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SUDAN: SOCIOLOGICAL REPORT
by Dr. COLES

1 INTRODUCTION

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METHODS OF RESEARCH

1. Field work for the social survey was April 15th and May 30th, 1964. Before this I had made a two day reconnaissance trip of the area.
2. In the course of the survey all villages and nomadic camps lying within area 3c and 3c extension were visited. The total population was not large. Therefore all villages and nomadic camps lying within 5 kilometres of the proposed scheme on the south, and west sides, and all villages between the scheme and the Rahad were also visited. These people would be close enough to the scheme to be able to partake in it successfully. In addition, since the western boundary of the scheme near Jebel Fau seems likely to be extended, all villages in the Fau were surveyed although they lie more than 5 kilometres west of the original 3c extension. Villages to the north of 3c were not visited as they lie within the Guneid scheme and their inhabitants already have irrigated holdings.
3. A more superficial study was made of the surrounding areas further from the scheme. Its purpose was to obtain some idea of how the presence of such a scheme would affect these areas, and to see whether the people there would be likely to want to partake in a scheme. Thus, selected villages to the north and south of 3c and 3c extension, and on the west bank of the Rahad were questioned. The very distant and scattered villages of central Butana on the east were not visited, but certain chiefs were consulted when making pilgrimage to Baniya el Faki during the Bairain festival. Villages were visited every 15 kilometres, or less if there seemed to be a significant change in environment. Altogether over 200 communities were visited.
4. In addition three villages in or near 3c and 3c extension were studied more intensively. They were selected after the initial survey had been made, and were chosen because each was typical of a large group of settlements. One was an old established agricultural village in the north. Another was a rather new village in the south which consisted of two communities; Arab and West African. The

third was situated in the centre of the area and was chosen because of its strong nomadic characteristics. The three were visited several times. All the homes were seen and discussions were held with a wide variety of people at each village. Controversial matters could be raised and more detailed information gained than during the initial survey. These subsequent visits were particularly useful for cross-checking purposes. The information gleaned from these studies has been incorporated in the general body of the report. (It does not form three separate sections because it was felt that such individual examples would be out of place in a survey of this kind).

5. QUESTIONS ASKED AT EVERY VILLAGE DURING THE INITIAL SURVEY

The aim of the questions was to find out about the present way of life of those living in or near the area 3c and 3c extension. This knowledge is essential in estimating whether they will make good tenants on an irrigation scheme. Attention was paid to the extent to which these people are in contact with and adapting to modern ideas, especially in the economic sphere.

6. Questions asked where relevant

General

1. Name of sheikh
2. Name of omda
3. Tribe(s)
4. Estimate of village's age
5. Observation of type and conditions of houses and other buildings
6. Approximate house count

Agriculture

7. Location of fields
8. Area cultivated by average family
9. Type of crop(s) grown
10. Employment of agricultural labour
11. Ownership and hire of tractors
12. Crop yields
13. Ownership of gerf or sagia land. Profitability of this.

Services

14. Shops in village
15. Ownership of trucks
16. Nearest schools and dispensaries. Use of these.
17. Location of most-frequented market
18. Regular bus or truck services

Degree of nomadism

19. Type and importance of animals kept
20. Adequacy of nearby water points in the dry season
21. Details of seasonal animal migrations
22. Details of seasonal human migrations
23. Dry season employment - location, duration, profitability and numbers participating

7. These questions were designed to find out:-

- (a) the present economic state of the area, so that the benefits of the proposed scheme can be assessed,
- (b) the extent to which the population is already fully settled and occupied with agricultural pursuits, for this is the way of life the people will follow if they undertake irrigated farming,
- (c) the extent to which villagers participate in modern life and appreciate new ideas. Adaptability to changing circumstances will be necessary if they are to become good tenants,
- (d) the neighbouring communities with which each village has most contact. This is to help with any regrouping of villages which may be necessary. Villages sharing the same sheikh or of the same tribe, are obvious instances of where amalgamation may be possible.

8. Methods of questioning

Whenever possible the questions were asked of a group consisting of the Sheikh and several other responsible people. As sheikhs are often old and conservative it was useful to include several younger men in the group. Usually these were not sufficiently in awe of the sheikh to keep quiet if they disagreed with his statements. If the Sheikh was absent,

the village shop often proved a useful base from which to collect information. Shopkeepers are usually both knowledgeable and intelligent. Whenever it seemed necessary, information was cross-checked, both by asking a different group of informants in the same village and by asking another village for its views on a neighbouring community. Because of the short time allowed for the survey, however, cross-checking could not always be as thorough as one would have wished.

9. The pretext for my questions was that I was making a new map. I did not mention the scheme, unless the villagers brought it up, until nearly the end of the interviews. This was to avoid answers being influenced by what the respondent hoped to gain from the project. No questions were asked about the exact number of animals kept. The answers would be useless. People either exaggerate because flocks and herds bring prestige. Or they minimize because they fear you will report them to the officials who collect animal tax. Such questions would only prejudice the whole interview. They make the people suspicious and reluctant to answer further questions accurately. (see detailed discussion on estimating livestock numbers in Appendix B)

10. On the whole villagers were most courteous and ready to provide information.

11. Occasionally, all the men at a nomadic camp would be away when the camp was visited. Where there was an elderly woman she often proved a willing and frequently voluble informant. Young women, however, were most reluctant to say anything in the absence of their husbands.

OTHER SOURCES OF INFORMATION

12. Local government.

Information was obtained from the executive officers of the three rural councils, Rufa'a, Gedaref North and Hosh. Education, public health, veterinary and land use officials were seen at the headquarters of Blue Nile and Kassala provinces.

2 PHYSICAL FEATURES, SETTLEMENT AND HOUSING

INTRODUCTION

14. The area proposed for the Rahad irrigation scheme, C3 and C3 extension, lies in the north east of the central clay plains of Sudan. The vegetation consists of short grasses with occasional scattered bushes; with thicker scrub and permanent tussocky grasses along seasonal water courses. The utilisation of this area is largely dependent on and limited by the amount and variability of the annual rainfall. The River Rahad and the Blue Nile form the western boundary of the scheme. Away from these rivers, the availability of drinking water limits settlement and determines the area of grazing. The population is dependent on agriculture and animal husbandry for its livelihood. Yet drought frequently results in a scanty growth of annual grasses and heavy crop losses. It is clear that the provision of extra water would allow a more intensive use to be made of this area of generally fertile soils.

EFFECT OF CLIMATE ON LIFE AND LIVELIHOOD

15. The area has a semi-arid tropical climate. According to the generally-accepted kppen classification the northern part lies in the B Wh zone while the southern part lies in the B Sh zone. The boundary between zones occurs at about 14° latitude.

16. Temperature

Mean monthly temperatures for Wad Medani are given in fig. 1. Figures for only one station are shown, as there is little variation in temperature throughout the area.

Fig 1 MEAN MONTHLY TEMPERATURES AT WAD MEDANI
1931 - 1960 °F

	J	F	M	A	M	J	Jl	A	S	O	N	D
Mean Max Temp	89	92	98	105	107	107	100	97	101	103	96	91
Mean Min Temp	60	61	66	73	78	80	78	76	78	77	69	63

13. Irrigation schemes.

The irrigation schemes of Gezira, Managil, Guneid and Khasm el Girba were visited. The relevant officials discussed social problems in these schemes, providing comparative material for the Rahad Survey.

I would like to thank all these officials, and the many others whom I visited in Khartoum, for their help and information.

The availability of this water is largely dependent on and limited by the amount and regularity of the annual rainfall. The River Rahad and the other rivers are the main sources of water for the schemes. Apart from these schemes, the availability of drinking water for the population and domestic use is a problem. The population is dependent on agriculture and pastoral husbandry for its livelihood. The drought frequently results in a scanty supply of food-stuffs and heavy crop losses. It is about this situation that the present report would like to make a more detailed account in the context of the area of irrigation schemes.

CLIMATE OF THE AREA

The area has a semi-arid tropical climate. According to the generally accepted climatic classification the northern part lies in the B Wh zone while the southern part lies in the B Sh zone. The boundary between these zones is about 12° N.

CLIMATE AT WAD MEDANI

Mean monthly temperatures for Wad Medani are given in Fig. 1. Figures for only one station are shown, as there is little variation in temperature throughout the area.

MEAN MONTHLY TEMPERATURES AT WAD MEDANI

1951 - 1950 °C

	J	F	M	A	M	J	J	A	S	O	N	D
Maximum Temp.	31	33	35	38	40	40	39	37	35	33	31	29
Mean Max. Temp.	26	27	28	30	31	31	30	29	28	27	26	25

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17. The highest temperatures occur during the high sun period in April and May. There are two periods of low temperatures. The first occurs in August, at the height of the rainy season. Temperatures are reduced by the evaporation of rainfall and by cloud which checks insolation. The second occurs in winter during the low sun period.

18. Temperatures are never so low as to restrict plant growth. Housing and clothing, which are suitable for protection against the sun, are adequate for such cool periods as may occur.

Rainfall

19. Rainfall is the critical factor determining the present utility of the area. Thus any study of the economy must include some analysis of the existing rainfall data.

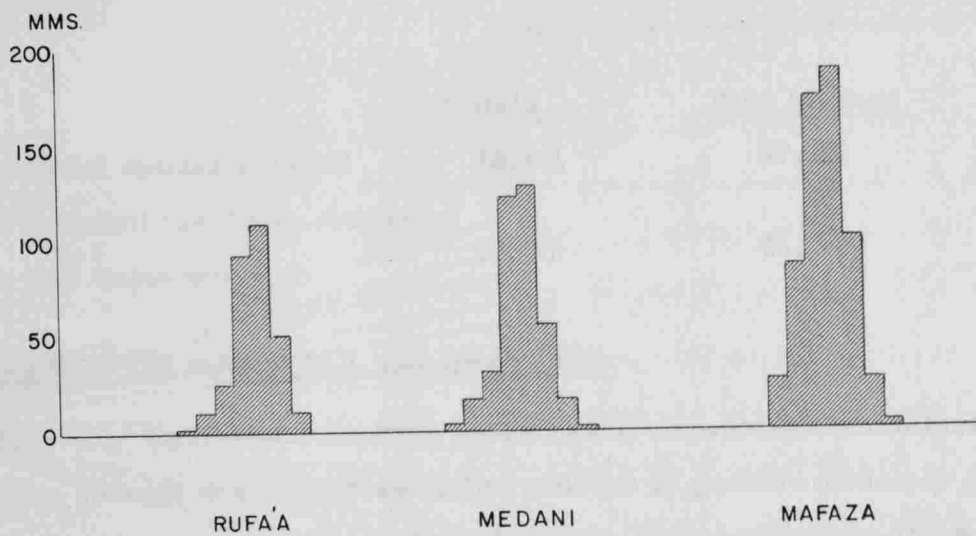
20. Three meteorological stations lie close to the area. Rufa'a is on the northern boundary, Mafaza is about fifteen miles beyond the southern margin, and Wad Medani lies to the north-west (Fig. 2). These stations have kept records for at least thirty three years.

21. In this report daily rainfall records for the Sudan standard period 1931-1960 have been examined. It seems likely, however, that a thirty year period is too short to give an accurate picture of the climate in many intertropical regions. (In this area, for example, Mafazas mean rainfall based on the Sudan standard period 1931-60 is 642 mms., based on the international standard period 1921-1950 it is 638 mms., and based on the fifty year period 1911-1960 it is 589 mms.). Mafaza is the oldest station in the area, and the thirty year period was taken in order to facilitate comparison between the three stations.

22. Rainfall is essentially seasonal. It is associated with the northward movement of the intertropical convergence zone during the high sun period in summer. Scattered showers may occur in April, May and June with the passing of the intertropical front. The main rains occur in July, August and September when the front is several thousand feet deep over the area. (Fig. 2.).

23. Rainfall decreases from north to south, in accordance with the pattern generally prevailing in Saharan Africa. Over most of the

MEAN MONTHLY RAINFALL FIGURES 1931-1960



continent isohyets are parallel to lines of latitude. But in the Rahad area they probably swing slightly northwards towards the east. Here rainfall increases because of the proximity of the Ethiopian plateau which lies only 200 miles from Jebel Fau. Thus the mean annual rainfall for Rufa'a is 299 mms., while that of Mafaza 110 miles to the S.E. is 602 mms. and that of Wad Medani 25 miles to the S. is only 309 mms.

24. As in other intertropical areas as the mean rainfall becomes lower so its variability becomes greater. This accentuates the chances of a bad drought occurring in areas where the mean rainfall is already marginal. Thus the rainfall figures for Mafaza show a quartile deviation of 27% around the median, while those for Rufa'a rise as high as 38% (Fig. 3).

Fig 3

VARIABILITY OF RAINFALL

Quartile deviation expressed as a percentage deviation around the median. 1931 - 1960.

	N	-----	S
	<u>Rufa'a</u>	<u>Wad Medani</u>	<u>Mafaza</u>
(a) Total annual rainfall	38.6%	37.8%	27.7%
(b) Rainfall for July, August and September	33.3%	41.9%	39.5%

EFFECT OF RAINFALL ON GRAZING

25. Variations such as these cause considerable fluctuations in grass growth and therefore in the amount of pasture which is available from year to year. They also affect the filling of hafirs and wells, which form the only source of drinking water for animals away from the over-grazed riverine strip.

26. If total annual rainfall is variable, the date of the commencement of the first rains is equally uncertain. Thus, at Gedaref,* seventy miles east of J. Fau the date of the first rains over 5 mms. has varied from an isolated shower on February 1st to June 22nd in the last fifty years. At the end of a hard dry season a delay in the onset of the rains may cause large numbers of stock to die of starvation before the new grass appears.

* Rainfall figures in Gedaref District are slightly higher than those near C3 and C3 extension (see para. 23) but detailed analysis shows that rainfall characteristics are otherwise very similar.

EFFECT OF RAINFALL ON AGRICULTURE

27. It is not simple to decide how much rain is required to mature a crop in this area. Much depends on the date, frequency and intensity of the rainfall.

28. It is generally assumed that, providing most of the rain falls in regular heavy showers during the growing season, a total rainfall of about 400 mms. should be adequate to produce a crop of Dura. Rather more rain is required for Simsim. If water conservation techniques are used a crop can be grown with between 400 and 250 mms of rain*. Turus or low bunds are constructed on all sides of a plot except the upper slope. Water flows into these fields and is conserved against the retaining wall on the lower slope. By this means water falling on a large surface area is used to grow crops on a smaller area.

29. As mean rainfall decreases, the proportion of rain falling during the three wettest months increases. Thus, at Mafaza 76.9% of the rainfall falls during July, August and September, while at Rufa'a over 84.6% of the rainfall falls within this period. (Fig.4).

30. Moreover, unlike total mean rainfall, there is some evidence to show that the variability of rainfall for the three wettest months does not increase with decreasing annual rainfall figures. Thus the quartile deviation for rainfall during the wettest months at Rufa'a is markedly less than the quartile deviation for total mean rainfall. (Fig. 3 and Fig.5).

