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NOMADS OF THE SEMI DESERT BELT OF NORTHERN KORDOFAN AND DARFUR REGIONS

VOL. I

A BASELINE STUDY OF SODIRI DISTRICT

BY :

M. O. ELSAMMANI
G. EL TAYEB
B. ABDALLA
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A BASELINE STUDY OF SODIRI DISTRICT

By

M. O. EL SAMMANI,(Ph.D.),Geography,
Department of Geography,
University of Khartoum (Team Leader).

B. ABDALLA,(Ph.D.),Geography,
Faculty of Education,
University of Khartoum.

G. EL TAYEB,(Ph.D.), Geography,
Department of Geography,
University of Khartoum.

M.M. SULIMAN,(Ph.D.),Range Ecologist,
Range & Pasture Administration.

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El Gaa
El Koketi
El Shatib
El Shaw
Fadliya

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Shershar
Umm Garfa

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Debba
Dongola
El Ordi

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Ed Dueim
El Sheikh El Siddig
El Shigeig

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El Liri
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Kutum
Malha
Mellit

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Abu Hadeid

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Abu Mariga

Abu Urug

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Dazingur

El Farak

El Gemmama

El Hagib

El Hiraiz

El Mohbas

El Mikhanzir

El Safiya

El Shatout

El Rabda

Gabrat Esh Sheikh

Gabrat Umm Gamal
Gambir
Gireih El Sarha
Hamrat El Wuz
Hamrat Esh Sheikh
Jebel Haraza
Kabsh Nor
Kagmar
Kujum
Sodiri
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Tinna
Umm Badr
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Diweih

Gamouiya

Gawamma

Guhayna

Guraan

Hassaniya

Hawawir

Kababish

Kaja

Katul

Kawahla

Medoib

Norab

Nuba

Zaghawa

Zeyadiya

3. Local terms used

3.1. Abu Sabein

Sorghum vulgare.

3.2. Adal

A kind of well lining, using wood which is laid in a square form at the botton of a well.

3.3. Ansar

Followers of the Mahdi (see 3.20)

3.4. Bir (plur. Abyar)

A well of average depth, of permanent type or annually dug.

3.5. Barseim

Medicago sativa.

3.6. Daboka(s)

A herd of camels of the size of a 100 heads

3.7. Dallo

A container for drawing water from wells using a rope.

3.8. Damar

Connotes dry season grazing period (November-May).

3.9.. Darat
Connotes early months of dry season grazing period (November-December)

3.10. Dika(s)
Nomadic encampment

3.11. Dukhun (millet)

3.12. Fettarita
A variety of sorghum

3.13. Galiba
A sack of salt weighing 50 lb.

3.14. Gizu
Vegetation of the desert portion of the north western corner of Sodiri District.

3.15. Idd
A well-field

3.16. Karr
A protected place prepared for ewes lambing during wet period.

3.17. Khabir
A guide in charge of trekking commercial livestock to export markets.

3.18. Khor
A seasonal water course. It is mostly used for drainage lines in the Savannah region.

3.19. Mahal
Connotes drought conditions

3.20. Mahdi (Mahdist)
Relates to the Mahdiya Revolution (1881-1898)

3.21. Milih and Gardiga
The two are minerals used by locals in livestock operations.

3.22. Murah
A herd of cattle or camels; a flock of sheep or goats. Sizes on the average are : cattle (50 heads) camels (50) sheep and goats (100).

3.23. Mushra (plur. Mashari)
Any kind of water source where livestock is watered.

3.24. Nazir
Official title of a head of a tribe.

3.25. Nazerite(s)
The office held by a nazir, or the territory of the tribe.

3.26. Nishoog
Connotes early wet season grazing period (June-July)

3.27. Omda
A head of a sub-tribal unit

3.28. Qoz
A country of rolling sand, varying from gentle undulations to dunes of varying height.

3.29. Sanya (plur. Sawani)
A well of great depth in the order of 30 metres and more. In all cases it is lined with permanent materials, and animal power is applied for drawing water.

3.30. Sifal
Land that carries a dense cover of dry grass from last rainy season.

3.31. Umm Lawaay
A kind of well lining using branches of trees which are laid in a circular form at the bottom of the well.

3.32. Zariba(s)
An enclosure made of thorns

3.33. Zinari
A sorghum variety.

3.34. Wadi
A seasonal water course. It is mostly used for drainage lines in the semi-desert and desert regions.

CHAPTER ONE

INTRODUCTION

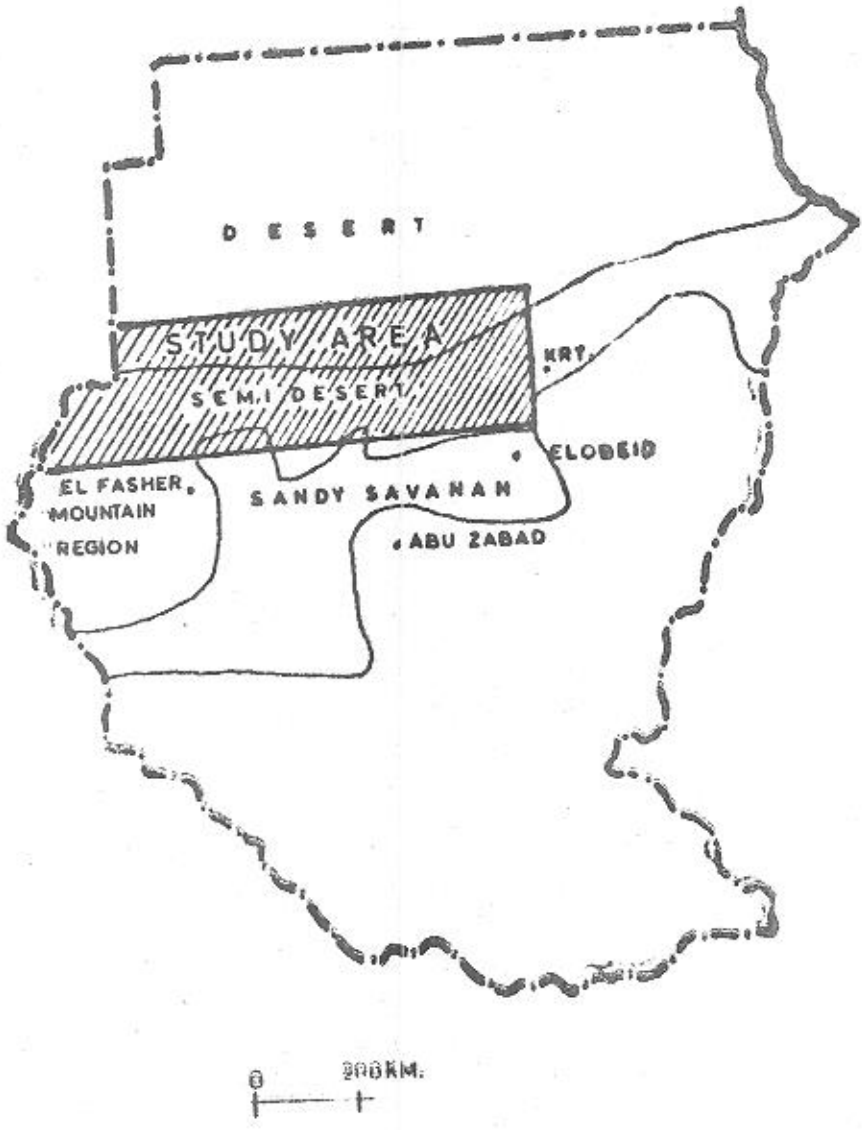
1. General:

The title of the research project under which this study is done, is "nomads of the semi-desert belt of Northern Kordofan and Darfur Regions, with a suggested strategy for action". In administrative terms the belt referred to here, embraces Sodiri district in Northern Kordofan, and Kutum district in Northern Darfur, which is the area lying north of Lat. $14^{o}.00'N.$ approximately. In terms of tribal composition, Sodiri district includes main nomadic groups such as the Kababish, the Kawahla, and the Hawawir, plus some settled communities. In Kutum district, the main nomadic groups are the Zeyadiya, the Zaghawa and the Medoib, again with the presence of some settled population, Fig.(1).

Though the administrative boundaries of the study area, and the ecological setting of the semi-arid belt define the Southern limits of the area at Lat. $14^{o}.00'N$, where the administrative and the ecological boundaries happen to coincide, the penetration of nomads south of this latitude necessitates an extensive treatment of the subject; which entails examining current phenomena in the southern parts of Kordofan and Darfur regions.

FIG. (1)

LOCATION OF THE SEMI DESERT BELT IN THE SUDAN



2. Content of the Study:

As it came in the initial proposal submitted to the National Council for Research for funding the study, the research aims at investigating the ecological and socio-economic parameters of the nomadic economies prevailing in this belt. Based on research findings, a strategy for action to tackle the problems of the belt shall be formulated.

The interest in studying the nomadic population of the two areas i.e. Northern Kordofan and Northern Darfur, arises from the migratory behaviour of these populations which transcend the administrative boundaries of the two regions to utilize the grazing resources available, at different times of the year. As such there is a need for a comprehensive treatment of the whole belt as one eco-system.

Within the above frame the issues treated by the study are :-

i) Examination of the main features of nomadic ecosystems with emphasis on the ecological, economic and social parameters,

ii) study of the ecology of the area, as a spatial and temporal container within which the systems operate,

iii) investigation of the human aspects, reporting on the main nomadic groups that comprise the population of the belt,

iv) study of human settlements and existing service facilities to reveal the degree of development attained by the population,

v) examination of the water supply situation, as a basic activator of the nomadic ecosystem, and a main determinant of nomadic migratory patterns,

vi) study of the nomads migratory systems exhibiting their basic features and the change they have undergone in time,

vii) assessment of the range/livestock management to reflect the current situation; and the potentialities of the two areas,

viii) investigation of livestock marketing activities as indicative of the economic bases of the area, and

ix) finally, examination of the phenomena of environmental degredation, and identification of indicators of change, to reveal the strain under which the ecosystems of semi-arid lands operate at present.

3. Objectives of the Study :

Two objectives are envisaged to be achieved by the study :-

i) As emphasised in our initial proposal, nomads of the semi-desert lands have never received comprehensive treatment by researchers. The work so far done approached the problems of this belt from a specialist angle. Though we do not claim that the outcome of this study shall furnish a resource inventory of the belt, our broader treatment of the various parameters studied is adequate to lay the ground for formulating a strategy to guide action for improvement of conditions in this belt. This stands as the basic objective of the study.

ii) The need for such a strategy is justified on many grounds. The study area is one of those which are suffering most from environmental decline at present. It is labelled as desertified and experiencing depopulation at an accelerated rate . The occurrence of both phenomena has negative impacts on areas outside the semi-desert belt, to which livestock and human populations are continuously heading. Thus a strategy that checks the ongoing degradation in the northern parts of Kordofan and Darfur and works towards their rehabilitation,

shall automatically relieve the resources of the 'pull' areas from the over use they presently experience.

4. Organization of the Study :

This document is Volume I on the nomads of Northern Kordofan. It shall be followed by Vol.2 on the nomads of Northern Darfur. Based on the findings of the two volumes a synthesis of problems and the suggested strategy shall appear in Vol.3.

5. The Study Team :

The team which conducted the study was comprised of three geographers and a range ecologist, as main researchers. At some stage of the work the team consulted a range specialist and a hydrologist. The team was assisted by three research assistants: a geographer and two agriculturists, in reviewing secondary data, preparation of map work, and in carrying out the field survey.

6. Research Methods :

The findings of this work are based on review of secondary data and field visits to the study area.

Prior to the field visits all senior researchers and research assistants spent some time examining the available literature on the subject. A major achievement in this regard was the preparation of an album of quarter million maps for all of Kordofan and Darfur, showing the existing water sources and the migration routes of the different tribal groups. This proved later to be a valuable aid for assembling map information in the field.

A main visit to the area was made in May 1983 involving three of the senior researchers, accompanied by research assistants. The methods applied were observations, study of transects, group interviews, meetings and consultations with government officials, plus review of office data. The visit took 15 days, during which the team managed to visit all of the main centres of the area including : Umm Inderaba, Gabrat Esh Sheikh, Hamrat El Wuz, El Safiya, Umm Kherwei, Gemmama, Sodiri, Hamrat El Sheikh, Umm Badr, Gireih Es Sarha Scheme, Sawani El Shikheib, and El Mazroub. (The latter is in Bara District).

This main visit was followed by two short ones in October and December 1983, by the team leader and the range ecologist, for the purpose of studying the

area at different times of the year, and substantiating some of the previous findings.

Based on the field data furnished by the visits, the team embarked on analysing the findings and writing up Vol.I. The final outcome of this effort is presented in this document.

CHAPTER TWO

ECOLOGICAL BACKGROUND

1. Location:

Sodiri district is the northernmost district Kordofan region. It is located between Latitudes 14° and 16° 80'N, and Longitudes 27° and 32°E. (Fig.2). Areawise, this territory is nearly 130,000 sq.km., and is ranked as the largest district in Kordofan region.

2. Climate:

2.1. Type

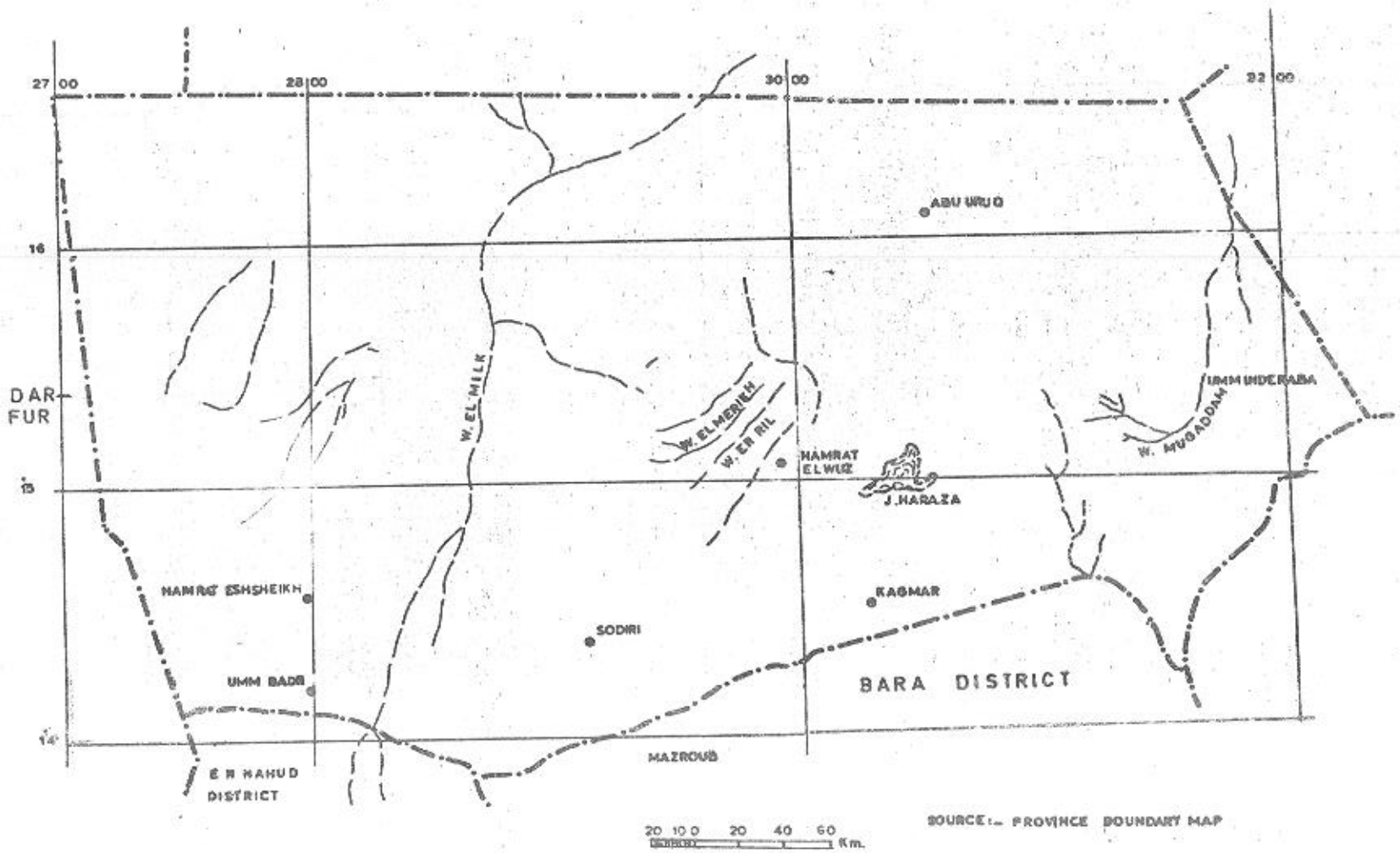
Being entirely land-locked, Sodiri district has a predominantly continental climate. The climate of the area is classified by most authorities, as desert and semi-desert, with summer rain and cool winter. It is dominated like most parts of the Sudan by the annual movement of the boundary between the dry northerlies and the wet southerlies (Ireland, 1948). This boundary reaches its northerly limit in mid summer and its southerly limit in mid winter.

2.2. Temperature

The temperature, being influenced by arid and semi-arid conditions (desert), varies greatly between day and night, this being the case particularly in

FIG. (2)

SODIRI DISTRICT (DAR KABABISH) AREA = 130000 Km²



SOURCE :- PROVINCE BOUNDARY MAP

the northern part of the district. The daily maximum in winter and summer varies roughly between 38°C and 45°C, respectively, while the daily minimum varies roughly between 15-25°C in the same succession of seasons.

Table (1) shows data concerning mean daily maximum temperature, mean daily minimum and mean daily piche evaporation for Sodiri Meteorological Station.

The highest mean maximum usually precedes the rains and the months of occurrence vary from April to May. The lowest mean minimum occurs in winter (December January and February) and generally the seasonal variation decreases from north to south. The evaporation follows the same pattern; it decreases from north to south.

2.3. Precipitation

Throughout the district, rainfall is meagre and sporadic. It varies from 0-50mm in the north, to 50-300 mm in the southern part of the district. In this particular district rainfall is always described as uncertain both in quality and time of occurrence.

Table 1.

Mean Daily maximum, Mean daily minimum and mean daily piche evaporation for Sodiri Station for the period 1962-1982 (Sudan Meteorological Department).

Daily Maximum °C

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Octo.	Nov.	Dec.
26.2	33.4	39.4	41.2	41.0	37.3	35.1	37.2	34.5	26.0	28.7	30.4

Daily Minimum °C

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
5.3	12.8	16.7	18.0	24.0	25.0	25.4	24.2	22.4	22.2	15.2	7.5

Daily Pche Evaporation

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
11.3	14.2	17.9	19.0	19.0	17.2	10.0	7.0	6.0	12.5	13.5	13.5

The rainy season is confined to the period between mid June to mid October, while the rest of the year can be described as rainless. In short, rainfall is concentrated within a period of 4-5 months, with a drought period of about 7-8 months.

Table 2 shows rainfall data for Sodiri, Umm Badr and Hamrat El Wuz for the period from 1952-1982, grouped arbitrarily into three periods.

Table 2.

Average Annual Rainfall for some selected Station in Sodiri District.

Sodiri	1952-1962	1963-1973	1974-1981	1952-1981
	235 mm	160 mm	193 mm	196 mm
Umm Badr	1951-1961	1962-1972	1973-1978	1951-1978
	277 mm	197 mm	143 mm	205 mm
Hamrat El-Wuz	1951-1961	1962-1969	---	1951-1978
	185 mm	149 mm		167 mm

Source: Sudan Meteorological Dept.

These rainfall data have been extracted from reports issued by the Sudan Meteorological Department. The three stations are located in the southern part of the district and therefore represent the most favourable areas of the district. However, the decrease in rainfall from south to north is remarkably regular. On the other hand, the mean variability decreases from north to south.

Apart from monthly and seasonal drought, occurrence of severely dry and drought years is normal in this district.

3. Soils :

Generally speaking, the soils and geomorphological features of Kordofan region have been gradually influenced by the geology and the desert climate of the area. In other words, the long years of geological activities together with prevailing climatic conditions resulted in the different groups of soils of today.

In Sodiri district soils can be categorized generally into two major groups, viz: Sandy-loams and dry loamy soils. The former is characteristic of and dominant throughout the district, while the latter is found along wadis and Khors. These two types were formed by the gradual weathering of the parent rocks. It was assumed that in one or more of the interpluvial periods, strong wind blew from the northern Sahara desert and deposited much of its load of sand on the northern and western parts. Later, other series of winds - probably from the northeast - blew on the area and reshaped it into the different present geomorphological features. In all cases these soils are

yellow, neutral to slightly alkaline. Some soil analysis data representative of Sodiri and Umm Badr are shown in Table 3.

Table 3.

Soil Analysis representative of Sodiri and Umm Badr Vicinity.
(Soil Conservation Dept. 1968).

Depth (cm.)	% Sand 0.002(mm)	% Silt 0.002(mm)	% Clay .002(mm)	Soil-texture Class.
Sodiri				
50	87	2	11	Sandy-loam
100	82	5	13	" "
150	83	3	14	" "
200	78	5	17	" "
250	79	5	16	" "
300	75	15	10	" "
350	76	15	9	" "
Umm Badr				
50	64	9	27	Loam
100	65	14	21	"
150	61	9	30	"
200	64	7	29	"
250	52	12	36	Clay-loam
300	47	15	38	Clay-loam
350	46	16	38	Clay-loam

4. Vegetation Classification :

Information concerning the flora of the Sudan and the ecological classification of the country is generally inadequate and for some areas exclusively lacking.

Andrews (1955), "The Flowering Plants of the Sudan" Volumes I, II & III, are considered as the most reliable work pertaining to the flora of the Sudan. The flora of the Kababish district is well reported in these volumes. The desert and the Gizu area have received adequate attention.

Andrews (1955) also came out with a general classification of the vegetation of the Sudan. Later, Harrison and Jackson (1958) started the first genuine ecological classification of the vegetation of the country. Their classification is an integral of soil type and precipitation pattern. However, most authorities in the Sudan seem to agree with Harrison and Jackson classification.

The discussion of vegetation classification of the Kababish district is based entirely on Andrews (1955), Harrison and Jackson (1958) and transect data collected by Mustafa Suliman(*) in 1971-1973, 1982, 1983 and 1984.

(*) Mustafa M. Suliman, (ph.D.), Range Ecologist, Range and Pasture Administration, Khartoum.

The Kababish District is ecologically classified into only two major zones : The desert, and the semi-desert.

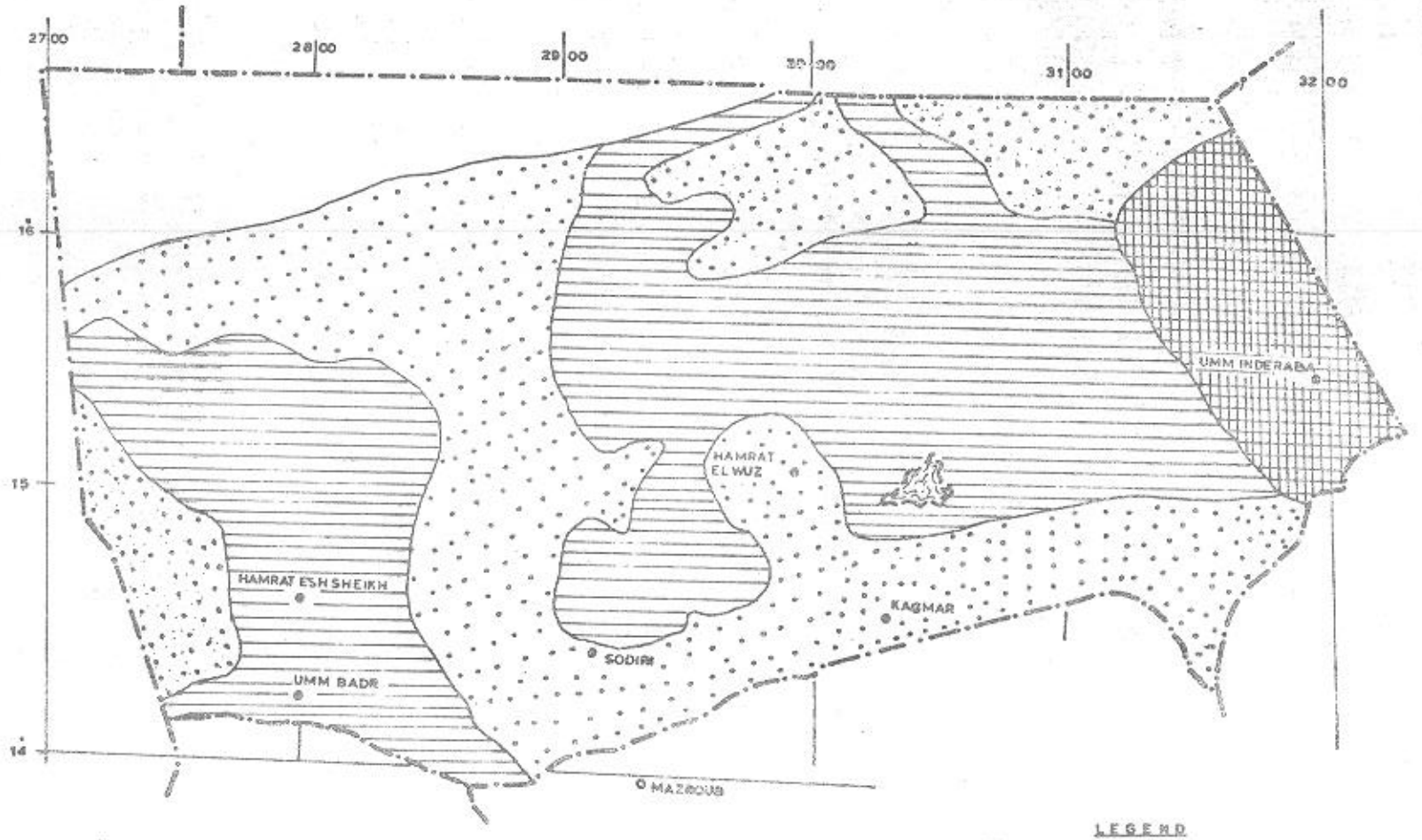
The semi-desert is subdivided into three sub-zones: Acacia tortilis - Maerua Crassifolia Desert Scrub, Semi-desert Grassland on sand, and Acacia mellifera - Commiphora Desert Scrub. Figure(3)shows the vegetation classification of the Kababish area. Table 4 summarizes the area of each zone, its rainfall and seasonal use.

Table 4.

Ecological Zones within the Kababish, Area, rainfall and Seasonal Use (Adapted from Harrison and Jackson(1958).

