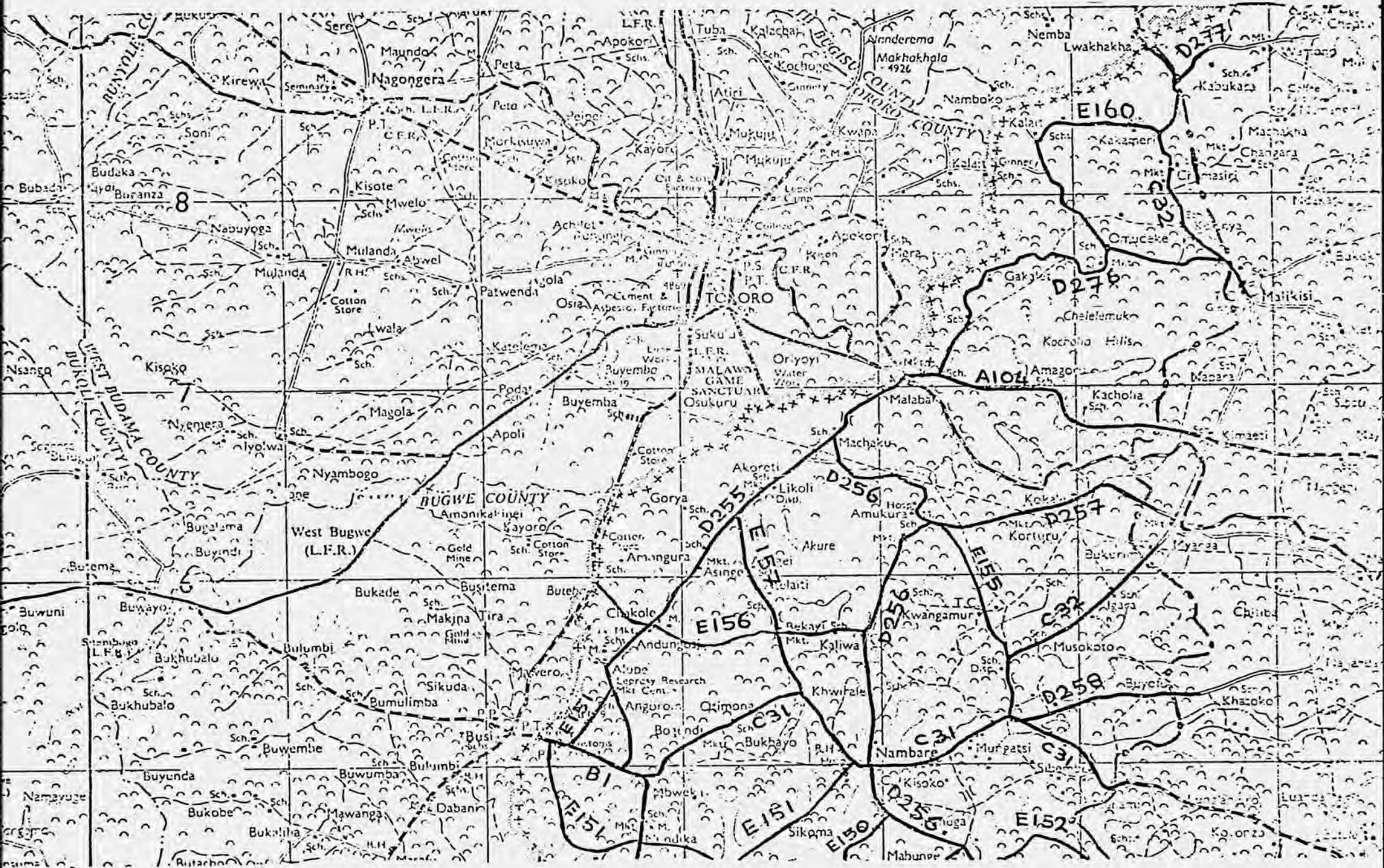




MAP 1
BUSIA DISTRICT
SCALE 1:250,000

WR XR XR

XR



8

34

Nagongera

TIGORORO

BUGWE COUNTY

E156

E160

D276

A104

D256

D257

E155

D258

E151

E151

E152

D256

West Bugwe (L.F.R.)