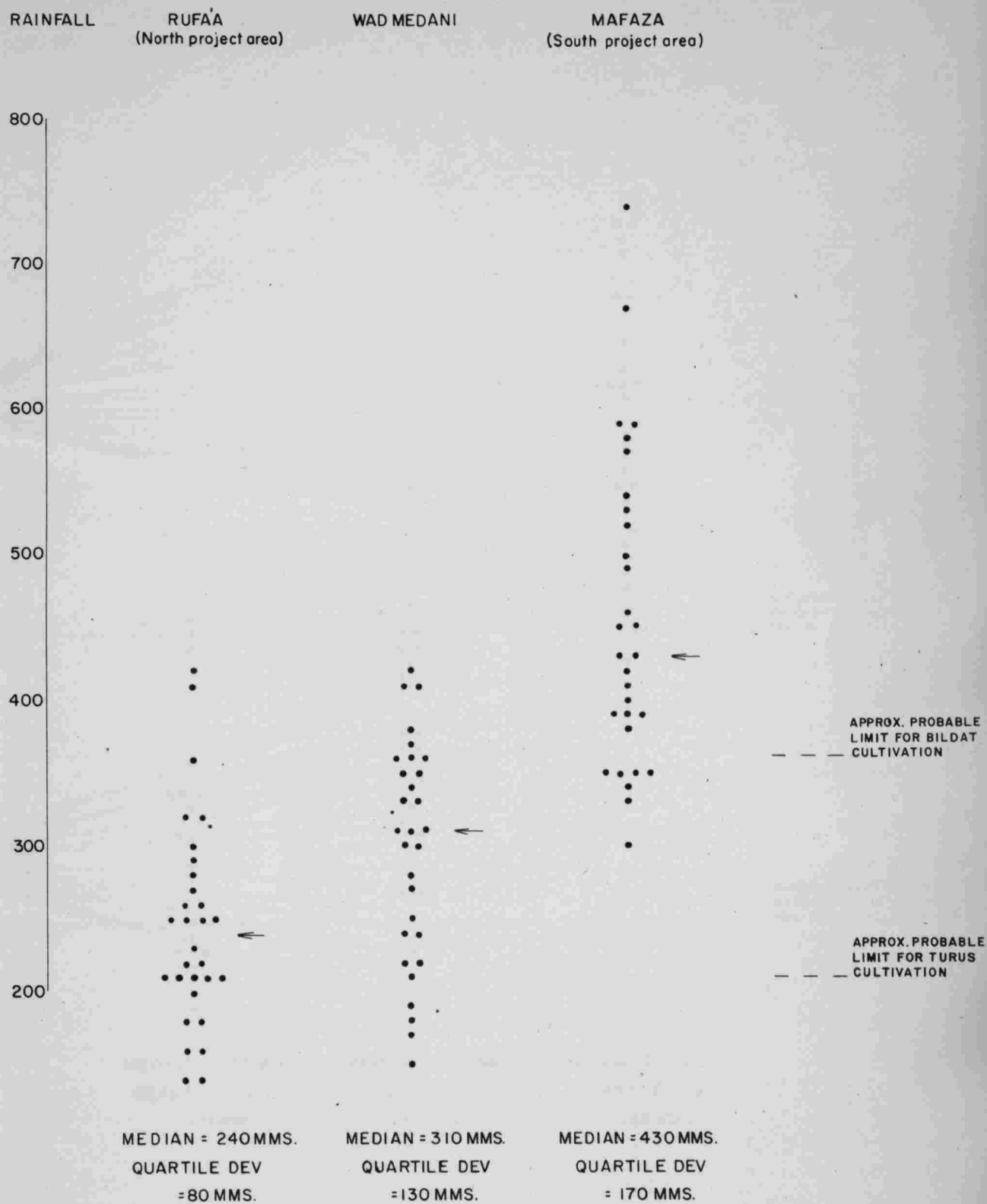
31. These factors assist the agriculturalist in the arid north. Many varieties of Dura only need a growing season of less than 90 days, and quick maturing types can be grown in 70 days.**

32. However, agriculture in this area remains a hazardous business. Rainfall is not only variable from year to year it also varies enormously from place to place in any one year. Meteorological stations are not close enough together to illustrate this in the project area. In the Gedaref Mechanised Crop Production Schemes sixty miles to the east the rainfall for places 5-7 miles apart was found to vary by as much as 370 mms. for individual years.

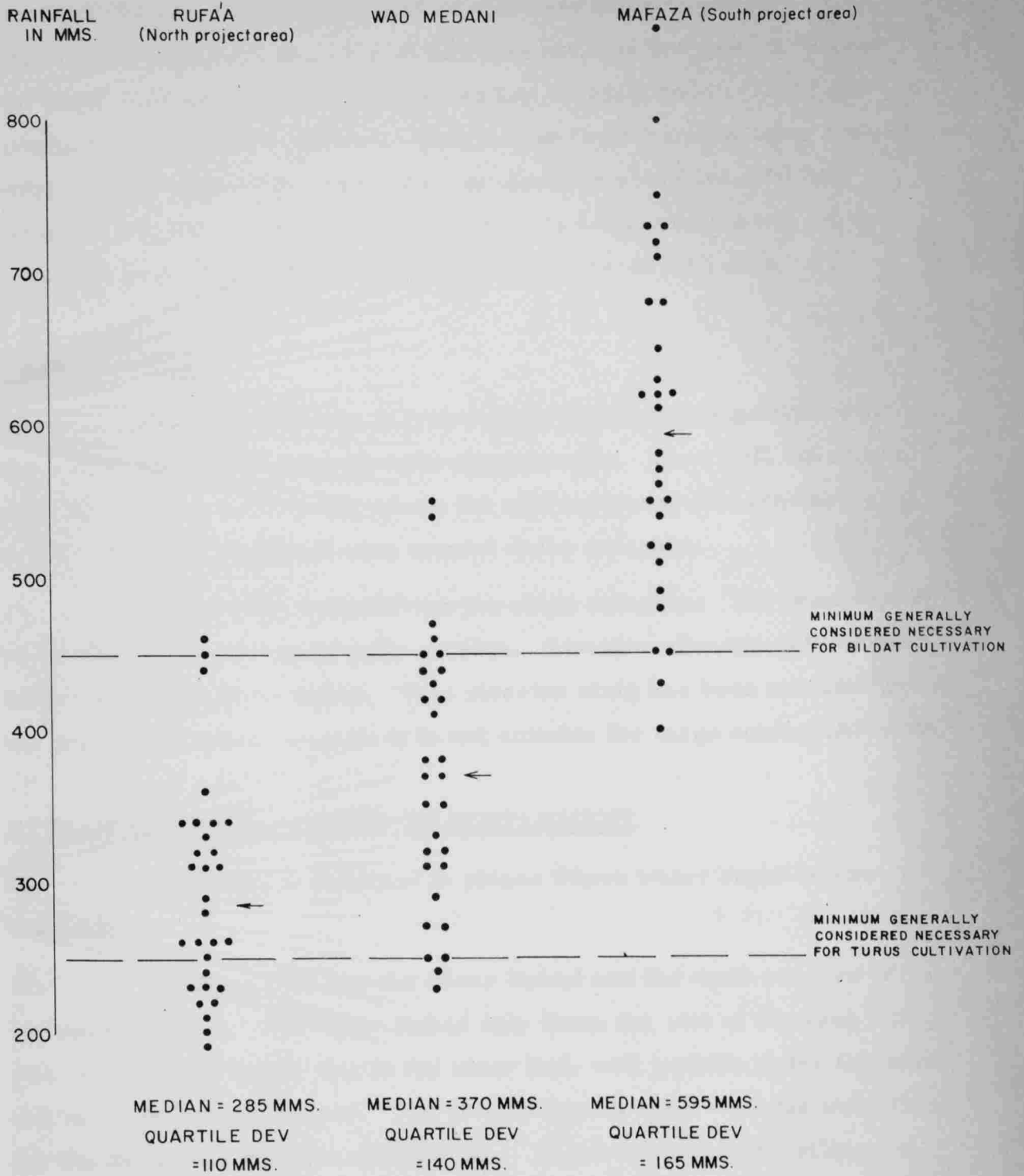
* Bacon "Crops of the Sudan" in "Agriculture in the Sudan" ed Tothill o. u. p. 1948 p. 310. Confirmed by local questioning.

** Bacon "Crops in the Sudan" in "Agriculture in the Sudan" o. u. p. 1948 p. 311 confirmed by local questioning.

VARIABILITY IN RAINFALL FALLING IN JULY, AUGUST AND SEPTEMBER 1931-1960



VARIABILITY IN TOTAL ANNUAL RAINFALL 1931-1960



DISTRIBUTION OF AGRICULTURE

33. The effect of the rainfall has influenced the pattern of cultivation as follows: Around Mafaza and about fifteen miles north it is possible to grow both Dura and Simsim. North of this only Dura is grown. Turus construction begins north of Ein el Luweika but it is not generally used until north of Sherif Yagub where inadequate rainfall makes open field farming too hazardous. Towards Rufa'a even turus cultivation is a risky business, only negligible crops being produced in about one fifth to a quarter of all years. Even at Mafaza there is adequate rain for really successful open field cultivation in only 75% - 80% of all years.

PHYSIOGRAPHY

34. The area consists of a clay plain which slopes gently towards the west. The clays are generally impermeable. Thus well water can only be obtained in the north where the soil is thinner and sandier, or in the weathered pediment zone around rocky outcrops.

35. Close to the Rahad River the slope steepens. The topography is irregular as a result of gully erosion. Riverine alluvium often forms levees along the river banks. This riverine strip has been excluded from the proposed scheme because it is not suitable for large scale cultivation.

EFFECT OF PHYSIOGRAPHY ON SETTLEMENT

36. Settlement is confined to places where water supplies are available.

37. The Blue Nile and the River Rahad are the main sources of permanent water. The River Rahad only flows for part of the year but pits (1-6 metres deep), dug in the river bed, will provide water for man and beast in the dry season. The natural levees form well drained sites for the numerous riverine settlements. About 39% of all the villagers in the area use one of these rivers for their main source of water supply.

38. North of Sherif Yagub there are scattered villages away from the river which depend on wells. South of this there are only a few permanent or transhumant settlements which are based on the wells of Jebel Fau or nearby hills. Both these hill settlements and the riverine villages lie close to but outside the boundaries of the scheme.

DIFFERENCES IN SETTLED POPULATION BETWEEN NORTH AND SOUTH

39. The northern part of the area is very much more densely populated than the south. This is partly the result of the availability of well-water in the north. It is also the result of historical factors.

40. The settlements in the north consist of old, compact, well-established villages. The sandy soil and low rainfall result in the area being relatively accessible even in the rainy season. The proximity of the area to Medani and Gezira - one of the most developed parts of Sudan - seems to have influenced the distribution of services. The town of Ruifa'a, the administrative headquarters of the area, lies just on the boundary of the scheme.

41. In the south settlement has many pioneer characteristics. Even the riverine strip is sparsely populated and much of the land bordering the Rahad River is uncultivated. Where villages occur they are often small and of recent origin. Many are only a few years old and are still receiving a trickle of newcomers. These villages, most of which lie in Hosh RC or Gedaref N RC are far from their administrative centres and are ill provided with services.

NON PERMANENT SETTLEMENT

42. The wells of the north provide water throughout the year and have long enabled permanent settlement. The density of village animals is such that all grazing is thoroughly used. There are virtually no nomadic camps in the area in the dry season, although camels grazing far into Butana may cross the area every 5-7 days to water at the Blue Nile.

NOMADS CAMPING IN AREA IN DRY SEASON

43. In the south the situation is different. In the dry season there are about 1,300 nomads encamped in ferigs along the Rahad. The beasts drink in the river and graze inland. When the rains come the nomads move into Butana in search of pasture. Some move slowly NE browsing near wells and hafirs on the way until they reach Mundera, 70 miles from

Sherif Yagub. Others camp at the hills of Fau, Qala, Buweida and Danoba. Many of those near Ein el Luweika only go as far as a well drained sandy area a few miles inland from Sherif Yagub. Nomads migrating to these two nearer areas may send some of their stock off to Mundera with one member of the family, especially if they have a large number of camels.

44. Many of the nomads cultivate in wadis or at the base of the hills near their rainy season headquarters. They grow only Dura and do not usually construct terraces. Grain grown in this way reduces food bills. Poor men cultivate to earn cash to buy more animals. Although useful, agriculture is generally held in low esteem by the nomads. Thus a rich man often gets someone else to cultivate for him.

45. The Butana nomads are accustomed to return to the same camping places year after year. Most of those interviewed had been coming to the same spot by the Rahad since childhood and were very attached to their particular camping grounds.

46. Many nomads in fact move directly from their rainy to their dry season camps. But for the fact that they live in tents and therefore their way of life is theoretically more flexible, they differ little from transhumants.

TRANSHUMANT SETTLEMENT

47. In the south there are also examples of transhumant settlement. The people concerned live in rainy season villages in Butana where they cultivate and graze their beasts. Inadequate water supplies then force them to move to a second village by the Rahad River for the dry season.

South of Ein el Luweika villages practice this way of life, travelling over 20 miles between their dry and rainy season homes. To the north it gradually dies out, although several villages near Sherif Yagub move a few miles to the river for a couple of months each year. In the most northerly village, a group of Dubabya moved from their well constructed houses and lived in huts by the river a mere half a mile away! They said they liked the change. (Fig. 6).

Changes in Settlement types

48. In the past there was almost certainly less permanent settlement.

49. In the north there are villages hidden in scrub with the huts widely scattered like tents in a ferig. These villages are called camps, although the people have been permanently settled there for at least thirty, and often up to eighty years.

50. There are also several pairs of villages which have the same name, one on the Blue Nile; one further inland. In some cases the inland village may have been the original rainy season site of a transhumant movement. In other cases it may have been an offshot of the original riverine village, formed as a cultivation camp when the river strip became too populated for land to be available for all. Certainly, today, some men in the north, particularly from large riverine villages cultivate far into Butana, either living in rough shelters on their fields or sleeping at an existing village for two or three months.

51. In the south in the last few years several groups have abandoned a transhumant or nomadic life and have built permanent houses by the river. As more of the land is cleared so the area becomes healthier, and less fly ridden in the rains. These factors may account for recent settlement. With ample uncultivated land the riverine south offers considerable opportunities for settlement, particularly for those without large herds.

52. If the Rahad scheme is developed, it will enable the people of the area to practise an even more fully settled way of life.

THE PEOPLE - TRIBAL AFFILIATION

53. The people of the area are nearly all Arab. The most numerous tribesmen are Shukriya. The Nazirs of both Rufa'a Rural Council and Gedaref North Rural Council are Shukriya. There are also numbers of Rufaa, Cuahla, Misellamiya, Sherafa, Lahawin and Arakiw, and some Kawasma, Akallin, Boidre, Dubawya, Kenawa, Ahamda. There are a few Mahass from Nubia and Murraba from Tunisia, who trade in the northern part of the area. Ricabin from northern Sudan are scattered throughout. There are groups of Jaalim

throughout the area, especially in the north. This tribe has a reputation for commercial enterprise and many are shopkeepers or truck drivers. Other tribes found had only a few representatives. (Fig. 7).

54. There are several small villages of West Africans in the south, some of whom have been settled here for over thirty years. These people are farmers in the area like their Arab neighbours.

VILLAGE STRUCTURE

55. In the case of almost all the villages in the south and half of those in the north the inhabitants came from one tribe only. In a few cases there may be a minority group belonging to a second tribe which forms a small outlying settlement 50-200 yards or so from the main village.

56. About half of the villages in the north, however, contain members of several tribes living in one homogeneous settlement. The people have lived together for many years without serious dissent and members of the various tribes are usually scattered throughout the villages rather than living in tribal quarters. These mixed villages were usually larger and often, although not always, relatively sophisticated.

57. Most villages have one sheikh. A big village may have several, usually chosen on a tribal basis, where a small village has a large minority group of a different tribe it may have its own sheikh. Most people seem prepared to accept a sheikh of a different tribe if necessary. There are several examples of Shukriya, members of the administratively important Abu Sinn family, in charge of villages which contain almost no members of their own tribe. In a few instances two villages share the same sheikh. These are villages which originally formed one community but which have been forced to divide for economic reasons. In the case of nomadic camps it is usual for several ferigs to owe allegiance to a single sheikh.

HOUSING

58. Housing, too, is influenced by physical conditions.

59. Tukhls (circular huts with conical roofs) predominate throughout the area, but in the south they are almost the only building type.