Ecological Zone	Approx. Area Km^2	Rain-fall mm.	Major Animal Class.	Seasonal Use.
I. Desert(Gizu)	17,403	0-75	Camel, sheep goats.	Winter.
II. Semi-desert:				
1. A. tortilis-Maerua crassifolia, desert scrub.	18,200	75-200	Camels, sheep goats.	Winter-wet.
2. Semi-desert Grassland on sand.	54,128	75-300	Camels, sheep goats.	Wet.
3. A. mellifera-Comiphora Desert scrub.	40,268	75-300	Camels, sheep goats, cattle	Wet.

FIG. (3) VEGETATION CLASSIFICATION



LEGEND

- DESERT
- ACACIA TORTILIS-MAERUA CRASSIFOLIA DESERT SCRUB
- SEMI-DESERT GRASSLAND ON SAND
- ACACIA MELLIFERA - COMMIPHORA DESERT SCRUB

SOURCE:- HARRISON AND JACKSON, 1958.

SCALE:-

20 10 0 20 40 60 Km.

4.1. Desert

The desert portion located in the north western corner of the district is known locally as Gizu vegetation. It is extremely scanty, and is generally found in depressions or in almost permanently dry water courses. Woody species are practically absent and the few to be found are usually deep rooted and often thorny (e.g. Fagonia cretica). In the order of their importance, plant species in this particular area are :-

- Indigofera bracteolata
- Neurada procumbens
- Indigofera arenaria
- Triraphis pumilio
- Aristida paposa
- Tribulus sp.
- Fagonia cretica

These species are always found associated in the desert, but they make their best aggregation in the Gizu area. It has been said that they occur if rain has fallen with the onset of intensely cold nights (Harrison, 1958).

4.2. Acacia tortils - Maerua crassifolia Desert Scrub

This is one of the three associations in the semi-desert zone. This particular association is characterized by sparsely distributed plant cover. Overstorey vegetation is very poor in diversity. Maximum species diversity in this area is always less than ten species, and in most cases a diversity of 4 species per 10 m^2 is considered as maximum.

Important tree species are the following :-

- A. tortilis, variety radiana
- A. radiana, variety tortilis
- Boscia senegalensis
- Maerua classifolia

Species such as A. senegal and Balanite aegyptiaca, are found as out-layers. Along water courses and Wadis, species including A. albida, A. nilotica and Zyziphus species, are also common.

Understorey vegetation is composed of few grass and forb species. In the order of rough importance, these are :-

- Panicum turgidum
- Eragrostis aspera
- Aristida pallida
- Cenchrus biflorus
- Crotelaria thebacia

However, undershrubs such as Leptadenia and Indigofera species are occasionally seen in stable sand dunes and depressions, respectively. Through transect and quadrat readings at Umm Inderaba area (representative of this association), the following floristic composition has been obtained :-

Table 5.

Understorey floristic Composition and Cover values at Umm Inderaba Area.

Vernacular Name	Botanical Name	% Composition.
Banu	Eragrostis aspera	62
Rabaa	Trianthema pentandra	22
Hasskanit Khishin	Cenchrus biflorus	2
Umfissassiat	Fimbristylis dicotomo	7
Dirassa	Tribulus sp.	4
Tumam	Panicum turgidum	3
		100

Cover Value 15%

Most of these species are annuals that dry out and wether away after the rainy season. Perennials are represented by the drought resistant Panicum turgidum which is ranked as least palatable forage species in this area. However, it has a good value as soil-binder.

4.3. Semi-desert grassland on Sand :

This is the major ecological association in the district. It is found on vast stretches of Qoz country, a country of rolling sand varying from gentle undulations to dunes of varying height. In some places dunes up to 50 ft. high are very common.

Floristically, this association has richer species diversity than the preceding association. Representative tree species include the following :-

- A. tortilis
- A. radiana
- Leptadenia pyrotechnica
- Blanites aegyptiaca
- A. senegal
- Silvadora persica.

Understorey vegetation is composed mainly of Aristida pallida, Cenchrus biflorus, Aristida mutabilis, Eragrostis aspera, Panicum turgidum, Steria sp., Blepharis Cinariifolia, Trianthema pentandra, Ipomoca sp. and Tripulus terrestris.

These species are found in varying density and frequency depending upon growth conditions and degree of utilization and disturbance.

Table 6 shows average composition of understorey species and contribution of each species to the total.

Table 6.

Understory Floristic Composition of Sodiri-Kagmar Area.

Vernacular name	Botanical Name	% Composition.
Banu	Eragrostis sp.	21
Tamalka	G. gaynandra	2
Tumam	Panicum sp.	35
Haskanit	C. biflorus	15
Dirassa	Tripulus sp.	5
Gau	Aristida sp.	16
Rabaa	Trianthema pentandra	6
		100

This floristic composition is typical of this association during rainy season. However around live-stock watering places this is not always the case. Species such as Panicum turgidum and Aristida species are almost disappearing.

4.4. Acacia mellifera - Commiphora Desert Scrub

This association is characterized by the occurrence of Acacia mellifera and Commiphora africana species. The former is always found in dense solid stands along Wadis and Khors where soils have relatively higher proportion of clay.

Characteristic woody plant species in this association are :

- Acacia mellifera
- Commiphora africana
- Blanite aegyptiaca
- Acacia tortilis
- Acacia senegal
- Leptadenia sp.

Herbaceous plant species associated with this vegetation are :-

- Polycarpeia sp.
- Eragrostis aspera
- Cymbobogon sp.
- Staria sp.
- Evolvulus alsinoids
- Tripulus sp.

This association constitutes the major camel and sheep grazing areas in the Kababish district. This is mainly due to the occurrence of A. mellifera as a browse species.

CHAPTER THREE

HUMAN ASPECTS

1. Population:

According to 1955-56 national census the total population of Dar Kababish rural council (Sodiri District) was 137,635 person. The 1973 census results showed an increase of more than 62 thousand persons. However, the population of the area had almost doubled during the Intercensal period, 1973-1983, table (7).

Table 7

Population of Dar Kababish Rural Council 1955-56, 1973, 1983

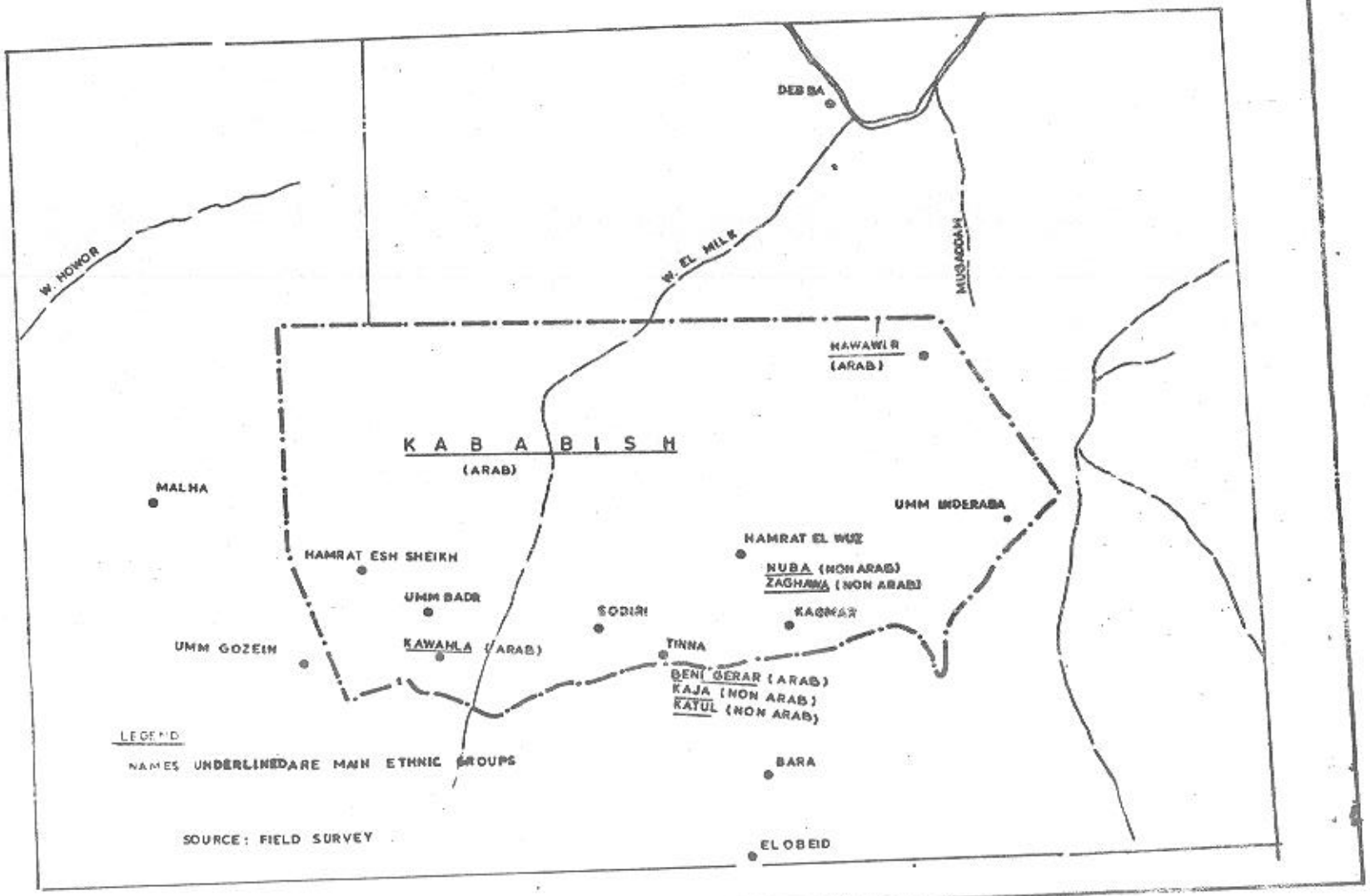
	Urban	Rural Nomadic	Rural Settled	Total
1955-56	-	110,098	27,537	137,635
1973	2,676	137,523	59,652	199,851
1983	3,558	29,461	77,629	210,648

Source: 1955-56, 1973 and 1983 national censuses results.

2. Ethnic Composition :

Two major ethnic groups live in Dar Kababish: Arabs and non-Arabs. The former group are basically pastoral nomads while the latter are sedentary cultivators, table (7) and Fig. (4).

FIG. (4) MAIN ETHNIC GROUPS , SODIRI DISTRICT.



Non-Arabs, who consist of Nuba, Kaja, Katul, and Zaghawa, are believed to be the oldest inhabitants of Dar Kababish having existed there long before the arrival of the Arab tribes. In fact the Nuba, Kaja and Katul are thought to be the remenants of the larger Nuba tribal complex that occupy the Nuba Mountains of northern and central Kordofan. When the Arabs came to north Kordofan the Nuba took refuge in the hills and preserved their identity. They are now scattered in small pockets along the Southern fringe of Dar Kababish near Hamrat el Wuz, Jabel Haraza, Abu-fas, Tinna and Sodiri, Fig. (4).

Under the term Arabs are included different tribal groups who moved into the area within the last 150-200 years. The Kababish and to a lesser degree the Kawahla and the Hawawir, are the main tribes. Other minorities include Beni Gerar, Diweih, Batahin, Bederiyia and Gawamma.

2.1. The Kababish :

According to the 1955-56 census there were about 68,000 Kabashi living in the area i.e. more than 50% of the total population of Dar Kababish. The Kababish are believed to belong the Guhayna Arabs, and some

authorities think that the Kababish were at one time in their history sheep grazing people and the name Kabsh, meaning male sheep came from that connection.

However the Kababish do not consist of only one tribe with one common origin. They are, rather, a collection of different Arab tribes who migrated to this part of the country in waves and at different times in history. Each new wave of Arab people who came to the area were gradually absorbed into the larger Kababish tribe. In fact tribes joined and left the larger Kababish tribe at different periods and immigrated from one locality to another. It must be noted, however, that some tribes were not absorbed and maintained their separate identity though administratively they are under the Kababish. These are the Kawahla, Hawawir, Batahin, and Beni Gerar.

Historically the Arab tribes migrated to what is now known as Dar Kababish through three routes: the Darb el-Arbain, Wadi Elmilk, and Wadi-Mugaddam Fig.(2). They originally occupied the area west of Wadi-El Milk. During this century, however, the Kababish expanded their territory westwards into northern Darfur. This expansion produced inevitable clashes with tribes of

Northern Darfur including Mediob, Zeyadia, Zaghawa and Guraan. This conflict continued from the beginning of this century till 1946 when an agreement, commonly known as the Malha agreement, was signed to reduce the conflict between these tribes. Another Malha agreement was signed in 1964. The aim of both agreements was to govern the relationship between the Kababish and the Darfur tribes, especially on the questions of grazing and water rights as well as on stray and stolen animals.

2.2. The Kawahla :

According to 1955-56 census the total population of the Kawahla was 13,000 people. It is believed that the Kawahla moved into Dar Kababish from the White Nile just before the advent of the Turkish Rule in 1821. They occupy the south-western part of the region and their headquarters is the Town of Umm Badr. Their Dar had good and comparatively more reliable water sources than the other parts of Dar Kababish. At first they peacefully co-existed as a separate tribe with the Kababish. This peaceful co-existence was partially due to the fact that they shared the same culture, and partially because the Kawahla occupied a buffer zone of friction between the Kababish and the Hamar to the south of Dar Kababish.

Conflict between the two tribes started at the early years of the Mahdist period. The Kawahla, unlike the Kababish, were strong supporters of the Mahdi . Relations between the two parties had seriously deteriorated in the late twenties and early thirties of this century, when Kababish migration westward beyond Wadi El-Milk increased significantly, and as a result clashes between the two parties were fairly frequent especially over the question of Dar rights. However, friction was smoothed, when the government succeeded in securing an agreement in 1935 in which the Kawahla accepted the loose supremacy of the nazir of the Kababish. They managed to ensure their separate identity by having their own nazir, independent tax assessment and collection, and a local court at Umm Badr .

2.3. The Hawawir :

The 1955-56 census results showed the Hawawir tribe as consisting of 20,000 people. They occupy the north-eastern part of Dar Kababish. They had come to Kordofan in the early decades of this century from the Northern Province near Dongola. They remained as a separate tribe and confined their movement eastwards

to the Nile in the dry season and Westwards during the rainy season. They limited their Southern movement to El Safiya so as to avoid clashes with the Kababish. However in the mid-forties the Hawawir extended their movement further South into Kababish territory due to need for grazing and water. This had led to mutual hostities between the two tribes occasioned by a number of fights on the rights of grazing and watering. The dispute was settled in 1953 when the Hawawir accepted to be part of the administration of the Kababish Rural Council on the same terms as other non-Kababish tribes within the district.

3. Administration :

During the pre-colonial period the different tribes (including the indigeneous groups e.g., Nuba Kaja, Katul etc) living in Dar Kababish had an organized political system with a definite class structure at the apex of which was the head of the tribe and his family. However, before and after the advent of colonialism political relations among the nomadic groups were not smooth. Conflicts between different nomadic tribes were not always connected with grazing rights and water resources. The British Administration

policy in Dar Kababish had always been to strengthen the power of the Norab (a section of the Kababish) to look after their interests in Northern Kordofan. Other tribes, especially the Kawahla who were staunch supporters of the Mahdi , were suppressed.

This policy continued until the Native Administration Scheme (1928) was applied to Dar Kababish. The introduction of the scheme inevitably le to the reorganization of the administrative system in Dar Kababish, Fig. (5). Thus the Dar Kababish had contained:

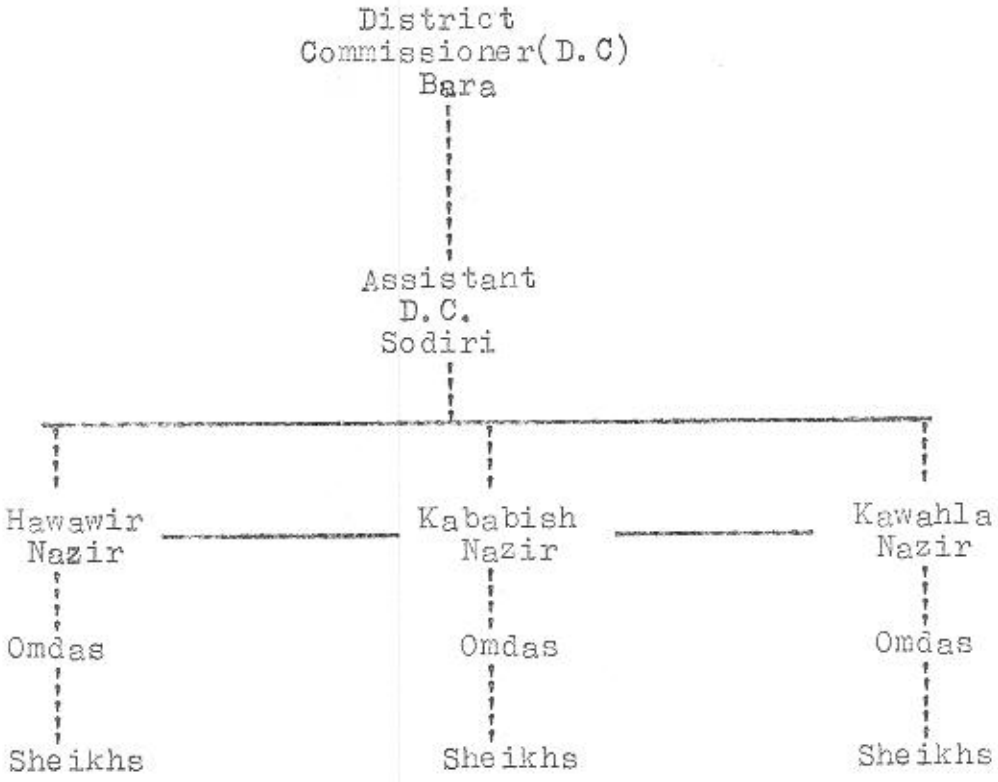
i) Three nazerites namely Kababish, Hawawir and Kawahla.

ii) omdas or heads of smaller tribes such as the Zaghawa, Kaja, Katul, Beni Gerar and Diweih.

iii) Kababish nazir having precedence over other nazirs and omdas except the Kawahla and Hawawir azirs, and with more powers including hearing from courts which the latter presided.

Fig. (5):

NATIVE ADMINISTRATION SYSTEM.



The native administration system continued until 1969 when a presidential decree was passed to dissolve this system. However, in Dar Kababish the nazirs as well as the Omdas positions are allowed to continue. Although their powers are being curtailed by the new Peoples Local Government system, the Kababish nazir still has the highest authority with refrence to local courts since he holds the powers of appeal. The structure of the peoples' popular local government system is shown in Fig. (6).

It must be mentioned that the current regional Government in Kordofan has re-inestated the Native Administration due to the felt vacuum created by its dissolution regarding the management of :-

i) the pattern of nomadic movement,

ii) the rights of access to grazing areas and watering points,

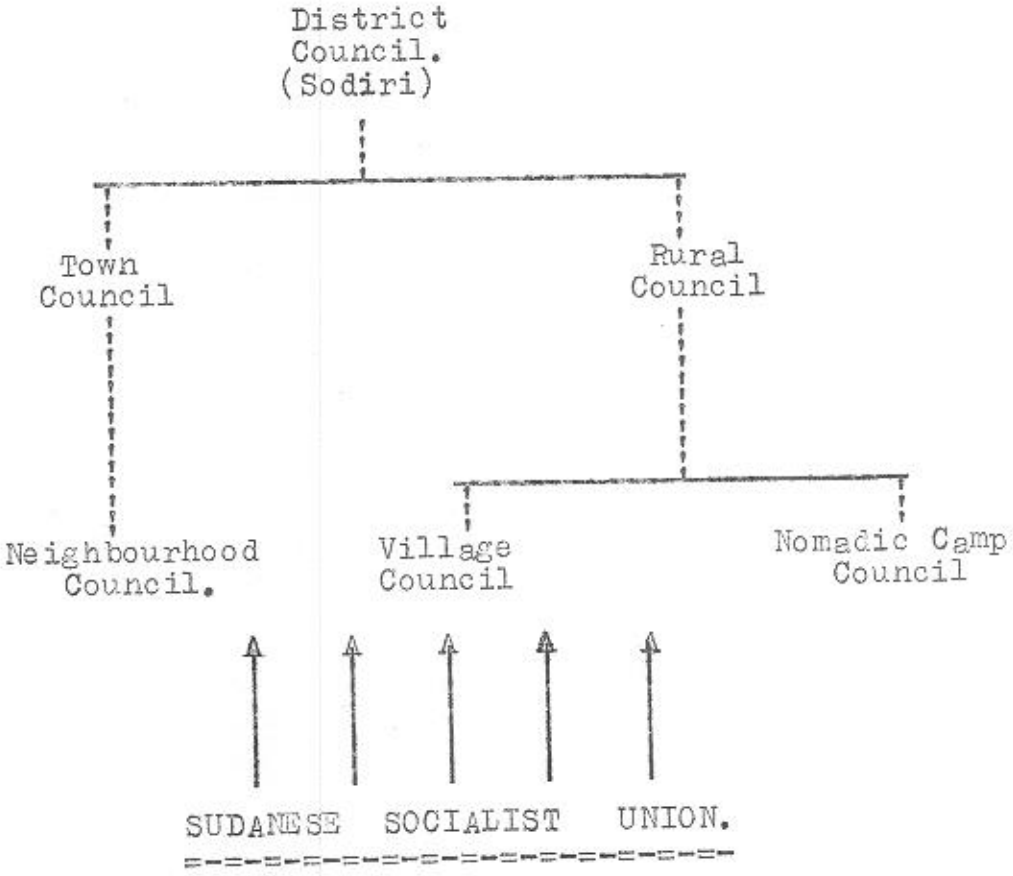
iii) the use and conservation of rangelands,

iv) settlements of tribal disputes and conflicts, and

v) collection of taxes.

Fig. (6) :

STRUCTURE OF PEOPLE'S POPULAR COUNCILS.



4. Settlements and Services :

4.1. Settlements :

The vast majority of the inhabitants of Dar Kababish lead a nomadic life. Settlement on a large scale has not taken place. According to the 1983 census the total population of Sodiri, the largest town of Dar Kababish, was only 3,558 persons. However, comparison of the 1973 and 1983 census results reveal that the nomadic population is in fact decreasing. As can be seen from table (8) rural nomadic represented 69% of the total population of Dar Kababish, while in 1983 their proportion decreased to 62%.

The majority of the rural settled live in villages with a populaton ranging from 100 to 500 persons. Only six settlements could be classified as urban with a total population exceeding 500 people*, namely, Sodiri, Hamrat Esh Sheikh, Hamrat El Wuz, Tinna, Gabrat Esh Sheikh, and Ummbadr.

The main reason for the location of the villages in the area is the availability of water supply. Since 1949 the area of Dar Kababish has witnessed a signific- and progress in the field of development of ground and surface water (table 9).

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* The national census figure for urban settlements is 5000 persons. The criterion used in the Study area is the agglomeration of services and not population size i.e. centres commanding the highest number of services are classified as urban.

Table 8

Population of Dar Kababish
Rural Nomadic and Rural Settled :1973,1983

	1973		1983	
	Total Pop.	Percent	Total Pop.	Percent
Rural Settled	59,652	30%	77,629	37%
Rural Nomadic	137,523	69%	129,461	62%

Source: The 1973 and 1983 censuses.

Table 9

Hafirs, Dams and Boreholes
constructed in Dar Kababish 1949 - 1974

	1949	1950-59	1960-69	1970-74	Total No. of Locations
Boreholes	1	6	25	18	30
Hafirs	-	-	22	7	29
Dams	-	-	2	-	2

Source: Land Use Soil Conservation and Water Programming.

Provision of water supply has undoubtly played a major role in sedentarization of the population specially the Kawahla. Many of the Kawahla and Kababish who used to concentrate exclusively on animal husbandry now included supplemental cultivation as part of their domestic economy. Other nomads faced with the loss of their herds due to drought or lured by the possibility of more secure living conditions in permanent settlements with enough water supply have settled spontaneously. For example, in the Southern areas of Dar Kababish, mainly in the area of Umm Badr and Tinna, where the annual rainfall is comparatively high and reliable, some of the pastoral nomads, especially from among the Kawahla,began to take more interest in cultivation. In addition, these people began to raise more cattle and thus some members of the household should stay all year round near water points as cultivators and cattle herders.

However, it must be mentioned that almost all village settlements provide neither goods nor services for their population. The vast majority of these settlements do not even have a single shop. These small villages have a satellitic relationships to

large villages and towns which owe their larger size either to the fact that some services are provided there e.g., a dispensary, or due to administrative and marketing services.

The evaluative dependence of villages in Dar meet the threshold of entery.

ii) As in many agrarian societies co-ordinated cycle of periodic markets are held once or twice a week in larger settlements like Sodiri, Umm Badr, Gabrat Esh Shiekh. Periodic markets help to reduce the distance that people must travel to buy a certain good or service. Hence they devote one or two days per week for their town visits.

iii) The needs of the people are mainly limited to food items that donot enhance the development of a large number of market centres.

The dominance of the previously mentioned six towns is evident if their zones of influence are explored, as can be depicted from Figs. 7,8,9,10 and 11 which give illustration of 5 of them. Taking

Gabrat Esh Sheikh as an example, the radius of its market area is an average of approximately 8 km. which leads to a really large market area of over 120 sq. km. This area is relatively large regarding the small size of the centre and the limited variety of its social and retail services.