MALAWI GAME SANCTUARY

Malaba

Kachola

Bukade

Busitema

Chakole

Kaliwa

Musokoto

Buyefi

Khazoko

Buyunda

Buwumba

Bulumbi

Buweti

Sikama

Mabunye

Kisoko

Lugha

Ko. or zo

Mwelo

Mulanda

Patwenda

Buyemba

Machaku

Kachola Hills

Amagoro

Kisigo

Nyambogo

Magola

Apoli

Gorya

Akure

Kokoti

Korturu

Kyanga

Bugalsma

Buyindi

Amonikalongi

Kayoro

Amungura

Asingo

Amukura

Bukuru

Kyanga

Buwuni

Buwayo

Bukade

Busitema

Buteba

Chakole

Makina

Tira

Chakole

Bukhubalo

Bulumbi

Sikuda

Bumulimba

Mavero

Angoro

Qimona

Boyindi

Bukhaya

Buwembe

Bulumbi

Busitema

Buweti

Sikama

Mabunye

Kisoko

Lugha

Ko. or zo

Buyunda

Buwumba

Bulumbi

Buweti

Sikama

Mabunye

Kisoko

Lugha

Ko. or zo

Bukobe

Bukabila

Mawanga

Dabani

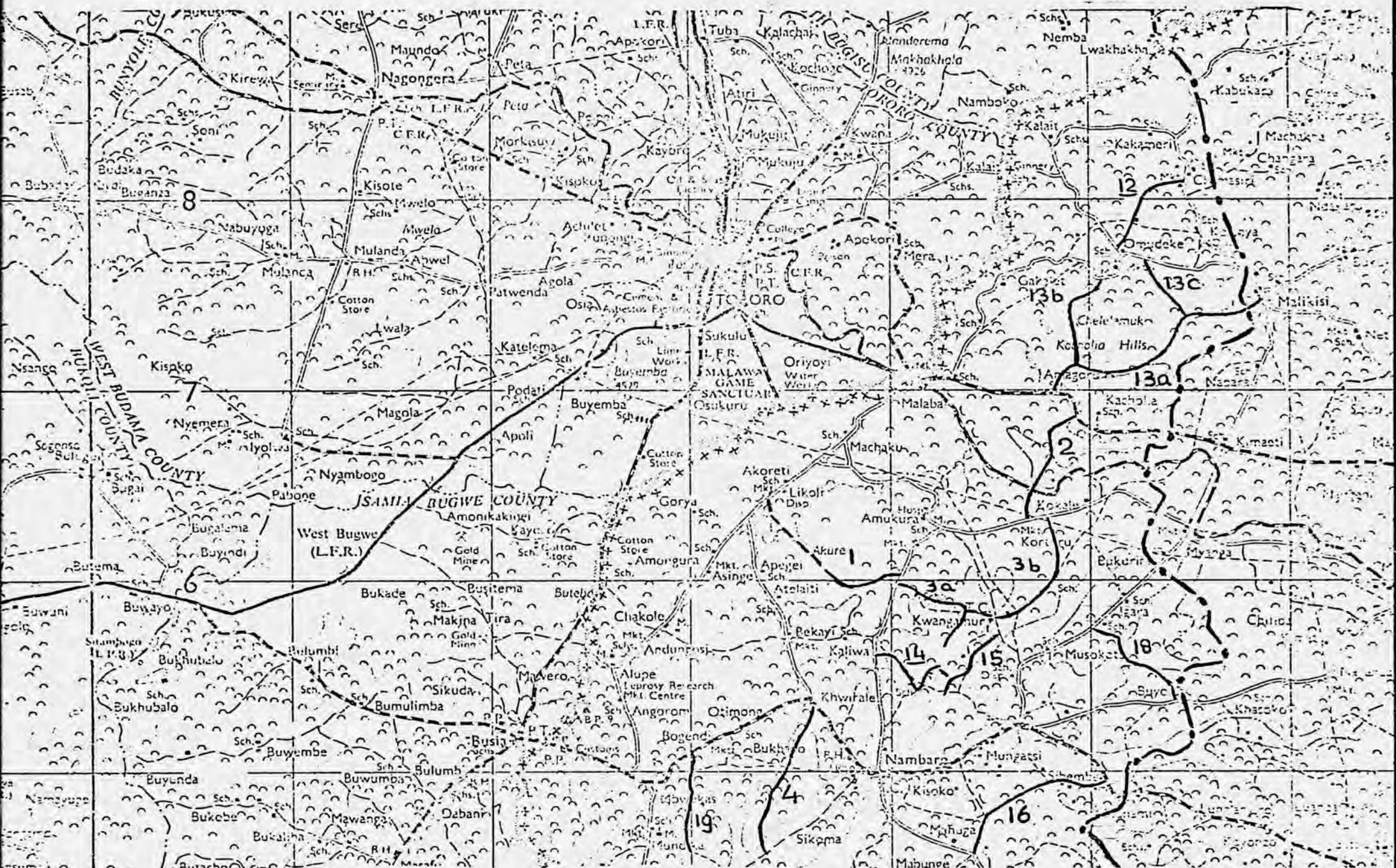
Mabunye

Kisoko

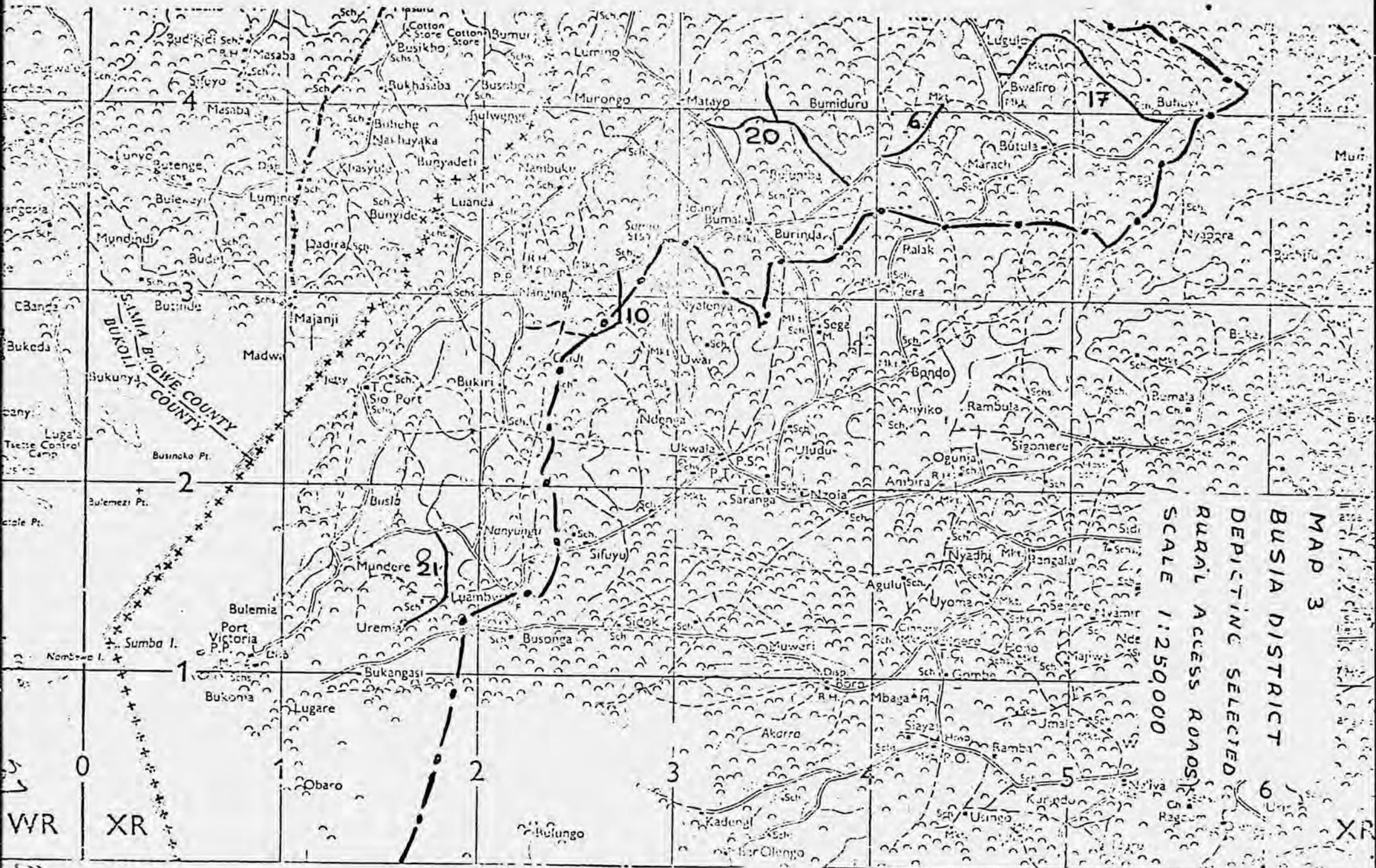
Lugha

Ko. or zo

Ko. or zo

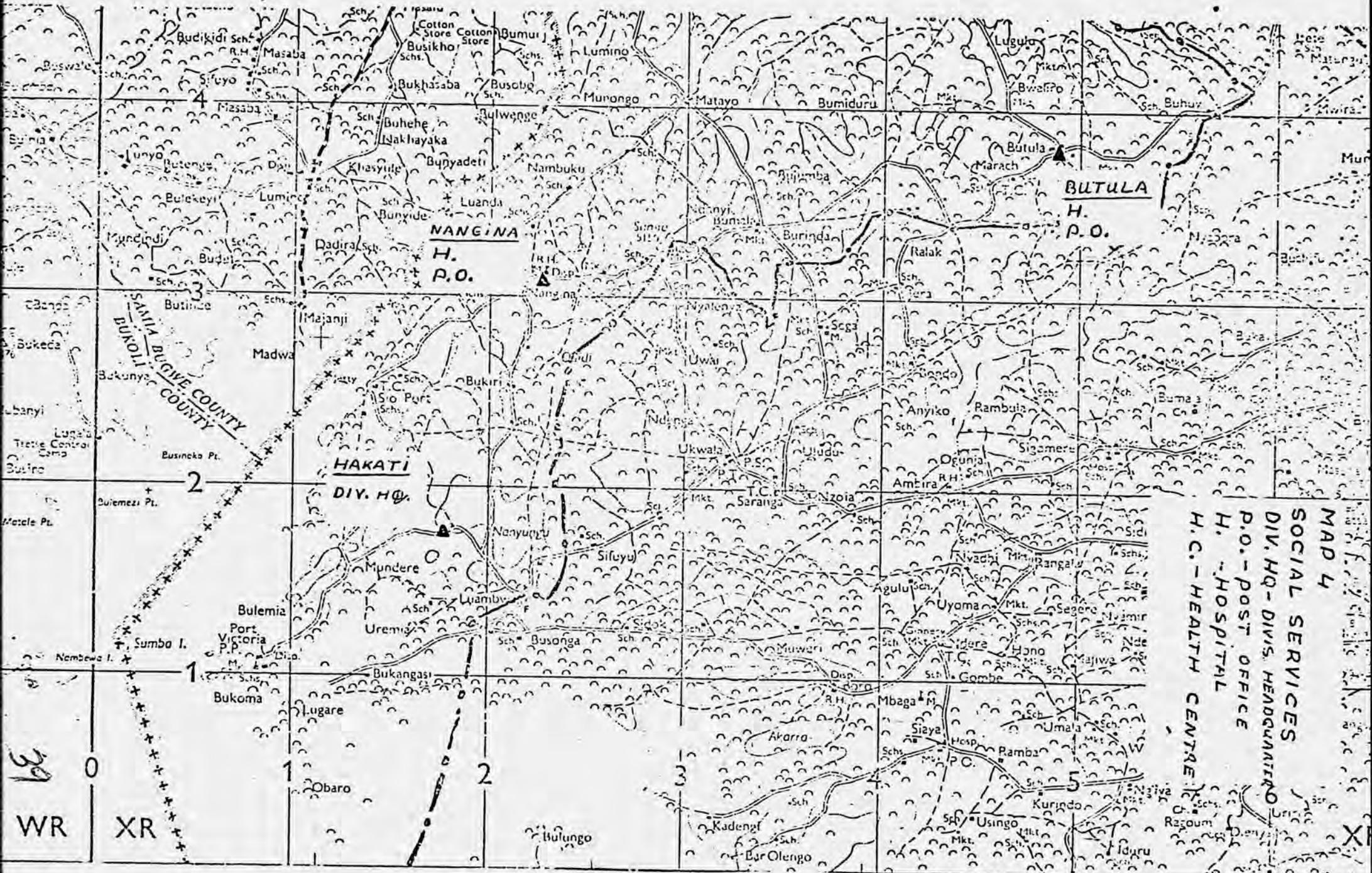


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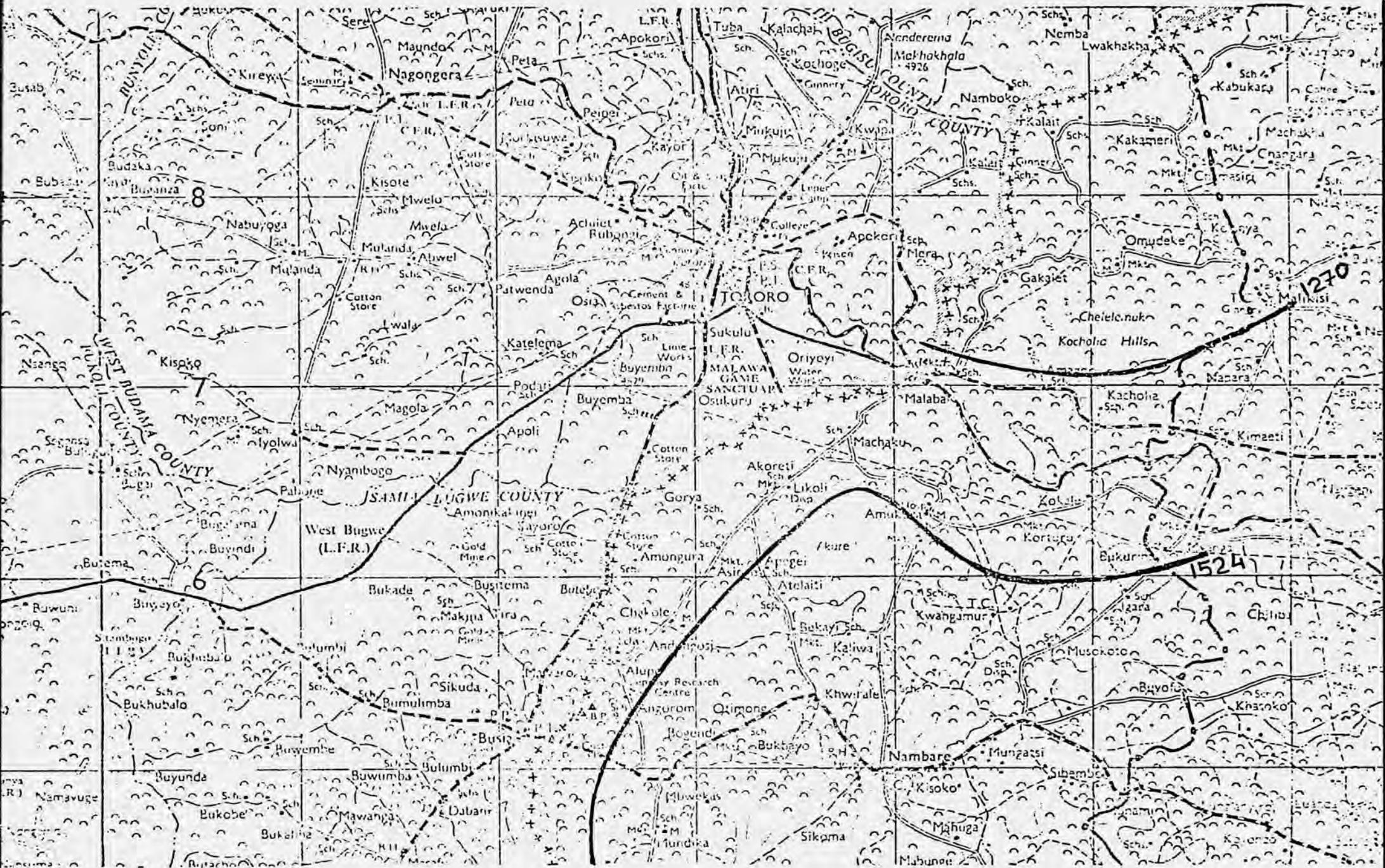
MAP 3
 BUSIA DISTRICT
 DEPICTING SELECTED
 RURAL ACCESS ROADS
 SCALE 1:250,000