Here the heavy rains would destroy a flat roof (unless made of expensive corrugated iron) but pointed thatch is perfectly satisfactory. Suitable building materials are readily available. Tall grass for roofing grows in wadis and depressions. Local wood (ideally Talh* or if obtainable Sunut**) forms the framework for both roof and sides. Cracking clay is not suitable for making mud bricks. Therefore the sides of the huts are filled in with Dura stalks or more grass.

60. Neither the ex-nomads of the Fau Hills nor the pioneer settlers by the river are particularly concerned about their housing. In fact both the levees and the piedmont zone around rocky outcrops contain silty material which if daubed on the sides of a hut, makes a more durable wall. But few bother with this. After the rains the huts become bedraggled and running repairs are needed.

61. A partly made hut lasts only two or three years. A good one, well maintained and neatly thatched, may last a dozen. Building materials are free. Once they have been collected, a job that takes several days to a fortnight, depending on the availability of transport animals, a hut takes only two or three days to build.

62. In the north there is more architectural variety, although in the north-east "tukhls" of the southern type are standard among those of recent nomadic origin. The generally sandier soils here are suitable for making mud bricks. Since timber is scarce, tukhls often have solid mud walls. Rainfall is lower so that it is possible to build rectangular rooms with flat roofs. A flat mud roof obviates the need for thatch, the materials for which may have to be transported a long way. (The grass in the north is short and scanty through over-grazing, at least in the most populated areas).

63. Building is not cheap in the north skilled labourers are needed to make the mud walls, it takes time and effort to draw water from deep wells for mixing the mud. The cost of an eight foot high wall for a tukhl may be 5LS - 7LS. Grass for roofing will probably cost more. Thus a complete hut is worth around 15LS - 25 LS when new. An all mud building with sides about 3 metres long costs about 25 LS - 30 LS. It is

* Talh = Acacia Seyal Dal.

** Sunut = Acacia Arabica Willd.

rather less durable than a thatched tukhl for overlapping pitched eaves are still the best way of protecting a wall from rain. Whereas a rectangular building with a flat roof, will last only about ten years, a thatched tukhl will last at least a dozen.

64. In most northern villages there are now a few brick buildings - a wealthy man's house, a shop or perhaps a mosque. They occur most frequently in the riverine villages, which are close to the brickworks and influenced by their proximity to urban buildings in Medani and Rufa'a. Costs vary according to the roofing material used but a simple room 5 or 6 metres square and lined with mud inside could cost about 100 - 130 LS*.

THE HOME

65. There is a great deal of variety in the individual and tribal concept of a home.

66. Every family requires at least one hut in which to sleep and relax. If the owner is poor or disinterested it may be windowless and have a gap for an entrance. The wealthy or the houseproud will have windows equipped with mosquito net and shutters and a door (usually made from flattened parafin tins) with a padlock. Where there are older children in the family additional sleeping huts will be required. If the household is large, West Africans in particular, will build a separate hut as a room for entertaining visitors. Densities per hut vary considerably. Among the near nomads an average of over five people to a tukhl was recorded, while a more sophisticated arab village in the north had just over three persons to a room.

67. Many families provide the wife with some sort of a kitchen where she can cook outside in the shade. In the north she may have a small hut; in the south it is usually a rectangular shelter of straw called a racuba. West Africans always build a high fence around their homes to protect their women folk, but this is rare elsewhere. Settled agriculturalists often convert an old hut into a shady place for their domestic

* Writer's own research discussed with F. Crooke, Dept. of Agriculture University of Khartoum who has worked on building costs in the Gezira.

animals, or else erect a simple shelter. Stock-rearers, living in the most basic of houses themselves, make no attempt to pander their beasts.

68. Thus, homes are a matter of personal choice and social environment. Except in the north where brick buildings indicate prosperity, houses are not a good guide to prosperity. Their contents are a somewhat better indicator.

HOUSEHOLD FURNISHINGS

69. The least well furnished homes in the area contain wooden beds with woven mats (birish) as mattresses, and a spare top as bed-cover. There are a few aluminium cooking utensils, spoons and knives, enamel serving bowls, glasses for drinking, some bottles for storing liquids and woven dish covers. Other household possessions are strung from the roof in baskets.

70. The average house has beds, with mattresses, sheets and pillows. Kitchen equipment is more complex. Cooking is done on a charcoal stove. There are special utensils for making and serving tea and coffee. There are low stools to sit on. Goods are stowed in tin trunks or in the painted wooden chests which the bride brings with her on marriage. Members of the family have at least two sets of presentable clothing, one or more pairs of shoes as well as a few older garments.

71. Within any village there are usually several more ostentatiously furnished houses. Dressers display row upon row of glass, china and enamel food basins. There are small tables for serving food and possibly a couple of armchairs. In such a house a radio is not uncommon. There may be wooden pegs for hanging and displaying the families best clothes - the wife's robe alone is worth more than 8 LS. Embroidery runs riot over sheets, pillowcases, tablecloths, radio cosies.

72. Most houses have a stand with an earthenware pot for storing and cooling water. Semi-nomadic peoples often use goatskins. The presence of enamel buckets and large bowls for bathing or washing clothes depends mainly on social status.

73. Two groups often have poorly equipped homes in relation to their incomes. Firstly there are the West African pilgrims. They travel light. There is little point in acquiring bulky material possessions when the money can be used to further the journey to Mecca. The second group includes bush nomads and recently settled peoples with strong nomadic traditions. Such people usually consider spartan, portable furnishings to be perfectly adequate.

74. In conclusion it can be said that most of the people in the area possess, or have the means to buy household equipment furnishings sufficient for a simple but reasonably comfortable life.

given in response to the question where has much land a household cultivated.

75. In the densely populated north many families have smaller fields. Sixty or 70 - 7 foldens are often mentioned. These are completely flat land is short. Many nomadic people only cultivate small areas. In the plainer zone of the south where there is often fairly dense woodland, a nomad may only manage to clear several foldens a year.

76. Particularly in the north, there are a few very big farms. Wealthy men from old-established settlements, they manage several hundred foldens a year.

Yields and rainfall

77. Rainfall is the factor having the greatest influence on yields. Thus, even despite conservation techniques in the north yields increase from north to south. In a year of good rains (perhaps once in every five years) yields are said to average 15 articles per folden south of Shalbi (20 per folden in the central area, and about 20-25 articles in the northern part of the proposed scheme).

78. Average yields, however, seem to be much lower probably about 10 - 12 articles in the north, 15 articles in the central area and 20 articles in the south. Every four or five years the yields are very poor. Crop yields are then negligible in the north (average about 5 articles per folden) in every field the crop is not worth harvesting.

3 ECONOMIC LIFE

75. It is extremely difficult to estimate the average income of the people of the area. Their main sources of livelihood, agriculture and animal husbandry are liable to enormous fluctuations depending on annual rainfall.

AGRICULTURE

76. Assuming the land is cleared one man can cultivate about 10 feddans with relatively little help. If he has a large family he can cultivate more. Thus 15-20 feddans were the figures most commonly given in response to the question about how much land a household cultivated.

77. In the densely populated north many families have smaller fields. Areas of $2\frac{1}{2}$ - 7 feddans are often mentioned. There are complaints that land is short. Many nomadic people only cultivate small areas. In the pioneer zone of the south where there is often fairly dense woodland, a newcomer may only manage to clear several feddans a year.

78. Particularly in the north, there are a few very big farmers. Wealthy men from old-established families, they manage several hundred feddans apiece.

Yields and rainfall

79. Rainfall is the factor having the greatest influence on yields. Thus, even despite conservation techniques in the north yields increase from north to south. In a year of good rains (perhaps once in every five years) yields are said to average $4\frac{1}{2}$ ardebs per feddan south of Sherif Yagub; $3\frac{1}{2}$ ardebs in the central area, and about $2\frac{3}{4}$ ardebs in the northern part of the proposed scheme.

80. Average yields, however, seem to be much lower; probably about $1\frac{1}{2}$ - 2 ardebs in the south. $1\frac{1}{3}$ ardebs in the central area and a bare 1 ardeb in the north. Every four or five years the rains are very poor. Crop yields are then negligible in the north (average about $\frac{1}{4}$ ardeb per feddan) in many fields the crop is not worth harvesting.

Yields and soil fertility

81. To a lesser extent yields also depend on soil fertility. In the north many turus have been cultivated continuously for several generations. It is common to find land infested with "Buda"* a weed associated with over-cultivation, which severely reduces crop yields. Constant cropping changes the texture of the sandy clay soil. In the dry season the bare surface becomes liable to wind erosion. The soil loses some of its absorptive power. At the beginning of the rains run off is swift and soil wash occurs. Soils which used to absorb enough rain to mature a crop without conservation techniques, may now require bunding to assist percolation and reduce erosion.

82. Thus in many densely populated areas soil fertility is badly depleted. In places the situation is so bad that land seems to have been abandoned**. A few enterprising farmers admit to clearing new areas far into Butana - up to 30 miles from their own villages in order to obtain "new" land.

83. This over-cultivation in the north contrasts with the under-populated south where vast areas of fertile land are unused.

The subsistence element in agriculture

84. Much of the Dura grown never enters the market. It is consumed by the farmer's family. The average household of five or six persons will eat 5 to 6 ardebs a year. Eaten as kisra or lugna and accompanied by stews and sauces, Dura forms the staple diet. (Very poor families may eat more than average amounts of dura because they cannot afford sustaining stews, or much tea and coffee which sap the appetite. Only in the richest families are rice, spaghetti and bread eaten in quantities sufficient to affect the position of Dura as the staple source of carbohydrate).

PROFIT FROM CROP PRODUCTION

85. In 1964 the price of dura was about 5 LS an ardeb.

86. Let us assume an average family cultivating 10 feddans in the centre of the area in a year of average rains. The farmers would hope to harvest 13 ardebs with a gross value of 65 LS. Allowing for

* Buda = Striga Hermonthica

** Writer's research augmented and confirmed by unpublished findings of J. Randall, Dept. of Geography. University of Khartoum.

consumption and seed retained, he could sell about 7 ardebs, realising 35 LS.

87. It cannot be too strongly stressed, however, that the average situation seldom exists. In the south a largish farm of say, 20 feddans would gross about 450 LS after a good rainy season. In the north, a fairly small farm of $2\frac{1}{2}$ feddans could never hope to gross more than 30 LS.

88. Thus the people of the area are accustomed to wide fluctuations in agricultural incomes. They accept variations in the quantities of surplus Dura available for sale fairly philosophically. During the year, if more ready cash is needed, casual employment can be undertaken. On the other hand great importance is attached to harvesting enough grain to feed themselves. Life is difficult if the family head is faced with earning a flat 25 - 30 LS to give his household a basic food supply, before beginning to acquire all the money needed for clothes, furnishings and extras.

89. So far no attempt has been made to deal with the economic complexities arising when field labour is employed.

90. Traditionally, the Arabs of the area are not enthusiastic cultivators. In the past the well-to-do left crop production to negro slaves. Many rather despise agriculture. All set a high value on leisure.

91. Thus, if money is available, they often employ labourers. If the early rains are good, the demand for labour is high, for farmers optimistically extend their areas of cultivation whenever possible. In the north, where land close to the river is scarce, harig far in the interior of Butana may be utilised.

92. Labourers put in charge of fields distant in Butana usually live beside the crop until harvest. They are employed for three to four months and receive about 4 LS a month with food. More commonly, labourers are only employed for weeding and harvesting. Gangs of them may be taken on for period of two to four weeks. Daily wages would normally be 25 - 40 PT. But with the development of large scale Dura production in Gedaref and the completion of Managil, labour can command a scarcity price. In a rainy year wages rise to 60 or 70 PT - occasionally more.

93. Only in the poorest villages are labourers never employed. In a typical village the few relatively wealthy farmers will employ labourers each year. Other will occasionally obtain several men for a few days. In perhaps a dozen villages the majority of householders reckon to farm with regular paid help.

94. If labour is used with a view to extending the cultivated area, the farmer with money to invest during the cultivating season can realise a handsome profit after harvest - assuming drought does not ruin the crop. But too often labour is employed in order to release the farmer from work he could well do himself. Net farm incomes are lowered, although the farmer may feel the supervisory position he enjoys compensates him for this.

MECHANISATION

95. Partly because of the high price of labour mechanisation has recently been introduced into the area. Since 1945 tractors with seed drills and disc harrows have been used to cultivate Dura in nearby Geradef District. The process greatly reduces the amount of weeding necessary, but harvesting is still done by hand.

96. There are now about a dozen tractors in 3C and 3C extension, each one representing an investment of over 2,000 LS. Since each set of machinery can cultivate over 1,000 feddans in a season, they are available for hire when their owners have planted their own fields. Hiring charges are about 3 LS - 4 LS for five feddans. Only the relatively rich can afford this and in only about half a dozen villages is their use widespread. However, throughout the area there are occasional people who have either hired tractors or attempted to do so. Mechanisation is only attractive for the man with large fields or is able to extend his cultivation. Nevertheless the demand for tractors is growing. It is especially great if the first rains are heavy, and weed growth likely to be dense.

GERF CULTIVATION

97. Gerf cultivation provides a minor source of income for some riverine villages. The banks of the Blue Nile and Rahad, which have been soaked by floods are planted with a variety of food crops as the waters subside. No irrigation is needed. There is adequate moisture in the soil to mature plants.

98. The banks of the Blue Nile provide a large area suitable for gerf. The smaller Rahad with its steeper slopes provides less, particularly in the north.

100. In the southern part of 3C extension much of the gerf land is uncultivated. This is partly because the population is low. Anyone wanting gerf can have it, in a quarter of the villages all the householders have some. West Africans are particularly keen vegetable growers. On the other hand, another quarter of the settlements do not cultivate it at all. Parts of this region are very remote from markets. Moreover, in the dry season there are numerous nomads by the river and their beasts are liable to trample down the gerf gardens.

101. In the north it is different. A very high proportion of the gerf is used. Indeed, over cultivation is becoming a problem. Less than 1/5 of the riverine villages have failed to obtain any gerf, but in only two cases is there enough for everybody. The old-established villages here have more varied dietary requirements than the southern pioneer settlements and relish fresh vegetables. Gerf land is particularly valued because the produce fetches a high price in the accessible markets of Medani.

102. Nevertheless profits from gerf cultivation are not high. Holdings are usually small. The water frontage may be about 40 to 150 metres. The width depends on the annual floods. Vegetable production is time consuming and demands skill. Cultivators are tied up to approximately six months. Yet they say they net only 20 - 30 LS from an average holding.

GARDENS IRRIGATED BY SAGIA AND PUMPS

103. In addition to gerf, there are also irrigated gardens growing fruit and vegetables. These are only found in the north along the Blue Nile. Most of the pools in the Rahad dry up completely during the dry season. In addition the steepness of the banks prevents the installation of sagia.

104. Gardens are irrigated either by pumps or sagia. Pumps usually belong to the wealthy. They cost a minimum of 200 LS to install and government permission is required. Gardens with pumps are usually worked by paid labour. The land commanded by a sagia is usually shared by six or eight men, each providing two cattle for a water-drawing shift.

105. There are about 17 gardens in the area irrigated by the traditional method of sagia, and 19 using modern pumps.

ANIMAL HUSBANDRY

106. Virtually everyone in the area engages in animal husbandry as well as in agriculture. Animal products make a significant, although variable contribution to family income.

DISTRIBUTION OF ANIMALS

107. The problem of assessing animal numbers has already been dealt with in the introduction and appendix "B". However, certain generalisations can be made about the distribution and ownership of stock.

108. Every family wants a goat to provide milk. Most households have between one and three. Those with more money prefer cows for this purpose. Most families like a donkey for riding and transport, but there seems to be rather less than one donkey to every two families. If a man transports goods commercially a camel is more satisfactory. But since they are expensive there are usually fewer than ten in the average village.