4.2. Services :

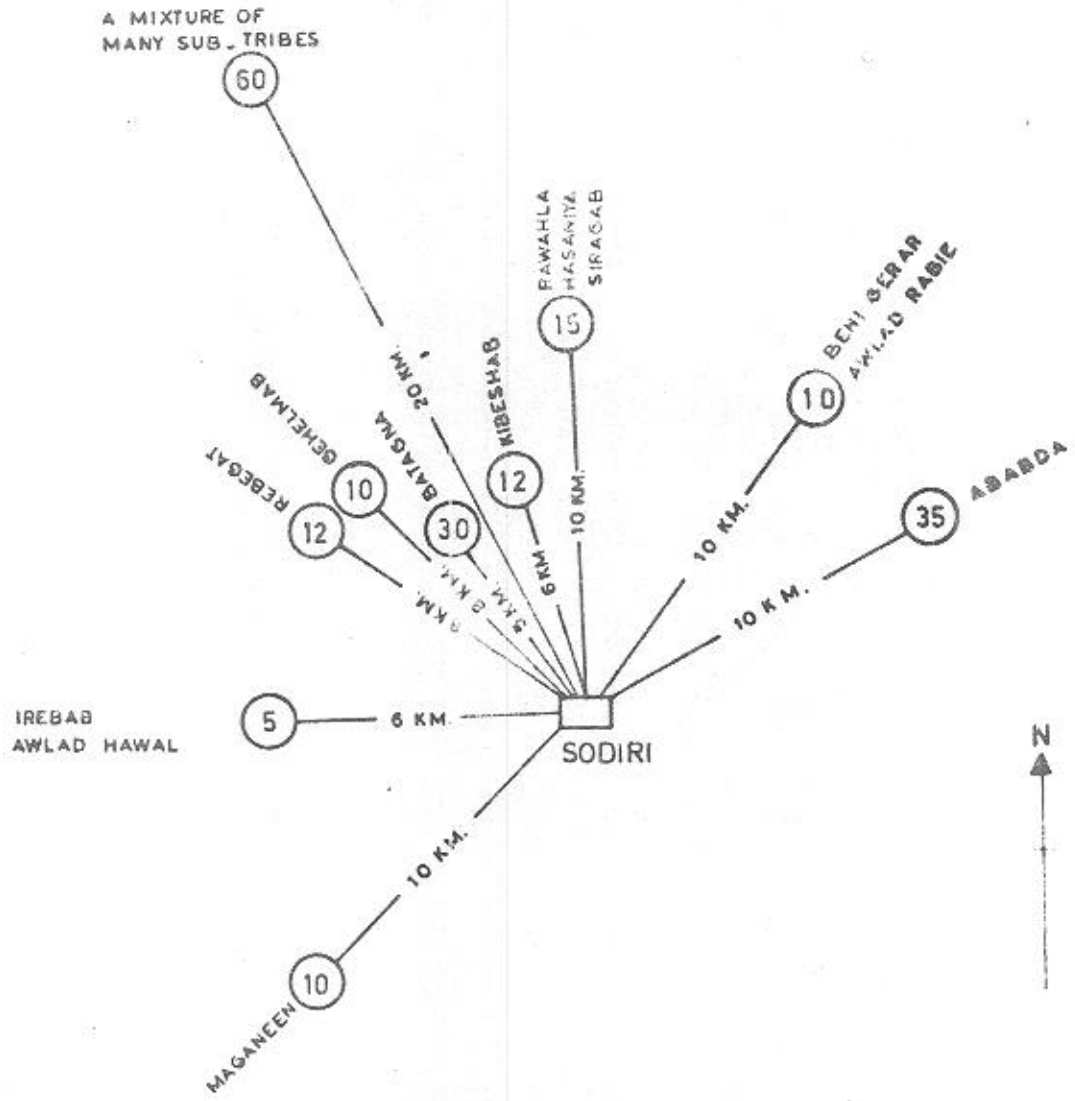
Services in Dar Kababish are limited in range and are highly concentrated in larger settlements. Services available in the area are given in detail with their spatial distribution in Fig.(12) and Annex I. They are divided into administrative, Educational, Health, Water Supply Services, etc.

4.2.1. Administrative Services :

Administrative services include Rural, village and nomadic camp councils, police stations and Judiciary Services. Rural Councils are located in Sodiri which is the headquarter of Dar Kababish, Hamrat Esh Sheikh, Hamarat El Wuz, Gabrat Esh Shiekh and Umm Badr.

The Police Headquarters is located in Sodiri. Other rural council centres have a small police office manned with only one officer and not more than five policemen. In some of the larger villages police

FIG (7) MARKET REACH OF SODIRI
(1981 DRY SEASON NOMADIC ENCAMPMENTS AROUND THE SITE)

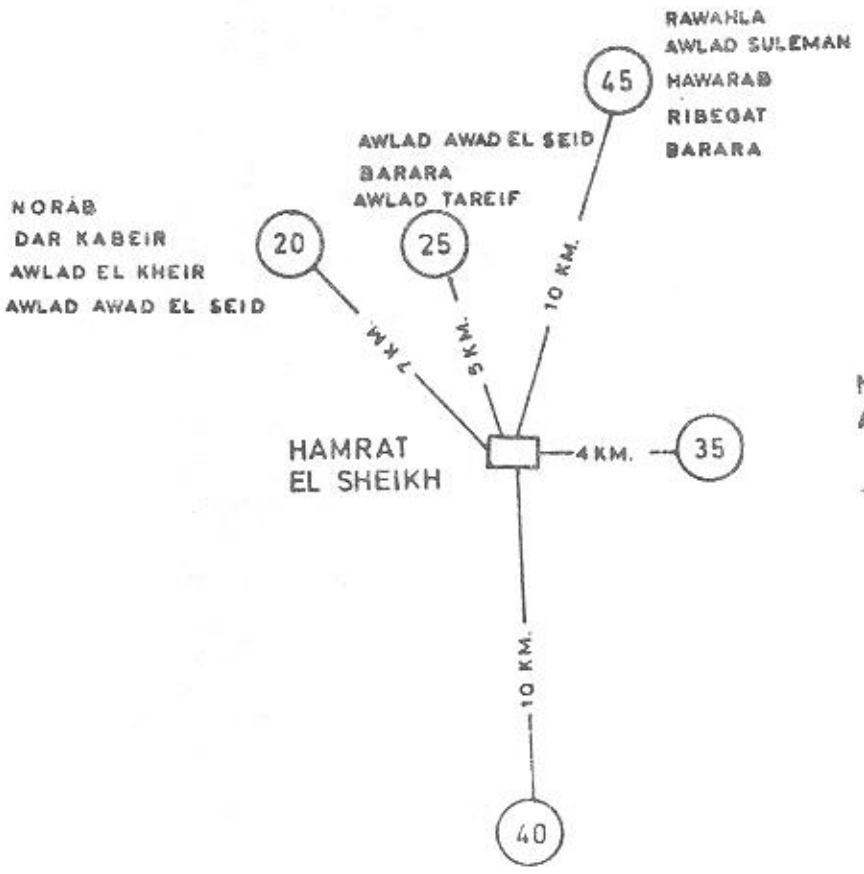


LEGEND

10 5 12 STAND FOR NUMBERS OF EXTENDED FAMILIES CAMPS (FARIGS) AT SITE, ABABDA, BENI GERAR, etc: ARE NAMES OF SUB-TRIBES.
DISTANCES FROM SODIRI ARE GIVEN IN KM.

SOURCE: ADAPTED FROM FIG (8) ASSOCIATED CONSULTANTS: MODEL WOMEN'S RUG-MAKING CO-OPERATIVE NORTH KORDOFAN PROVINCE 1981

FIG. (8) MARKET REACH OF HAMRAT ESH SHEIKH
(1981 NOMADIC ENCAMPMENTS AROUND THE SITE)



LEGEND

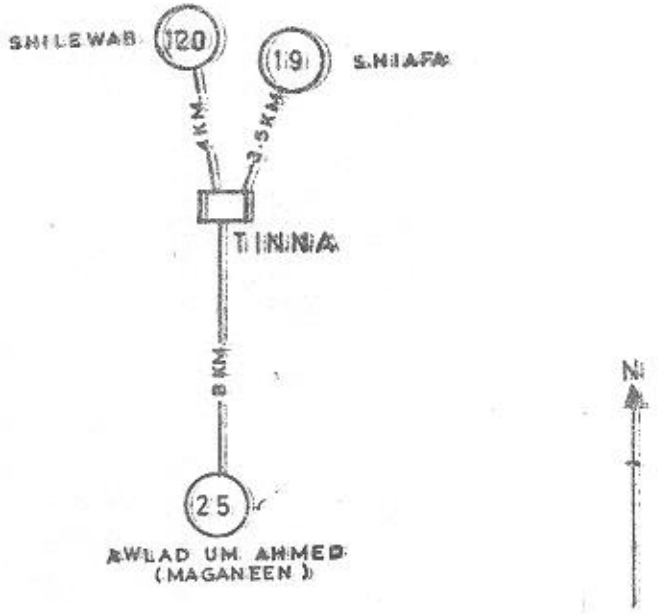
40 35 45 STAND FOR NUMBERS OF EXTENDED FAMILIES (FARIGS) AT EACH SITE.

ATAWIYA , SIRAGAB : ARE NAMES OF SUB-TRIBES.

DISTANCES FROM HAMRAT ESH SHEIKH ARE GIVEN IN KM.

SOURCE: ADAPTED FROM FIG (9) ASSOCIATED CONSULTANTS: MODEL WOMENS RUG-MAKING CO-OPERATIVE NORTH KORDOFAN PROVINCE 1981

FIG (9): MARKET REACH OF TINNA
(1981 NOMADIC ENCAMPMENTS AROUND THE SITE):

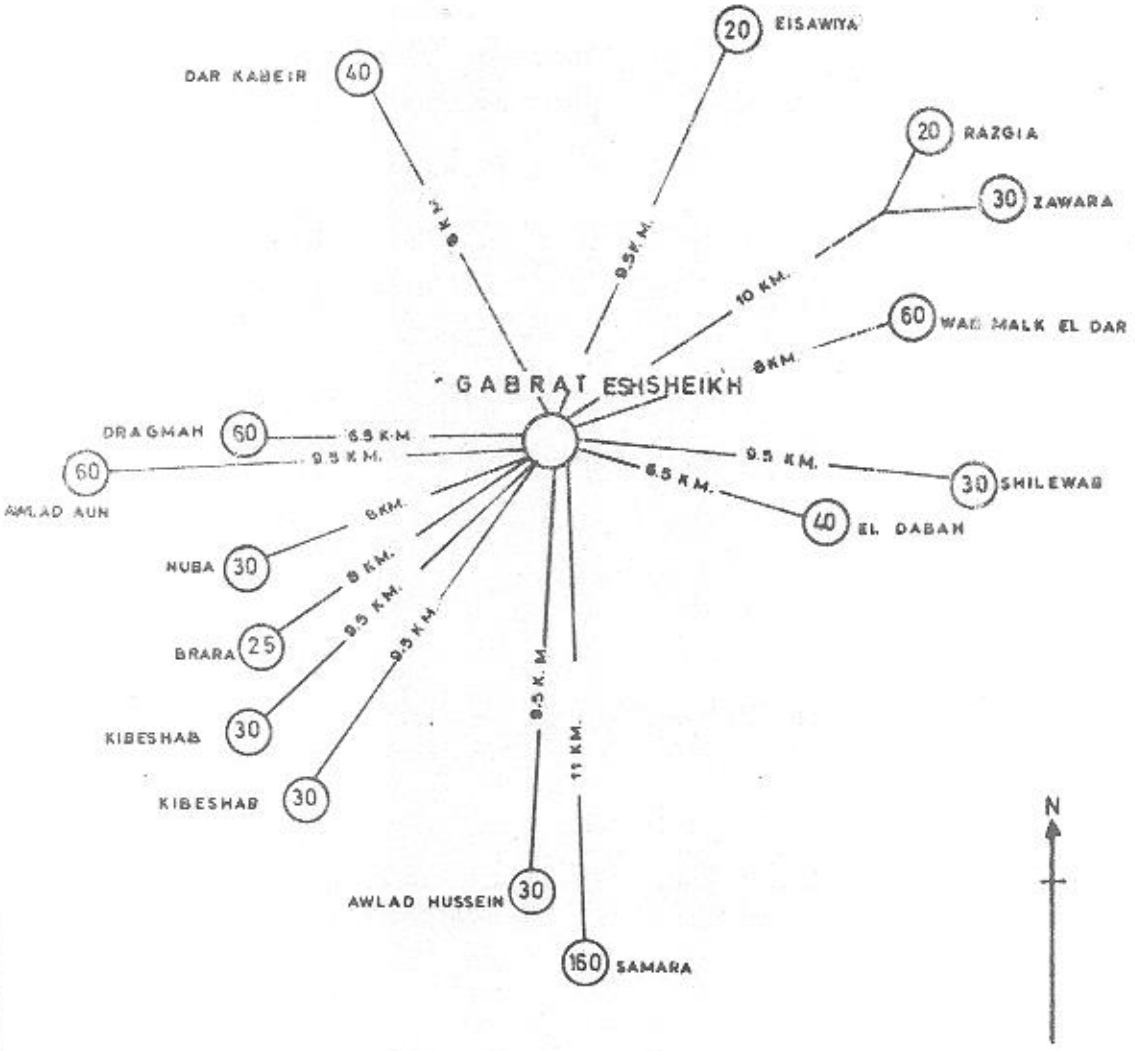


LEGEND

25 19 120 STAND FOR NUMBERS OF EXTENDED FAMILIES CAMPS (FARIGS) AT SITE. SHILEWAB, SHTAFA, ETC: ARE NAMES OF SUB-TRIBES. DISTANCES FROM TINNA ARE GIVEN IN KM.

SOURCE: ADAPTED FORM FIG (7) ASSOCIATED CONSULTANT: MODEL WOMENS RUG-MAKING CO-OPERATIVE NORTH KORDOFAN PROVINCE 1981

FIG. (10) MARKET REACH OF GABRAT ESHSHEIKH
(1983 DRY SEASON NOMADIC ENCAMPMENTS AROUND THE SITE)



LEGEND

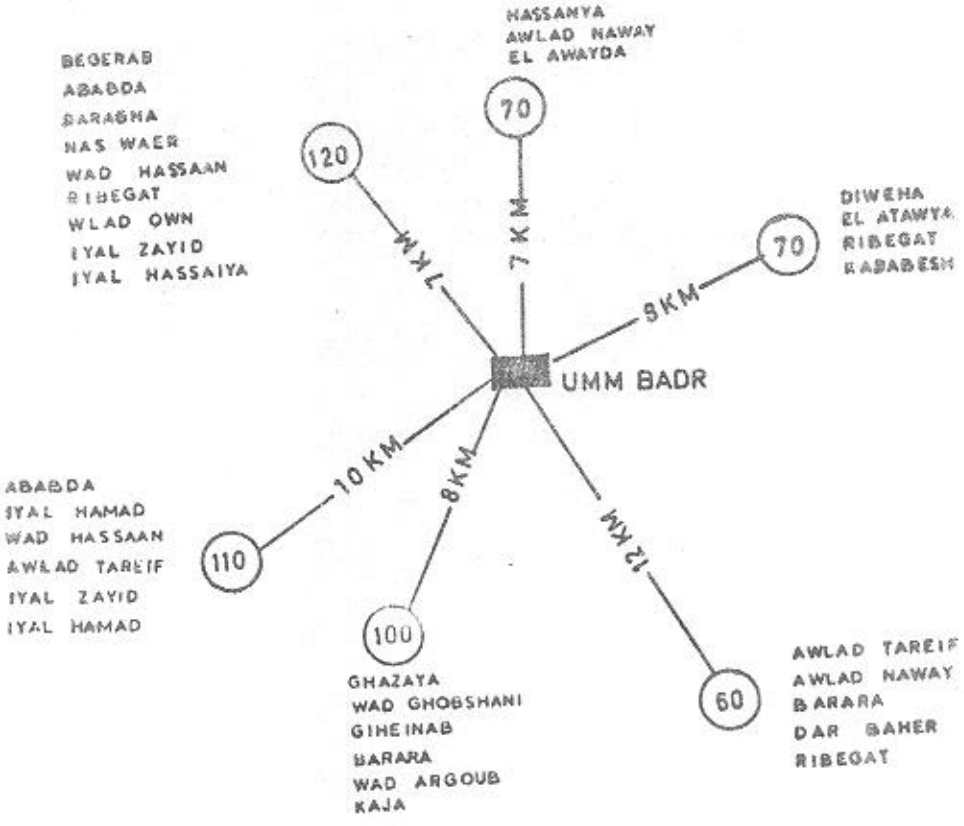
11 9.5 STAND FOR NUMBERS OF EXTENDED FAMILES CAMPS (FARIGS) AT SITE

SAMARA, AWLAD HUSSEIN, etc: ARE NAMES OF SUB-TRIBES.

DISTANCES FROM GABRAT ESHSHEIKH ARE GIVEN IN KM.

SOURCE: FIELD SUVLY

FIG (11) DRY SEASON NOMADIC CONCENTRATIONS MARKET REACH OF UMM BADR (1981 DRY SEASON NOMADIC ENCAMPMENTS AROUND THE SITE)



LEGEND

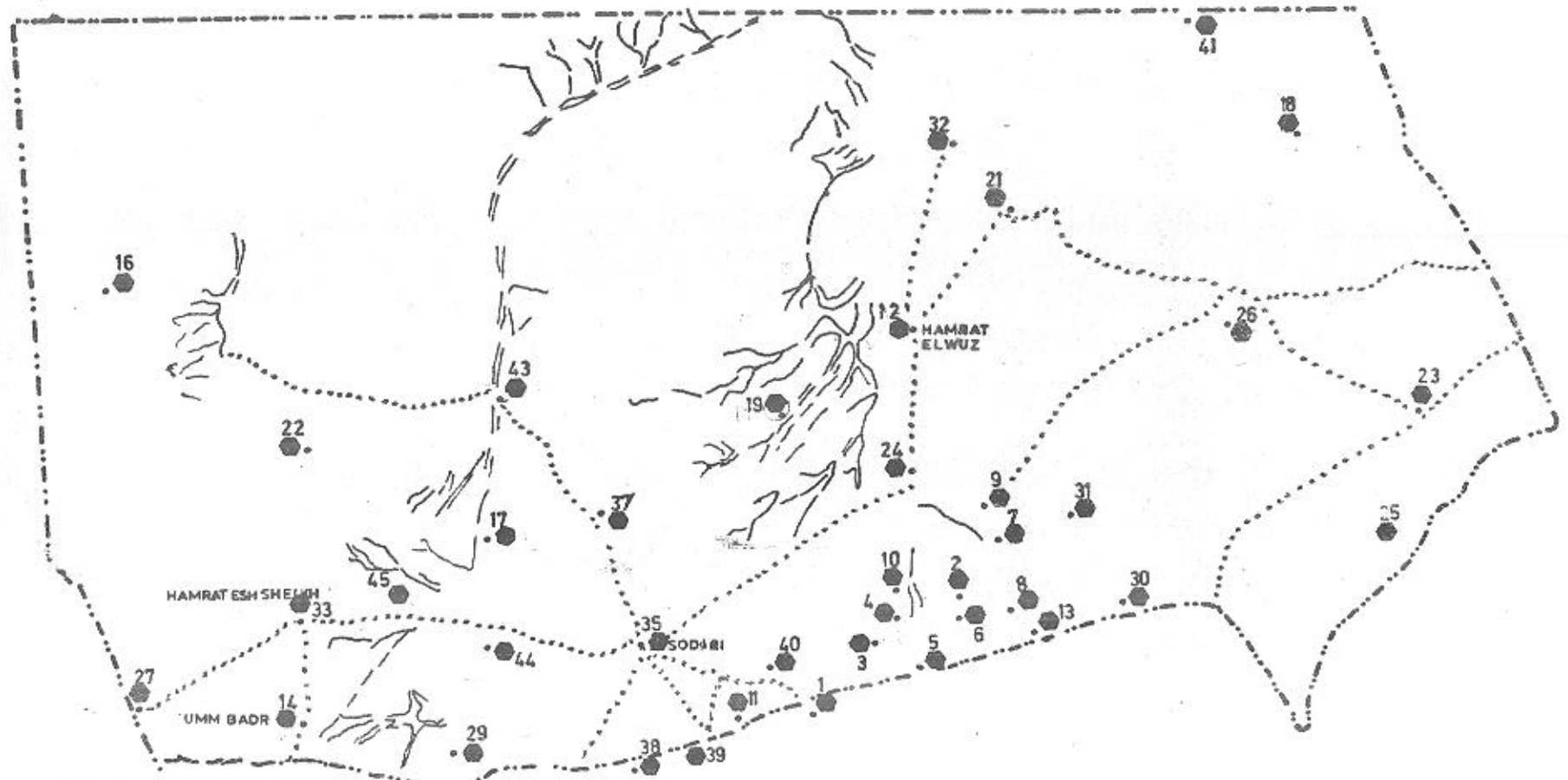
110 100 60 STAND FOR NUMBERS OF EXTENDED FAMILIES CAMPS (FARIGS) AT EACH SITE.

GHAZAYA, WAD GHOBSHANI, ETC: ARE NAMES OF SUB-TRIBES.

DISTANCES FROM UMM BADR ARE GIVEN IN KM.

SOURCE: ADAPTED FROM FIG 10, ASSOCIATED CONSULTANTS: MODEL WOMEN'S RUG-MAKING CO-OPERATIVE, NORTHERN KORDOFAN, 1981

FIG (12) CENTRES OF EXISTING SERVICES IN SODIRI DISTRICT



NOTE... SEE ANNEX (1) FOR THE DETAILED DISTRIBUTION OF SERVICES BY CENTRE
(NAMES OF CENTRES IN THE TABLE CARRY NUMBERS ON THE MAP)

SOURCE : THE SOCIO-ECONOMIC SECTION, MINISTRY OF CO-OPERATION AND RURAL DEVELOPMENT : INVENTORY OF EXISTING SERVICES BY RURAL COUNCIL KORDOFAN PROVINCE, 1971, AND FIELD SURVEY DATA 1983

stations are established but with very low manpower not exceeding two policemen.

Judicial Services are divided into civil courts, Islamic courts (the latter located in Sodiri only) and people's courts which are found in the other four rural council centres and in other larger villages namely Umm Inderaba, Abu Urug, El Safyia, Abu Zaima, Umm Sunta, Tinna, Gireih El Sarha, Kagmar, and El Hereiz.

4.2.2. Education :

Although education was introduced into the area in the early 1940s, it has not developed substantially through time. This may be due to the nomadic nature of the population and their disinterest in education. In the past only the children of poorer families were sent to school since they had no camels or other livestock to look after.

However, in present times the attitude towards education has changed and all people wish to send children to schools. This is mainly due to the aquired awareness of the benefits of education on the one hand, besides, the need for the labour of children has been reduced among many families due to losses of livestock.

The highest level of education in the area is intermediate schools for boys and girls located in the five rural council centres. In larger and smaller villages elementary schools are established but the intake is still low and the number of school leavers is high due to the nomadic nature of the population. In fact in some schools intake is every other year due to shortages in staff and the increase in the number of school leavers due to migration because of the drought. For example in El Hagab elementary school the total number of pupils in 1971 was 95 pupils, in 1983 the number declined to only 45 pupils. In Gabra Umm Gammal the number of pupils in the school dropped from 95 in 1971 to 80 and 48 in 1981 and 1983 respectively.

4.2.3. Health Services :

Provision of health services is inadequate in Dar Kababish. General hospitals are only established at Sodiri (80beds) and Hamrat El Wuz (60 beds). Other health services for humans are dispensaries located in Gabrat Esh Shiekh, Umm Badr , Gireih El Sarha, Tinna and Hammrat Esh Shiekh. In villages only dressing-stations, and health workers are to be found.

CHAPTER FOUR

WATER SUPPLY

1. Introduction :

The availability of water sources, and their geographical distribution have greatly influenced human habitation in the study area. The movement of herds and their concentration during dry season, closely follw up the location of water sites. Equally, settled communities have flourished where water is available. With the prevalence of a short rainy season and the occurrence of meagre rains, human and animal habitation is tied to the available permanent water source.

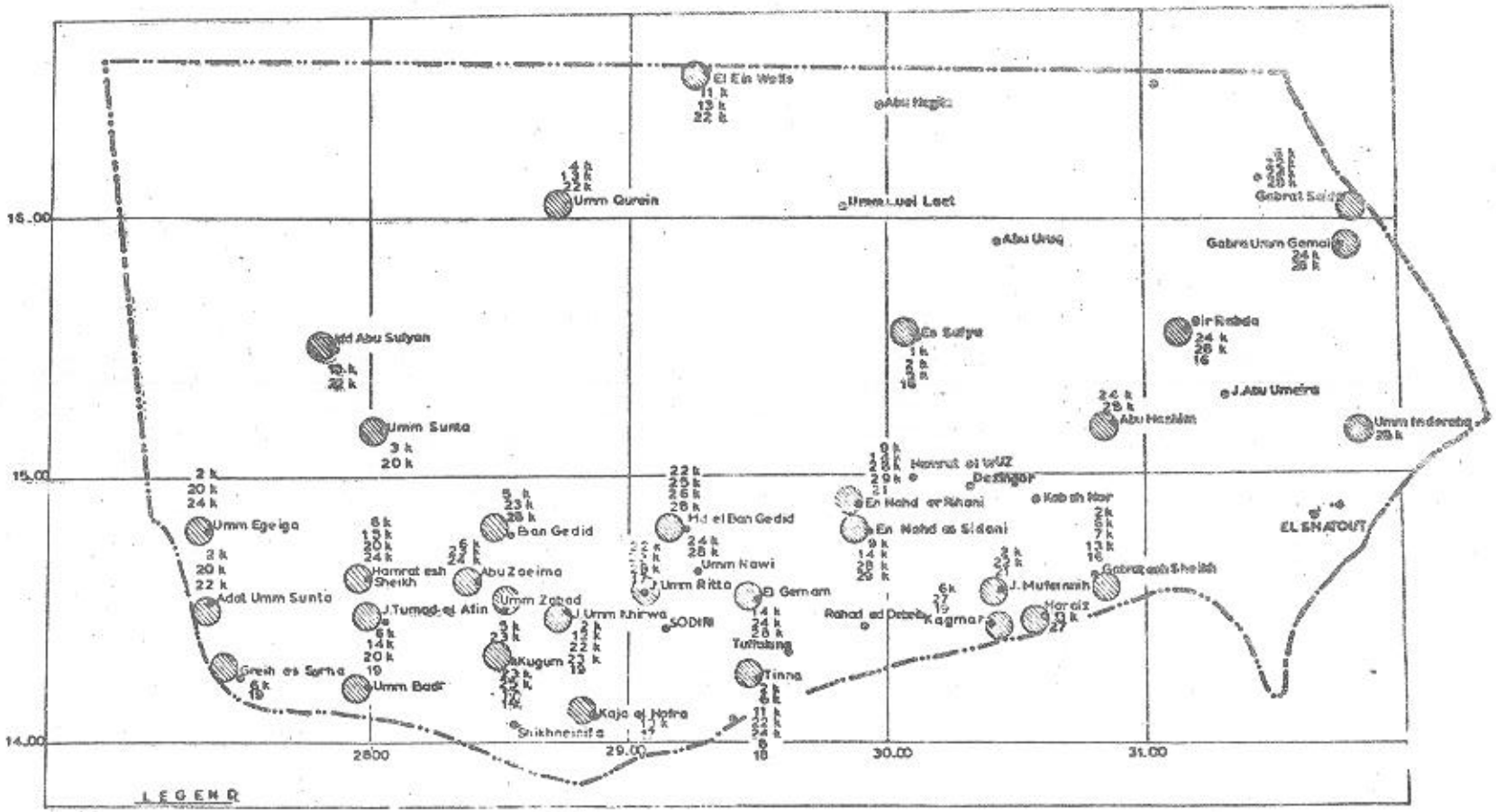
2. Types of Water Sources :

Figs 13, 14 and 15 give the existing water sources in Sodiri district. These can be grouped under : Open-shaft wells, hafirs and bore-holes. Other than these, there are the natural sources of water, formed directly by the rains. In what follows these four sources shall be accounted for .