WR XR

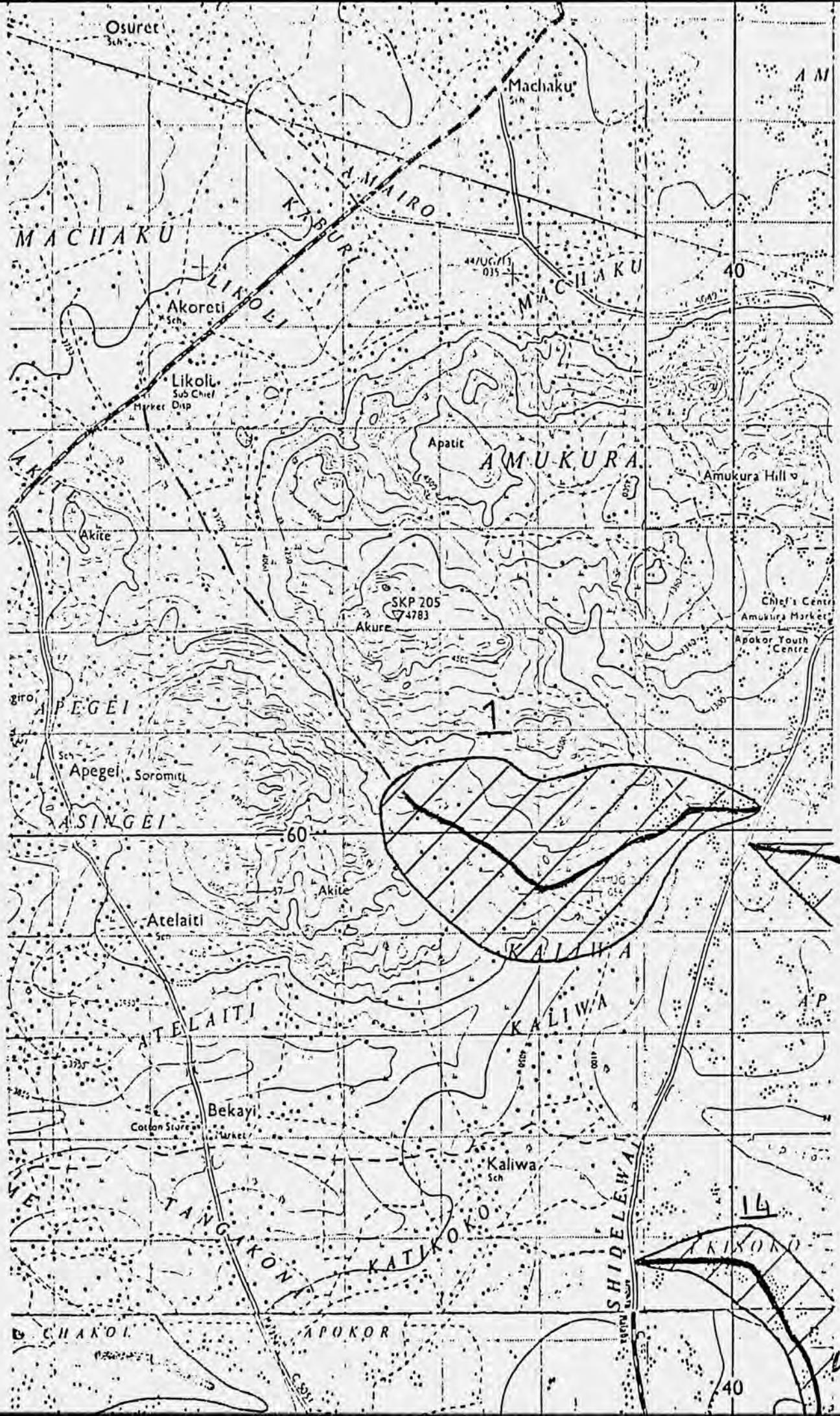


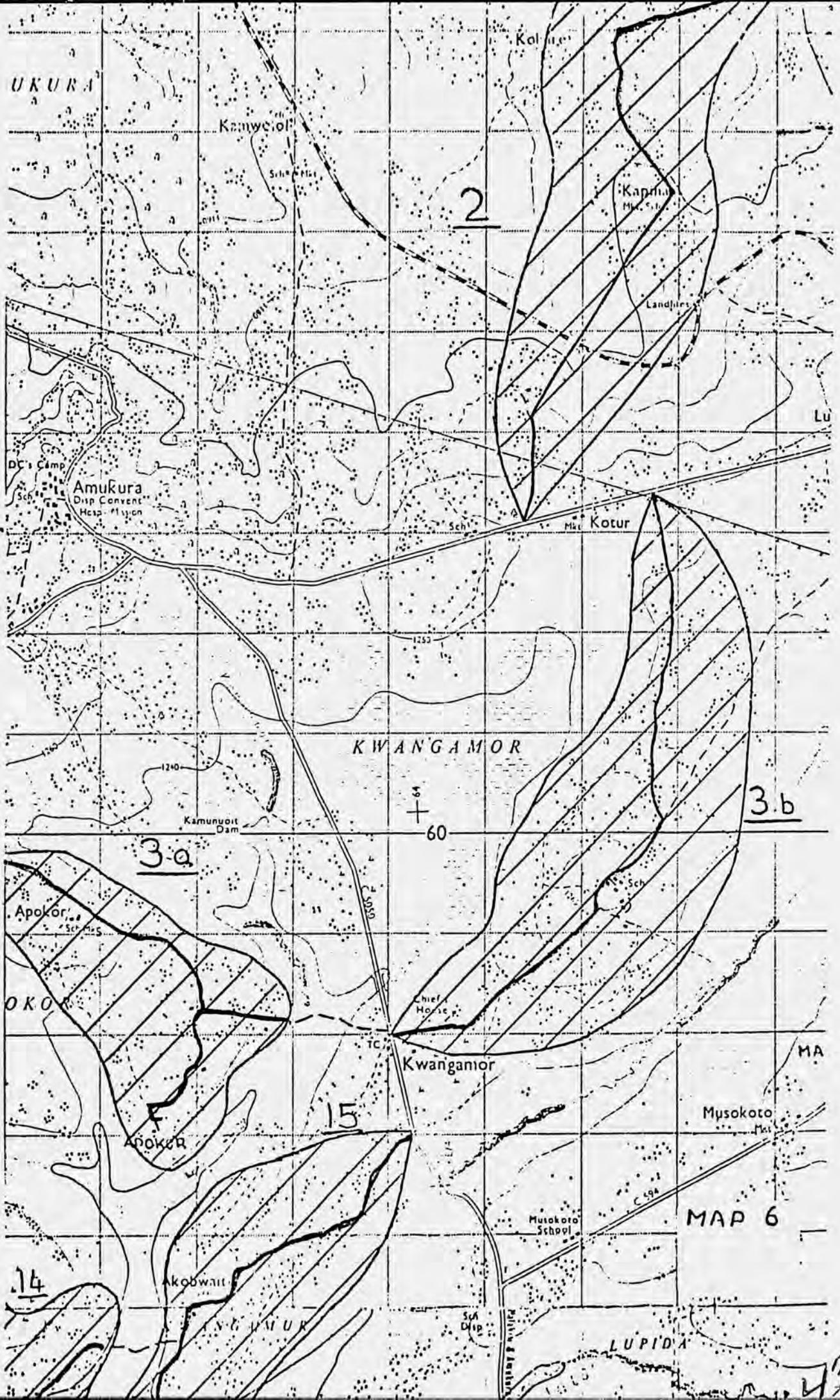
MAD 4
 SOCIAL SERVICES
 DIV. HQ - DIV. HEADQUARTERS
 P.O. - POST OFFICE
 H. - HOSPITAL
 H.C. - HEALTH CENTRE