109. Animal keeping on a larger scale shows distinct regional variation. The settled villages of the riverine south have few animals. West Africans pilgrims do not wish to tie up their money in slow-yielding stock. The area is unhealthy, wet and fly-ridden in the rains. If beasts are to maintain good condition complicated arrangements have to be made for nomads to take them north to Butana. Sheep are particularly affected by the muddy ground. As a result very few are kept - less than one per family.

110. In the north, however, there is an average of several sheep per household. In a year of poor rains these animals can go four days without water. During a drought most will survive. If harvests fail they can then be sold to realise money for food.

111. The people of the south have less incentive to keep animals as a supplementary source of income. Agricultural yields are more reliable, and crop diversification acts as some measure of insurance against the complete failure of a harvest.

112. In the north a further distinction can be made between riverine villages and those further east. There are relatively few beasts near the river. Settlement is dense and grazing inadequate. The people here obtain extra money by gerf cultivation or are drawn into the wage-earning orbit of Medani and the Gezira. Further 'inland' however, the villages have access to the grazing grounds of Butana. They have a strong traditional of animal husbandry and close links with the animals of central Butana. The cultivation of uncertain crops of grain may come to take second place to stock rearing. Some of these people differ little from nomads except that they are house dwellers, cultivate in turus rather than natural depressions and tend to keep fewer camels.

113. Although most nomads in the area grow some Dura, animal husbandry forms their main source of income and takes pride of place in their attentions. Most farigs have large herds of several hundred camels, as well as above average numbers of sheep. Some farigs in the south, however, say that they keep more cattle than camels, or large numbers of both. Because they withstand drought badly, cattle are less common among nomads in the north.

PRICES OF ANIMALS

114. The usual range of prices for livestock in 3C and 3C extension is as follows:-

Sheep	2.5 LS - 5 LS
Cattle	12.0 LS - 17 LS
Camels	20. LS - 39 LS
Donkeys	6 LS - 8 LS

The prices of animals vary according to their condition, livestock owners are fully aware of this fact.

115. Unfortunately, however, stock are rarely kept with a specific profit motive in mind. Beasts are seldom sold when in good condition. Goats and household cattle are usually kept for milk. They are not disposed of until too old to breed. Sheep, camels and large herds of cattle are kept for prestige purposes, or as a form of long-term capital investment. Only if ready money is required are beasts sold and then with reluctance. Sheep, in particular are useful for this purpose. Most people need cash to buy food at the end of the dry season. This is just when sheep are in their worst condition, hence they have to be sold cheaply. If cattle are marketed at this time they will be dry and fetch only the lowest of beef prices.

116. In recent years attitudes towards camel-rearing have changed somewhat. A commercial outlook has developed among many of the big herders. A very profitable trade grew up with Egypt where camels fetched 70 LS - 80 LS at the slaughterhouses. This trade has now been forbidden by the governments concerned. Camel dealing activities are consequently diminished, if not completely curtailed. The Sudanese do not like camel meat and an ordinary beast now fetches about a third of the previous price. Well-bred riding camels are still expensive. The best Butana beasts sell all over Sudan for over 100 LS. Most of the really large scale camel owners, however, probably live east of 3C and 3C extension.

ANIMAL HUSBANDRY AND FAMILY INCOME

117. There is clearly a vast difference between the few men earning an annual income of several thousand pounds from camel sales, and the small farmer who spends a few pounds buying a goat. The average household in the area probably earns 9 LS - 15 LS from the sale of two or three animals, the increase of his small flock, every year. From this gross sum he has to deduct monthly payments of about 10 PT which he makes to the village herdsman for looking after each adult animal during the day. In a poor year the farmer will sell more beasts, building up his flock again after the next good harvest. In this way he effectively lays aside part of the profit from a good agricultural year as an insurance against a bad year.

118. This type of small-scale animal keeping also has dietary benefits. It ensures a regular milk supply. Most villages eat meat several times a week. Since the Arabs here eat only small quantities of pulses and rather despise fish, meat is the main source of protein (West Africans with fewer beasts, seldom have meat, but do a lot of fishing).

LIVING STANDARDS AND MONEY INCOMES

119. In order to live well by existing standards a family probably needs about 200 LS a year. This assumes that grain and milk requirements are met within the household unit. The figure is based on estimates by local government officials and on conversations with the people themselves.

120. On the other hand, over much of Sudan, labourers are supporting their families on about 30 PT a day, just under 100 LS a year if a six day week is worked. Out of this sum, they may have to pay high urban rents and buy all their food. Thus life can be modestly sustained on under half the recommended sum.

121. It is clear that the normal agricultural income supplemented by the sale of a little animal produce often fails to reach 100 LS - let alone 200 LS.

122. Few farmers in the area are content with their profits from crop production and animal husbandry. The agricultural year only lasts from July to September. Farmers are free to undertake other employment for half the year. Most do work, although often sporadically. Having gained enough money for immediate needs, they cease work.

123. As a result the majority of households undoubtedly manage on cash incomes of less than 200 LS, although most earn over 100 LS.

DRY SEASON EMPLOYMENT IN THE SOUTH

124. People in the south undertake relatively little outside work in the dry season. Their agricultural incomes are certainly steadier and often higher than those in the north. Rainfall is more likely to be adequate and the growing of two crops, (small quantities of S imsim as well as Dura) reduces the risk of complete agricultural failure. Denser vegetation, earlier rains, heavier weed growth and a second crop to harvest makes the

agricultural year longer and harder, diminishing enthusiasm for other jobs. Villages are remote and villagers are perhaps not fully aware of employment opportunities elsewhere. In their isolation they have less temptation to fritter away their earnings, and so need less money.

125. Some casual occupations are available locally. Those who wish can cultivate gerf or fish, although on all but a small scale, marketing problems exist. Tenieba marks the northern limit of the "Hashab"* tree. Good money can be gained by having a gum garden or by acting as a tapper for an absentee owner.

126. The forests here have just reopened for charcoal burning. Nomads, in particular, find charcoal making profitable for they can use camels to transport the sacks to the towns. A bag sold locally fetches 30-40 PT, but in Khartoum, for example, it may be worth 3 LS. Camel owners can always earn money cutting wood and grass, and transporting it to the sparsely vegetated areas of the north, (Gedaref or the Gezira) for use as building materials.

DRY SEASON OCCUPATIONS IN THE NORTH

127. In the south most dry season activities are home-based. Such men as go away are seldom absent for more than a few days at a time. This is the reverse of the situation in the north. Here only a minority find adequate wage-earning activities locally.

128. This minority includes village shopkeepers, builders, and those who, as owners or labourers are engaged in market gardening on riverine land. People who live near the Butana grazing grounds and have large herds will also remain in their villages providing that well water is available for their stock.

129. Villages near Rufa'a and Wad Medani have a large number of commuters. These big towns offer a wide range of jobs. Since communications are virtually non-existent particularly in the Rains, commercial activities are crammed into the dry season creating plenty of temporary employment.

130. In over three-quarters of the villages in the north, however, the majority have to leave to seek dry season employment elsewhere.

* Hashab = Acacia Senegal Willd.

131. More than a third of the northern villages reported that significant numbers of the menfolk undertake labouring jobs outside the area. Some go to the large towns - Wad Medani and Gedaref, or occasionally Kosti and Khartoum. More and more often enterprising young men get constructional jobs connected with the Khashim el Girba Scheme. Some go further to Roseires. These development projects offer good money. Life is tough, but, a man who does work for a private contractor is said to be able to earn 70 PT - 2 LS a day. The government pays a standard rate of only 30 PT but there are ample opportunities for overtime. In about a quarter of the villages - mainly those on the Rufa'a - Gedaref or Medani-Girba bus routes - unskilled labouring is the commonest way of supplementing incomes.

COTTON PICKING

132. Taking the north as a whole, however, cotton picking in the Gezira is the dry season activity. In over half of the villages at least half the men are engaged in cotton picking. The work attracts people from as far south as Ein el Luweika and from further east than the boundary of the proposed scheme.

133. While labouring jobs involve only men, whole families often go to the Gezira. Complete villages may be deserted and left in the hands of a caretaker. The people spend two to four months encamped near the cotton fields, surrounded by their animals which they bring with them. They live in huts roughly constructed from Dura stalks, or even in tents.

134. This large-scale annual movement has some of the characteristics of a nomadic migration. Many villagers, particularly from the densely populated riverine strip, stress that their main aim is to provide grazing for their stock. For them the chief attraction is the pickers right to turn his beasts loose on the Dura stubble and Lubia in the tenancies. Some even say that they do not bother to go to Gezira if they have only a few animals.

135. The tenants also provide pickers with free supplies of grain. For the poor, the feckless or the drought-stricken the move is a means of obtaining food for their families.

136. Thus cotton picking with its perquisites is a most convenient way of supplementing cash incomes. Families often work for the same tenants year after year. Even before the development of the Gezira scheme there were close social ties between those living on the east and those living on the west bank of the Blue Nile. Since irrigation, a strong economic bond has also grown up between them. Although not the most hardworking of pickers, the East bank (Blue Nile) people provide a regular and acceptable source of labour for the tenants.

The figures for the total population of the three district councils concerned were as follows:-

Right's	190,281
Gezira North	175,511
West	124,000

The figures for the total population of the three districts in 1944 are as follows:-

Right's	21,000
Gezira North	4,300
West	1,400
	<u>26,700</u>

The census growth rate for each district was then applied to the above figures in order to estimate the population of the three districts in 1944.

	1935	Growth rate	Estimated population 1944
Right's	190,281	1.3%	202,100
Gezira North	175,511	1.3%	184,000
West	124,000	1.3%	130,000
			<u>516,100</u>

This method gives a total population in the area of 516,100.

Summary

137. The above method would be to apply the average Sudan growth rate of 1.3% to the 1935 population of 484,000. This would produce a figure of 500,000 total population in 1944.

4 POPULATION NUMBERS

ESTIMATES OF THE POPULATION OF THE AREA

137. Two methods were used to estimate the population of the area. The first made use of the 1955 population census. The second was based on field techniques.

138. 1) Total population = 81,778

In 1955 the census figures for the total populations of the three district councils concerned were as follows:-

Rufa'a	190,209
Gedaref North	175,511
Hosh	129,000

The numbers from each of these councils who were living in the area are estimated at:-

Rufa's	57,800
Gedaref North	4,800
Hosh	1,400
	<hr/>
	64,000
	<hr/>

The census growth rate for each council was then applied to the above figures in order to estimate the population of the three sub-areas in 1964.

	1955		1964
	<u>Population in Area</u>	<u>Growth rate</u>	<u>Estimated population</u>
Rufa'a	57,800	3.1%	73,790
Gedaref North	4,800	2.6%	6,046
Hosh	1,400	3.7%	1,942
			<hr/>
			81,778
			<hr/>

This method gives a total population in the area of 81,778.

Comment

139. A less accurate method would be to apply the average Sudan growth rate of 3.3% to the total 1955 population of 64,000. This would produce a figure 4,000 higher for the total population in 1964.

140. It is worth commenting on the validity of the growth rates arrived at by the 1955 census. A national rate of increase of 3.3% per annum to remarkably high. The rates were based on the excess of births over deaths during the census year. The Chief Census Officer himself wrote "without prolonged study it is impossible to say whether the figure of 3.3% is correct, and whether it obtained for the last few years prior to 1955/56 or whether it occurred exceptionally in 1955/66 only." The writer thinks it is about right*.

141. Bearing this consideration in mind it is possible that the figure of 81,778 should really be a little lower.

2) Total population = 72,959

142. This figure was derived as follows:-

a) Surveys were conducted in the four villages, which were studied in detail. The numbers of people per hut were found to be 5.3, 3.7, 3.4 and 2.6 in each of the four communities. The mean was 3.75.

b) All the villages in the area were toured, and at least two people counted the huts from the moving vehicle. Their results were averaged. The total number of huts counted was 16,918.

c) The four sample villages were thus counted twice; once during the general tour, and later during door-to-door visits. At the second count hut totals were 15% larger than the previous rough enumeration. The large error is due to the fact that huts are clustered very closely together in many villages. A vehicle cannot penetrate the clusters and therefore counting by this method is liable to miss a rather large number.

d) This 15% error was applied to the original estimate of 16,918, huts to give 18,945 huts. The total number of huts was then multiplied by 3.75, the number of persons per hut, to give a total population of 72,959.

143. Comment Each of the three villages which were studied in detail were typical of different types of settlements. It might therefore,

* Krotki "21 Facts about the Sudanese" Sudan census office, Dept. of statistics, Khartoum. 1958 p. 48.

be supposed that it would be most accurate to apply the individual, density figure of each particular village to all the communities of which that village was a representative. The total population of the area would then be calculated by adding together the four different sets of figures thus obtained. This approach was rejected as being too sophisticated for the data concerned. There was not enough evidence to show that all villages in involving a particular tribe or a certain type of building or typifying a particular way of life had closely similar housing densities. Research had rather shown that there was great variety.

144. If anything this figure of 72,959 is a little low. None of the four detailed surveys was carried out in a really large village. It is feared that in these cases the number of huts omitted might slightly exceed the 15% as calculated in (c). Moreover, some of the larger villages appear to be unusually wealthy, there seems to be a connection between prosperity and lower than average living densities.

145. The use of air photographs in making hut counts was also attempted. When making estimates of population densities only huts suitable for living in are included. The problem with air photos is that half-finished houses and old, deserted homes will appear as dwelling places providing they have roofs. In areas of dense square mud buildings it is not always easy to tell how many rooms are in a block.

146. The Rural councils concerned provided lists of the population of the area according to villages. It was not really possible to use these for several reasons. In the case of the two southern councils, many villages were omitted from the lists and others apparently appeared under different names. It was not possible to discover the dates at which the lists had been drawn up, so the figures could not be adjusted and brought up-to-date. Moreover, since the lists seemed to have been made at different times, their figures were not comparable. Conical grainstores may also be mistaken for small tukhls. The number of such additional buildings varies enormously and rather irregularly as previously described. (see 65). In the villages surveyed they ranged from 10% to 24% of all buildings. However, bearing these points in mind, hut counts using air photos compared reasonably well with survey made from the ground.

PRACTICAL APPLICATION OF POPULATION FIGURES

147. For working purposes the mean of the two population estimates is taken. This gives a figure of 77,368 for the total population of the area.

148. 16% of the population, or rather more than 12,000 live in the south. 84% or over 64,000 are north of Sherif Yagub.

149. About 39% or slightly less than 31,000 live close to the River Rahad or Blue Nile, and use these rivers as their main source of water supply. 61% or under 67,000 live further east.

150. Only just over 34% or about 26,000 live within area 3C and 3C extension. Almost 66% or around 51,000 live along the riverine strip outside the scheme, or within 5 kilometres of its boundary on the south and east.

Number of households

151. In 1955 the census calculated average household sizes as follows:-

Sudan	5.0 persons per household.
Rufa'a	5.2 " " "
Gedaref North	5.8 " " "
Hosh	6.0 " " " *

Applying the individual council figures to the total population from each council living in the area the following figures are obtained:-

	<u>Population</u>	<u>Persons per household</u>	<u>No. of households</u>
Rufa'a	69,850	5.2	13,434
Gedaref North	5,810	5.8	1,003
Hosh	1,701	6.0	285
Area	<u>77,368</u>		<u>14,722</u>

(A more approximate method is to apply the average figure for household size in Sudan, 5.0, to the total population of 77,368. This gives the slightly higher figure of 15,473 households).

* First population census of Sudan 1955/56 Final report Vol. 1 Dept. of statistics. Khartoum 1961. Compiled from tables 1.8 and 1.9 pp. 12, 14, 16.

CHARACTERISTICS OF THE AREAS' POPULATION

152. The 1955 census contains additional data which help in understanding the population characteristics of the area. It must be remembered, however, that the following figures were compiled nine years ago. At that time 90.3% of the population of the area was found to live in Rufa'a district Rural Council 7.5% were living in Gedaref North and 2.2% in Hosh.