2.1. Natural Sources :

By natural water sources reference is made to rain-water collecting in different forms over the land surface; locally named as small wadi, rahad, fula, mayaa, gamama, etc..

FIG (13) SODIRI DISTRICT:- ALL SEASON OPEN-SHAFT WELLS AND DISTRIBUTION OF TRIBAL GROUPS



LEGEND

TRIBAL GROUPS

1	AL BARARA	(K)	16	HAWAWIR
2	AISHTTA	(K)	17	KAJA
3	AMAYDA	(K)	18	KATUL
4	AWLAD NOAL	(K)	19	KAWAHLA
5	AWLAD SULIMAN	(K)	20	NORAB (K)
6	BARARA	(K)	21	NUBA 21
7	BEDEIRIYA	(K)	22	SARAGAB (K)
8	BENI GERAR		23	RAWAHLA (K)
9	DORASAB	(K)	24	RIBEGAT (K)
10	DAR SAEED	(K)	25	TOWAL (K)
11	GHALYAN	(K)	26	ZANARGHA (K)
12	GHREBAT	(K)	27	ZAGHAWA
13	HAMADAB	(K)	28	AWLAD AGAIYAL (K)
14	HASSANIYA	(K)	29	AWLAD TEREIF
15	HAWARAB	(K)		

WELL FIELD

K : DENOTES KABABISH TRIBE

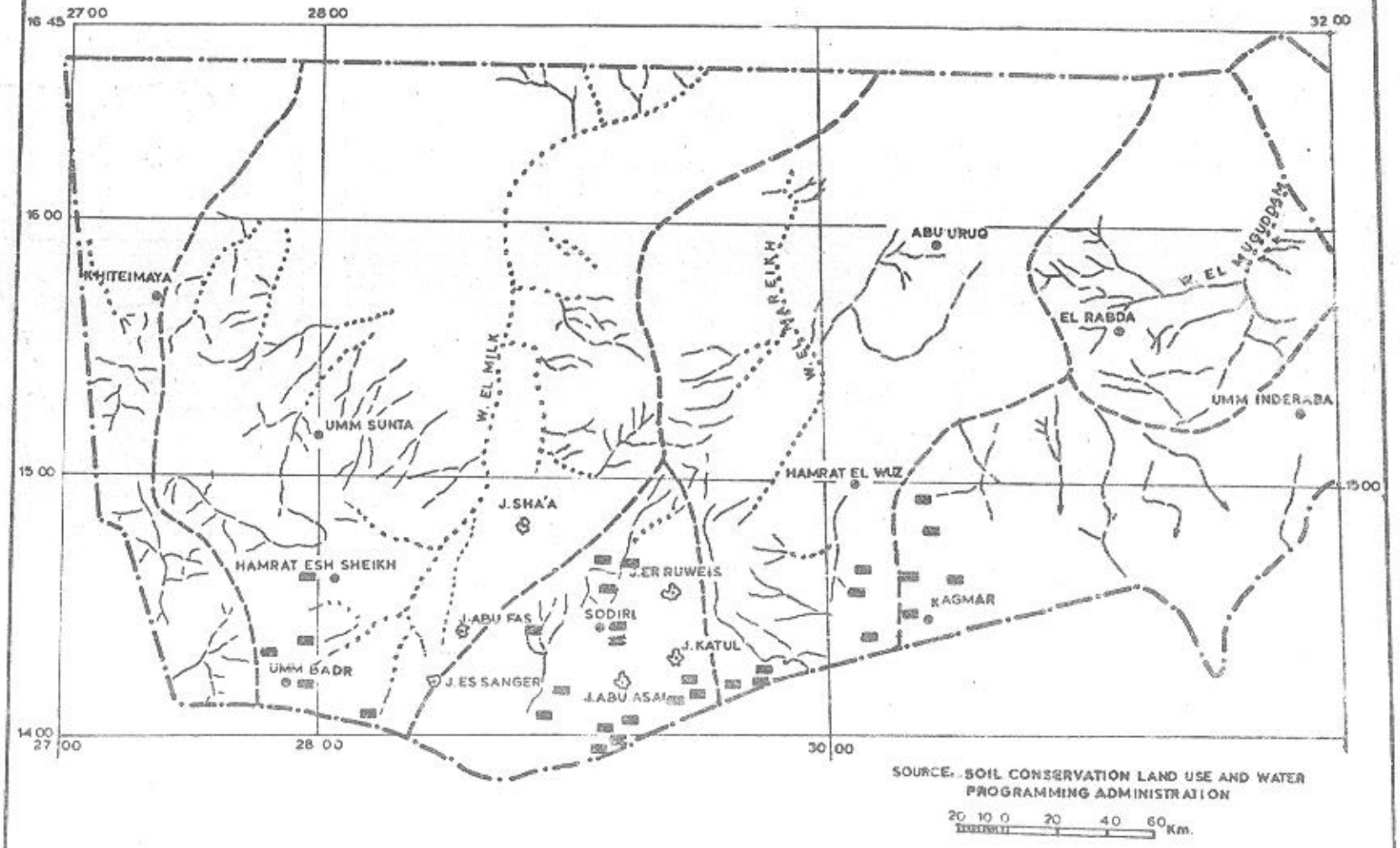
20 10 0 20 40 60 Km.

SOURCE:- FIELD SURVEY

all of which are not man-made. These sources are extensively used by humans and animals during the rainy season, and the one to two months that immediately follow the rains; all depending on the natural conditions of the site and the intensity of rains.

It is difficult to inventor all natural water sites, or present them on a map, since their dis ribution is variant; being conditioned by surface configurations, intensity of rainfall, and the occurrence of run-off. However, it can be ascertained that all of the big Wadis, the other drainage lines, and the loamy and gravel surface (Sisa), especially near jebels, hold water during the wet period, Fig(14).

In good years of rain the majority of the population, except those living in small rural centres, and almost all the herds, shift to water collecting in natural sources; with the other types - the man-made ones, completely deserted. During this time of the year, the availability of good supplies of water coupled with adequate grazing, allow for an even spread of animals over the rangeland, as compared to a picture of heavy concentration around water sources during the dry period. In recent years and due to repeated occurrence of mahal


16 45
27 00
28 00
32 00
16 00
15 00
14 00
27 00
28 00
30 00
15 00
KHUTEIMAYA
UMM SUNTA
W. EL MILK
W. EL MAREIKH
ABU URUQ
W. EL MUQADDAM
EL RABDA
UMM INDERABA
HAMRAT EL WUZ
J. SHA'A
HAMRAT ESH SHEIKH
J. ER RUWEIS
KAGMAR
J. ABU FAS
SODIRI
J. KATUL
UMM BADR
J. ES SANGER
J. ABU ASAI
SOURCE: SOIL CONSERVATION LAND USE AND WATER PROGRAMMING ADMINISTRATION
20 10 0 20 40 60 Km.
EXISTING HAFIR

i.e. drought conditions, this balanced distribution during rainy season no longer exists. There is a tendency for over concentration in those areas that receive adequate rains and have good forage.

2.2. Open Shaft Wells

There are 32 sites of open-shaft wells in the study area. The ones shown in Fig. 13 are those that yield a permanent supply year-round. There are others of temporary or seasonal production, not being inventored.

Surface topography and drainage have greatly influenced the existence and distribution of open-shaft wells, Fig.14. The latter follow the former as the annual supply given by wells depends on the direct replenishment carried by Wadi flow.

Sodiri district is bisected by numerous Wadis. Wadi El Milk running from the south west to the north east is an outstanding feature of the district; joined by many smaller Wadis on its course to the bent of the Nile at Debba. Of the other Wadis the most important one is Wadi El Mugaddam, Fig. (14).

Open-shaft wells exist in one of two forms: as numerous wells at a site forming a well field, or as one or a few wells at a site. The former are associated with depressions where the floods of Wadis stay for some time after the rainy season. The latter are dug at favourable sites where a localized acquifer yields some supply.

Open-shaft wells in Sodiri district can be described as bir plural abyar, or sanya plural swani. The distinction is on depth considerations. A bir is of a shorter depth compared to a sanya. The former may be lined or unlined, while the latter is in all cases lined with permanent material. Table 10 gives some indication of depth.

Usually a well depth is given by natives in man height, measured as a standing man with the arms up; equivalent to 2.5 m. Thus a well depth is so many men height.

Table 10

Abyar and Sawani depths
(in meters) at some selected sites
From field Survey

Site	Abyar depth	Sawani depth
1 . Umm Inderaba	7.5	--
2 . Gabrat Esheikh	12.0	--
3 . El Safiya	9.0	--
4 . Gemmama	15.0	--
5 . Tinna	12.0	--
6 . Abu Zabad	--	40.0
7 . Jebel Haraza	--	42.5
8 . Umm Surra	--	40.0
9 . Sodiri	12.5	18.0
10 . Hamrat Esh Sheikh	--	--
11 . Umm Badr	5.0	--
12 . Ideid Moya	2.0	--

Wells are of two types, i.e. dug or mended after the flood, or are of permanently lined material. Lining is essential because of the sand formation of the area. Even the ones dug annually are lined at the bottom with plant material. Some use dry wood which is intercrossed to take a square form, referred to as adal (muscles) by the local people. Others use green branches of trees, shrubs, or grasses laid in a circular form called locally umm lawaay i.e. a twisted structure. A well newly lined with any of the above type of material may for sometime have the odour of the vegetation used, often giving the water a nasty smell and taste.

In case of permanent wells the material used in lining includes: red-bricks, stones, gravel, cement blocks, and sand cement blocks with cement and sand mortar.

Many of these wells are provided by the government as part of the water supply programme for rural areas; however in all well-fields the majority of wells are privately owned. Well ownership takes different forms. Some are owned by nucleated families, others by extended families, a village or a sub-tribe. While in some cases wells are owned by a merchant, or a government department.

Except in occasions where the yields of wells at a site are very low, or a well is purposely dug for commercial use, or it is the day of watering the herds of a well owner, supply from wells is accessible free of charge to any user fetching his domestic needs. Usually those with no wells depend on relatives who own wells, and on those with whom they have some form of social association, or may visit government wells.

Water is extracted from open-shaft wells by one of four means : (i) manual labour using dallo i.e. one form of container and a rope, (ii) same as above adding a pulley to the device, (iii) using same device with the pulley but adding animal power, and (iv) recently engine driven pumps.

The first device is used in wells up to 15 metres deep , the second is used up to 35 metres, while the third in wells beyond the last depth that might go up to 60 metres. As for the last device, this is being introduced recently in the area; and is mostly associated with commercial extraction of water, that is carried by trucks to supply distant places.

People organize themselves in extracting water from wells. Most wells have a square opening, and no more than four users would be drawing water at a time: one in each direction. The same applies to the lined wells if they are of a small diameter. Big diameter wells may accommodate more than 4 pulleys at a time. Wells dug for commercial purposes can be considered as one users' type.

The supply given by open-shaft wells varies in quantity from one centre to another; depending on the hydro-geological characteristics of the site, and the rate of recharge by wadi flood during the rainy season. Hence at all sites, the water levels of wells tend to show fluctuations with the season i.e. a higher water level at the end of the rainy season which drops with the progress of the dry months.

2.3. Bore-holes

Fig.(15) exhibits the distribution of bore-holes in the study area. Table 11 gives additional information on existing bore-holes, regarding date of establishment, depth, static water level, pumping rate, etc. There are in total 53 bore-holes in the study area, distributed over 30 water-yards, with a variation of 1-3 bore-holes per water-yard.

Table 11.

Data on Existing Bore-holes in Sodiri District.

Name of Site	Location Lat.	Location Long.	Date of Drilling	Depth of well in ft.	Static water level	Production Gallon/hour.
1. Izergat	15° 42'	30° 32'	1948/49	201	--	1,200
2. Ghabat El Sunut	15° 36'	31° 31'	50/51	137	35	7,500
3. Umm Inderaba (1)	15° 12'	31° 35'	52/53	332	260	1,100
" " (2)	" "	" "	60/61	410	265	1,200
4. Adat El Surgur (1)	14° 43'	30° 58'	52/53	336	230	1,100
" " (2)	" "	" "	" "	344	299	1,100
5. Surfan (1)	13° 18'	27° 41'	53/54	406	325	1,000
" (2)	" "	" "	" "	402	325	960
6. Abu Urug (1)	15° 55'	30° 27'	56/57	525	430	1,000
" " (2)	" "	" "	56/58	530	400	690
" " (3)	" "	" "	62/63	385	150	1,028
7. Wadi El Adara	15° 45'	32° 14'	56/57	606	515	1,050
8. Adad El Sunta (1)	14° 31'	27° 24'	58/59	325	--	1,100
" " (2)	" "	" "	" "	325	--	1,100
" " (3)	" "	" "	60/61	250	--	1,000
" " (4)	" "	" "	68/69	480	100	1,200
9. Hamrat El Wuz (1)	14° 58'	30° 08'		450	180	1,920
" " (2)	" "	" "		314	185	1,200
" " (3)	" "	" "		335	185	1,200
" " (4)	" "	" "		335	185	1,200
10. Shatout (1)	14° 50'	31° 41'	61/62	435	260	900
" (2)	" "	" "	" "	435	260	900
" (3)	" "	" "	77/78	520	235	1,120
11. El Rabda (1)	15° 32½'	31° 10'	61/62	555	440	1,300
" (2)	" "	" "	" "	555	440	1,300

Cont.....

Table 11(Cont.)

Name of Site	Location		Date of Drilling	Depth of well in ft.	Static water level.	Production Gallons/hour.
	Lat.	Long.				
12. Umm Surgur (1)	14° 08'	28° 28'	1961/62	165	148	360
" " (2)	" "	" "	" "	185	140	480
13. Umm Bitetekhat (1)	14° 18'	27° 21½'	65/66	280	--	1,000
" " (2)	" "	" "	" "	290	165	1,050
" " (3)	" "	" "	" "	315	74	
" " (4)	" "	" "	" "	488	175	
14. Garyood El Singid (1)	14° 52'	27° 13'	65/66	605	459	760
" " (2)	" "	" "	" "	545	462	1,200
15. El Khitemaya (1)	15° 41'	27° 25'	67/68	504	195	--
" " (2)	" "	" "	" "	542	330	800
16. Kabsh Nur (1)	14° 56'	30° 39'	67/68	580	270	--
" " (2)	" "	" "	67/68	575	464	720
17. El Logadab	14° 12'	27° 26'	--	236	175	480
18. Garat El Sheikh	14° 34'	30° 46'	67/68	255	55	450
19. Idd El Sharak (1)	16° 03'	30° 15'	67/68	870	353	--
" " (2)	" "	" "	69/70	752	325	960
20. Umm Sidir	15° 08'	32° 07'	68/69	620	200	1,200
21. El Kuma (1)	14° 25'	27° 47'	68/69	375	205	700
" " (2)	" "	" "	69/70	462	338	800
22. Hamrat Esh Sheikh (1)	14° 35'	27° 58'	70/79	250	95	720
" " (2)	" "	" "	" "	230	--	--
" " (3)	" "	" "	72/73	250	70	1,200
23. Matart El Gawala	16° 16'	31° 17'	69/70	545	--	--
24. Wadi El Gansa	16° 19'	30° 12'	69/70	490	320	720
25. El Magar	15° 28'	32° 02'	69/70	323	223	576

Cont.....

Table 11(Cont.)

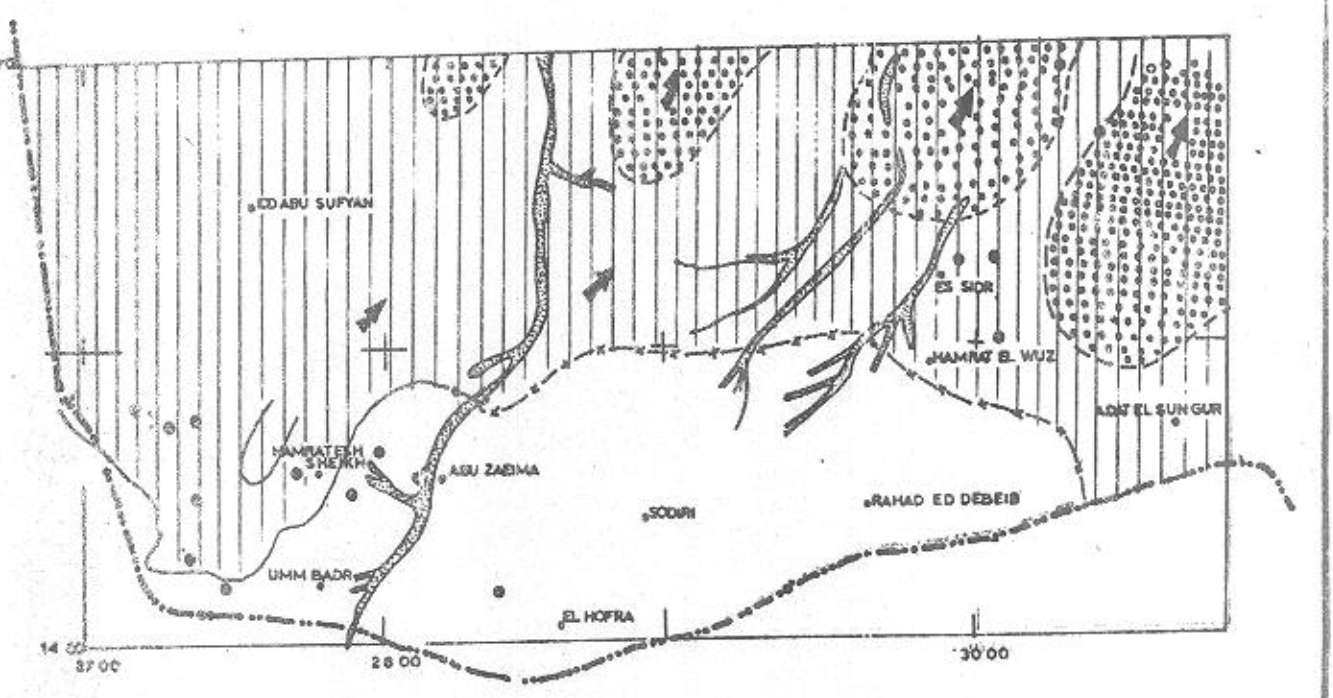
Name of Site	Location		Date of Drilling	Depth of well in ft.	Static water level.	Production Gallons/hour.
	Lat.	Long.				
26.El Erega	15° 15'	30° 03'	1969/70	400	--	--
27.Sawani El Horab	14° 40'	28° 00'	69/70	325	75	900
28.El Sidir	15° 14'	30° 10'	70/71	412	320	900
29.Gireih El Sarha	14° 14'	27° 30'	72/73	243	170	700
30.Umm Sunta	15° 10'	28° 02'	71/72	275	80	800

Source: Land Use, Soil Conservation and Water Programming Administration.

Fig.(15) gives the geological map of Dar Kababish. Relating the distribution of bore-holes to the geological formations of the Study area points clearly that bore-holes are associated with the presence of the Nubian Sandstone formation, being the one with water-yielding acquifers. Up to very recent times it was understood that the rest of the area outside the Nubian sandstone formation was basement complex. Recent geological discoveries have altered this picture as can be depicted from Fig.(15) which reflects a high ground water potential in the Study.area.

It is clear from the data in Table (11) on date of establishment of bore-holes, that up to 1956 there were only 8 bore-holes in Dar Kababish. The majority of bore-holes were supplied after independence following a national cry for more water provision in rural areas. A climax was reached in the mid-1960s following the launching of the anti-thirst campaign. The execution of massive well-drilling programmes after the mentioned period was phenomenal in the whole country. In the case of Dar Kababish we find that out of 53 bore-holes existing at present 26 were drilled in the period after the mid-1960s!

FIG (15) GEOLOGICAL FORMATIONS, GROUND-WATER AND EXISTING BORE-HOLES



LEGEND

- GEOLOGIC BOUNDARY
- SUB-SURFACE RIDGE
- DIRECTION OF GROUND-WATER MOVEMENT
- PLEISTOCENE TO RECENT
- GROUND-WATER POTENTIAL NEARLY ABSENT
- RICH GROUND-WATER POTENTIAL
- EXISTING BORE-HOLES

SOURCE:- ADAPTED FROM A MAP PREPARED BY:
W. ISKANDER - NATIONAL CORPORATION FOR WATER

Water-yards are under government control, being run by the Regional Corporation for Rural Water Supplies, which carries out the drilling of bore-holes, runs the maintenance service and supervises and manages the daily operation. The Corporation has a regional office with a workshop at Sodiri in charge of the water-yards of the district, linked to El Obeid where the regional headquarters of the Corporation are to be found.

Supply from bore-holes is more regular, abundant, timely and hygienic, as compared to the other types. However, in the last 5-10 years the conditions of water-yards have deteriorated considerably, due to lack of maintenance, inadequacy of fuel supplies, and shortage in skilled man-power. This can be attributed mainly to the lack of vision about maintenance requirements which dates back to the mid-1960's when the anti-thirst campaign was initiated.

The dilapidation that is taking place as from mid 1970's is a cumulative effect of massive drilling, without building adequate maintenance capacities. The situation is being aggravated further by the change in management policy, whereby the running of water-yards was entrusted to local communities under the supervision of

people's local councils. The local committees constituted at water-yard sites to run the facility on self-help basis by providing the fuel and spare-parts, proved to be short of the means to secure such requirements. By 1982 the failure of this policy was ascertained, and the responsibility of managing water-yards was shifted back to the Regional Rural Water Corporation.

Despite the change the current situation still reveals a low performance of water-yards for the same reasons cited previously.

Though in many places people and herds still depend on water-yards for their supply, there is an evident shift to open-shaft wells which incur less risk as compared to the former.

Hafirs :

Fig.(14) gives a picture of the existing hafirs in the study area. There are 31 hafirs of different capacities ranging from 2000 to 101000 cubic metres. Generally speaking Dar Kababish does not possess favourable topographical and hydrological conditions for hafir development, being a sandy country with annual rainfall that does not exceed 300 m as the highest rainfall isohyet

at its southern parts. Thus the hafirs that exist are few in number and are highly localized to serve especially selected sites such as Sodiri town.

Sodiri has two hafirs with a total capacity of 29,000 cubic metres. Both are fed by Wadi supply. The two are founded on loamy soils; hence their construction involved a lot of engineering work. As a source for a town supply, the two hafirs are connected to a sand filter unit to improve the water quality.

The initial design of the system envisaged connecting water to the town, with public taps to be installed in the different neighbourhoods. In the one close to the hafirs this system was laid and operated for some time; however it was soon realized that the rate of water consumption went very high, and was found that the amounts stored in the hafirs would not carry the town through the dry period. As a result, the use of the water of the hafirs has been brought under control, with supplies obtained only at the hafir gate, and exclusively for domestic needs.

Sodiri is continuously suffering from a shortage in water supply. There is an approved budget for a third hafir, however the engineers of the Regional Rural Water

Corporation are skeptical of the hydro-topographical and soil suitability of the site for accommodating a third hafir. The growing water-shortage faced by the town could be attributed to :-

i) The poor hydrogeological conditions of the site in terms of both ground and surface water potentialities.

ii) The failure of the hafirs to fill in some years due to uncertainty of rainfall, and the limited supply carried by the Wadi. This amounts in some years to an acute shortage, with the town supply augmented by tankers from near-by Essunut hafir, which is kept as a stand-by source.

iii) The high rate of evaporation and seepage at the two hafirs.

iv) The continually growing semi-urban population of Sodiri, which is partly accounted for by the addition of new government departments and staff families, resulting from the regionalization move.

3. Water Consumption :

There are no systems of piped water-supply in all of the study area. People usually fetch for their daily needs. Those communities living at places where a source exists, either carry it themselves from the site as a housewife activity, use donkeys to transport water to homes if the source is far, or buy their need from water vendors. Those living away from the source, in small villages and hamlets, or in dispersed nomadic encampments, dikas, use donkeys or camels to transport their daily needs. The following figures based on (PRC Engineering Consultants, Inc., 1980, pp.III-11) for Western Sudan, estimated rural human demand at ten liters per head per day. Per head for rural animals was estimated as follows:-

Livestock	l/head/day
Cow	20
Donkey	20
Camel	15
Horse	20
Sheep	9
Goat	9

However, these amounts are not actually obtained in practice. As a general trend, water consumption of both humans and animals tend to decrease with more distance from the source. Survey findings show that

a family of 7 persons would consume on the average 5 liters of water per day. While the population living at the water source may obtain water every day, those living far away collect their needs every 2-3 days; hence the daily consumption decreases for the same family of 7 persons to 3 liters.

As for animals, only goats and donkeys raised in a settlement where a source of water exists may obtain water every day. The rest of the animals owned by both settled and nomadic groups follow a system of drinking intervals, Table (12).

4. Water Costs :

The water taken from natural sources, open-shaft wells (for domestic use) and from hafirs other than the ones at Sodiri is obtained free of charge, except for the cost of labour involved in extracting the water from the source, as it is the case with the two latter types. As for water obtained from water-yards (bore-holes) open-shaft wells for herd supply and the hafirs at Sodiri, different prices are paid.

Table 12.

Animals Drinking Interval at Different Seasons, given in Number of Days.

Animal	Rainy Period (Kharif) July-Sept.	Darat Oct.-Nov.	Cool Period (Shita) Dec.-Feb.	Hot Period (Seif) March-June
Camel	May be obtained daily or every other day	10	15	8
Cattle	" " "	3	4	3
Sheep	" " "	4	7	4
Goats	" " "	3	3	2

Source: Survey findings.