39
 0
 WR
 XR



CH





UKURA

KANWEL

KOTUR

2

KAPRI

LANDHUR

DC's Camp

AMUKURA
Disp Convnt
Hosp Mission

Sch

MA KOTUR

KWANGAMOR

60

3.b

KAMUNUIT
Dam

3.a

APOKOR

Chief
House

Kwangamor

MA

OKOR

APOKOR

15

Musokoto

Musokoto
School

MAP 6

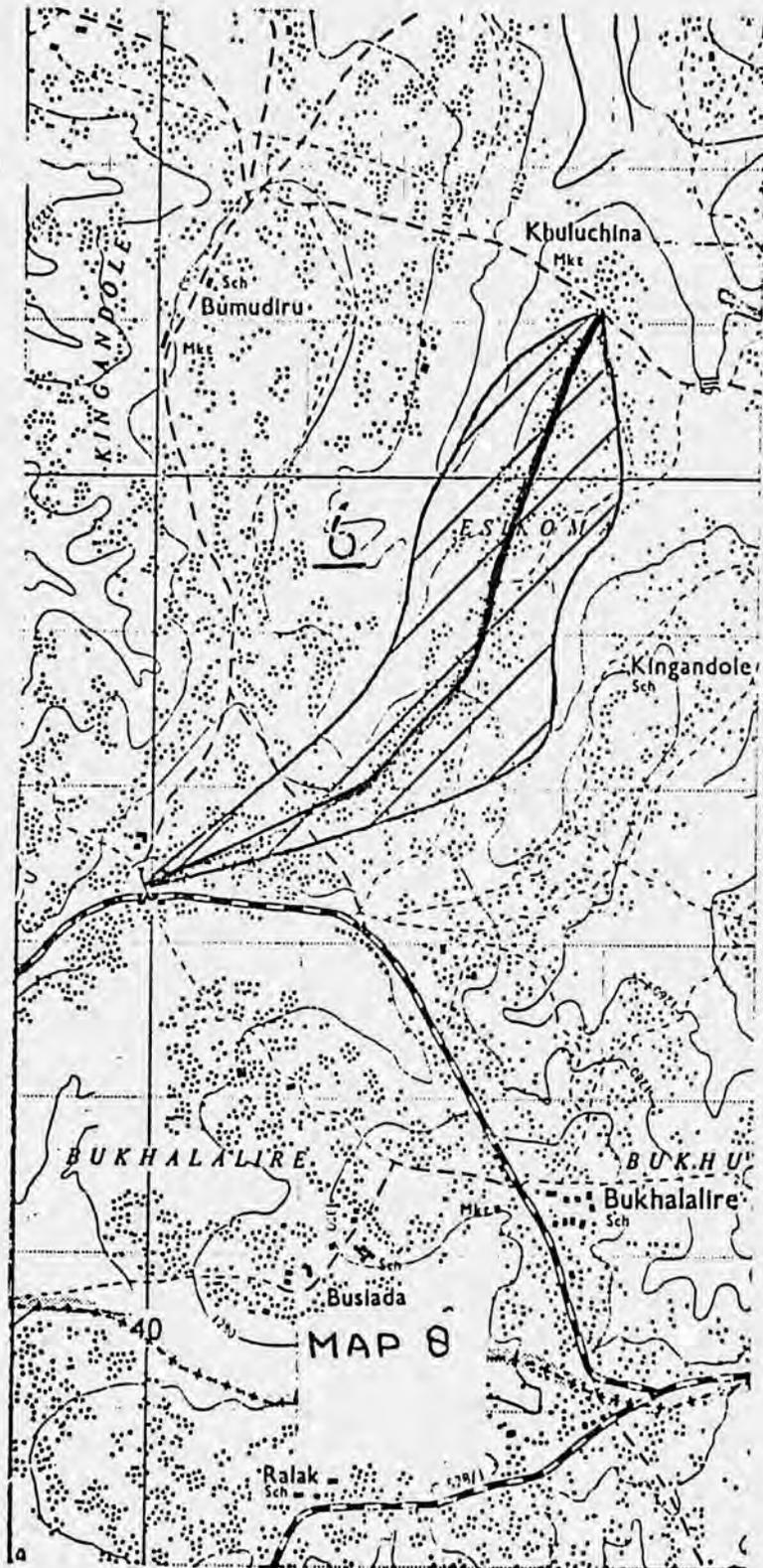
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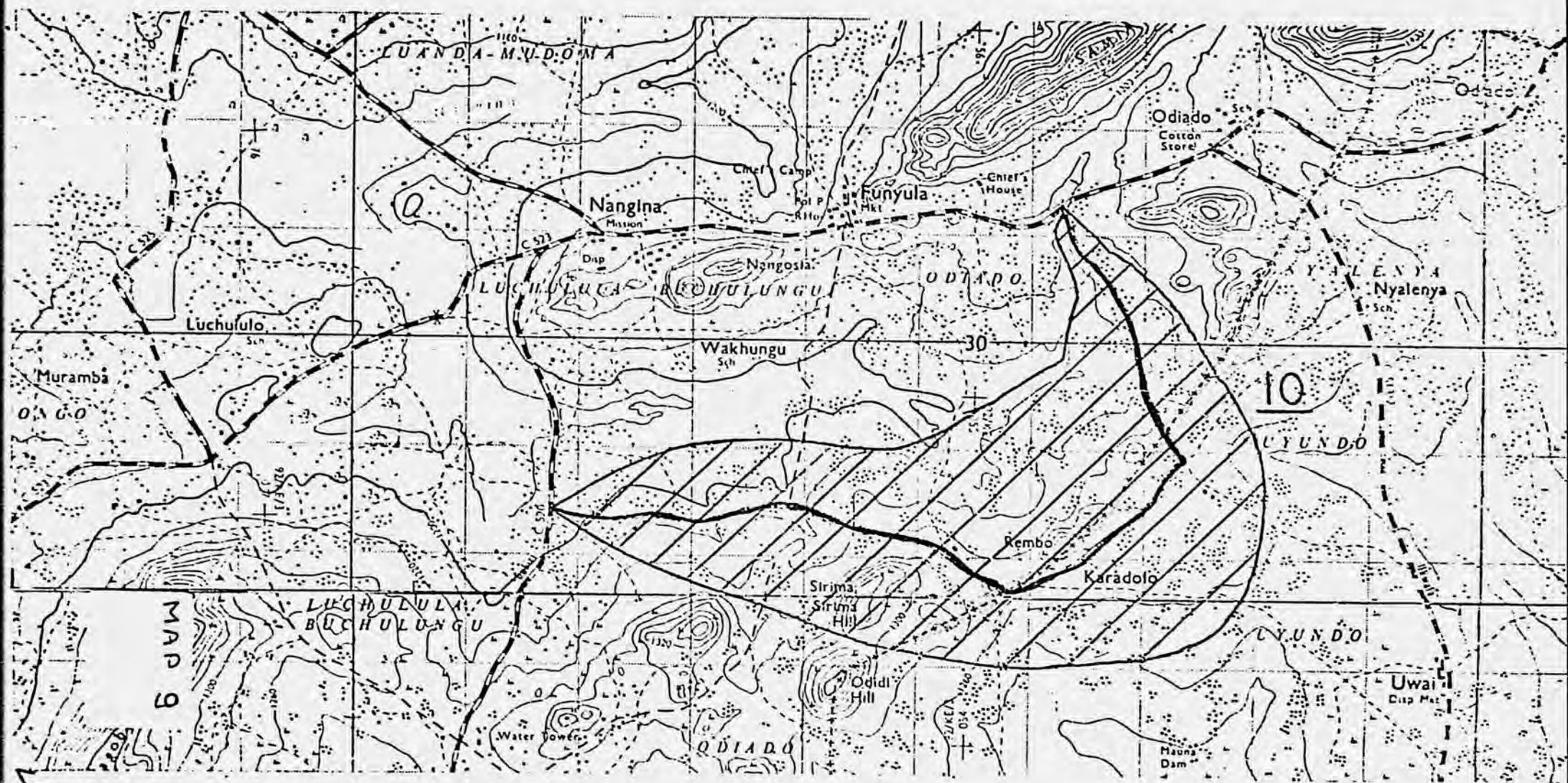
Akobwat