153.

1) POPULATION BY AGE GROUP AND SEX (percentages)¹.

	All ages	Under 1		1 - 5		5 - Puberty		Over Puberty		Females over puberty				
		M.	F.	M.	F.	M.	F.	M.	F.	of child bearing age	past child bearing age	unknown		
Sudan	100	50.5	49.5	2.4	2.4	7.4	7.7	12.9	10.2	27.8	29.2	21.1	7.0	0.1
All Arabs	100	51.1	48.9	2.1	2.1	7.6	7.9	14.5	11.1	27.0	27.7	21.5	6.1	-
Rufa'a	100	50.3	49.7	1.6	1.8	8.9	9.2	14.0	10.6	25.7	28.1	21.6	6.2	0.1
Gedaref North	100	51.6	48.4	2.4	2.6	7.0	8.4	13.9	10.7	28.3	26.8	21.2	5.6	-
Hosh	100	51.6	48.4	2.6	2.4	9.1	9.0	14.4	10.8	25.5	26.2	20.4	5.7	0.1

2) MARITAL STATUS OF PERSONS OVER PUBERTY²

Percentage of these over puberty who are married.

	M	F
Sudan	68.3	88.4
Arab	72.1	?
Rufa'a	73.7	88.7
Gedaref North	73.7	96.0
Hosh	75.5	92.0

1. First Population Census of Sudan 1955/1956. Final report vol. 1 Dept. of Statistics, Khartoum 1961. Compiled from tables 3.2, 3.4 and 3.6 pps. 62, 70 and 78.

2. Ibid. Based on tables 4.1, 4.2 and 4.3 pps. 96, 97 and 100.

3) MEASURES OF FERTILITY

a)	Average size of completed family of women past childbearing	Gross reproduction rate
Sudan	4.7	2.4
Arab	4.8	2.4
Rufa'a	5.4	2.7
Gedaref North	5.2	2.6
Hosh	4.9	2.5

b)	Number of children under five per 1000 women of childbearing age
Sudan	902.3
Arab	916.4
Rufa'a	1001.5
Gedaref North	964.4
Hosh	1130.4

4) BIRTH RATE, DEATH RATES AND INFANT MORTALITY RATES⁴

	Crude birth rate per 1000	Crude death rate per 1000	Crude infant mortality rate per 1000
Sudan	51.7	18.5	93.6
Arab	44.7	14.7	72.8
Rufa'a	37.2	12.8	74.2
Gedaref North	49.1	15.3	38.5
Hosh	53.3	16.4	55.7

3. Ibid a) Compiled from tables 2.14, 2.16 pps. 46 and 48.

b) " " " 2.7, 2.8 and 2.11 pps. 36, 37 and 42

4. Ibid Compiled from tables 2.1, 2.2 and 2.5 pps. 25, 26 and 31.

Comment

154. These figures show a young population which has the potential for rapid expansion. The chief census officer wrote that the Sudan has one of the youngest populations in the world, one of the highest nuptiality rates, and almost the highest recorded crude birth rates and death rates.⁵ Compared with the Sudan average figures, the area has an even larger proportion of young people under puberty (1). Its nuptiality rate is extraordinarily high (2). The measures of fertility tables show that both now and in the past family sizes are larger than average. The gross reproduction rate is very high.

155. Rather surprisingly, in view of table 3b, the crude birth rate for all Arabs is lower than average and Rufa's figures are particularly low (4). (It may be that there were fewer than normal births here in 1955). This accounts for Rufa's relatively small natural increase of 2.6%, although its effect is partly offset by a low crude death rate. Infant mortality rates, at least, are lower than the national average throughout the area.

156. As this youthful population matures, rates of natural increase are likely to accelerate, particularly as better medical facilities will probably reduce the death rate. The north of the area is already overpopulated. Thus, unless irrigation can bring about an intensification of agriculture, either living standards must fall or emigration take place.

157. The 1955 census also deals with some socio-economic aspects of population. These are not discussed here for two reasons. The riverine strips belonging to Hosh and Gedaref North Rural Councils represent only small fragments of the total areas of these councils. It would be misleading to apply data concerning the material welfare of the whole to these a typical backwaters. Secondary economic statistics are rapidly outdated. It therefore seemed better to rely on 1964 field experience for this type of material, using the census cautiously for background reference only.

5. K. J. Krotki "21 Facts about the Sudanese" Sudan Census Office Dept. of Statistics, Khartoum, 1957. pps. 22, 38, 43 and 44.

INTEREST IN THE SCHEME

ABILITY

158. The people of the area have virtually all practiced rain grown cultivation. Many have seen and worked on the Gezira scheme. Although over half have used water conservation techniques, almost none have had experience of irrigation. The vast majority have only cultivated one crop - Dura.

159. Some employ labour. A few have used mechanisation and many will have seen agricultural machinery in operation.

160. Their ability as cultivators varies with their enthusiasm. A small minority of nomads see^w totally disinterested, relegating their fields to poor relatives (see sections 45 and 90). All value leisure, and this makes a fair number of farmers less productive than they could be agriculturally.

161. On the whole it seems that the people of the area could make satisfactory tenants. Others with similarly limited agricultural backgrounds have become adapt at irrigated farming in Gezira, Managil and the pump schemes.

162. There will naturally be problems during the first few years, but generally the people seem fairly adaptable to new ideas. Village radios and the widespread use of lorry transport have brought them in touch with the outside world. The young men who have worked on the new dams have broadened their experience. In some cases their imagination seem to have been captivated by the sheer size of modern development projects.

163. The demand for education is growing, especially in the north. Yet the north already has a higher than average number of school places. Even the Butana school at Jebel Fau is enthusiastically, if sporadically attended. The nomads are, at present, the group least interested in education.

164. Despite all this, however, the majority in the area may appear to be traditionally minded and conservative in outlook. Most rural societies are. It does not necessarily mean they are backwards. In a

difficult environment the methods which have been sanctioned by their survival through time may be the effective means of making a reasonable living.

WILLINGNESS

165. Most of the people expressed pleasure at the prospect of a scheme. A few nomads showed clear displeasure, although the Fau villages appeared enthusiastic. Some large stock owners were worried about how the scheme would affect their animal husbandry. Others were anxious lest the scheme involve their moving from old village sites, which are steeped in family and tribal memories. Those who had inadequate or over-cultivated land seemed particularly to welcome the scheme since they see in it a chance to improve their lot.

166. The villagers' concepts of the scheme is wildly nosily optimistic. Theirs' would be a particularly smart development project. Tenancies would be larger than at Managil. No one would expect them to grow tiresome sugar as at Guneid. They would naturally need a lot of land for fodder and grain. Above all they would earn far more than at Gezira!

167. The means for achieving this happy ideal must be left to others. In the following chapter some recommendations are suggested which may make the transfer to irrigation techniques more acceptable and smoother for the prospective tenant.

6 IMPORTANT POSTSCRIPT

P1. Since completing this report it has been learnt that the northern section of 3C is no longer to form part of the proposed Rahad scheme. The small quadrangle south of Rufa'a and the thin strip linking it to the main area, which lies south of Abu Haraz, have been omitted (see fig. 10).

P2. (Two other small areas have also been excluded:-

1) An area of high ground between Abu Haraz and Sherif Yagub which lies fairly close to the river.

2) An area between the R. Rahad and the hills of Fau. This break in the scheme creates a passageway which should facilitate the movements of Blue Nile Arabs to and from Butana in the rains (see sections A50 - A52).

P3. No adjustments have been made to the population figures as a result of the exclusion of these two minor areas.

P4. In the general body of the report, the terms "south", "north" and "far north" are frequently used. The "south", the area lying south of Sherif Yagub remains virtually unchanged. The "north", the area lying north of Sherif Yagub, has been reduced in size. The term "far north" is generally used to refer to the area north of Abu Haraz. Under the new proposals almost all of this area now lies more than 5 kms from the boundaries of the scheme.

P5. Nevertheless, bearing these points in mind, the vast bulk of the report is still relevant.

P6. Two parts of the report, however, require considerable revision.

The number of households in the new area has been recalculated as follows:-

Sub-area	Population	Percentage of population	No. of households
General North (unchanged)	6,813	6.8	1,503
North (unchanged)	1,753	6.7	359
Rufa'a (reduced)	41,308	9.2	7,582
	<u>49,874</u>		<u>9,444</u>

P7. 1) Sections 137 - 151 THE POPULATION OF THE AREA

138) Estimates of population using the 1955 census

<u>Council</u>	<u>Population in Area in 1955</u>	<u>Growth rate per annum</u>	<u>Estimated population in 1964</u>
Gedaref North (no change)	4,800	2.6%	6,046
Hosh (no change)	1,400	3.7%	1,942
Rufa'a (reduced)	30,400	3.1%	40,216
			<u>48,204</u>

142) Estimates of population using hut counting method

Number of huts	=	10303	
Number of people	=	10303×3.75	= 38,636
+ 15% error	=	<u>44,431</u>	

147) For working purposes the mean of the two population estimates is taken. This gives a figure of 46,817 for the total population of the new area.

148) 26% of the population, or rather more than 12,000 live in the south. 74% or just over 34,000 live in the north.

149) About 44% or around 20,500 live close to the rivers Rahad or Blue Nile and use these rivers as their main source of water supply. 56% or over 26,000 live further east.

150) 39% or roughly 18,500 live within the boundaries of the proposed new scheme. 61% or about 28,300 live along the riverine strip outside the new scheme or within 5 kilometres of its boundary on the north, east and south.

151) The number of households in the new area has been recalculated as follows:-

<u>Council</u>	<u>Population</u>	<u>Persons per household</u>	<u>No. of households</u>
Gedaref North (unchanged)	5,810	5.8	1,003
Hosh (unchanged)	1,701	6.0	285
Rufa'a (reduced)	41,306	5.2	7,982
	<u>48,817</u>		<u>9,270</u>

P8. 2) Sections R1 - R32 RECOMMENDATIONS AND CONCLUSIONS

R1 It is understood that the new scheme will provide an irrigable area of about 337,500 feddans, and that the recommended size of tenancy will be about 25 feddans. This being so about 13,500 tenancies will be available.

The new scheme will therefore provide about 1,000 more tenancies than the old proposals. Yet the number of people living in the new area is 30% less fewer than in the old area.

R2. About 9,270 households lie in or within 5 kms of the area demarcated for the new scheme. Most of the people surveyed were keen to participate in the project. A few of them, who are already cultivating large areas, may have the right to be allocated several tenancies (see sections 78 and R12). Yet even if all these households decide to take part in the scheme about 3,000 tenancies will remain vacant. These holdings will have to be taken up by immigrants into the area. This makes the recommendations on resettlement (R4 - ^R27) particularly relevant.

R6) Over 5,450 families live in the "far north" of the area originally surveyed. The way of life of these people has been recorded in some detail in this report. Believing that the scheme was to come close to or include their homes, these families have been expecting to participate in it. Of all the people surveyed they have the most need of irrigated tenancies. Their fields are small and sometimes infertile because of over-population and over-cultivation (see sections 77, 81 and 82). Their harvests are meagre and uncertain because of inadequate and variable amounts of rainfall (see sections 28 - 32). It is therefore suggested that these people might be offered tenancies before the other groups mentioned in Appendix A, most of whom live in better watered areas.

R28-32) It is to be hoped that the reduction in the size of tenancies from 40 to 25 feddans will not result in operators' net cash incomes falling much below 200 LS.

7 RECOMMENDATIONS AND CONCLUSIONS

R1. It is understood that the scheme will provide an irrigable area of about 500,000 feddans, and that the recommended size of tenancy will be about 40 feddans. This being so about 12,500 tenancies will be available.

R2. About 14,722 households lie in or within 5 km of the area demarcated for the scheme. Since most people in the villages surveyed were keen to take part in the scheme this suggests that an adequate number of tenants will be found locally.

R3. The situation is complicated however, by the fact that beyond Sherif Yagub population becomes increasingly dense as one goes north. South of Sherif Yagub population is very sparse. (see sec. 40 and 41). North of Abu Haraz the scheme becomes narrow in width and limited in area. Thus only a small proportion of those living in or around the scheme in the far north will be able to find tenancies nearby.

R4. It is not clear how eager the northerners will be to have tenancies if it means leaving their homes. Many of the villages here date from before the Mahdia (see sec. 40). In several villages, people stressed their reluctance to move, raising the matter spontaneously during interviews. Furthermore, in the immediate vicinities of both Abu Haraz and Rufa'a certain people may not wish to move because the benefits of an irrigated tenancy would be outweighed by the loss of tertiary employment opportunities available in these centres.

R5. In a few parts of Managil the problem of resettlement has been shelved by allowing farmers to remain in their old villages. Some men are living up to 30 kms away from their tenancies. Opinions are divided about this. Some officials say that such tenants are inclined to neglect their fields. Others say that a good farmer can cope, and is happier and more efficient travelling to work in this way than he would be if he were uprooted, and faced with strange neighbours and building problems on a new site. In the north of the Rahad scheme it seems that there are good grounds for allowing tenants to live somewhat more than 5 kms from their holdings at least in the first instance. The transition to irrigated agriculture may be smoother if farmers can devote their full attention to cultivation, without the problems attendant on resettlement. The women of the north are anyway accustomed to having their husbands away for considerable periods (see sections 131 and 132) so that overnight absences from home to tend fields should not cause family difficulties. Nonetheless adequate space for village sites should be left within the scheme. It is to be hoped that tenants, who began by living more than 5 kms from the scheme, would eventually find it more satisfactory to live on it.

R6. If there are still difficulties in setting enough tenants for the scheme locally, Appendix A indicates adjacent areas where suitable farmers might be found.

R7. If there should be a shortage of tenants for the far south it might be worth reconsidering the general policy of not employing local West Africans (see section A12). They have proved to be highly efficient cultivators both in the Gezira and in the Gash, where some of them were given tenancies during the condominium period. On the Rahad scheme they could perhaps be allocated tenancies, as a temporary measure, on an annual basis.

R8. Most of these West Africans seem to have been in Sudan for many years. Few appeared to have any real intention of returning home, although they have a sentimental and romantic attachment to their countries in the west. They might be encouraged to apply for Sudanese citizenship. Many West Africans in Sudan have never taken this step merely through ignorance or because they are living in a remote area. As Sudanese nationals they would be eligible to receive tenancies.

R9. There seem to be between 100 and 125 households of West Africans in the area studied.

LAND ALLOCATION

R10. The land in the area requires registration. In the north, where cultivation is by turus, private ownership is assumed. Land can be inherited and if it is sold the transfer of ownership takes place in the presence of government officials. Land in the pioneer areas of Gedaref North officially belongs to the government. Cultivators choose land, with the approval of the local sheikh, if necessary. If land changes hands the price involved is merely a form of compensation to the previous owner for his efforts in clearing the field in the first place. Wadi land in the Butana is regarded as "belonging" to individuals who hold it with the permission of the tribal authorities. Gerf land is allocated by the local authorities and an annual rent is paid. Sagia land is privately held and is registered*.

R11. In expectation of a scheme there is likely to be a great expansion of cultivation in the south. Nomads and pioneer settlers will probably plant scant crops of Dura over wide areas. This is in order to achieve compensation when "their" land is taken over by the scheme, and to establish their right to as many tenancies as possible.

R12. It is assumed that the government will adopt the usual methods of granting compensation and of allocating tenancies on the scheme. These methods are very fair and have stood the test of time. The allocation of plural holdings, however, always presents a problem. In the north there are some large landowners. A few may be absentee landowners, but others seem to be efficient and a few have adopted mechanisation. It would be a pity if these men did not receive tenancies corresponding to their previous acreages providing they appear to be good managers. An upper limit might be fixed at three or four tenancies for an able-bodied man with his dependents, since irrigated agriculture requires closer supervision than dry farming. On the other hand it would be ridiculous to give an unexperienced nomad several tenancies if he had only been cultivating a large area in the expectation of this happy event.