Up to early 1970's a unified water-price was applied at all water-yards in Kordofan i.e. 2 m/m for a 4 American gallon tin, with the following rates charged for animal drinking at the water-yards :

	m/ms
Camels	20
Cattle	10
Sheep	5
Goats	5
Donkeys & Horses.	10

The above rates were doubled by mid 1970's, partly as a response to rises in fuel and maintenance costs, and partly as a deliberate policy to increase the revenues of local councils from the sales of water. More increases in water prices were effected afterwards with the shifting of the management of water-yards to the local communities, which in fact set their own rates guided by the notion of self-help support. Water rates at present vary from one water-yard to another and are in the order of 10m/m for a tin of water, with the following rates collected for animals drinking at the yard :-

	m/ms.
Camels	150
Cattle	30
Sheep	20
Goats	20
Donkeys & Horses.	15

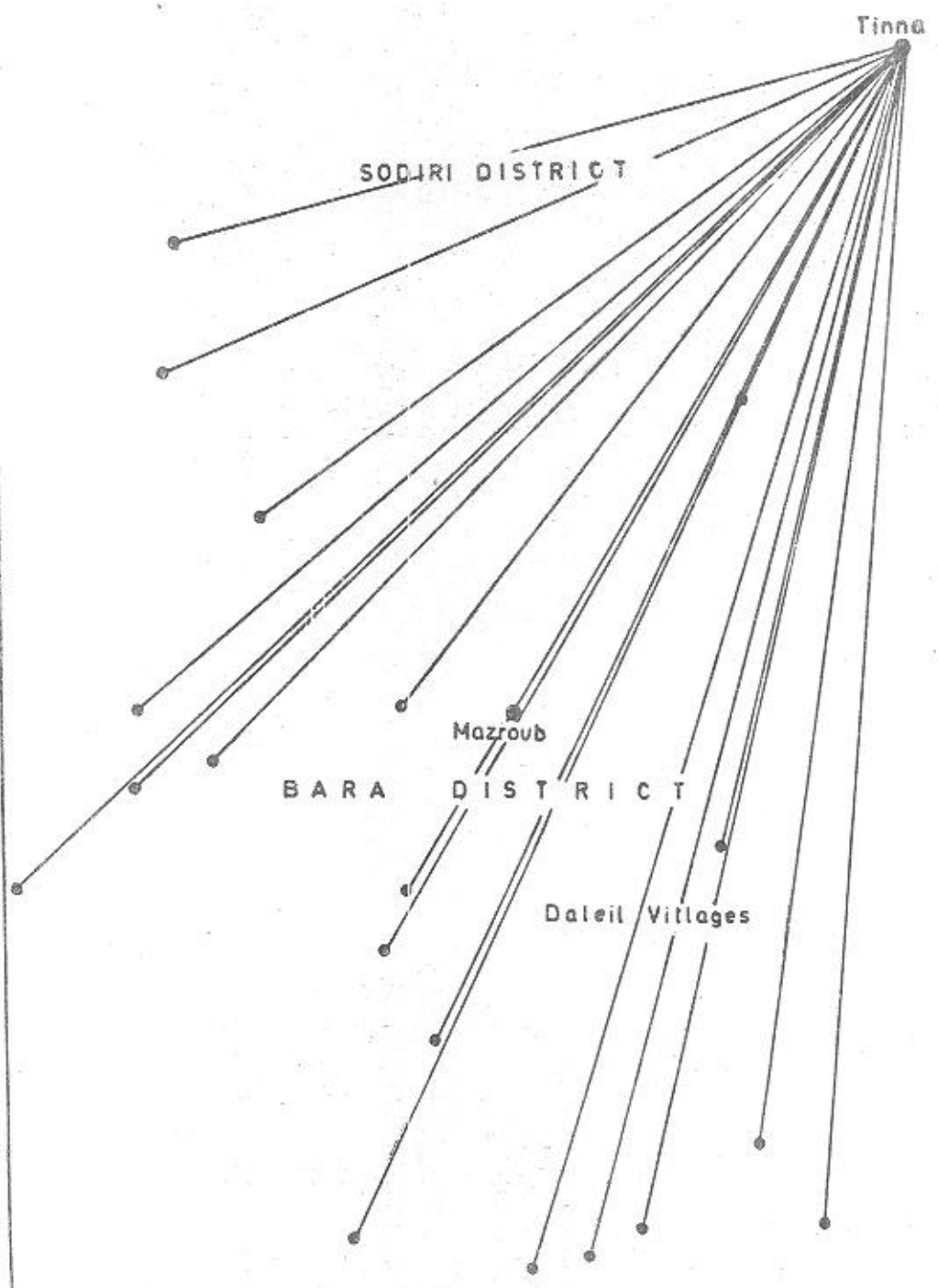
The water obtained from hand-dug wells involves the cost of digging and/or maintenance of the well and the cost of extraction of the water. As mentioned before small amounts of water taken for domestic use are obtained free of charge. The situation is different with water required for herds and that extracted for sale at distant areas.

Those owning herds need to maintain a regular supply for their animals. They usually dig wells to safeguard the amounts of water needed. The number of open-shaft wells owned by a family depends on the size of its livestock, and the amounts of water yielded by the wells at a specific site. Since animals are not watered every day, a well or a number of them, may be owned by more than one family - normally agnates - whereby the use of the source is alternated among them.

Trade in water is practiced in the area, at least from Tinna located in the very south central part of the study area, Fig.(16). Up to early 1970's this site had little water, barely adequate to meet the needs of the settlement existing there. In 1974 an earth embankment was constructed by the Regional Rural Water Corporation to retain the flood of the wadi and keep water for a longer period at the site. In a few years time this retention of flood water raised the water table and changed Tinna to a rich centre of water supply. This simple device of checking flood water to recharge local acquifers, can be specualted as an efficient water conservation technique for application at suitable sites in this broad semi-arid belt.

The area to the south-west of Tinna including Mazroub and Daleil villages in Bara district Fig.(16) which faces scarcity of water during the dry months began to depend on Tinna for its water, which is carried to these places over long distances by lorries. This has resulted in a flourishing water trade from Tinna. A four American gallon tin is sold for 80 paistres in the area mentioned.

FIG (15)
WATER TRADE FROM TINNA TO VILLAGES IN BARA DISTRICT



SOURCE:- FIELD SURVEY
SCALE:- 5 4 3 2 1 0

The cost of water obtained from open-shaft wells for the supply of herds or for trade involves the cost of digging and/or maintenance of wells plus the cost of extracting or drawing the water. A temporary well may cost up to Ls.100 depending on the depth at which water is reached, as the digging is contracted on mans' height (2.5 metres for Ls.10). The maintenance of a well for the whole of the dry period may cost up to Ls.50. On the other hand, a permanent well of durable lining is more expensive and may cost up to Ls.5,000.

Watering the herds involves the extraction of water from wells and collecting it in earth constructed troughs, of about 300 gallons capacity. The labour needed for drawing water is either supplied by family members, herders, or outside labour contracted for the job. In case the latter is used, a daily pay of Ls.3 is incurred for filling a trough which suffices for watering about 100 sheep.

Trade in water carried by lorries involves the cost of the water at the well-field plus the cost of transportation to the site where it is sold. Some of the lorry owners have wells, while the majority buy water from other well owners.

Usually the water transported to villages is carried in barrels, and to facilitate the filling of the latter 2" pumps are used for pumping water from the wells into the barrels which are loaded on the lorries. A lorry load of 22 barrels (4 M^3 approx.) is supplied with water for Ls.25 that go to the well owner.

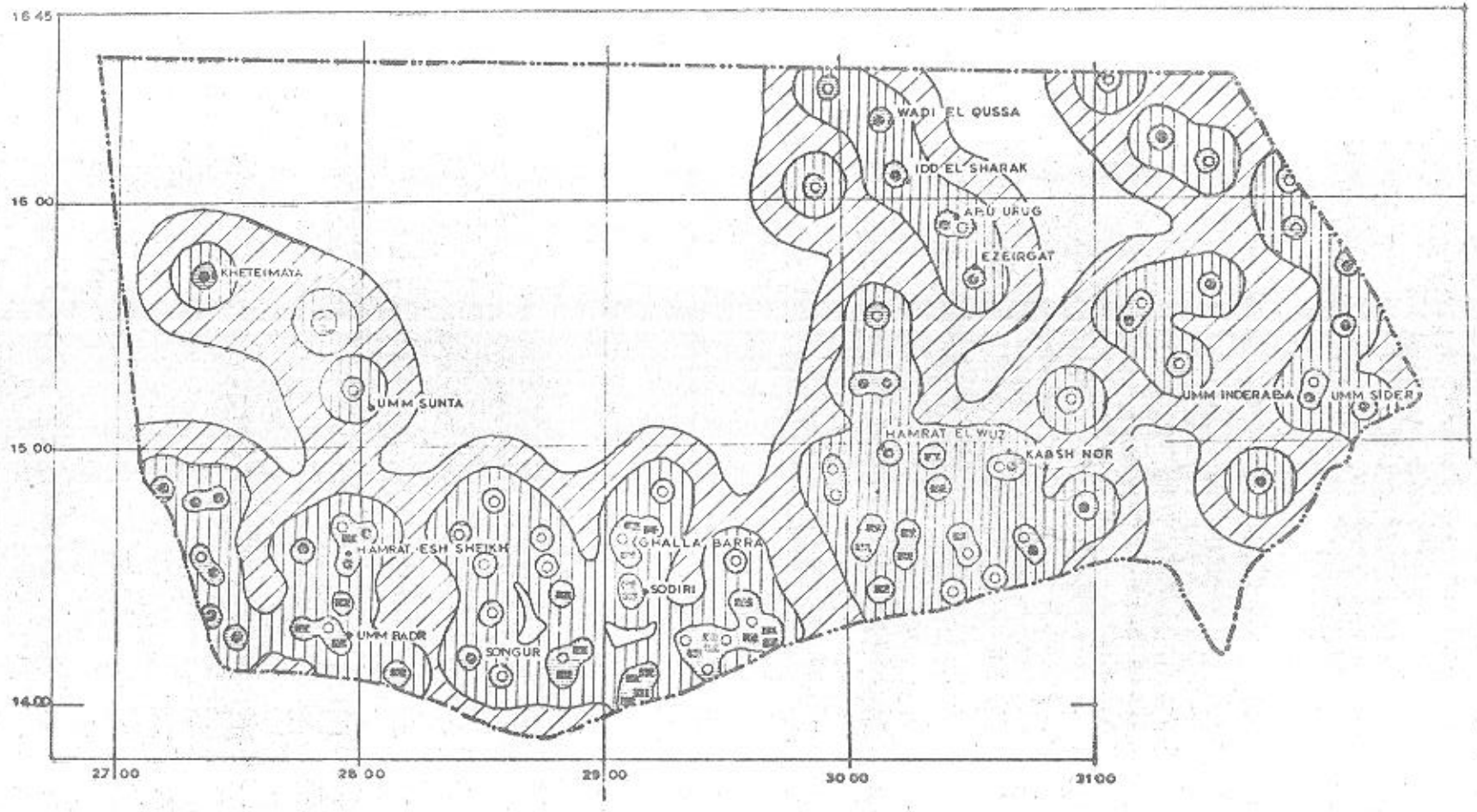
5. Impact of Water Sources on Eco Systems :

Water provision is a controversial issue, especially under semi-arid conditions. While water is badly needed for human communities and the requirements of the herds, experience has shown that water sources accelerate environmental degredation at unprecendented rates. With the lack of control of the use of grazing resources and the number and types of animals, provision of water sources in the study area has contributed among other factors to the decay of the environment. Since water sources act as focal points for the attraction of human activity and lead to the concentration of livestock at certain points, the areas surrounding these points are the most vulnerable to loss of vegetation cover and the activation of the decay factors.

From observations and measurements made to assess current situations around water sources it is possible to construct the following picture of spheres of influence of the different users operating from a water source. The users identified are the human community inhabiting the site, and the 4 graziers : the goat, sheep, cattle, and camel. Each of these has a sphere of influence which can be demarcated around a water source. The influence of human communities which takes the form of agricultural activity, wood lopping, charcoal making, and grazing of village animals is found to extend for a radius of 5 Km. Cattle grazing extends for 15 Km., and sheep and camels up to 30 Km. from a water source.

These impacts are summarized in Fig.(17) which gives a good indication of the current land use situation in the study area.

FIG (17) SPHERES OF INFLUENCE AROUND WATER SOURCES BASED ON 5 Km, 15 Km. AND 30 Km.



CHAPTER FIVE

THE NOMADIC SYSTEM

1. Introduction :

Livestock raising is the main economic activity of the study area. Next to it comes agriculture, which is practiced by both the settled and the nomadic sections of the population. The two economies are interfaced with more reliance of the nomads on animals, and the settled population on crop raising.

2. Main Features of the two Economies :

2.1. Livestock Raising :

The entire district is consedered as vast range-lands for the Kababish pastoral tribe and their associates.

The main animals raised in the area in order of economic importance and ecological adaptability are: sheep, camels, goats and cattle. When the Kababish and the other related tribes: Kawahla, Hawawir, Deweih, Beni Gerar, etc. entered this area in early 18th C and the periods that followed, their livestock was mainly camel, sheep and goats. Cattle was not one of the animals originally raised by these tribes. They found

of animals after grazing and water, which may take the form of macro or petite migrations; all depending on the pattern of animal raising practiced i.e., nomadic or settled, herd size, range conditions, and water availability.

Data pertaining to livestock population in the nation, in general, and in Kababish area, in particular, have long been considered as unreliable. All previous attempts were wholly based on professional guess-estimates, which cannot be described as fair in the dynamic nature of the nomadic societies. Crude figures obtained from local government livestock taxation records "Koshofat El Gutaan", are really far below the actual numbers. Obviously, people always evade the truth about their property when it comes to taxes affair. Therefore, and at least for planning purposes, reliance upon this method is absolutely illogical. The ultimate result is the fact that livestock populations continued to increase

without check and without being detected by the authorities and range planners.

Recent livestock population census has shown that in Dar Kababish, there are 259,408, 132,659, 415,334 and 584,224 of cattle, sheep, camels and goats respectively.

2.2. Agriculture :

Agriculture is widely practiced in Dar Kababish, especially in the Southern reaches of the district. It is the main occupation of the settled communities, and is also practised by the nomads, being pursued by both groups as a source of grain foods.

Dukhun (millet) is the main crop produced in the area, and in good years surpluses raised by the settled communities beyond domestic requirements are sold in the local markets. The other crops casually raised are water-mellons, sesame and sorghum. Vegetable crops such as okra, local varieties of cucumber, plus others are also attempted on a very small scale, especially at sites that receive some run-off.

There is a general belief among the settled population, that agriculture was more prosperous in the past, as back as the mid 1950s. Yields were higher, and

farmers used to secure some harvest almost every year. The majority of those questioned referred the decline in yields, to bad rainfall distribution and a drop in annual averages.

The rainfall pattern of semi-arid lands is characterized by irreguarities, which affect crop production. However, the long term figures of the annual rain do not point to a decrease in rainfall. Accepting the irregularities in distribution as characteristic of the climate of this area, there seems to be a general drop in soil moisture efficiency as a result of the vast removal of the vegetation cover. Hence the amounts received are not efficiently utilized by the soil.

The settled population cultivates those areas surrounding settlements, where they traditionally own the land. Nomads, on the other hand, cultivate in localities where they have sub-tribal rights to grazing and water resources Fig (13) shows the localities of the different sub-tribal groups.

While settlers practice agriculture from their villages, with family labour involved in the different agricultural operations, nomads' agriculture entails some division of labour, between the grazing requirements of

the herd and looking after the fields. Usually in the case of nomads, the head of the household would attend to the cultivations assisted by any surplus labour in the family, while the young men would take care of the livestock. After crops are established, the head of the household would join the rest of the family in the rainy season grazing area, leaving the supervision of his fields to relatives present in the locality, thus dividing his time between cultivation and herding.

As the belt where agriculture is practised extends east-west along the southern fringes of Dar Kababish, conflict between grazing and land for cultivation is minimized to some degree, since during rainy season most of the animals are north of this zone. By the time livestock heads southwards fields are almost harvested. However this does not preclude that during this last period, some conflict might arise between the nomads and the cultivators over right of passage to watering places, obstructed by a continuous expansion of the area cultivated.

3. Nomads Migration Pattern :

3.1. Main grazing movements :

Nomadism is advocated as an efficient system for the utilization of the range resources of the semi-arid

lands. The yearly grazing cycle of the Kababish nomads follows this rythm:

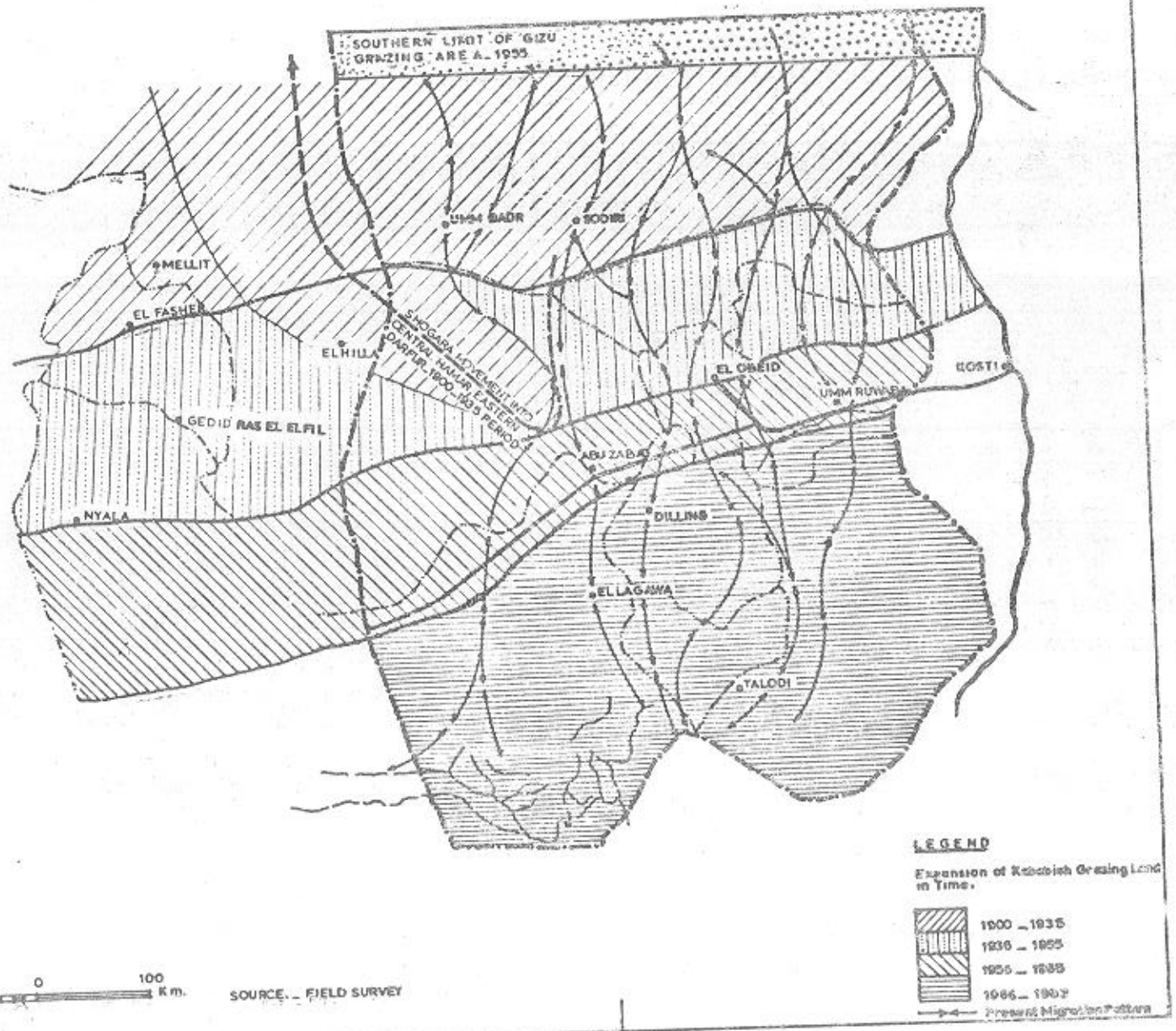
3.2. The Shogara :

It is a movement associated with the early rains. It usually takes place in June. Its direction changes according to the place where the herds had spent the dry season. If that happened to be in the north i.e., in Dar Kababish as used to be in the past, animals would be driven southward, and then eastward to make use of the improved range conditions associated with the early showers received at these areas. In case animals spent the dry season south of Dar Kababish as it is the situation to day, the shogara movement will be to the north, again timed with the appearance of good pastures there, Fig. (18).

3.3. The Nishoog :

It refers to the rainy season grazing period that takes place during the months of July, August and September when the herds are in the north. The northerly peneteration depends on the conditions of pasture and water-supply, which are directly related to the performance of the rains in a particular year.

FIG. (18) GRAZING TERRITORY AND MIGRATION PATTERN OF KABABISH NOMADS IN TIME PERSPECTIVE



In the past herds habitually traveled as far north as the Sudan-Libya border; with the nishoog period extended up to January, as animals used to graze the gizu vegetation, Fig. (3). This has ceased for the last 15 years; and presently animals start trekking southward by October.

3.4. The damar :

This connotes the dry season grazing period: October-May. The first three months of this period: October-December are referred to as darat grazing, which is distinguished from the rest of the period by the availability of some green grasses, the remains of crops, and in good years by the presence of water pools. During the rest of the damar period livestock heads southward and concentrates around water sources. The extent of the southerly peneteration is influenced by the availability of grazing in the areas to the north, which is variant from one year to another.

4. Change in grazing cycles: a historical perspective:

In time this motion combining the Shogara, nishoog, darat and dammar grazing has been confused, and in many instances interrupted, which is a sign that the once balanced ecosystem in which nomads operated is

strained at present. A review of the situation in time perspective helps in revealing the processes through which the changes in ecosystem capability have been effected.

4.1. 1900-1935 :

Up to 1935 the migrations of the Kababish nomads were confined to their tribal district boundaries, with the exception of the shogara grazing where they used to penetrate south eastward into Hamar district and then northwards into northern Darfur, Fig. (18).

4.2. 1936-1955 :

By mid 1940s this movement into Hamar district extended further south, sparked by the newly opened water-yards in the central parts- Khwei area - of the district. The D.C. En Nahud district at that time issued a local ordinance that prohibited the coming of the Kababish to this area before April. He had two reservations against their early coming:

i) that Hamar nomads-the people of the dar (land) should have a priority to the water and grazing resources of the area. Hence by delaying the coming of the Kababish to April, these rights could be reserved to the former, and

ii) that the Kababish being wealthier than the Hamar if allowed to enter the district immediately after harvest-December- would buy their grain requirements, which amounted to large quantities, from the local markets, and by doing so they would raise the prices of this basic commodity in the district. By 1955 the Kababish had already incorporated this area of central Hamar as part of their dry season grazing territory.

4.3. 1956-1965 :

Infilteration to the south continued with the water courses of Wadi Shelango, Wadi El Ghala, and Khor Abu Habil invaded by 1965. Important watering places for livestock such as El Odaya, Es Sunut Abu Zabad, Abu Galib, Abu Haraz, El Birka, Kazgeil, El Ban Gedeid, Er Rahad, Umm Ruaba, El Goghan, and Sherkeila, Fig. (18) began to witness frequent Kababish visitation.

4.4. 1966-1983 :

The Kababish continued to push southward into the Nuba Mts. By 1975 they were already south of Dilling, utilizing the water sources at places such as El Faid Umm Abdallah, Rashad area, El Abassiya and Abu Gebeiha, Fig. (18).

With this southerly thrust continuing, the Kababish are found at present in the very southern reaches of Kordofan region, sharing with the Baggara (cattle raisers) their dry season grazing areas; cited recently at places like Lake Keilak, Lake Abyad, El Liri, Safaha, El Magadama, etc. The latter two are on Bahr El Arab, Fig. (18).

5. The North-South Shift :

The southern infilteration has been accompanied by a marked north-south shift of seasonal grazing belts, especially with reference to the two movements of nishoog and dammar.

It is established that up to 1935 the rainy season - nishoog grazing belt occupied the area to the north of the latitude of El Safiya 15° 30' N and extended up to Debba, Fig. (18), While dry season grazing was limited to the part of Dar Kababish south of this latitude.

The utilization by the Kababish of the area north of latitude 15° 30' N. was extended after the rainy period by shifting to gizu grazing. Gizu was abundant with a high frequency of occurence year after the other in the area north of this latitude.

The gizu supported livestock, mainly camels and to a lesser degree sheep, for the period from December to April. This reduced the dry season grazing period-damar- to only two months: May-June, which was spent in the southern parts of Dar Kababish at the mashari i.e., centres of permanent water supply.

The present pattern of grazing shows a completely different cycle. The rainy and dry season grazing belts have shifted to the south, as explained previously. Fig. (18) exhibits the situation now and 25 years back. These changes are a result of the interplay of many factors which can be summarized as follows:

i) The spread of security in the country side which facilitated the free movement of nomadic groups and their herds, and enabled tribes to utilize the rangelands in districts other than their own.

ii) Improvement, in time, of the water supply situation through the addition of more sources, which opened new rangelands for grazing within and outside tribal territories. This expansion started in mid 1930s, and gained momentum as from early 1950s.

iii) Increase in livestock numbers due to expansion in the utilization of the rangelands and the control of endemics, as a result of intensification of disease control programmes as from the late 1930s.

iv) Inversely and running contrary to the above three conducive situations to herd building, decay factors such as exceeded carrying capacities of the range, overgrazing, expansion in cultivation, inefficiency of rainfall, and repeated occurence of drought conditions, have induced the Kababish nomads to push southward and adopt new grazing cycles.

6. Encampment mobility :

As herds move with the season for pasturage and water-supply, nomadic families also do. However the long range migrations with the herds over different grazing territories which were carried out in the past are no longer practiced at present. With the provision of water supplies and the establishment of security, families began to settle down for most of the year at specific sites. This tends to separate herders and livestock from families, especially during the dry season.