NYAMUR

LUPIDA

43

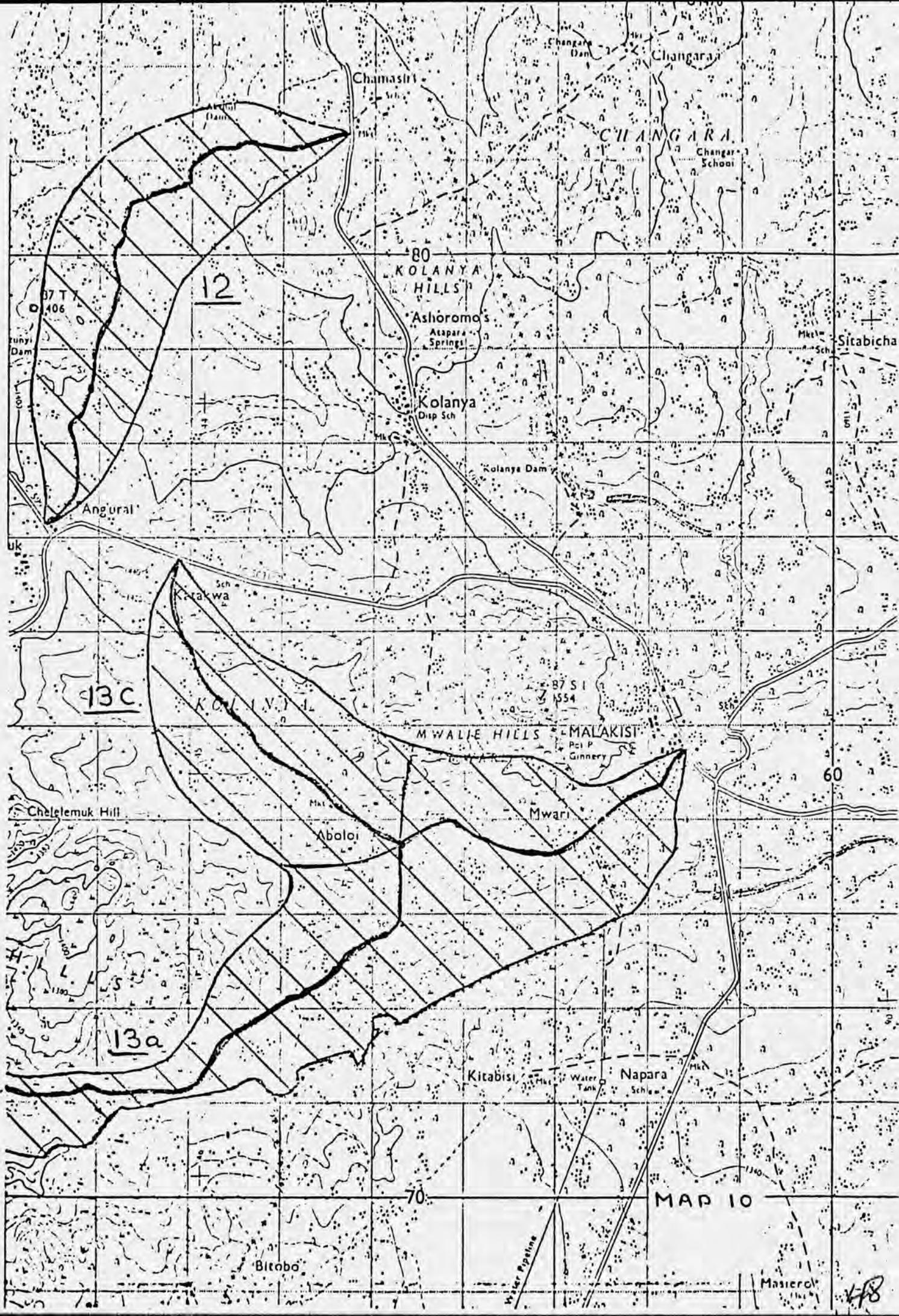




MAP 9

46





Chamasi

Changara

CHANGARA

Changara School

12

80
KOLANYA HILLS

Ashoromo's
Atapara Springs

Kolanya
Disp Sch

Kolanya Dam

Angural

Sitabicha

13C

KOLANYA

87 S I
1554

MWALIE HILLS

MALAKISI

Pcl P
Ginnery

60

Chelelemuk Hill

Aboloi

Mwaru

13a

Kitabisi