* Information supplied by Gedaref N. Rural Council and Rufa'a Rural Council.

R13. (It would seem fair that West Africans should be compensated for their land in the same way as Sudanese. After all they have saved the government clearing costs. If the loss of their land and their exclusion from the schemes results in their having to move they should receive the same compensation for house loss as Sudanese who move to the scheme as tenants).

THE EXISTING VILLAGES

R14. South of Ein el Luweika there are no permanent settlements within the probable boundaries of the scheme (See section 38). This should enormously facilitate the layout of the project.

R15. There is a transhumant settlement at Jebel Buweida lying just within the project. Sited on the pediment it is an area which is too high and too sandy for cultivation. If it is still to be used as a nomadic camp there must be free access to the Butana, while the surrounding irrigated fields must be protected. If the boundaries of the scheme are extended into the Jebel Fau region, as has been suggested, similar remarks will apply.

R16. Between Ein el Luweika and Sherif Yagub several villages may fall within the western margins of the scheme. Whether or not they do depends on the exact location of the boundaries, which awaits detailed soil and altitude surveys. Such villages are Babanusa and Buweida, which are served by wells, Sheikh et Tief which is several kilometres from its Rahad water supply and several transhumant or recently transhumant camps which also use river water.

R17. Dense well-based settlement begins directly north of Sherif Yagub, although luckily there does not appear to be much along the narrow strip between the main scheme and the Rufa'a section.

RESETTLEMENT OF VILLAGES

R18. In the interests of economy and simplicity as few of the existing villages as possible should be moved when the scheme is established. Where necessary small rather than large villages should be moved. Several of these could then be amalgamated on a new site

if they are individually too small to form practical settlements. In order to avoid moving bigger villages, it may be possible to arrange the layout of canals so that they by-pass settlements, as has been done in Managil.

R19. Villages where there are a large number of brick buildings are especially expensive to move because of the costs of reconstruction with similar materials. Moreover, since these are the wealthier villages, they are likely to be more vocal and influential in their complaints if such a move is proposed. Public buildings such as medical units and schools are by no means cheap to rebuild as the following table shows.

Recently constructed public buildings

(sources - various local government departments)

Dressing station and house	£ 1,050
Dispensary with three houses	£ 6,000
Sub-grade school	(£ 650 - £ 700 (local (£ 2000 materials)
Elementary school (no house)	£ 8,000
Elementary school with houses	£ 14,600
Elementary boarding school	£ 25,000 - £ 29,000
Girls elementary school with houses	£ 15,000
Girls elementary boarding school	£ 32,000

It is therefore recommended that villages containing permanent government buildings such as these should not be moved when the scheme is established unless it is absolutely essential.

AMALGAMATION OF VILLAGES

R20. If the development of the scheme includes the amalgamation of settlements the following points should be noted. As section 56 indicates, the people of the north are accustomed to living in multi-tribal villages so that amalgamation involving a further mixture of Arab tribes should present no serious problems. Experience in Gezira and Managil has shown that different communities can be brought together to form satisfactory new villages, and in Gedaref harmonious multi-racial settlements are being formed voluntarily.

R21. The easiest villages to amalgamate would be those which already share the same sheikh, and those which, having formerly existed as one community, were forced to divide for economic reasons (see section 57).

R22. The new village sites should be large enough so that the amalgamated communities may form themselves into distinct quarters if they wish. Former neighbours should be resettled close together to avoid the disruption of social ties. In extreme cases, it may be necessary to accept different sheikhs for each community.

NEW HOUSING

R23. Villagers who are involved in moving in order to take up their tenancies should be compensated for their houses in the usual way. An indication of the costs of building modest new houses is given in sections 63 and 64. As the scheme comes into being, however, scarcity of building materials and labour may cause costs to rise.

R24. Many of the houses in the north are well finished and "extras" form a significant part of their value. Villagers should be asked to bring all removable parts such as doors, windows, mesh screening and roofing timber with them so that their new houses may be constructed as economically as possible.

R25. It is most important that tenants should have time to build their new homes before the beginning of the first cultivation season. It would be extremely demoralising to embark on a new demanding form of agriculture while spending the rainy season in a hastily-constructed temporary shack. At Managil many of the first tenants were disillusioned and disappointed in their tenancies because of an over-hasty start. If necessary tenants should be given loans in order to complete their houses. The money could be deducted after the first harvest.

R26. Because of difficulties in obtaining building materials locally, especially in the north, house construction would be accelerated if the government supplied materials to the village sites.

R27. At present living densities are rather high in the Rahad area. In the villages surveyed there are 5.3, 3.7, 3.4, 2.6 people to a room (excluding kitchens and similar shelters). In Gezira, however, Culwick* found there were only 2.0 people to a room among tenant households

*Culwick "A study of the Human Factor in the Gezira Scheme"
Sudan Gezira Board, Wad Medani, 1955 typescript.

and 2.6 people to a room in non-tenant households. In the Rahad villages surveyed between 6% and 12% of the households have separate kitchens. In Gezira 50% of the tenants (and 25% of the non-tenants) had separate kitchens. These figures suggest that increasing prosperity results in increased home construction. Ample room should be left on the village sites in the Rahad Scheme to allow for improved densities.

AGRICULTURAL EXPECTATIONS

R28. The people of the area hope that the coming of irrigation will enable them to enjoy a higher living standard than before. It is those who are poor at present who are most enthusiastic about the scheme. Some are sceptical, pointing out that the Gezira tenants have not made very large profits in recent years.

R29. Section 119 shows that in this part of Sudan a family requires a net cash income of about 200 LS. per annum if it is to achieve modest prosperity. It is recommended that as far as possible the scheme should attempt to provide cultivators with an income of this magnitude.

R30. It is true that this figure is larger than most of the local people receive at the moment (see section 123). There are, however, certain disadvantages in being a tenant which require compensation. The farmer on an irrigation scheme has to work fairly hard during most of the year. The people of the area are not used to sustained periods of cultivation. Sporadic efforts during the three month growing season are all that is required at present.

R31. Tenants are to a great extent tied to their holdings. The Arabs of the east bank have always prided themselves on their freedom and independence in comparison with their west bank brethren in the Gezira. Many will miss the annual migration to the Gezira and may regret the restrictions on their mobility.

R32. If they become tenants many of the younger more vigorous men may miss the good money which they have been earning on construction jobs in the dry season. The construction boom in the eastern Sudan is unlikely to last. Nevertheless, profits from irrigated agriculture should be such that able men like these are attracted to the scheme.

ATTITUDES TO AGRICULTURE

R33. There is no reason to suppose that the people of the area will prove dissimilar to tenants elsewhere in Sudan. They will not wish to be peasants but rather gentlemen farmers whatever their gross cash incomes. net incomes will probably be lower than estimated because they will employ more labour than the government considers necessary. Only a severe labour shortage accompanied by an astronomical rise in wages, will nullify the value which the people of the area put on leisure (see Appendix D).

AGRICULTURE ON THE SCHEME

R34. The people living in within the project area have clear ideas of what crops they would wish to grow on an irrigation scheme.

DURA

R35. Millet forms the staple carbohydrate of the central Sudan. (see section 84). It is grown by tenants of the Gezira and Managil schemes and on the flush irrigation schemes of Gash and Tokal. It has an important economic and psychological value. The tenant is assured a basic food supply. This is a major attraction to people accustomed to crop failures following erratic rains. It makes the tenant less dependent on the market prices of whatever cash crops he is producing. Moreover, the tenant with millet to spare can attract ample labourers to his tenancy by offers of food. (see section 135).

R36. After harvest Dura stubble can be grazed by household animals. Offers to provide grazing of this sort are a further attraction to prospective pickers with large herds (see section 134). The tough stalks of the Dura form a useful building material. It is much used to construct shelves, temporary housing and, in the south, where the mud is unsuitable for bricks, for building permanent homes (see section 59).

R37. In an area such as the Rahad project Dura grown under irrigation should produce about $3\frac{1}{2}$ ardeb of grain per feddan. Since an average family needs about 5 - 6 ardebs a year for its own consumption, a minimum area of 2 feddans should be put under millet on each tenancy.

This area would provide only a small surplus for attracting labour. Tenants on the Managil extension feel that $2\frac{1}{2}$ feddans under Dura is inadequate.

R38. It would probably be wrong for so much surplus Dura to be grown on irrigation schemes that it came to compete with non-irrigated millet, which is the only commercial crop which can be grown in the drier parts of the northern clay rainlands. In recent years there have been occasions when a glut of Dura has lowered prices, and there are difficulties involved in increasing export markets for this grain.

R39. Nevertheless there is likely to be a steady increasing market for Dura within Sudan as the urban population grows. Besides, small quantities of Dura fed to livestock on the schemes could greatly improve their condition.

R40. The tenants on the Guneid scheme complain about the exclusion of Dura from the rotation. Many attempt to grow rain grown Dura on the margins of the scheme, and this detracts from their efficiency as tenants. The Shukriya who are to be established on the Khashm el Girba scheme are also upset at the exclusion of their staple food.

R41. Dura is the one crop which all the people of the area have had experience in growing - whether they are settled or nomadic. Adaptation to irrigation techniques will be facilitated if tenants are cultivating a crop with which they are already familiar.

R42. There are two good reasons for devoting about 5 feddans of land to Dura on each tenancy.

FODDER

R43. The villagers of the area are most anxious to be allowed to grow fodder on their tenancies. They seem aware of its value to good livestock management. They have seen it being used in the Gezira and Managil schemes. Several men already attempt to bale and store grass for later use by their household stock. All appeared to realize the increased market value of well fed beasts (see section 114). Moreover, since fodder crops form part of the rotation on all the big irrigation schemes (except Khashm el Girba) the people are led to expect its inclusion at Rahad. If it was excluded the project would become less attractive in comparison with other schemes.

R44. Any surplus fodder could probably be sold to Butana nomads in the dry season. Indeed it would be good if surplus water was used to grow fodder for stock on the western margins of the scheme. This would provide the nomads with some compensation for the grazing they have lost. It would also improve the condition of the beasts at a time when normal grazing was in short supply (see also Appendix B).

ANIMALS

R45. Throughout Sudan meat and dairy prices are high. In Gezira and Managil there is a great shortage of animal products. Mrs. Culwick commented on the great number of beasts which are brought into Gezira annually for slaughter*.

R46. The existing irrigation schemes in Sudan have not developed an integrated system of mixed farming. Household animals have been kept and fodder has been grown, but that, for the most part, is all. In recent years in Gezira there has been a very small, though successful establishment of a dairy industry in a few places. (My own information of this development of dairying duplicates that already supplied by Mr. Grist and is therefore omitted here).

R47. The people of the Rahad area all keep animals, many on quite a large scale (see section 10 and following). For the most part they are devoted to and experienced in livestock management. The Rahad project could utilise this available skill. It would provide an opportunity of rethinking the role of livestock on irrigated schemes in Sudan.

R48. Surplus milk could be converted into butter or cheese for sale locally or in Medani and Khartoum where there is a steadily growing demand.

SUGAR

R49. The villagers do not wish to grow sugar. A very few of those living in the area have tenancies on Guneid where sugar is the chief cash crop. They are not convinced of its merits. They are worried about the prices they will receive for their cane when the government ceases to offer them fixed prices in 1965. The profitability of sugar production in

*Culwick "The Human Factor in the Gezira Scheme" Sudan Gezira Board, Wad Medani typescript.

this region seems doubtful unless the government wishes to subsidise it, for other reasons.

R50. Neither Arab nor West African labour are keen to handle sugar. At Guneid, southern Sudanese have had to be employed. This has caused a certain amount of tension. It has also probably led to a withdrawal of family labour as tenants say they do not wish their wives to be seen working in the fields with southerners.

R51. Moreover, if sugar is grown on a scheme then millet has to be excluded because of the possibility of disease transmission. Therefore, unless economic conditions change radically, there are good social reasons for not growing sugar on the scheme.

VEGETABLE GARDENS

R52. Throughout the area there are riverine villagers who are skilled in cultivation of vegetable on gerf. In the north a few have worked on sagias' and pumps, and have some knowledge of fruit production as well (see sections 97 - 105). These people should be encouraged to practise market gardening on the Rahad scheme. The Roseires dam will provide ample water for the intensive use of a small amount of land in this way.

R53. At present the people of the north appreciate, at least partially, the advantages of vegetables and fruit in a mixed diet. Throughout the area there is a lack of vitamin C at the end of the dry season. On an irrigation scheme this could easily be remedied, especially if citrus fruits such as limes were grown. The sophisticated market of Medani and, to a lesser extent, Rufa'a are likely to provide a demand for any surplus garden products. Onions and dried peppers are habitually used by nomads and dried tomatoes might also be sold to them.

SERVICES

R54. The Sudan government has established methods of allocating services in irrigated areas. Thus only a few supplementary comments about the provision of services will be made.

R55. One of the main indirect benefits of living on an irrigation scheme is that better services can be provided at lower cost than in the often sparsely populated surrounding areas. The typical pattern of settlement on a scheme is of regularly spaced villages of fairly large size. These can be provided with services relatively easily. In Managil, for example, the government attempts to ensure that no village is more than 5 kilometres from a school, 5 - 6 kilometres from a dispensary and 10 - 12 kilometres from a veterinary station. This spacing of services seems basically satisfactory.

R56. The people in the northern part of the area have been comparatively well served with schools, and have a high regard for education (see fig. 8). If they are to be attracted to the tenancies in the south of the scheme it is important that the poor state of educational facilities here should be remedied. Some tenants' children may be able to find places in existing schools in the south not all of which are full. But new schools will also be needed. The opening of new schools should where possible coincide with the initiation of the scheme so that the children of tenants may not be without educational facilities.

R57. Many of the people of the south are living far from schools (see section 41). Both they and any nomads who may be settled on the schemes may need encouragement if their children are to benefit from education. At present many are not fully convinced of the merits of schooling and may not appreciate the necessity for regular attendance.

R58. These people are also usually living far from government medical facilities. They are reluctant to travel to a dispensary or hospital except in an emergency. Then they may be bewildered by and suspicious of the treatment they receive. Local dispensaries can thus do much to improve health standards in the south, but initial misgivings may have to be overcome first.

R59. The people of the north stressed that schools must not be too far from the villages which they serve. A seven-year old cannot walk more than a few kilometres. If the school is further away then the boy has to be provided with a donkey. The poorer families cannot afford this, and thus education is confined to the children of the prosperous.

R60. Girls' schooling lags far behind boys, although in the north there is an increasing demand for it*. Girls' schools are fewer and therefore further apart than boys'. Yet girls cannot travel as far to school as boys because it is not considered seemly for them to ride donkeys. It is therefore hoped that, as far as possible, adequate sites for the future building of girls' schools will be available in the irrigated villages, even if finance and demand do not allow many such schools to be built in the first instance.

R61. It is important that at the very outset each village should be assured of a safe accessible supply of drinking water. If not, the villagers will develop the habit of drawing water from the nearest canal. This habit will be hard to break if hygienic water points are supplied later. Meanwhile Bilharzia may have become endemic, as it has in Gezira.

EXTENSION SERVICES

R62. The establishment of compact, permanent settlements in an irrigation scheme provides an admirable opportunity for extension work. The Sudan has been slow to develop services of this type. Adult education only began in 1947 when classes were held in Gezira. The Gezira Board now has 16 adult education workers and 78 social welfare workers. Many of the villages in the southern Gezira have received extension courses and work is just being extended to Managil. There is a severe shortage of personnel which limits activities. Attempts should be made to overcome this problem and to recruit suitable applicants, particularly able women.