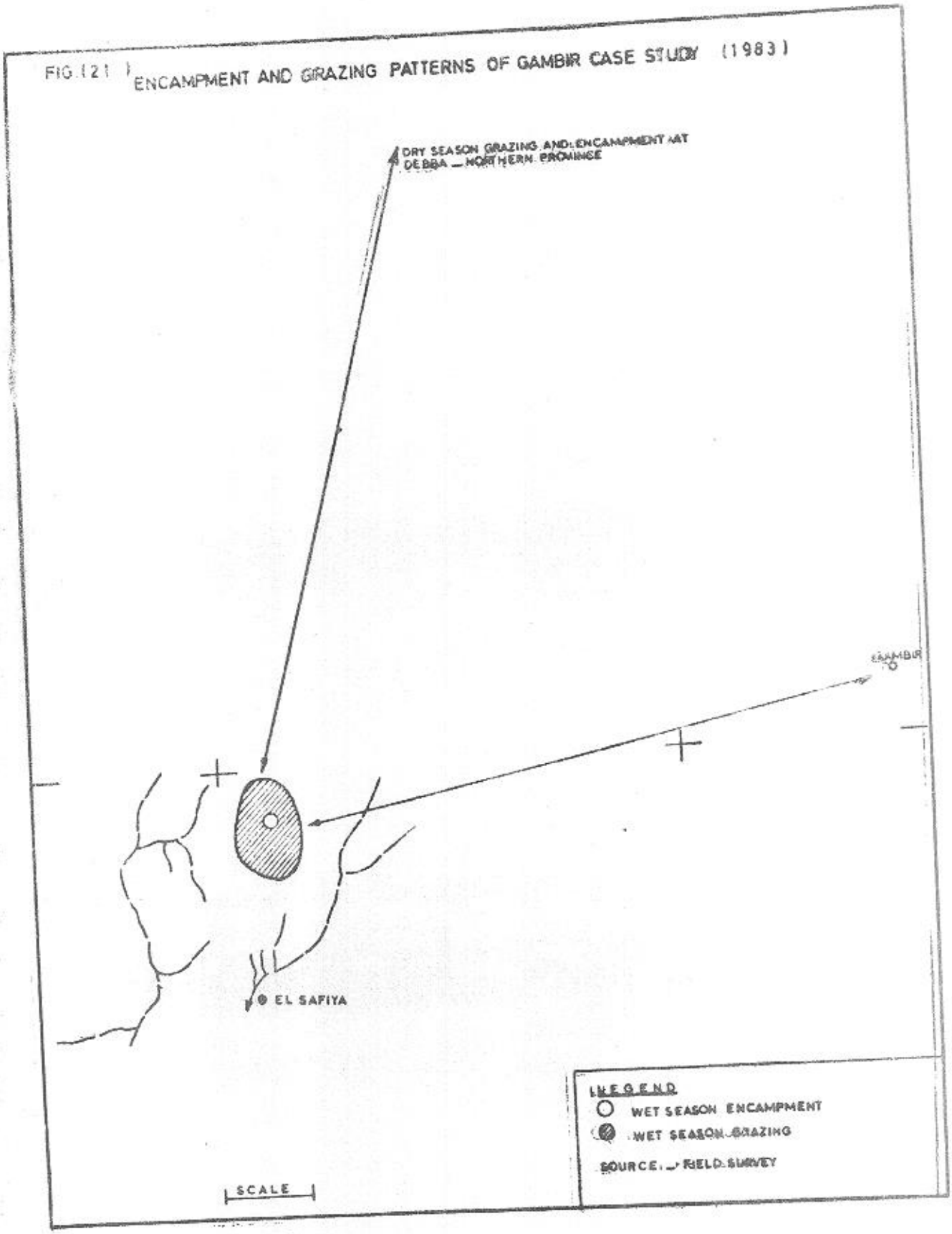
Though there is a tendancy towards settling down, still regular movements between different encampment sites is practiced, which is conditioned by factors including:

i) The dry season requirements of the herd, which are at variance from those of the family. While herds need to roam over wide areas to reach grazing and water, families have to settle close to water sources, which normally in corporate shopping and other facilities which are essential for obtaining the daily family needs. Accordingly most of the permanent water sources have dika (s) i.e. encampments, in their surroundings.

ii) The type and size of animals owned by a household which induce different herding requirements, as each type is managed separately. While camels and sheep are taken for distant grazing, cattle concentrates around water sources. Hence, families tend to associate with the latter, with herders following camels and sheep.

iii) The practice of cultivation by some of the nomads, who build huts in their fields or close by, where they spend the rainy season, while the herds graze far away. After crop harvesting, the same families would move with their cattle and goats to settle near water sources, while the other animals i.e. camels and sheep are tended separately.

FIG. (21) ENCAMPMENT AND GRAZING PATTERNS OF GAMBIR CASE STUDY (1983)



season grazing they headed with their animals to the northern region and camped near Ed Debba - since the Hawawir still maintain ties with relative groups there.

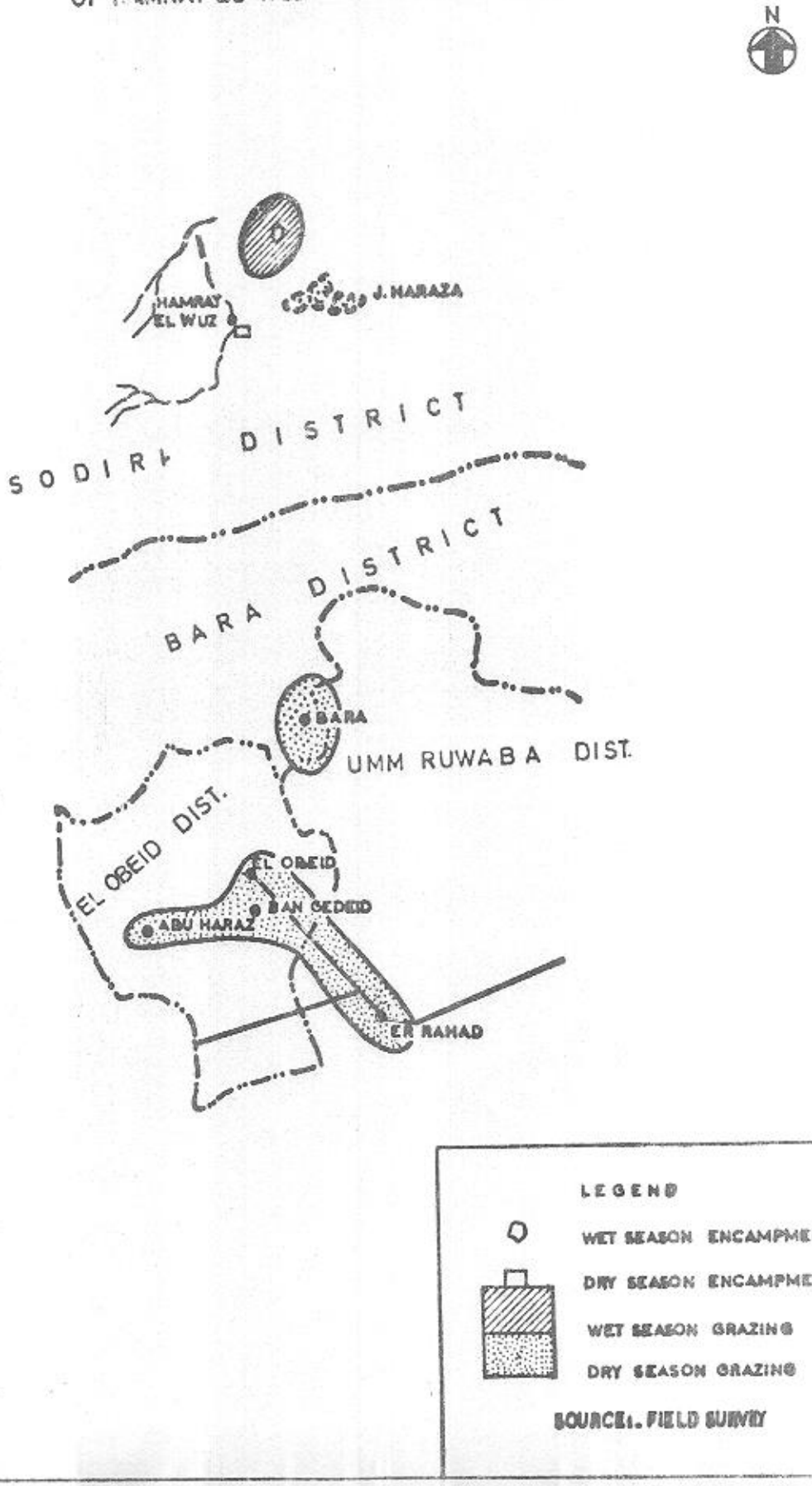
iv) Hamrat El Wuz Case Study, Fig. (22)

This family spent the rainy season west of Hamrat El Wuz, accompanied by their animals. During the darat and damar grazing periods the family was left behind at Hamrat El Wuz, living in an encampment at the id site, while the herds were driven south to graze at the vicinity of Abu Haraz, Ban Gedeid and Er Rahad.

The above illustrations confirm the previous findings that the Kababish nomadic system has in time undergone major spatial transformations. These have their direct reflections on grazing cycles and population/herd relationship. While there was a close association between the two in the past, presently and because of ecological imbalances, the family and herd are becoming quite separated from each other, and for a considerable period of time.

With a tendancy towards more family stability near water supply centres, the present stage in the life of the Kababish marks the occurence of a transitional phase between nomadism and settlement.

FIG. (22) ENCAMPMENT AND GRAZING PATTERNS OF HAMRAT EL WUZ CASE STUDY (1983)



a camp at a wadi bed close to Jebel El Haraza, where they spent the dry season. The tree vegetation at the wadi provided them with adequate pasturage for the small animals, which were watered at Dazingur water-yard. On the other hand their cattle grazed in the vicinity of Jebel El Haraza, obtaining water from the Swani wells there. The camel and sheep grazed at a distance to the east of Jebel El Haraza and were watered at Kazingoor water-yard.

The same family practiced a different grazing cycle the year before. They spent the rainy season at the hamlet site, which they deserted after harvest for the camp site at the bed of the wadi where they spent the darat period. By December they headed southward spending the dry period at the vicinity of Bara, while their animals grazed at the neighbourhood of Umm Soat, El Shireim, Hamdan, and Umm Ushara.

iii) Gambir Case Study, Fig. (21)

This family was not physically in the area at the time of the survey but its case was reported by the head of the household who happened to be there. The family belonged to the Hawawir tribe. They spent the rainy season at a site north of El Safiya. For dry

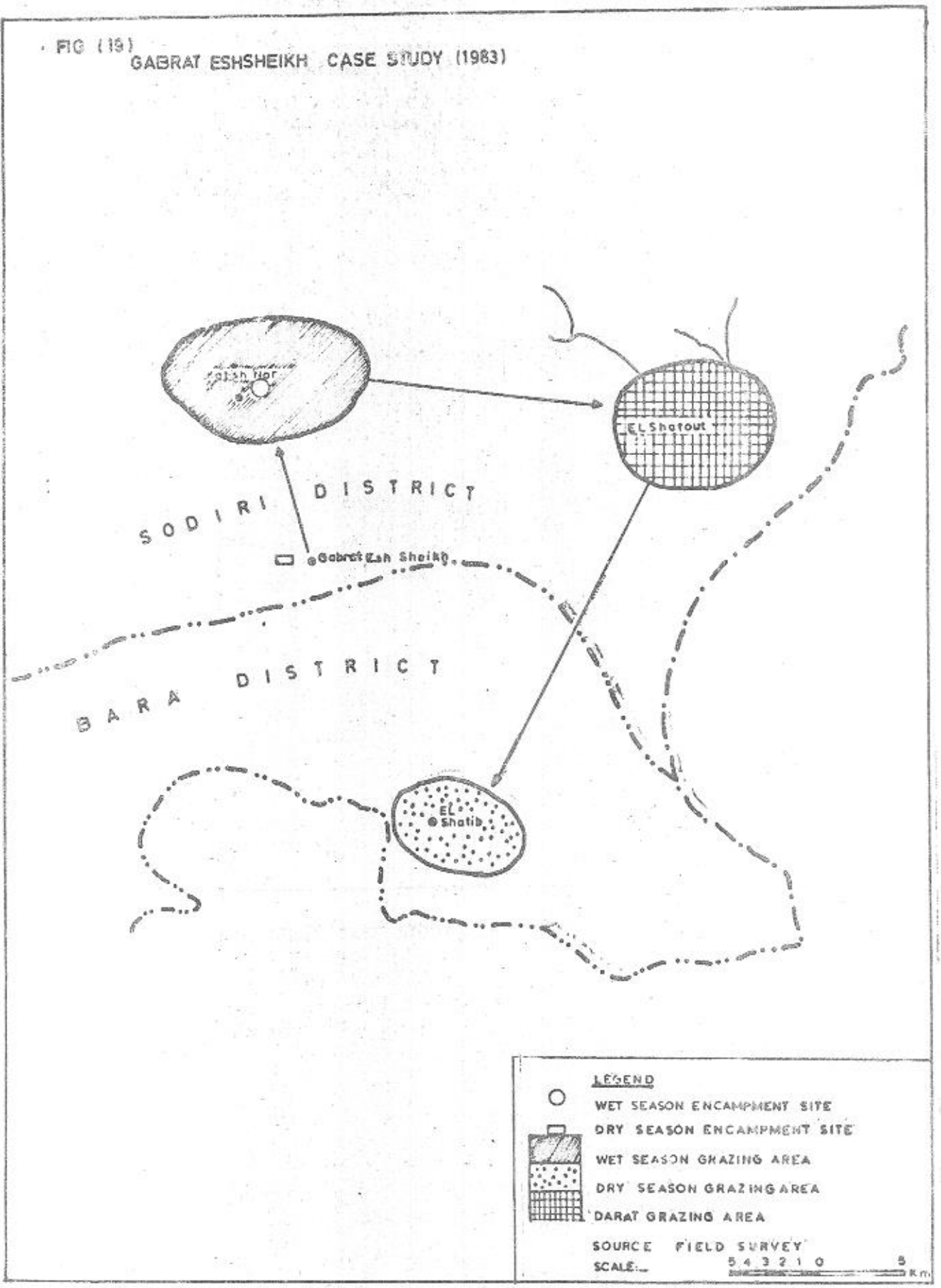
whatever encampment pattern adopted, it is generally observed that Wadis are the focal points of population concentration during the dry season, where most of the households are to be found. They are the last resort for human and small herd populations, where water is available at many sites, and trees provide shade and browsing material for camels and goats.

A few cases on the mobility of encampment during a year grazing cycle are illustrative of the migratory pattern of nomadic groups. The information on these cases is obtained from the field surveys conducted for this study.

i) Gabrat Esh Sheikh case study Fig. (19).

This is a case of a family made of a head of a household, his wife, three sons, and a daughter. The family was settled at the id (well-field) site at Gabrat Esh - Sheikh, keeping 15 goats to supply it with milk during the dry period. With the goats they kept about 10 sheep, reported to be weak animals, not fit for long distance migration which was pursued by the main flock. These weak animals were fed on hay and concentrates to improve their general condition.

FIG (19)
GABRAT ESHSHEIKH CASE STUDY (1983)



The main herds of camels and sheep owned by the family spent the wet season (the nishoog period) at Kabsh Nor and Abu Mariga, Fig.(19). The two animals were grazed separately, and a division of labour was followed, with one son in charge of each type.

At the end of the rainy season, the family migrated southward and spent the darat period at El Mikhanzir: a big wadi with a good vegetation cover to the east of Gabrat Esh Sheikh. By December the family moved to Gabrat Esh Sheikh to spent the dry period. Their main flock of sheep continued to graze at El Mikhanzir, obtaining water from El Shatout water-yard, while camels grazed at the vicinity of El Baniya, El Shatib, and El Shaw water-yards. For obtaining water, camels depended on Gabrat Esh Sheikh well-field, because the above mentioned water-yards offered a limited opportunity for watering camels, being highly congested. The ability of camels to stand thirst enables them to graze almost the same area utilized by sheep and depend on a distant water-source such as Gabrat Esh Sheikh.

ii) Jebel El Haraza Case Study, Fig.(20)

This family spent the rainy season in a hamlet at a site where they practiced cultivation, while their animals grazed near-by. After the rains the family set

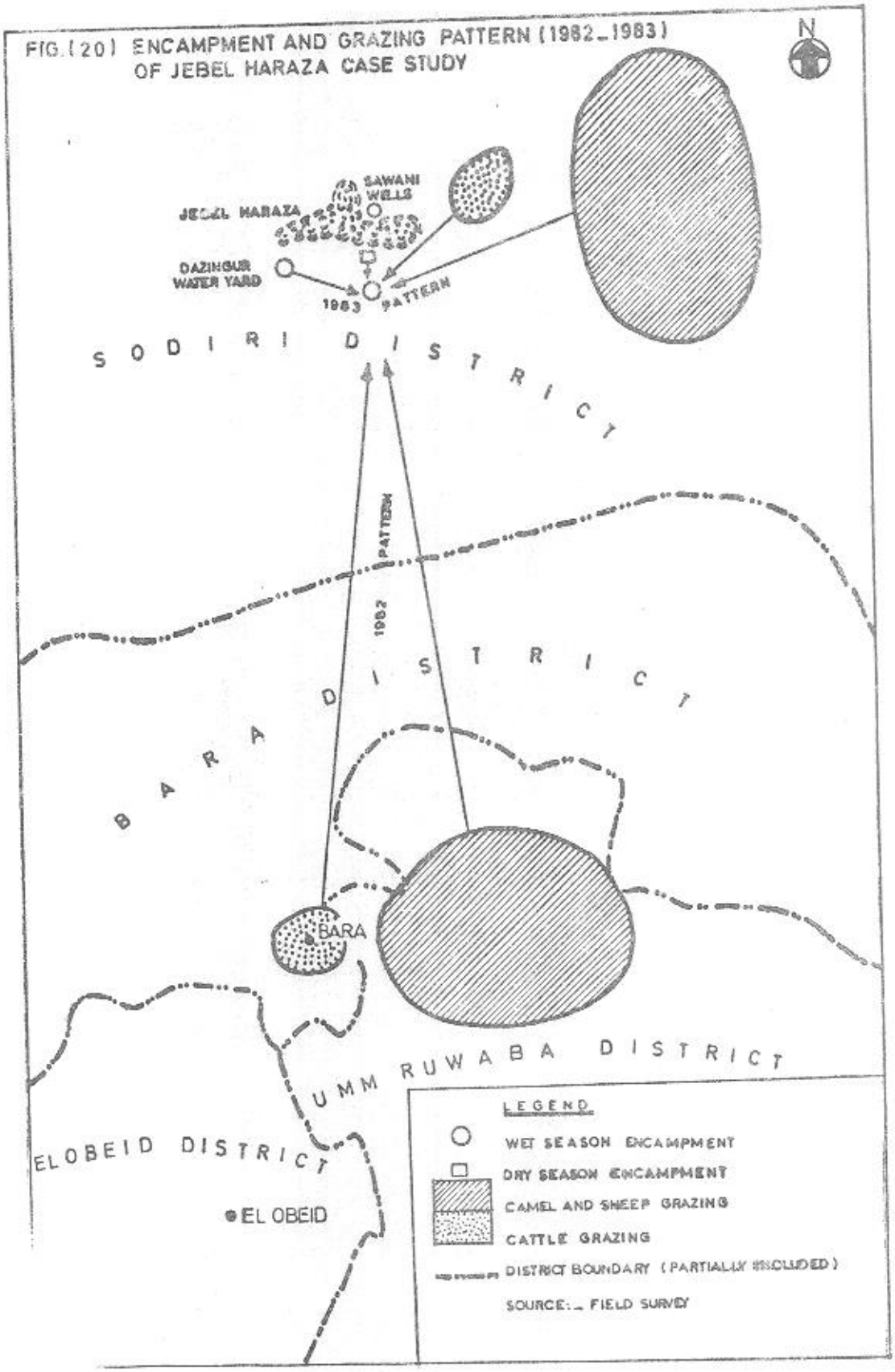


FIG.(20) ENCAMPMENT AND GRAZING PATTERN (1982_1983)
OF JEBEL HARAZA CASE STUDY
N
SAWANI WELLS
JEBEL HARAZA
DAZINGUR WATER YARD
1983 PATTERN
SODIRI DISTRICT
1982 PATTERN
BARA DISTRICT
BARA
UMM RUWABA DISTRICT
ELOBEID DISTRICT
EL OBEID
LEGEND
WET SEASON ENCAMPMENT
DRY SEASON ENCAMPMENT
CAMEL AND SHEEP GRAZING
CATTLE GRAZING
DISTRICT BOUNDARY (PARTIALLY INCLUDED)
SOURCE:_ FIELD SURVEY

7. Increase in usage of Supplementary Fodders :

Nomads depended fully in the past on the natural range for the fodder requirements of their animals. Still the majority of them, especially those inhabiting the western half of the study area, depend on the same source for maintaining their animals; and shortage in natural fodder is made for through the adoption of extensive grazing cycles, by penetrating deep into southern Kordofan and Darfur.

As established earlier the Kababish lands, through time became incapable of holding the current livestock numbers, especially during dry season. The decline in the carrying capacity of these lands is the result of a number of factors:-

i) the continuous increase in livestock numbers beyond the carrying capacities of the range,

ii) the imbalances in the distribution of the grazing load at the macro level, caused mainly by the mala-distribution of water sources, leading to over use in certain areas, and under use in others,

iii) the high stocking rate at water sources that has resulted in overgrazing and devastation of the vegetation cover around most of these sources.

iv) the extensive degradation of the vegetation cover, especially grasses, beyond annual regeneration, due to imbalances of soil moisture relationships.

v) the frequency of drought conditions due to the meagre and sparodic pattern of rainfall which characterizes semi-arid climates, and

vi) in some instances the effects of fires which devastate the rangelands, especially in places away from water sources.

This evidenced shortage in natural grazing induced livestock raisers to look for supplementary feeds, especially so in the eastern half of the area including: hay, grown fodders, dura, cotton seeds, oil seed cake , and water mellons.

7.1. Hay :

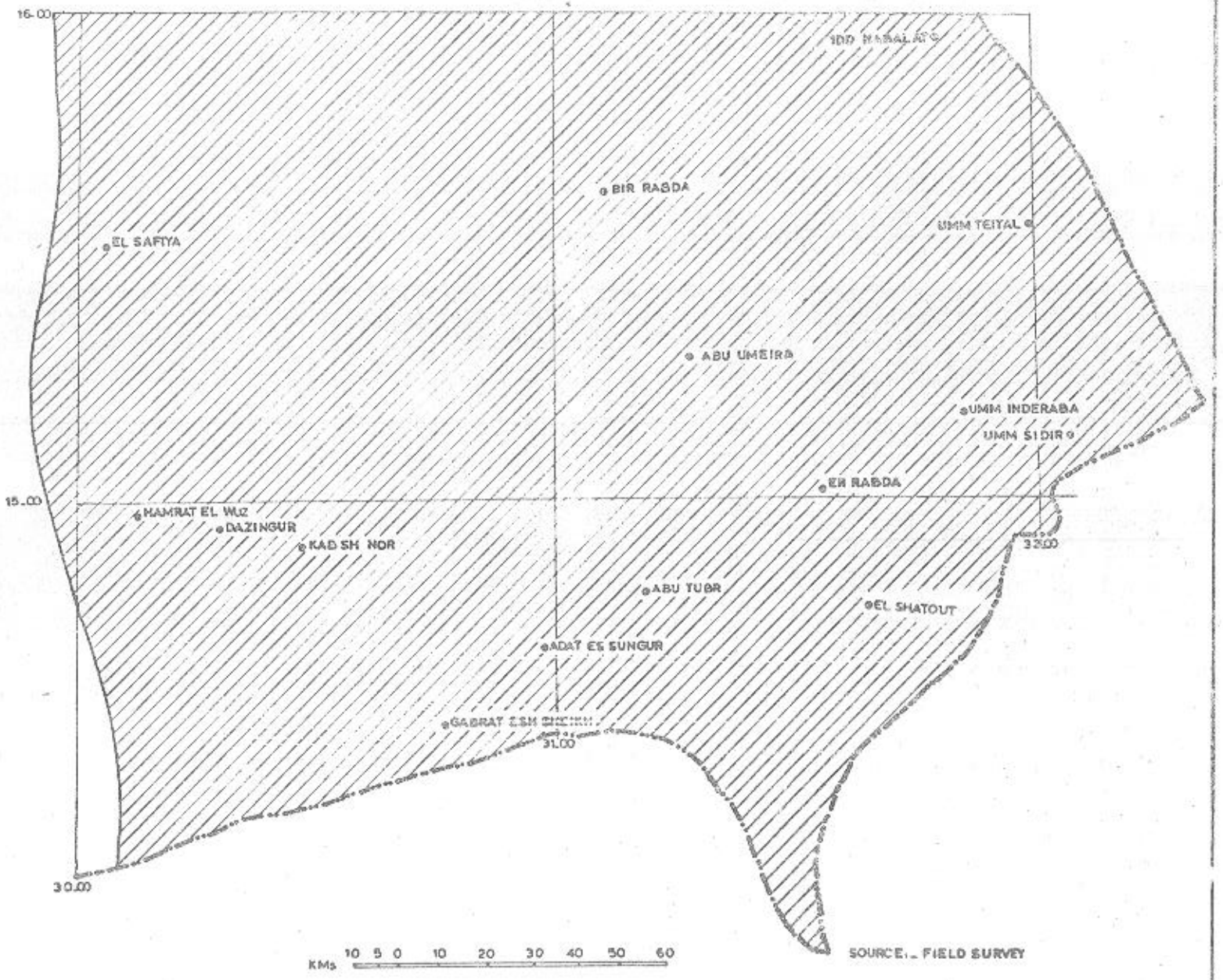
This source is widely resorted to at watering centres, where the vegetation in the vicinity of these centres has been completely removed. Though in most settlements throughout the study area hay is found stored on top of huts or in small exclosures, this is more evidenced in the eastern half of Dar Kababish, where the degree of ecological degradation is more severe, well illustrated by the amounts of hay to be found at places such as:

Umm Inderaba, El Hagab, El Shatout, Gabrat Esh Sheikh, Hamrat El Wuz, El Safiya, Abu Urug, Umm Sura, El Gemmama, Tinna, etc. Fig. (23).

Hay is obtained by one of two ways: either collected by the family, immediately after the rainy season to be stored for use during the dry period, or collected during the dry season. A number of grass species make good hay, however the one which is widely collected is el Gau, Aristida sp. At some settlements it is easily obtained by the end of the rainy season from near-by sites. However by the end of the darat grazing period the grass cover in most of these sites get depleted due to large herd concentration, at this intermediary zone between the rainy season pastures lying north, and the dry season ones further south. As from December and on, hay is collected from distant localities which are devoid of water sources, hence out of reach of nomadic herds.

Except at those sites where the range resources have been severely overgrazed such as Umm Inderaba, Gabrat Esh Sheikh and El Safiya, where dependancy on stored hay may begin immediately at the end of the rainy

EASTERN HALF OF DAR KABABISH WHERE HAY PLUS OTHER SUPPLEMENTARY FODDERS ARE EXTENSIVELY USED



season, normally nomads in the eastern area, resort to hay feeding in December, and the practice is continued throughout the dry months up to the onset of the rains in July. In normal years of average rains the months: January-July make the critical fodder period in these semi-arid lands, with the situation becoming more acute in years of bad rains.

Prices of hay rise with scarcity. While a sack of gau (20 kg.) is purchased for LS 1.00 during late rainy season, it is obtained for double this price during the dry months. Big collectors use camels to transport loads of hay from distant sites (5 days round trip) to settlements. Usually a camel load of gau is sold at a price of LS. 10.00, either directly to nomads, or to the local hay merchants, who sell it afterwards to nomads at a price of LS. 13.00.

7.2. Grown Fodders :

These are mainly dukhun and dura stalks, Abu Sabein and barseim.

7.2.1. Dukhun and Dura Stalks :

As mentioned, the main grain crop grown in the area, particularly in its southern part, is dukhun, sorghum varieties such as Zinari and quick maturing fetarita are

also attempted on a very small scale in places where soil and moisture conditions are favourable, i.e. loamy pockets that receive some run-off. Both do not constitute a reliable source of fodder, since the areas cultivated are small, and in most years are open to crop failure because of inadequacy of rains.

However in good years of rain the residues of these crops are collected and stored by the cultivators as supplementary fodder for animals during the dry season. Since the areas cultivated are small and the success of the two crops is casual, dependence on this type of fodder is limited.