Water Tank

Napara
Sch

70

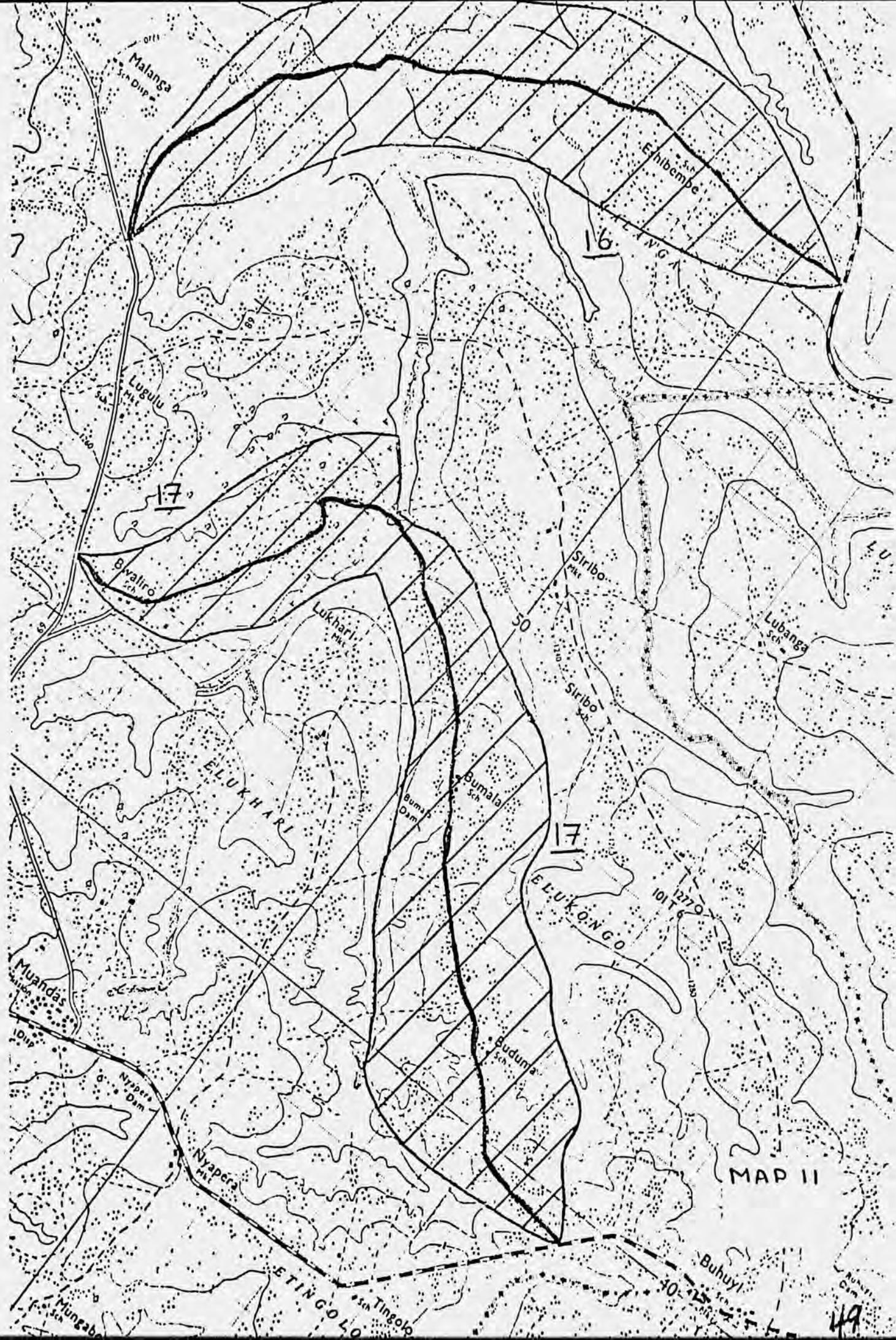
MAP 10

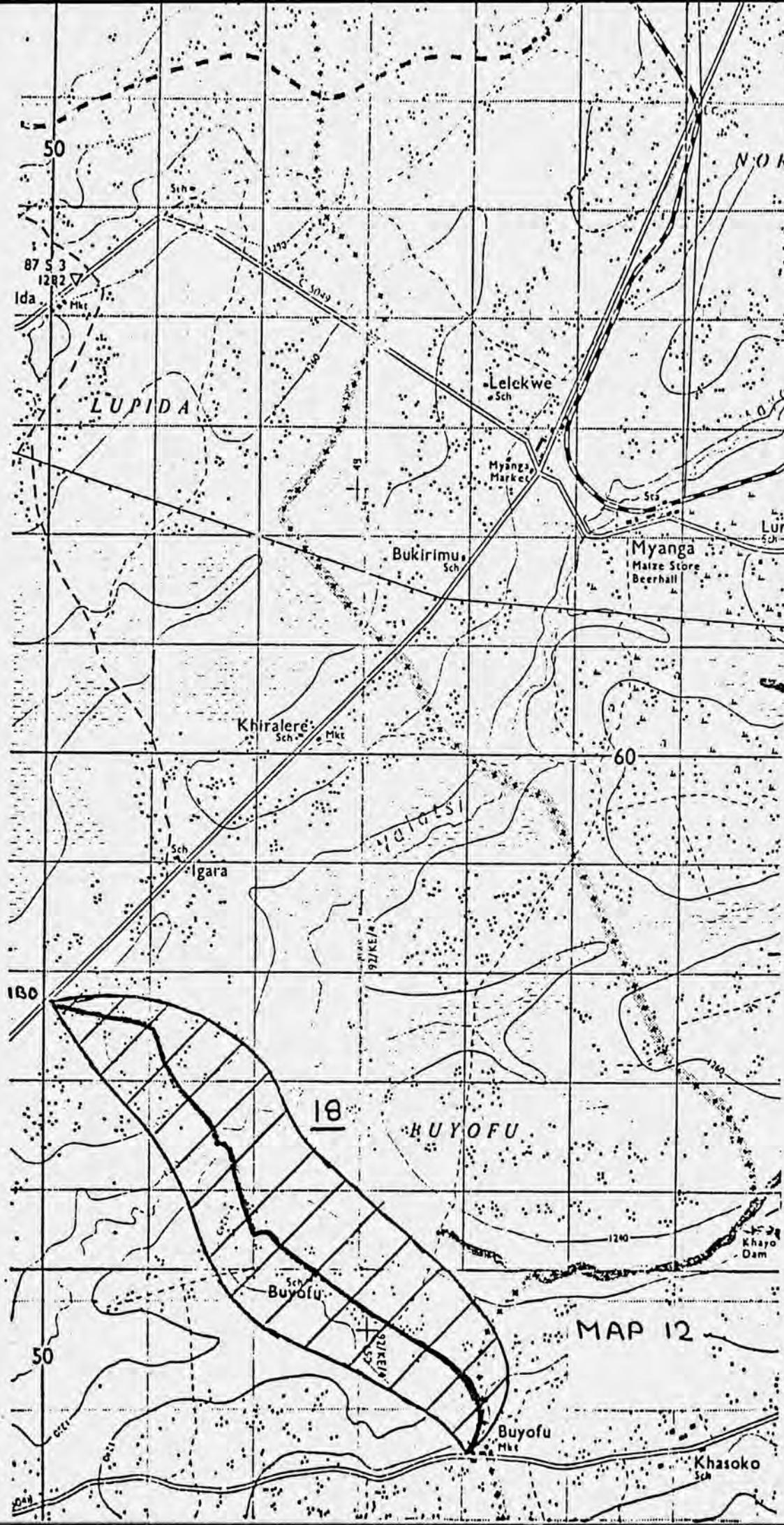
Bitobo

Water Pipeline

Masiro

48





87 S 3
1282

LUPIDA

Lelekwe Sch

Myanga Market

Bukirimu Sch

Myanga
Maize Store
Beerhall

Khiralere Sch

Igara Sch

Vatatesi

BUYOFU

18

Buyofu Sch

Buyofu Mkt

Khasoko Sch

MAP 12

50