Women's work

R63. Women's education has made much less progress than men's. Adult classes, can, to a certain extent, help to even out this discrepancy. Domestic science courses are obviously useful. Kitchen methods are primitive though often surprisingly hygienic. Some knowledge of sewing could enormously prolong the life of household linen and clothing.

* Rufa'a had one of the first girls' schools in Sudan.

R64. Women spend long hours preparing millet for meals. Much time could be saved if there were more mills and bakeries. Ground space for these could be auctioned as they were in Managil.

R65. This would mean that women would have more time to work in the fields at peak periods. At present some of the women in the area help with their husbands' crops. Others engage in cotton picking when they move to Gezira with their families. Like the women in Managil, they may be prepared to do a certain amount of agricultural work when their men acquire tenancies. This is to be encouraged as it would reduce the need for outside labour.

R66. In many villages in the project area, the men are away for several months each year (see sections 132 and 133). The wives acquire considerable independence and responsibility at these times. Having the menfolk at home all the year, as will occur on the scheme, will require domestic adjustments. It will be a great pity if the women lose their maturity of outlook. Too often in Sudan the inferior position of women has resulted in their being irresponsible and childish*.

AGRICULTURAL EXTENSION WORK

R67. Agricultural extension services will be especially valuable in certain circumstances which may arise as the scheme is developed.

- 1) If nomads are given tenancies they will almost certainly require extra help in cultivation techniques during the first few years of the scheme. In fact, the less accustomed to an agricultural way of life the tenant is, the greater will be his need for help, both in adapting to his new circumstances and in carrying out his basic farming tasks.
- 2) If dairy industry is to be encouraged tenants will require help in such matters as constructing dairies, purchasing equipment, techniques of storing fodder and in the hygienic handling of milk products. Experience in Gezira has shown that officials can assist in altering traditional attitudes to livestock by, for example, encouraging culling.

* Culwick "The Human Factor in the Gezira Scheme" Sudan Gezira Board, Wad Medani 1955 Typescript.

- 3) If the crop rotation on the Rahad is to involve an intensive use of the land then it will be necessary for the tenant to perform his tasks within a scheduled period. Extension workers can by advice increase the speed with which the tenant carries out his agricultural routine.
- 4) The villagers in the project area are not accustomed to communal work, except over house building. The government may want to establish cooperatives on the scheme, either for marketing or for producing products such as vegetables or dairy produce. If so it will have to provide help until the cooperatives are running smoothly and their members are experienced in this kind of activity.

R68. Thus extension work, both agricultural and social is no luxury. Rather it is a sound investment producing a more able tenantry who have higher standards of living and efficiency.

MARKETS

R69. At present the north of the area seems to be adequately provided for by markets. There may be no need to increase the number when the scheme is established. Markets near but beyond the periphery of the scheme may decrease in importance, while those within the scheme may increase in size.

R70. At the moment the south has few markets. Sherif Yagub with about forty shops and fifteen stalls open on market days, lies on the margin between the densely settled north and the poorly populated south. If irrigation came, it would probably expand. From Sherif Yagub southward there are no other markets until Teneidba is reached, lying just beyond the southern margin of the proposed scheme. The people living along the Rahad between Ein el Luweika and Luweisa in fact shop at the towns on the other side of the river. Teneidba itself, has only a small market and twenty or so permanent shops. It does not seem to be particularly prosperous. Probably the much older market of Mafaza lying only 17 miles to the south detracts from its trade. The development of the scheme would probably increase Teneidba's prosperity. Mafaza's influence would decline. This historically important and

energetic town has already sustained one blow to its prominence when the railway by-passed it in the 1920s.

R71. Ein el Luweika has been a shopping and refreshment centre for some time. Merchants appreciated its position at the junction between the north-south riverine road and the road to Gedaref, through Fau and the Mechanical Crop Production Schemes. These traders are asking the local government authorities for permission to establish a market here. Particularly if the Rahad scheme is developed such a market could perform a most useful function as it would be admirably sited. Other new markets might also be necessary. A possible site would be at Jebel Fau which is already a minor service centre. Fau could then act as a market for the exchange of nomadic produce of the central Butana with irrigated produce from the west. It might be desirable later to establish two more markets near the eastern margins of the scheme, one north and one south of Fau. There are no villages here at present and future settlement patterns would doubtless determine their exact location. Another possible market site would be mid-way between Ein el Luweika and Teneidba near the river where, at present, settlement is very sparse.

APPENDIX A

THE SURROUNDING AREAS

a1. In case not enough people in the area wished to receive or were considered suitable to receive tenancies a brief survey was made of the surrounding districts to see whether the people there were eager and competent to participate in the scheme.

THE SOUTH

a2. Immediately beyond the area studied there is a forest reserve with little settlement. But within a few miles of Mafaza (which is 17 miles from Teneidba) the population becomes dense. There are six large Arab villages, each of them apparently having a population of 500 or more.

a3. The people here are relatively sophisticated. Mafaza, itself, is a very old market-town lying in the traditional zone of contact between nomad and agriculturalists. It has specialised as a centre for commercial lorry transport. Both Mafaza and one of the villages to the north of it have schools and dispensaries, which are widely used by the surrounding settlements. A large number of West Sudanese labourers are employed for the entire cultivation season. There is at least one tractor owner, and others also employ mechanisation.

a4. If more people are required for the scheme it is felt that these villages would make particularly intelligent tenants. Some of them have gum gardens, however, and it must be remembered that the trees require tapping at intervals between November and March. There is also considerable animal husbandry, Kenana cattle in particular being kept. In some cases these may occupy the attention of their owners more than is thought desirable on a scheme.

a5. These villages all lie within Gedaref North Rural Council, part of which falls within the project area. Therefore there would be no administrative problems in giving these people tenancies.

THE WEST BANK OF THE RAHAD

a6. The people of the west bank of the Rahad fall into two geographical groups. There are a series of well established villages in

the north. Southwards there is empty wooded country. Then there is a cluster of small, scattered villages, beginning fifteen miles west of Teneidba. These increase in size southward along the river towards Mafaza.

a7. In considering the suitability of these people as tenants on the Rahad scheme, it is important to realise the close connections which already exist between villagers on both sides of the river. The same Arab tribes are found throughout the riverine strip. Intercommunication is easy, as the river bed is dry for more than half the year. People may use markets or even schools on the other side, if it is convenient to do so.

a8. There are about a dozen Arab villages lying close to the river north of Hufeira. Much of the land between the Rahad and Blue Nile here has been developed by the pump schemes. The people already come into close contact with irrigated agriculture. Some have actually acquired tenancies on these schemes. Most of the remainder pick cotton on them - except for the northernmost villagers who go to the Gezira for their picking.

a9. The pump schemes have reduced and restricted the rainland available to villagers. This together with the increasing population, means that cultivable land is often over-used and in scarce supply. There are occasional instances of groups emigrating from here to settle in the empty riverine lands, which are to be found in the southern part of the area on the east bank.

a10. If additional tenancies are available, there are good reasons for considering this group of people from the West Bank. They have acquired considerable knowledge of irrigated agriculture, either through practical experience or through close contact. They are keen to adopt this type of farming. Many have tried but failed to find tenancies on pump schemes locally. Socially, there should be no serious difficulties in settling them on the scheme. They already have close relations with people on the east bank, and a few at least have demonstrated their willingness to emigrate.

a11. There are about a dozen villages in the Southern group. East of Teneidba the settlements are mostly inhabited by West Africans. The villages are about twenty to fifty years old, and vary considerably in size,

containing upwards of fifteen huts. The majority of the people are Fulani who tend to keep large herds of cattle.

a12. Most of these West Africans have probably never taken out Sudanese nationality, although they have been living here for a long time. Therefore under the present regulations they are not eligible for tenancies.

a13. At present the gerf land in the area is largely unused (possibly because of the numbers of stock) but there are one or two small irrigated gardens near Mafaza. The development of the scheme could stimulate vegetable production here and possibly create a market for animal products.

THE NORTH WEST

a14. There is a line of dense settlements north-east of the proposed scheme, which show up clearly on the 1:250,000 map.

a15. More land for turus cultivation is available here than nearer the river. In addition there seems to be considerable use of harig for cultivation. The employment of labour is widespread, and in every village visited some people were using tractors. In this area of marginal rains, yields are very low. Large acreages have to be cultivated in order to obtain a food supply.

a16. The people are enthusiastic stock-rearers. Unlike most people in 3C and 3C extension, they admit to owning many herds of camels, as well as considerable flocks of sheep. The camel market at Tambul is famous.

a17. In the dry season there is a very marked migration to Gezira. The ability to obtain three months' grazing, food supply and wage-earning employment doubtless helps to maintain reasonable living standards in a very harsh environment.

a18. These villages are more subject to drought than any of those within the proposed scheme area. Theoretically, their populations would therefore benefit most from irrigation. Despite their extensive cultivation techniques, however they are in many ways conservative, retaining a traditional nomadic outlook. In time of stress they might well sacrifice crops in the interests of their animals. Moreover, many might not want tenancies

if it meant abandoning their old villages, to which they are very attached (to a lesser degree this reluctance to leave home affects all the prospective tenants in the outlying districts)

THE GEZIRA

Since the beginning of the Gezira scheme, the people from the west bank of the Blue Nile and its tributaries have provided a large and regular supply of labour for cotton picking. Many of those who make this annual migration come from within or near 3C and 3C extension. If the Rahad scheme is developed their labour will be withdrawn from Gezira.

The supply of labour has already become scarce. The Gezira used to use pickers from villages immediately to the south, but these now have tenancies of their own on the Managil extension. And they themselves require labourers of their own. The Rahad scheme, too, may require workers for cotton picking. The existing shortage of labour would thus be doubly exacerbated.

THE WEST

a19. The problem arises as to whether any of the Butana nomads might wish to be considered for tenancies. Since they will lose some of their grazing grounds it might be thought equitable for them to be invited to participate. When they lost pasture and also some areas of rain-grown cultivation at Khashm el Girba they were offered tenancies as compensation. They may thus expect to receive a similar invitation in the case of the Gezira scheme.

a20. The nomads of the Central Butana are already practising a very limited form of migration. There are signs that many are ready to adopt a more settled way of life.* The deterrents to this have been the grazing requirement of extensive animal husbandry and inadequate water supplies. (The settlement at Suki had to be abandoned because of a well failure). For geological reasons it is not easy to create permanent water supplies in much of Butana. By allowing nomads to hold tenancies on the scheme the government would indicate its desire to offer these people a more settled existence.

* Abu Sinn "The Economy of the central Butana" B.A. thesis University of Khartoum 1964.

a21. The nomads seen at Banyia el Faki certainly expressed keen interest in the Rahad scheme. In the case of Khashim el Girba 20,000 feddans have been set aside for the Shukriya. More have asked for tenancies that will be able to receive them.

a22. It would be wise to see how the nomads settle down on this scheme, before making any final decision regarding the Rahad project. Some say that the Shukriya only wanted tenancies at Khashim el Girba because they mistakenly think they will get freehold like the Nubians, that they only intend to grow fodder, or, alternatively, that they will grow the prescribed crops and then turn their beasts loose in the fields (on the Gash scheme the Beja have been known to pasture their herds on their cotton plots when grazing was scarce). The officials in charge of the Khashim el Girba scheme, however, are hopeful that all will be well and consider the Shukriya should make competent tenants.

a23. At Khashim el Girba the exnomadic tenants will grow neither millet nor fodder. The divorce with their past way of life will be complete. They will have to make drastic and, it seems, unnecessarily great adaptations to their new environment. This may result in considerable inefficiency during the period of adjustment. Moreover, it appears economically wasteful to neglect the nomads' skill in animal husbandry.

a24. It is suggested that the nomad be allowed to grow millet on his tenancy. Dura is the only crop with which most, at least, are already familiar.

a25. If the rotation selected for the scheme is very intensive it may be best if the ex-nomads, and other tenants who are agriculturally inexperienced, begin with a simple rotation. Then as they become more competent, more varied crops and a larger proportion of the holding can be cultivated.

a26. A tenancy could provide a nomadic family with a settled home within easy reach of services. There seems no reason why some of the men in the household should not continue to herd stock in Butana, providing cultivation is not neglected. (Many nomadic families do not expect to be united throughout the year anyway. Women frequently spend some time at a base camp while the men go off with the animals).

a27. It is suggested that fodder be grown on the ex-nomad's tenancy. The problem with animal keeping in Butana is that of deficiency of grazing in the dry season. The Scheme's fodder could be used as a supplementary feed at a time when lack of pasture normally results in a loss of condition. Better quality animals in the dry season would result in animal prices remaining high throughout the year. Moreover, because of their interest in livestock the nomad would be pleased to grow fodder. This would help to overcome his generally low regard for agricultural activities. (See secs. 44 and 90)

A28. The scheme would provide a new market for animal products. Meat fattened on irrigated pasture would fetch a good price in this densely populated area. Surplus milk from Butana beasts could be sold to the creameries which are being recommended for the scheme. Kenana cattle, which are widely kept in the south, are one of the best milk producing breeds in the country. Under normal conditions they yield 12-15 rotls of milk a day with two milkings. But if fed on an improved diet their yields increase to 40 or even 50 rotls a day with a fat content of 3-4%.

a29. A plan like this would provide the nomad with a smooth transition to irrigated agriculture with comparatively little loss of efficiency due to disruption of his way of life.

a30. It would offer the nomad a chance of adopting a more intensive form of animal husbandry. To be successful it requires a change in attitude towards animal values. Beasts must be appreciated for their quality rather than their quantity. Such a change is not impossible. As section 116 shows there is already some regard for livestock quality among the people of this part of Sudan.

a31. Such a project would require close co-operation between the Ministry of Animal Resources and the Ministry of Agriculture. At a local level, at least, it is often felt that the latter simply imposes its will on the former.

a32. The provision of supplementary fodder could reduce the pressure of livestock on Butana, at a season when further grazing would cause most damage to the regeneration of pasture. This beneficial effect of the scheme will only be felt if livestock numbers remain constant. At present the amount of water and grazing available in the dry season imposes a limit

on the number of animals kept in Butana. The provision of fodder and water in the scheme could result simply in an increase in livestock numbers. These beasts would then require more natural pasture in the rainy season. The Butana could become so overgrazed that it would lose its value as one of the best grassland areas of Sudan.

a33. Surrounded by irrigation schemes except on the north, the Butana will cease to be an area of nomadic grazing in the traditional sense. Ranching techniques (such as carefully spacing water-points, controlling animal numbers and ensuring an even, moderate use of the available pasture) will have to be applied to it. This is indeed already beginning to happen. Only in this way can the Butana's grazing lands be preserved, and in this way the value of livestock on it can be enormously increased.

A detailed consideration of the effects of the Rahad Scheme on the nomads of Butana who do not receive a share in the project forms Appendix B.

APPENDIX B

THE SCHEME AND THE BUTANA GRAZING AREA

a34. The land demarcated for the Rahad Scheme forms part of the central Butana. This clay plain is one of the best sheep grazing areas in the country, and is also extensively used for cattle and camel raising.

a35. The traditional pattern of grazing is one of convergence into Butana in the rains, when beasts can water at pools and hand-dug hafirs. In the dry season nomads disperse southwards and to the Rivers Atbara, Rahad, Dinder and Blue Nile. Only a few Shukriya remain in the interior using the scanty well water available in the pediment zone around rocky outcrops.

a36. This grazing pattern resulted in large areas of grass away from wells and rivers being undergrazed for lack of water supplies. Only camels which range far from water could reach these areas. Conversely sheep and cattle, forced to remain close to water points, caused severe over-grazing around them.

a36a Part of the western interior of the Butana was particularly important as a source of rainy season grazing. The pasturage was good, for the area lacked water points and so could not be overgrazed in the dry season. It was widely used by the people of the Butana. The western Shukriya, mainly settled in villages near the Blue Nile, sent their beasts there. So did the Lahawin and E. Shukriya who spend the dry season on the Atbara, and the Shukriya who winter at their wells in the centre of Butana. Some Batahin came from the Abu Deleig area and some Bisharin from even further north. But this grazing area was also used by tribes from the west. Cuahla, Kenana and Rufa'a from between the White Nile and the Rahad, used the area for their stock and particularly their camels. In the dry season they returned to the Rahad, Dinder, Blue or White Niles, travelling south and completing an annual migration of over more than 200 miles*. Lack of water supplies resulted in large areas of grass away from wells and rivers being undergrazed.