It is worthmentioning here that the stalks of dukhun, the most prevalent crop in the area, are not normally used as fodder. However, and as reported by many respondents, due to scarcity of forage, animals began in the last few years to develop a taste for dukhun stalks, which are presently eaten by all types of livestock. This shift to inferior types of feeds deserves some investigation, as it is reported that in severely drought hit areas where no fodders are available, some farmers are pounding dry wood of highly noxious Acacia nubica shrub (laot) as a feed for donkeys.

7.2.2. Abu Sabein and Barseim

These are not widely used by the nomads so as to be considered as important sources of ofooder. Yet small amounts of both types are imported by lorries and sold at the market places of the eastern area facing Omdurman, i.e. Umm Inderaba and up to Gabrat Esh Sheikh. A small bundle of four kg. weight, of either type, fetches LS 1.00 at the first centre, and LS 1.500 at the second one.

Increasing quantities of abu sabein are being imported recently by commercial livestock owners to sites such as Umm Inderaba to maintain herds driven from the west on their way to Omdurman. The main places which supply this type of fodder are the Gezira, the area between Khartoum and Gezira, and the White Nile pump Schemes, Fig. (24).

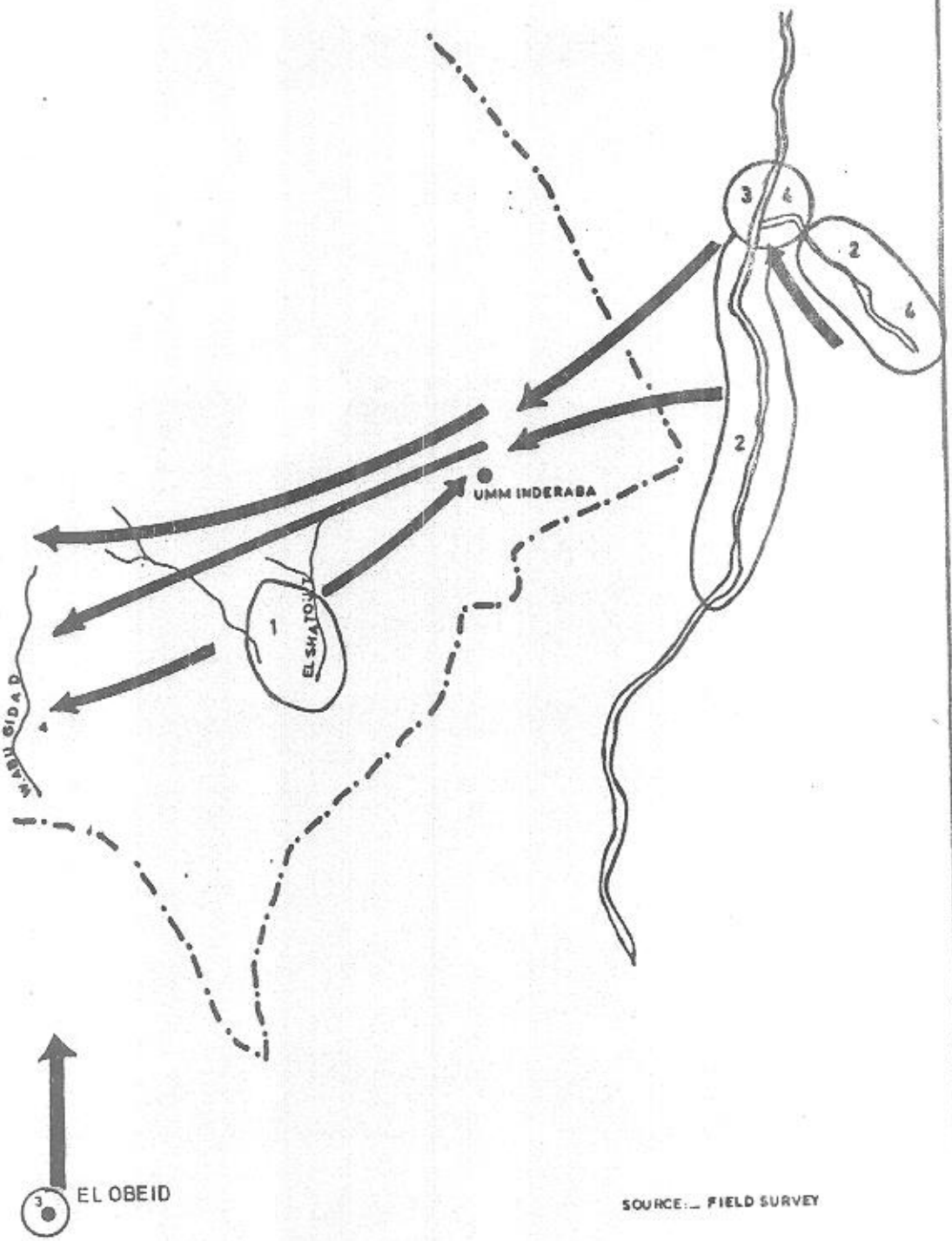
7.3 : Imported Fodders :

Fodders imported to the area are dura, cotton seeds and cotton seed cake .

7.3.1. Dura

Dura is assuming importance as a supplementary feed. Dependancy on this kind of fodder has increased in the last 10 years, especially at settlement centres

FIG(24) AREAS FROM WHICH SUPPLEMENTARY FEEDS ARE IMPORTED



SOURCE:- FIELD SURVEY

1 HAY (FOR UMM INDERABA CENTRE FOR EXAMPLE)
2 DURA STALKS 3. DURA 4. COTTON SEEDS AND CAKE
⟹ DIRECTION OF FLOW.

due to the prevalence of drought conditions. Since the area does not produce enough dura to meet the staple food requirements of its population leave aside fodder for animals, supplies for humans and animals are imported from outside the area: mainly from Omdurman and El Obeid. The current price of a sack of dura is in the range of LS 45.

7.3.2. Cotton seeds, and cake

Bizra or cotton seeds and seed cake are next in importance to hay, being widely used throughout the district, as a supplementary feed, mainly for sheep.

Bizra was introduced for the first time into the area by groups of nomads from the White Nile region, in the early 1960s. Its use gradually spread to the west as far as the Medoib area in Northern Darfur. The price of bizra increases with distance from centres of supply. A sack costs LS 28.00 at Hamrat El Wuz, and is sold for higher prices as we go west. Bizra is obtained from village shop-keepers who import it from Omdurman.

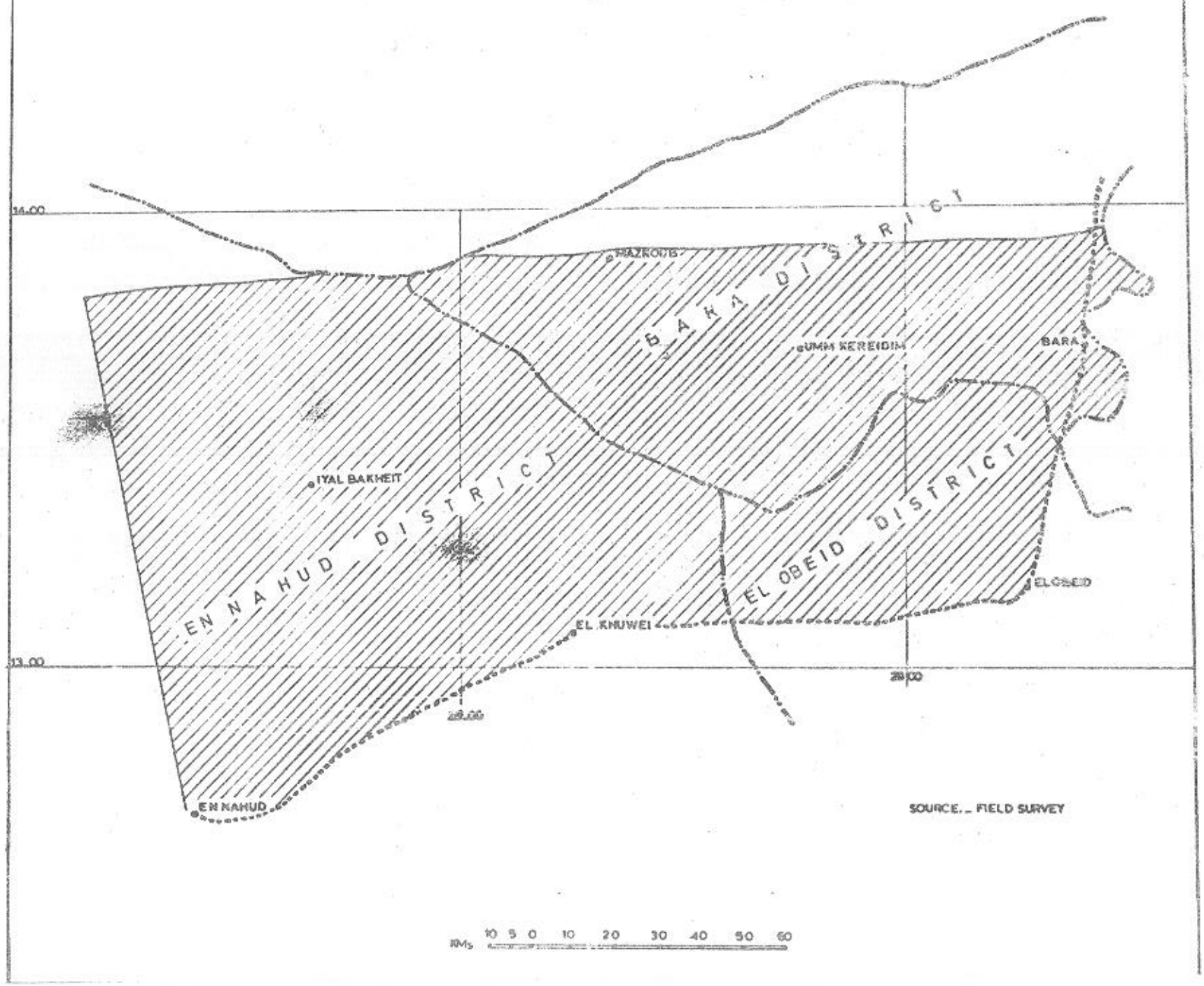
In years of good forage, feeding on bizra starts from mid April. However, with the drought conditions of recent years, breeders are resorting to this type

of feed from as early as January, especially so in the severely affected eastern area.

Umm Inderaba is an illustrative case. Here sheep-owners hold their animals at the water-place in zariba(s), thorn exclosures, as from the beginning of January; feeding them on hay collected by the family, or brought from the local collectors, plus bizra which is purchased from the village market.

8. Water mellons :

These are grown fodders but as the crop is raised by farmers and utilized by nomadic herds outside the Study area, they are thought to be treated separately. Water-mellons began to assume an important role as a source of water and as a fodder crop in the last 10-15 years. Though not extensively grown in Dar Kababish, it is worthy of consideration, since many of the Kababish livestock raisers buy water mellon farms from cultivators, in Dar Hamar and Dar Hamid districts, Fig. (25) to feed the crop to their animals, when migrating south-wards to the dry season grazing areas. In both districts the crop is purposely grown so as to be sold to the nomads.



SOURCE.- FIELD SURVEY

The expansion in cultivation of water mellons in the two districts is encouraged by the low cost of production of the crop. Usually it involves no weeding which is the most costly operation in this type of traditional farming. It is grown on what is known as Sifal land i.e., land that carries a dense cover of dry grass from last rainy season. The farmer normally waits for the new grasses to germinate under this mulch, and in late rainy season applies fire to the plot to burn the new grasses, hence obtains a cheaply cleaned area, where he throws his water mellon seeds. Usually the crop is sown in September to start producing by November, with production sometimes continuing up to May.

The period November-March, which registers the peak of production coincides with the earlier part of the critical fodder period, hence the water mellon crop offers a ready supplement to the forage produced by the range.

Livestock owners buy the mellon farms from local cultivators. The average price (1983) was LS 150 to the makkamas (1.5 feddans). Farms' sizes are in the range of 10-15 makkamas. After the price is settled

the herd owner would enter his animals into the farm. Mellons are then collected, cut in pieces in containers and fed to animals. The seeds are dried by the herd owner who later sells them at the near-by crop market.

In most cases the price paid for buying the mellon crop is recovered from the sales of the seeds. Hence for a period of three months nomads pay for feeding and watering their livestock, the equivalent of the cost of their labour, spent in collecting and preparing the mellons for the animals.

It is clear from the above disposition that the increasing dependancy on other fodders to supplement forage from the range, which is being widely resorted to during the last 10 years, is an indicator of the severe degree of ecological degradation the Study area has undergone. If the present trend would continue, as evidenced by the transition of the grazing zones to the south, and the increasing reliance on imported fodders to augment natural forage, it is inevitable that the pastoral economy of Dar Kababish shall face a total collapse in the near future. The present stage is transitional in the path to that end.

CHAPTER SIX.

RANGE LIVESTOCK MANAGEMENT.

1. Introduction :

In the preceding chapter emphasis has been given to the nomadic system and the grazing resources, of Dar Kababish. This chapter is intended to draw a short account of the traditional livestock husbandry, particularly breeds and breeding practices in the open range and grazing areas.

2. Breeds and Breeding Practices :

Livestock breeds found in Dar Kababish district are a natural result of a continuous breeding process that, probably, started since the beginning of the recorded history of man and animal kinds. Current breeds owned by locals do not represent the original blood or specimen, as they went through a long process of natural selection and breeding from within the herd. Having in mind the aridity problems in the district, we could easily anticipate that livestock breeds owned by the people are superior in terms of surviving these harsh conditions, though with low productivity.

2.1. Sheep.

2.1.1. General

Kababish sheep is categorized as Desert or Arab ecotype. This particular ecotype and its different tribal breeds are currently widespread throughout the Sudan. Kababish and Hamar breeds are considered among the best sheep breeds both in Kordofan and in the nation.

The conspicuous characteristics of these breeds are: Their relatively large size, long legs, hairy coat, pendulous ears and Roman nose. Adult males weigh up to 68 Kg. or over. The ewes are good milkers, yielding as much as 2-3 Kg. daily.

In Dar Kababish district sheep is considered as second to camel in prestige. Locals describe them as "gurbab el bil" an Arabic phrase which means that camels and sheep are complementary to each other and whenever you see camels in the range you see sheep in the background, with the connotation that a breeder sells sheep to spend on camels. From the standpoint of range management this outlook is absolutely correct. The foraging habits of these two kinds are complementary as there is no dietary overlap among them and they can graze together safely without any competition.

2.1.2. Husbandry

Sheep husbandry in Dar Kababish is evolved and developed by locals for maximization of production both for commercial returns and subsistence. Handling and raising a lamb from birth to marketable size is a tribal art that is well absorbed and conceived by everybody in the tribe.

There is a well calculated optimum herd size and a rational breeding system that includes a planned lambing per cent, herd structure, and annual off-take.

The economic and managable herd size in Kababish sheep is 300 heads. This number is considered by most tribal breeders as a 'complete' flock and is held as a target. However, herds of less than 300 heads are commonly owned in the area.

2.1.3. Herd Structure

Sheep herd structure in Dar Kababish is commonly as shown below :

Castrated males	(2-4 years),	85 head	or 28%
Yearlings	(1-2 years),	20 "	7%
Lambs	(Birth-1 year),	80 "	27%
Ewes	,	100 "	33%
Rams (Breeders)	,	15 "	5%

A lambing per cent of up to 85% is not uncommon among them. This value is more than acceptable even in a proper ranching system. In the herd structure shown above, castrated males are considered as marketable at any time and the herd owner sells according to markets' demand. He continuously replaces this class from yearlings stock and in some instances by buying 2 years old lambs from other breeders. Rams for breeding purposes constitute 5% of the herd. This means that a breeder ram has to serve from 20 to 25 ewes according to terrain and range condition. Among the Kababish there is a well established gargon or local naming for the different class in the herd. This naming is based upon sex and age make-up of the herd as shown below :-

baham	: from birth to 6 months.
Hamal Kharif	: a lamb born last fall.
Hamal Shita	: a lamb born last winter.
Hamal rushash	: a lamb born early in the fall.
tani	: 2 years old.
rabaa	: 3 years old.
sadees	: 4 years old.
fahal	: a breeder ram.

2.1.4. Lambing

Interesting enough is the breeding and lambing processes practiced by the Kababish in the open range.

Kharif or fall is the proper breeding season and animals are firmly controlled and not allowed to breed throughout the year. They always breed them to ensure that offsprings be dropped during favourable conditions where forage and water are adequate, and survival is not difficult.

A breeding pasture or site with specific properties is carefully selected before lambing. They usually avoid sand dunes where ticks and other insects are abundant and shade trees are absent. Flat and levelled sandy-loam areas (Sisa) are often preferred as shade trees and adequate pasture are available. In this process of site selection, sheep owners or herders have to have a riding camel to scout and explore different sites.

After he has chosen the breeding pasture a protection or karr should be immediately built to accommodate newly born lambs. Karrs are always established under big trees to shade lambs and protect them against mid-day insolation.

When sheep begin to drop their offsprings, all herders are alerted and individual attention is increased to help dams and newborns, and thus insure

high lambing percentage that often increases beyond 100% in case of twins or multiple births.

Newborns are kept in the Karr and not allowed to follow their mothers in the pasture, until weaning time and become strong enough to feed on items other than milk. Before this time, lambs are allowed to mix and suckle their mothers only from dusk to early morning.

2.1.5. Mineral Supplementation

Supplemental feeding such as concentrates was seldom practiced in Dar Kababish. As discussed previously, this has considerably increased in the last decade. However, mineral supplementation is a common practice among sheep owners. Locals are fully aware that an intake of certain minerals is important and essential to the life of sheep for general health and for production. Although there is no chemical analysis available for the forage plants of Dar Kababish to indicate what minerals are specifically defficient in their rangelands, there is a belief however among them that there is a general defficiency of minerals, particularly phosphorous.

Nacl and $CaCO_3$ are the only minerals that are used by locals in livestock operations. They are called "milih" and "gardiga", respectively, and they obtain them from local centres in less purified forms.

During dry period sheep have less accessibility to mineral supplementation than during the rainy season or Kharif time. The common practice is to salt sheep every 10 days and sometimes every 2 days during Kharif time while accessibility to salt is once a month or every second month during the hot months.

A 200 Lb. sack, 4 galibas,(*) that costs about Ls.13 is fed monthly during fall time to a flock of 150 heads. Only half of this amount is sufficient during summer for the same number of sheep.

Salt is often brought from Omdurman or Shershar and El Gaa in Dar Hamid area. Kababish livestock owners prefer Omdurmans' salt to Shershar's.

As mentioned by Kababish themselves, salting frequency is positively correlated with the watering interval. They reported that an average of 5 days is an optimum watering interval for sheep during both summer and winter times. In some instances water is not always available and sheep can withstand a longer time than 5 days. In these instances salting is not recommended.

(*) A galiba is approximately 50 Lb.

2.2. Camels.

2.2.1. General

As mentioned before, camels have top prestige value in Dar Kababish. Need not to say that the prominent image of Kababish among other tribes is always as camel breeders.

Kababish camels, one humped (dromedary) and are typical Arabian camels that are said to have originated in the middle and southern parts of the Arabian peninsula some three thousands years ago. With their Arabian owners (Kababish) crossed the Red Sea and found their way to Dar Kababish and other parts of the Sudan.

No attempt has ever been made to categorize camels into strains and it seems that classification in this direction is non-existent at all. However, there may be a broad functional categorization based upon the kind of work most suited to each type. Bennett (1948) considered camels as either Pack type, Anafi type or Bishari type, referring to heavy, light weight riding, and slightly stronger and sturdier camels, respectively.

2.2.2. Husbandry

In Dar Kababish, camels are raised more for "meat on the hoof" to Egypt (Tothill, 1948). Therefore, the

commercialization consciousness is well developed among Kababish camel breeders. Traditional information about economic and managable herd size, herd structure, calving, and proper grazing and watering activities are well established routine and everybody is brought up with.

Specific gargon pertaining to naming of their camels is known to the tribesmen. This is based on age which is always determined by general appearance and teeth condition of the camel, as shown below :-

howar or fasil	: from birth to 6 months.
mafrood	: 6 month to 1 year .
Wad Laboon	: 2 years.
hog	: 3 years.
jada'a	: 4 years.
tini	: 5 years.
raba'a	: 6 years.
sadis	: 7 years.
alloul	: 8 years.

From 8 years on, camels are considered mature and have well developed incisors and molars. However, Kababish are also aware of the fact that camels on concentrates have big and less eroded teeth than free ranger camels.

2.2.3. Body Weight

No body in Kababish has attempted to weigh a newly born camel. However, birth weight is roughly in the order of 25 to 30 Kg. depending upon sex. Baby camels gain body weight at a high rate during the first year and then weight gain slows down. It is said that at weaning (7 to 16 months) body weight may range from 100 Kg. to 150 Kg.

Mature bulls may weigh up to 600 Kg. if castrated and well finished for export. However, due to transport stress, body loss is inevitable. From this weight average dressing percentage is roughly 55%. Data on body weights, body measurements, productivity (synthetic activities) and other particulars of camels are extremely lacking and research in this direction should be encouraged.

2.2.4. Herd composition

Camels herd size in Dar Kababish is roughly in the order of 75 to 85 heads with only one mature bull to serve the females of the herd. It is said that a well fed bull can serve up to 6 females a day.

Herd structure varies slightly from one place to another depending upon terrain, availability of pasture and water and also labour and manpower afforded by the owner . In most cases two herders are assigned to each herd.

During mating season (November-April) extra labour or more individual attention is needed as bulls grow nervous, fight with each other and chase females from one place to another.

At the end of the mating season, herds may camp near a water source where grazing is not too far. At this time less labour is needed and herders prefer to reciprocate and divide labour among themselves.

2.2.5. Herd Structure

Herd structure in Dar Kababish camels is roughly as follows :-

23 heads below mating age (males and females)
30 mature females
2 bulls.
20 Castrated males.

However, this structure varies largely from one owner to another particularly in the first and second categories i.e. juvenile class and castrated males. This variation is attributed to the longer calving interval of camels and marketing favourability.

2.3. Cattle

Cattle in Kordofan region can be divided into three type groups : Arab or northern, Nilotic or southern, and

Nuba Mountain type or Dwarf African short-horn. The Arab cattle, which is considered as short-horned zebu (Bos indicus), is thought to have been introduced into Africa by the Persian invadors of Egypt in the seventh century A.D., and to have gradually worked its way down to the Sudan (Lucas, 1942). These cattle are characterized by having a large hump and relatively short horns. Some variations may be observed among individual beasts.

In Northern Kordofan, particularly in Kababish and Kawahla area, the northern Riverain type is very common. This type is also a short-horned Zebu that commonly inhabits the banks of the Blue and White Niles. People of the district mentioned that this type had been introduced from the White Nile area and particularly from Hassaniya area. Also among the Kababish herds it is not uncommon to see rather more superior type, Kenana breeds, that have been introduced for breeding purposes.

Kababish cattle (short-horned zebu) are comparatively good milkers and the maximum individual yield may reach 15 Kg. per day and over 2500 Kg. per location of 10 months.

Although cattle breeds in Kababish district are ranked among the best breeds throughout the region, the Kababish themselves look upon their cattle, as compared to other livestock kinds, as a third priority both in terms of value and social outlook. This fact is confirmed by livestock statistics and interviews made among them.

There is a continuous and steady decline in cattle numbers in the district. For example, Sayed Ibrahim Fadlalla a prominent figure in Sodiri rural council had a total of 200 heads of cattle in 1982 and is left with only 50 heads in 1984.

There are several reasons associated with the phenomenon of cattle decline in Dar Kababish. Increase in aridity conditions, lack of adequate forage, scarcity of water and cattle being naturally less hardy than other animals are among the reasons often mentioned by the locals.

A fact that worth mentioning here is that Harrison (1958), reported on the situation of cattle raising in Dar Kababish district, He considered cattle as dangerous to the rangelands and not suited to the arid ecosystem of the area. He also emphasized that cattle

raising in Dar Kababish area will eventually lead to serious environmental degradation in Northern Kordofan. Harrison prophecy has come true, as cattle are now confined only to settlement centres and forage is brought to them from distant locations.

3. Animal diseases :

Animal diseases and deteriorating livestock health are among the first priority problems that have been tackled by the Ministry of Animal Wealth in the Sudan, with great accomplishment. In Dar Kababish district the Department of Animal Health had established a number of veterinary Service clinics at Sodiri, Hamrat el Wuz, Umm Badr, Umm Sunta and Umm Inderaba. Periodic vaccination campaigns against endemic diseases have been launched since independence. Vaccination teams used to visit the district regularly up to 1975.

From 1975 up to now, veterinary services in general and vaccination against endemic diseases in particular are not as regular as before. However, locals have begun to deal with most of the diseases both at the protection and treatment levels. Medicines and tools used in livestock diseases find their way to the hands of the locals via Omdurman and El Obeid.

It may be well accepted that most livestock diseases prevalent in Dar Kababish district are equally existent in other parts of the Sudan. However, the widespread diseases are listed below.

Principal Livestock Diseases in Dar Kababish.

Infectious Diseases :

1. Foot and mouth	(el Huma el gulaiya) cattle, sheep and goats.
2. Rinderpest	(el Taun el bagari) cattle. An active campaign against this disease, started in 1968-1969 and ended in 1977. It has been reported that the disease has almost been eradicated in the country.
3. Contagious Bovine Pleuropneumonia	(abu genit) : Cattle. It is widespread among nomadic cattle in arid and semi-arid regions.
4. Haemorrhagic Septicaemia	(el tasamom ed damawi): Cattle.
5. Anthrax	(el huma el fahmia): Cattle, sheep, goats and Camels. The danger of this disease stems from the fact that all ruminants are suceptible to it and can also be transmitted to humans. It is well controlled.

Non-infectious Diseases

6. Black leg. (abu zagala): Cattle and sheep.
7. Babesiosis (huma el gurad)
8. Heart water (el khadar)
9. Fascioliasis (el duda el Kabdia)
10. Other Intestinal worm infestation.

Although it is well accepted that camels are most hardy and less vulnerable to disease infections than other livestock kinds, there are a number of diseases and parasites, both interal and external, that are always associated with them.

The following are the names of important camel diseases and parasites often encountered in Dar Kababish area :

- Mange
- Camel box
- Diarrhea, particularly among the young.
- Trypanosomiasis
- Internal parasites.
- Mastitis.
- Flies and ticks irritation in certain seasons.

Fortunately, locals have developed skills and competence in diagnosis and treatment of most of these diseases.

CHAPTER SEVEN

LIVESTOCK MARKETING

1. General :

The magnitude and type of trading activities bear heavily on the general standard of living in the Study area and the level of nutrition and diet among the populace.