* Information on migration obtained from own enquiries, government files and especially:

- a) Harrison "Grazing in Butana" and Baasher "Effects of further extension of the MCPS on the grazing of Butana". Both undated typescripts.

a37. During the last twenty years the utilisation of Butana has changed considerably.

a38. Hafirs have been dug mechanically enabling a wider area to be grazed by sheep and cattle. A line of such hafirs runs N-S between the Atbara and the wells of central Butana. There is a second cluster between these wells and the villages bordering the Blue Nile and the Rahad. These hafirs seldom contain water after March but they nevertheless have had two important effects.

a39. Firstly they have enabled sheep to graze areas that could previously only be reached by camels. It has therefore been possible to increase the number of sheep kept in Butana. Since sheep are by far the most profitable animal to rear in this area, there has been an accumulation of wealth.

a40. Secondly, the hafirs have reduced the need for an extensive southward movement of the central Shukriya in the dry season.

a41. Other factors, too, have tended to reduce Shukriya migrations. Since 1945 large areas in the southern part of Gedaref District have been put under mechanised crop production. Although nomads can obtain permits for their animals to graze the stubble and water at hafirs, they cannot enter the schemes until harvesting is finished. The southern part of the district used to be sparsely populated but now pioneer settlement is increasing. Clashes between settlers and Butana nomads and settlers are not uncommon.

a42. Thus in recent years migrations have gradually become restricted and a much more intensive use has been made of Butana. Few parts are under-grazed and it seems likely that the Butana may be becoming overstocked.

a43. Around many water-points "Sedia", one of the most valuable fodder plants for sheep and camels has disappeared.

a44. The establishment of the Khashm el Girba Scheme will reduce the Butana's grazing by over 362,900 feddans in the initial phase. (A further 400,000 feddans or so will presumably be lost if the scheme is later extended). Animals which used to water along the 45 mile stretch of the Atbara will have to go elsewhere. Overgrazing of the riverine strip north

and south of the scheme will probably increase. The organisers of the scheme intend to provide watering points for nomads on the outer margins of the scheme. These water points will be only about 17 miles from the line of mechanised hafirs and about 40 miles from the wells of the central Butana. Thus it seems likely that their provision will cause further overgrazing in the eastern Butana.

a45. Not only is dry season pasture being lost, but one group of nomads is losing its rainy season camp site. This lay on well-drained sandy ground between the main canal and the Atbara. The Shukriya concerned will no longer be allowed access to it.

a46. The introduction of the Rahad Scheme will have a similar but even greater effect on the grazing of the western Butana. 350,000 feddans of pasture will be put under cultivation. Along a hundred mile strip Butana nomads will be prevented from reaching the waters of the Rahad or the grazing of the kerrib lands beside the river.

a47. As in the case of the Khashm el Girba the Rahad Scheme will have to provide nomads with alternative dry season water supplies along its outer margins. If water is supplied at discontinuous points there is likely to be severe overgrazing beside these points and possible overcrowding. If it is possible to provide water by means of a continuous canal, watering will be facilitated and grazing more evenly used.

a48. Such a canal would bring about 300,000 feddans of pasture into use in the dry season. This pasture, part of the general grazing area, has previously only been used in the Rains as it lies far from water supplies. It will be particularly welcome as it will be accessible to the beasts of the densely populated northern part of the scheme.

a49. The canal, however, would doubtless cause further overgrazing around Fau. The high land around these hills is extensively used by nomads for sites for rainy season camps. In the dry season its wells provide water for the men and beasts from four villages and three large ferigs. The canal, by providing easily available water only a few miles from the hill would attract more stock than the surrounding grazing could support.

a50. The Rahad scheme will not only reduce the grazing available to Butana nomads, it will also affect the migration of Blue Nile Arabs northwards into the general grazing area in the rains.

a51. This migration is on a large scale. Probably about 50,000 camels, 45,000 sheep and 20,000 cattle take part in it. The Guahla, Kenana and Rufa'a who own the beasts bring them north with the first rains, crossing the Rahad at Ein el Luweika before the river rises. At the end of the rains when pools dry up the animals leave the general grazing area and return to the Rahad where they may graze for a few weeks until the river is low enough to cross.

a52. The Rahad scheme will lie across the route taken by these nomads from Ein el Luweika to the several grazing areas. A new routeway will have to be made north or south of the scheme. Alternatively a passageway with fodder and water points will have to be made through the centre of the scheme. If the former course is adopted care will have to be taken lest the nomads interfere with the water points and grazing of the existing riverine villages.

a53. The Rahad scheme will reduce the general grazing area and this may make the Butana Shukriya less willing to accept these rainy season migrants. The migration of the Kenana, Rufa'a and Cuahla have already been affected by the development of pump schemes on the Blue and White Niles. If, in addition to the Rahad scheme, the Kenana scheme is developed, their nomadic movements will become extremely circumscribed. It will be very difficult for them to continue to pursue their present way of life. The whole position of nomads in Sudan will have to be reviewed.

APPENDIX C

LIVESTOCK ESTIMATES

a54. It is not easy to estimate the number of livestock kept in this part of Sudan.

a55. All animals including goats are subject to an annual animal tax. Tax evasion is understandably common. It is estimated that in Sudan probably only about one third of all livestock are taxed. In the Rahad area local government officials believed that about half the animals were being taxed. Rufa'a Rural Council was the only council to respond to my request for up to date figures on animals taxed. Such of these figures as refer to the area studied are available at the end of this appendix.

a56. It is likely that the degree of tax evasion varies with the type of village concerned. It is comparatively easy for nomadic peoples to avoid taxation simply by sending away a proportion of their flocks and herds during the assessment period. The same is true of wealthy Arab villages, where many of the animals graze far from the village for most of the year. In a settled village where only household animals are kept it is much harder to hide them. Much too depends on the connivance of the local sheikh.

a57. Because they fear more thorough taxation the people of the area are naturally unwilling to reveal the true numbers of their livestock to anyone who appears, however remotely, to have official connections.

a58. A small proportion of the villages seen seemed to understate their livestock numbers, not simply to avoid repercussions over taxation, but in order to emphasize their poverty. Thus they hoped to show how necessary it was to establish an irrigation scheme in order to improve their lot.

a59. One of the most persistent of the nomadic concepts in the Rahad area is that animal ownership brings prestige. Livestock numbers may be exaggerated in order to increase the importance of one's own village. Numerous herds will be ascribed to prominent men. This type of exaggeration is usually vague; phrases such as "many", "hundreds" and "lots of herds" being common. Such statements must be treated with caution.

a60. There are however certain rough guides to the number of livestock kept by a village.

a61. If a village's animals all graze locally throughout the year then a survey of the grazing available round the village will give some idea of their numbers. (Animals do not normally graze far from water points: in the nomadic areas of central Butana, sheep will normally graze up to 15 miles from water points and cattle up to 12 miles*. Beasts from the settled areas of the southern Butana do not graze so widely. Goats seldom travel more than 5 miles to water and cattle seldom more than 8 miles **). Thus a village where all the stock are permanently at home is not likely to have many beasts, because the surrounding pastures could not support them.

a62. Animals are formed into "mudah" or herds, each herd being looked after by a stockman. There is some regional variation in the size of mudah, but these are approximate limits to the numbers of each type of animal which can be cared for by one man. Thus a knowledge of how many herds a village has gives some idea of number of livestock owned.

a63. A village may have one or two rich people with large numbers of beasts. These animals may be formed into private herds. They may not mix with the other village livestock. Thus enquiries at a village should include questions about any wealthy men with personal "mudah".

a64. During the dry season these are comparatively few water points in the Rahad area. Stock congregate at certain wells or by certain ponds in the river for watering. By watching all such points the number of animals grazing the area during that particular time could, presumably, be assessed. The task would require individuals stationed at each water point. It would be tedious, especially as not all animals are watered daily. In this part of Sudan goats are usually watered every day - but not always. Cattle are often only watered every two days in the dry season. Sheep are watered every two or three days. Camels, on average, are watered every five days***.

* Harrison "Grazing in Butana" Typescript undated

** Graham "Rural Water Supplies and Settlement in Gedaref District, Sudan." Phd. thesis University of London 1963.

*** Own research confirmed by Harrison "Grazing in Butana" typescript undated.

The results would include many animals belonging to nomads who are only in the area for a few months each year. It would exclude any animals from the area which graze elsewhere, notably in Gezira at the height of the dry season.

a65. The water points' method of counting livestock could not be used in the rainy season. The grass is lush; animals drink very little. However, when they do it is often in dispersed ponds that have been formed on the surface of the clay. Even poor wells and hafirs hold some water at this time, so that there are numerous scattered sources of water which could not all be checked.

a66. Some have suggested that slaughter house records would indicate the livestock kept in the area. The slaughter house records record animals officially killed. This is not the same as the number of animal deaths. Many animals are slaughtered privately for family use, particularly in the more remote areas. Others just die. Moreover, as Culwick* has pointed out in the case of Gezira, slaughter house records are usually neither complete or clear enough to be handled to any useful purpose. In any case, in the bigger centres some of the animals killed have been brought in from outside the Rahad area, by nomads living further afield.

* Culwick. "A Study of the Human Factor in the Gezira Scheme"
Typescript, Sudan Gezira Board, Wad Medani, 1955.

ANIMALS ON WHICH TAXES WERE PAID

VILLAGES IN THE AREA STUDIED

IN RUFA'A RURAL COUNCIL

<u>Village</u>	<u>Goats</u>	<u>Sheep</u>	<u>Donkeys</u>	<u>Cows</u>	<u>Camels</u>
Ghanawa	26		9		
Rhawa Ahmed	45	32	9	11	1
El Dahawi	23	22	5	27	9
Taiba	42	36	16	36	
Awadiya	37	36	16	36	
Dahawi Koror	95	15	12	22	9
El Mudah	199	90	18	21	8
Wad el Ubeid	139	36	36	63	9
Musselamya	32	59	24	40	1
Ureibi	88	61	21	53	4
Raghwi	135	29	23	25	16
Khamsin	47	34	4	15	4
Abu Dona	91	71	26	46	9
Wad el Muheidi	86	24	18	9	
Fang Misselamya	77	46	5	37	123
Balaalab ferig	260	50	3	47	60
Shanabla ferig	316	261	2	19	68
Rubamat ferig	192	87	1	68	104
Masavaa ferig	433	107	10	86	310
Mahala	59	19	13	17	
Khairan	119	124	49	94	1
Wad Fadni	81	55	21	45	28
Umm Khuteira	85	17	28	58	3
Abu Galfa	178	64	32	82	1
Misselamya (2)	178	96	29	39	7
Hubeika	109	54	23	51	10
Umm Mattda	70	54	22	1	1
Bala'a lab	26	17	3		1
Hashish	39	177	6	7	6
Gerfa	48	29	14	19	11

<u>Village</u>	<u>Goats</u>	<u>Sheep</u>	<u>Donkeys</u>	<u>Cows</u>	<u>Camels</u>
Umm Hureizat	57	207	35	47	15
Trajnia	123	130	35	25	5
Scrufab	69	474	13	46	23
Saiyal Wad Falr	52	215	18	58	9
Banat	335	86	94	68	2
Umm Talata	127	80	24	63	11
Dallawat	336	94	110	130	
Hubeika	150	100	3	37	
Rufaiin	222	114	74	81	26
	4796	2995	890	1608	889

N.B. This list is incomplete but it nevertheless may serve to give the reader some idea of the livestock kept in the northern part of the area studied. (It includes both villages within the scheme boundaries and those within 5 km of the edge of the scheme).

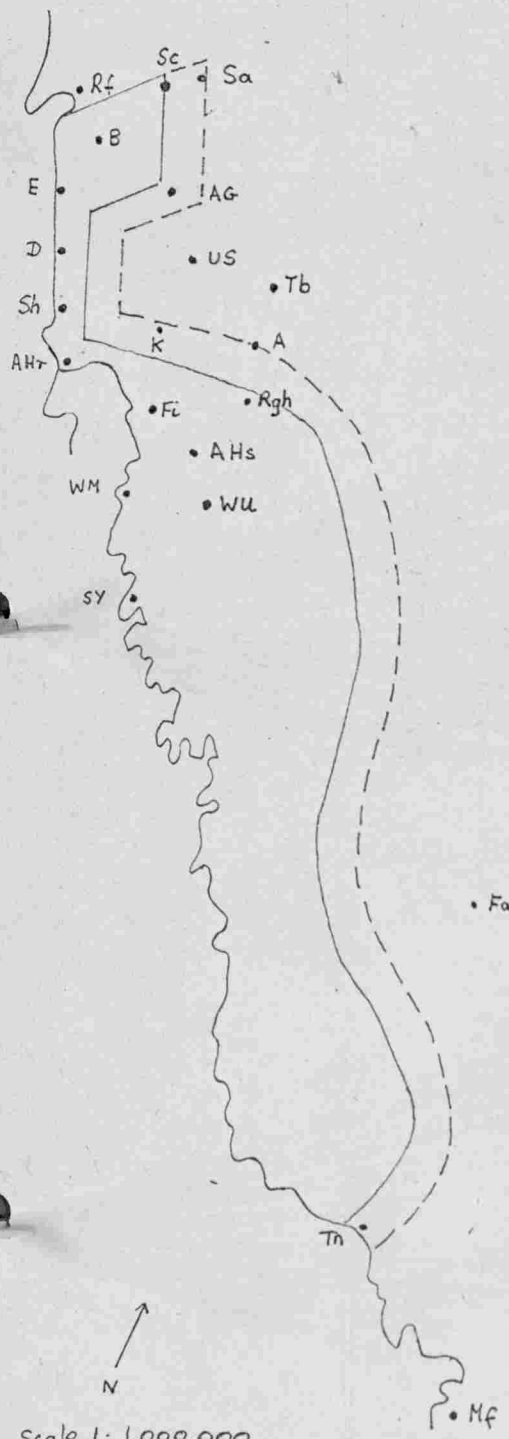
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These were the main references used. Numerous other articles in Sudan Notes and Records and in the Proceedings of The Philosophical Society of Sudan were also consulted as well as government monographs and files.

FIG. 9. SERVICES IN 3C AND 3C EXTENSION

•Z



Initials	Village Names	Elementary Boys' school	Sub-grade Boys' school	Elementary Girls' school	Sub-grade Girls' school	Medical Facilities
Rf	Rufaa	Many schools		and a	hospital	✓
Sc	Scurufab	✓				✓
Sa	Saiyal		✓			✓
B	Banet		✓			
E	Erewab		✓			
AG	Abu Galfa		✓		✓	✓
D	Dallawat		✓			
Sh	Sharafa	✓		✓		✓
US	Um Shaneg	✓			✓	✓
Tb	Tebeid		✓			
K	Kheivan		✓			
A	Amara	✓			✓	✓
Ahr	Abu Haraz	✓		✓		✓
Fi	Fig		✓			
Rgh	Raghwa		✓			✓
AHs	Abu Hassan	✓		✓		✓
WM	Wad Meheidi		✓			
WU	Wad Ubeid		✓			✓?
SY	Sherif Yagoub	✓		✓ or	✓	✓
Fa	Fau		✓			✓?
Tn	Teneidba		✓			✓

In addition boarding schools at Zurga, (Z)
Mafaza (Mf) and Wad Sugurbi (ws) were used.