Items of trade include locally produced commodities as well as those imported from outside the area. Almost the whole area depends on the Three Towns for consumer goods the most significant of which are sugar, tea, coffee, textiles (dammuriya, zarag, firka, etc) and dates. Grains are also imported in bad years.

The main trade items produced locally are livestock, some grains in good years, and occassionally gum in small amounts. Some of the farmers bring to the market water mellons, tibish (a local variety of cucumber) and ladys' fingers during the darat time. Other items include locally produced household items such as mats made of palm leaves plus leather workings.

2. Market Centres :

The main market centres operate permanently and on weekly days. There are signs that trade activity

in these markets is declining compared to the past, mainly due to the desertion of the area during the dry season, as most of the nomads are outside the district at this time of the year. Hamrat El Wuz and Gabrat Esh Sheikh are cited to illustrate the growth of market places in the Study area, and to show how they are presently performing.

The market at Hamrat El Wuz was developed by 1935 when it was all built of straw except for 4 shops which were built of mud. Trade here involved dura, livestock, gold and silver ornaments which were often used as a currency to buy from the local people. Lorries were introduced in the area in 1947, but camels remained the major means of transport, and the journey from Hamrat El Wuz to Omdurman took 7 days.

The market at Hamrat El Wuz is permanent, with two specially active week days: Monday and Thursday. During the dry season it depends on the surrounding population, while during the wet period it attracts people from Wadi El Milk, El Haraza, Abu Hadeid, Umm Darag, El Mahbas and El Sheikh El Siddig. Livestock brought from these areas to Hamrat El Wuz market is bought by Sababa coming from Omdurman.

Gabrat Esh Sheikh market has 25 operating shops most of which deal with iron works (black smith), shoe making, and angareib making. Some of these items come from the Kheiran area north of Bara. There are also 20 coffee shops. Dura grain and flour are prosperous items in the trade.

The Saturday weekly market attracts traders to Gabrat Esh Sheikh from Omdurman and Umm Garfa (in Bara district). Some merchants have moved to Gabrat Esh Sheikh from Fadliya which had once been a prosperous crop market, but declined following the decline of crop production in the area.

There is interaction between Gabrat Esh Sheikh and Umm Garfa which is more active, attracting more sababa from Omdurman and El Shigeig. Interaction is, in fact, encountered among many of the weekly markets. Traders move to various market centres during market days almost throughout the whole week, using lorries to transport trade items.

3. Livestock Marketing :

The main animals marketed in the area, in order of importance are : sheep, camels, and cattle. The three enter the livestock export trade from Sudan.

Goats are mostly marketed locally, and only few numbers find their way to outside markets. In what follows the marketing processes involved regarding the three types of livestock shall be examined in detail.

3.1. Sheep:

3.1.1. Marketing arrangements

The number of sheep sold at Sodiri district (1983) was estimated to be in the order 200,000.

The leading sheep market is Hamrat El Wuz; other important market centres include Sodiri, Hamrat El Sheikh, Umm Badr and Gabrat Esh Sheikh. All these market places have local merchants, agents, companies and brokers.

The peak of sheep marketing is the darat period. Marketing transactions are normally held at the water-places i.e. the bore-wells and mushra, or in the grazing area. The buyer and seller usually agree on a specific day on which they meet at one of the three sites mentioned above. After the buyer examines the animals, he specifies the number he is going to buy. The seller would bargain to increase the number of animals to be purchased once the price is fixed, because he could

sell weaker and lower-quality animals, so as to buy in turn better ones to add to his flock. The two would finally agree on a figure and then the buyer would select the animals he would buy.

The number to be sold also depends on the size of the murah (herd). For a murah of 300 animals the sale is usually between 50 and 60, while for a murah of 100 animals the sale is between 10 and 15.

It seems that the size of the murah, depends on the breeding cycle. Most livestock owners started first with a small number of animals, i.e. the murah was small and so was the sale. Herds continued to increase and build up till about 1965, with the number's sold becoming equally large. Though the numbers sold at present are still large due to the increase in off-take which is motivated by the export trade, there are signs of decline in sales due to the comulative effect of over stocking, overgrazing, and the general deterioration of the eco-system.

The tendency towards commercialization of the livestock economy manifests its effect in the rise of three sub-categories of breeders: the very rich owning

up to 5 murahs, the medium ones with 3 murahs, and the poor who keep less than 100 animals. The last group sells locally for the first two who build-up herds after the selling season.

3.1.3. Marketing Systems:

Four different types of marketing systems are followed:

i) El Fasl:

It is a system whereby merchants can buy livestock without actual payment at the time of the transaction. The merchant and the breeder agree on the price (which is usually 20-40% higher than the current prices), and the breeder delivers the animals on the understanding that payment will be made after the merchant sells the animals at Omdurman. The merchant may advance the breeder some consumer goods to support his family. It may take a year to finally conclude the transaction.

ii) Purchase in cash: There are three variants of this type. Firstly, there are the companies or their agents who pay immediately or within a short time (not more than a month) when money has to come from Omdurman. The three main exporter companies are: Wad Hadob, Mahadi Abdel Hameid and El Amin Bakheit. Secondly, there are

the local merchants who pay part of the money immediately and the rest after a period which is usually longer than the period granted to companies because they have more established relationships with breeders. Thirdly there are the brokers: about 10 of them reside at Hamrat El Wuz, while others (about 50) come from outside the area, mainly from the White Nile centres such as El Shigeig, El Sheikh El Siddig, Jebel Aulia and El Alaga. Most of them come on donkeys, and may continue westward as far as Sodiri. However, they centre at Hamrat El Wuz because of its central location and because it is more active than the other centres.

iii) The Barter System: which operates through the exchange by breeders and merchants of livestock for goods. This usually takes place to the advantage of the merchant.

iv) The Sheil System: The breeder receives a sack of dura and some other consumer goods from the merchant to pay back on selling his animals, sometimes to the same merchant. The dura and other consumer goods are usually accepted at prices 30-35% higher than their current market prices.

The marketing system is undergoing some change. In the past, agents used to buy from local merchants and brokers. Recently, they have started buying directly from the breeders, because:

(a) Knowing the local market and procedures, brokers monopolize the livestock market;

(b) Companies and agents have contracted obligations, and want to buy as quickly as possible to honour their contracts.

3.1.4. Marketing Season :

Different buyers and sellers have different seasons. The local merchants and sababa start buying in June and sell in September either to local exporters or at Omdurman. Company agents come to the area during the darat period, starting in October and continuing up to February, with the peak in December. Some local merchants buy weak animals, feed improve and sell them during July-August. This takes place in all of the intermediate centres.

Exports of sheep have favourably affected the breeder in terms of higher prices, but have had negative impacts on the local community:

(a) the business scale of local traders has significantly been reduced, and

(b) meat is becoming increasingly scarce in the local, small market places.

The introduction of sheep transportation by trucks to Omdurman has attracted more and more of the local shop-keepers to be involved in the trade by becoming sheep exporters. A lorry takes about 60 sheep at a transport cost of LS. 5 per animal from Hamrat El Wuz to Omdurman. Local and outside traders buy and transport sheep from January up to the advent of the rainy season. During this period animals generally command higher prices at Omdurman than during the darat and shita periods.

Sheep prices at Hamrat El Wuz ranged between Ls. 100 and LS. 130 per animal in 1983, while the average prices at Sodiri were as follows:

LS. 70 for the lamb

LS. 130 for the gadaa and tani

LS. 150 for the sadees.

3.2. Camels :

Camels in Dar Kababish are either marketed within the bounds of the area or exported. The total number of camels marketed in 1983 was in the range of 5,000 heads. The number sold by breeders depends on the size and composition of the livestock they possess.

An average breeder owning 100 camels, for example, would sell about 5 camels annually if he is not commercially minded and does not own a relatively large number of sheep.

The main local markets are Mazroub and Umm Badr, with some trading activities taking place at Hamrat El Wuz, Umm Sunta and Sodiri.

Camels marketed are of the following three types:

(a) male camels for riding,

(b) castrated male camels, and

(c) female camels.

There is no fixed price for either of the three types, and the transactions are concluded through bargaining between buyers and sellers. Buyers, who may be local merchants or merchants coming from Egypt, are more experienced and have a better bargaining power than sellers. However, the average camel prices at Sodiri were in 1983 as follows:

LS. 300 for a female camel and

LS. 500 for a castrated camel

Egypt and Libya constitute the foreign markets for camels driven on the hoof.

The peak time for export is the darat, however buyers start building herds as from August. The animals are driven to Egypt during the cool period, since camels are sensitive to heat. Some camels are steadily taken to Libya through Mellit.

3.3. Cattle:

Numbers sold in the area are limited, especially with the drought of the last years. Sodiri is the main market for cattle, but commercial transactions take place at all watering centres. Cattle are marketed either for slaughtering at local market places or for export to Omdurman. Local merchants all over the market centres, usually buy beef cattle immediately after the rainy season. Each merchant buys up to 150 animals.

They buy indiscriminately with regards to age and sex, and breeders accept this because they badly need cash.

Those trading in milk-cattle usually buy during the dry period when cows are pregnant and expected to deliver during the rainy season. After delivery, cows are driven to Omdurman during the rainy season when it is cool and pasture is more abundant.

Cattle prices at Sodiri last year (1983) were as follows:

LS.	300	per mature bull
LS.	200	" " cow
LS.	100	" heifer
LS.	1	Sales tax
LS.	1	Guaranter fee

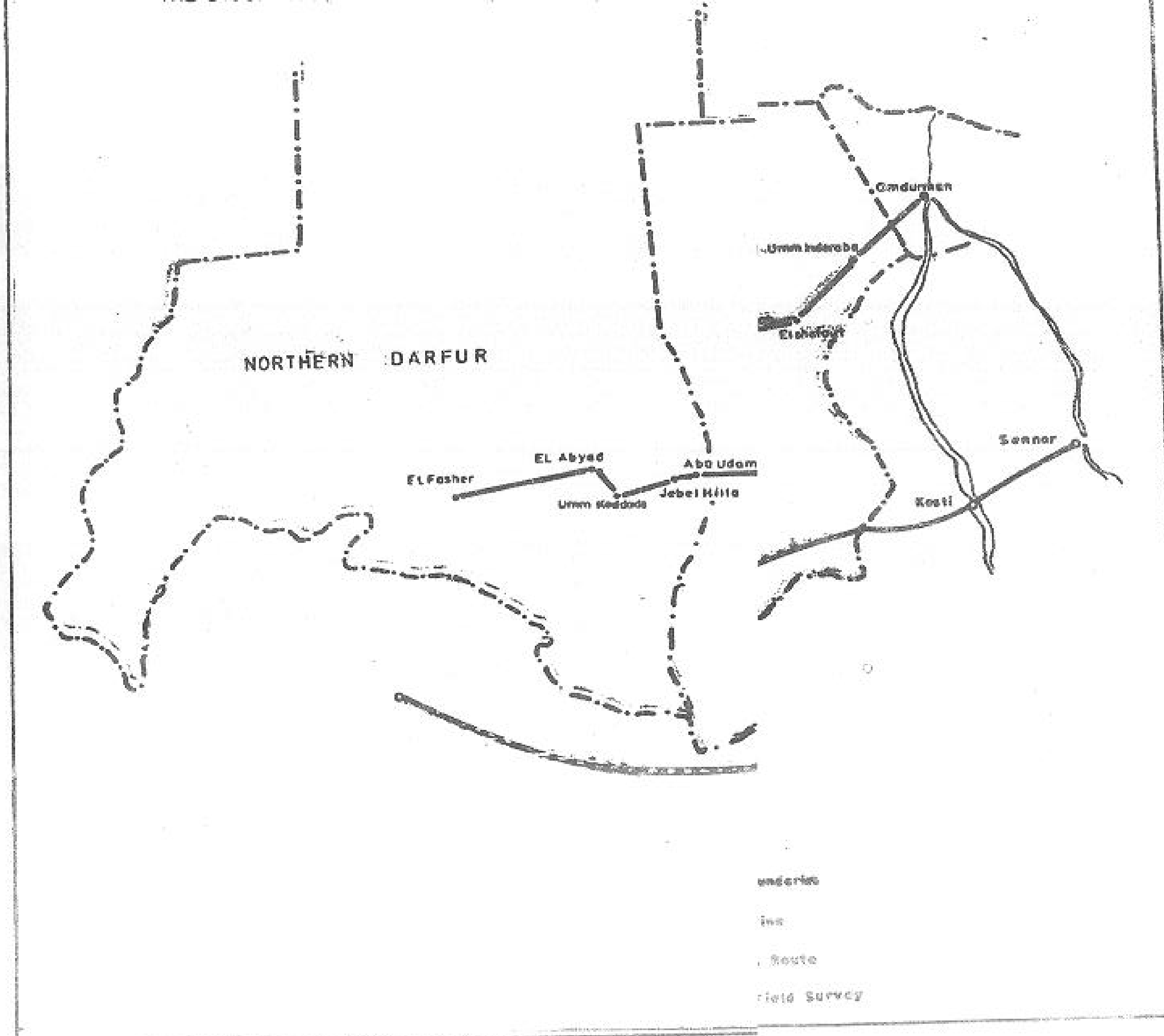
4. Livestock Trekking :

4.1. The stock route:

The road from El Fasher to Omdurman crosses the Study area (Fig.26) passing through El Abyad, Umm Keddada, Jebel Hilla, El Farrak, Abu Udam, Armil, Foga, Kujum, Sodiri, Tinna, El Koketi, Shershar, Gabrat Esh Sheikh, El Hagab, El Shatout and Umm Inderaba. As from Kujum and on-except for El Koketi and Shershar, the route is fully running in Dar Kababish. The same route is used by sheep and cattle exported from the Study area. Camels follow a different route that meets the Nile at Dongola.

Of the above mentioned points on the route, Jebel Hilla, Gabrat Esh Sheik, El Hagab and Umm Inderaba have grazing problems. Herders start buying hay, especially for cattle, as from Shatout onwards. The journey from El Fasher to Omdurman takes about 38 days, and from the fartherest western point in the Study area about 14 days.

FIG (26) THE STOCK ROUTE EL FASHER OMDURMAN (THE NORTHERN



4.2. Trekking System :

For trekking livestock merchants divide the animals bought in murahs of about 100 sheep each. Each murah is managed by a khabir (guide), who is paid LS. 100 per month, and two shepherds or herders each of whom is paid LS. 50 per month. The khabir is provided with a camel to carry water, food and all needed trekking requirements. The trekking activity usually continues from November to February, though for animals driven from Darfur trekking starts at the beginning of the rainy season in July.

As for cattle, each murah (50 heads) is accompanied by a khabir and four shepherds. The former, if travelling from El Fasher and incharge of 3-4 herds, is paid LS. 500. Each of the latter is paid LS. 250 for the same trip in addition to food and transport. The rate of payment differs with the distance from the centre of delivery, time spent and number of murahs taken care of by the khabir and herds.

Merchants are willing to spend on trekking because it is a prosperous commercial activity since the price of cattle at El Fasher may be about LS. 300 per animal and as high as LS. 1000 in Omdurman.

Exported camels are usually driven in herds of about 100, known locally as Daboka, and usually ranged on the trek by 3 herdsmen and a guide. Each of the herdsmen is paid LS. 150 and the guide is paid up to LS. 300 together with food, animal transport, water bags and pocket money. The annual tax rates on animals are :

100	P.T	per	camel
50	"	"	cattle
25	"	"	donkey
16	"	"	sheep
8	"	"	goat

The total animal tax collected annually by Sodiri district is estimated at LS. 180,000. It is clear that taxes collected are too low to reflect the property owned or the real size of livestock in the District.

Sales taxes are collected on the three animals. The rate for sheep is P.T. 50 per animal. An additional amount 30 P.T per sheep is paid to the guarantor who is usually from the people of the area. His function is to trace back the seller of the animal in case any dispute arises afterwards about the selling.

Camels are charged LS. 5.00 per animal as export fees. Other per head miscellaneous fees including the guarantor and the sales fees amount to LS. 5.00. For cattle the fees are LS. 2.00 and LS. 1.00, consecutively.

CONCLUSION.

Environmental Change and Impacts.

This chapter attempts to synthesize the findings of Volume I. The emphasis shall be on environmental change: its impacts and effects, through according special weight to the following parameters.

1. Ecosystem Imbalances :

The study has shown that livestock raising is the dominant activity in Sodiri district, with special emphasis and interest in camel and sheep raising entirely on nomadic and transhumance frame works. Although the nomadic way of range use in this semi-desert area is always looked upon as ideal, compatible with the fragile nature of the ecosystem and acts as a safeguard against the deterioration induced by grazing, yet there are serious indications of severe rangelands degradation. Increased livestock number beyond the natural ability of the land is considered as the major causative factor of this deterioration.

The expansion of the Kababish into southern Kordofan and Darfur is mainly due to limited range productivity in their own land. Productivity of

rangelands in the Kababish district is naturally low and in its excellent condition production per hectar is hardly above 0.5 ton per year. As revealed, range productivity at present is very much related to water supply distribution. Areas located in the basement complex formation are generally more productive and less destructed. This is mainly due to lack of livestock water and thereby, low intensity of grazing. In places where water is adequate and within reach of livestock, rangelands are severely overgrazed.

Table (13) shows estimated average forage production per hectar for each of the associations examined in Chapter Two.

Table 13.

Estimated Average Forage Production per Hectar

Association	Area in Km^2	Average Production Ton/ha.	Total Production Ton/ha.
1. A. torvilis-maerua desert scrub.	18,200	0.25	455,000
2. Semi-desert grassland on sand.	54,128	0.50	2,706,400
3. A. mellifera-Commiphora desert scrub.	40,268	0.60	2,416,080
Total			5,577,480

Source: Based on survey findings.

This table indicates that forage produced throughout the district is about 5,577,480 tons. If we assume that livestock population in the district is evenly distributed, this amount is sufficient to support(5,577,480 ÷ 3.6 ton) 1,549,300 AU. per year, compared to a total of about 1,020,539 A.U. in the district.

However, livestock in the Kababish district can never be distributed evenly throughout the rangelands due to water scarcity in more than 60% of the district as can be depicted from the distribution of water sources. Therefore, livestock populations are concentrated in the southern part of the district where water is relatively available. This has led to severe deterioration of the rangelands and creation of desert-like condition in this part of the district.

Recently, the status of overgrazing has been accentuated by the frequent occurrence of drought periods in the area. Drought occurrence, although is a characteristic feature of the long-term climate of the district, it became very serious in its effects due to increasing livestock and human populations and the consequent increase in natural resource utilization. The impacts of all this are well exemplified in the quick changes and transformations that the land, economies, modes of living, and populations

of the district are undergoing at present.

Based on the findings of this research a scheme of environmental indicators of change is worth attempting as a frame for the policy and strategy tackling the problems of the semi-desert belt of the two regions suggested for Volume 3 of this study.

2. Indicators of Environmental Change :

Environmental degradation refers generally to the temporary or permanent disturbance of the ecological balance in a particular area. This disturbance may be a function of natural, particularly climatic factors, and/or may be arising out of the human misuse or over-utilization of the environment, i.e. coaxing it to yield beyond its equilibrial limits.

This section looks into the latter aspect of environmental degradation in Dar Kababish, with particular emphasis on indicators of degradation, and major land use factors initiating and intensifying degradation. The indicators of change that can be synthesized from the findings of the previous chapters are :-

2.1. Large Scale Removal of Vegetation.

Travelling across the area, one will encounter extensive areas bare of tree and/or grass cover, especially during the dry period. This is an indicator as well as a cause.

Different spp. of acacia have been removed from wide territories. The Acacia senegal for example which used to grow in pockets in the southern parts of the area has almost disappeared completely. Production of gum, though a subsidary activity, has significantly declined in these areas. Besides a wide variety of other trees has been removed to provide for fire-wood, to produce charcoal and for construction purposes. Most of these items are produced commercially to be marketed at local centres or at Omdurman.

The same applies to grasses as many of the palatable spp. have disappeared, shrank in area, or their place is taken by inferior types. The change is more severely felt in the goz (sandy), areas compared to the Sisa (clay or loamy) areas which up to very recent times held a good vegetation cover. Presently, Sisa grasses are disappearing as well, partly because of the removal of the tree cover, and partly because wind blown sands have burried them.

2.2. Sand Dune Building

The soil-fixation function of the vegetation cover has been terminated by the large-scale deforestation and removal of grasses. Sandy soil has become mobile and sand creep has become an identifying phenomenon of the area. Many evidences can be cited: the road to El Fasher, which used to pass through the centre of Hamrat El Wuz, shifted from the centre in about 1970 because a sand dune has developed west of the village. The teachers at Gabrat Esh Sheikh /reported that one morning in 1982 they could not open their door because of sand accumulation during the night before. Again the burial of the hospital and the water-yard at Hamrat El Wuz by fast building dunes is one of many examples of the wide occurrence of such phenomena throughout the district.

2.3. Burial of Water-Courses

Irregularity of annual flow of water courses is an established feature of arid lands. Yet this phenomenon has become more observed in Dar Kababish in the recent decades; mainly attributed to the disappearance of the once dense tree vegetation that used to grow there, also to accelerated wind action carrying sands into the Wadis. The effect is felt in many Wadis exemplified by those

running into Umm Inderaba, Gabrat Esh Sheikh, Hamrat El Woz, Sodiri Umm Badr, etc. The burial of water courses obstructs the flow of water during the rainy period, and causes failure of well fields; since all the surface water sites depend on the annual replenishment brought by the flood water of Wadis.

2.4. Death of Livestock

Death of livestock because of disease and lack of pasture has become such a wide-spread phenomenon that 7 persons at Gabrat Esh Sheikh reported that they had lost about 75% of their sheep and camels during the period 1980-83, and such that a whole section of Awlad Suliman sub-tribe have lost most of their livestock and sold the rest to abandon livestock rearing, and migrate to settle permanently near Ed Duein.

People at Sodiri mark the year 1976 as the onset of unprecedentedly high death rate among their livestock; they feared the spread of diseases from livestock to people in that year.

The merchant supplying the school at Hamrat El Wuz with milk reported that last year (1982) he lost a large number of milk-producing cattle because of the combined effect of scarcity of pasture and epedemic diseases. Another person at the same centre had 80 cows and 200

sheep in 1981, but now he has only one cow and 5 goats after the death of all the others.

People at Sodiri, Umm Inderaba, Gabrat Esh Sheikh and Hamrat El Wuz relate this high death rate to the prevalence of mahal (scarcity of grazing and water). They content that 1981, 82 and 83 were consecutive mahal years, and therefore speculate that even higher death rates await their animals.

2.5. Decline in Sheep Reproduction.

According to almost all nomads interviewed, ewes used to reproduce twice a year during the good, old years, but now it reproduces once a year.

2.6. Change in Type of Animal.

Pastoral degradation has also been manifested in a change in the composition of herds in favour of the less demanding animals and animals which graze less discrimatingly. At Gambir, the goat, which has become the dominant animal, feeds on tree pods collected by children. The complete dependence of animals on tree fruits for their feed is the most severe stage in animal sustenance, while the sheer dominance of the goat is a significant sign of the deterioration of the ecosystem.

2.7. Scarcity of Milk.

Because of the death of milking animals and the decline of animal productivity milk is becoming increasingly scarce. Hamrat El Wuz used to have abundance of milk, but now, except for a short period during the rainy season, its inhabitants depend on powdered milk. Merchants supplying schools with milk confirm that milk production has seriously declined, and some argue that the decline has become increasingly identifiable since 1975.

An active market for imported powdered milk is rapidly developing. This will have its impacts on the health, particularly of children, and on the consumption pattern of the people in the area.

2.8. Scarcity of Semn (Clarified butter).

Along with and as a result of decline in milk production arises the scarcity of Semn which had once been an abundant and/a prime milk product for the nomads, whether as a constituent of their diet or as a source of additional income. Now no Semn is produced at Hamrat El Wuz, and in occasions when Semn is required, it is imported from as distant areas as Iyal Bakheit.

2.9. Decline of Game :

Game had once been abundant in Hamrat El Wuz area. The deer used to roam at will. The deer was frequently hunted and sold in the market for only p.t. 2.5 during the thirties. Now no game can be seen in the area. Also, some birds once abundant, like hubar, have now disappeared from the area of Gabrat Esh Sheikh.

2.10. Lower Agricultural Yields :

People at Gabrat Esh Sheikh and the surroundings estimated that the decline in agricultural yields between 1979 and 1983 had ranged between 50 and 70%. Decline in yields has been consecutive and so significant that it has been reflected in their folklore. They named the year 1982 Umm Mugshasha, denoting that people had no harvest, and they simply "swept the stalks for their livestock". 1983 was called Fatasha, indicating that most people would have such a bad harvest that they would go around seeking help from the few who would have a surplus. Farmers anticipated that next year (1984) would be a bad year too (which has come to be true), and named it Malasha, denoting that luckier farmers would hide from the needy because their harvest, though better than that of others, would still be too low to allow them extend help to those needy farmers.

2.11. Conflict Incidence.

Incidence of conflicts pertaining to land use has increased. At Gabrat Esh Sheikh and Umm Garfa, for instance, conflicts over farm boundaries, agricultural lands and encroachment of livestock on cultivated land, especially during harvest time, have become more frequent during the last 7 years or so.

More serious is the conflict between the Kababish and the Zeyadiya over the buffer zone between the two provinces of Northern Kordofan and Northern Darfur. In the past, this area had been traditionally used by the two communities as a damar grazing area. Agreements organizing grazing in this area, concluded as early as 1908 and 1927 are filed at Sodiri. The main water sites in the area are Umm Sunta, Umm Qozein, Abu Bitteikh, and Umm Higleig. People from Northern Darfur Province have recently started digging wells in the area against the consent of the Kababish who speculate that digging these wells will lead to the rise of new settlements around these water sites, and that eventually these settlers will, through cultivation, claim title to the land and the right to use it. The Kababish will consequently lose their damar grazing rights on this zone.

Although a conference to solve this problem was convened in May 1983, the conflict between the Kababish and the Zeyadiya seems to be still unresolved to the satisfaction of both groups.

2.12. Diversification of Employment.

Previously, most of the local populace depended on a combination of animal raising and traditional cultivation for their livelihood. With the progressive commercialization of the local economy and the drawing of local communities into the market and with the arising of new social needs and higher livelihood aspirations, there emerged the need for higher income and more cash. On the other hand, the local ecosystem has so significantly deteriorated that the previous activities have fallen short of satisfying all the needs and demands. The only way out for the people is to look for new and more activities and appropriate forms of resilience. Thus, in areas of Umm Inderaba, Umm Garfa, Gabrat Esh Sheik and El Safiya members of families combine more than one of the following income-generating activities :-

a) livestock raising,
b) cultivation;
c) handicrafts, e.g. pottery, rugs, etc.
d) fetching and sale of water at Ls.3 per trough;
e) collection of straw and selling the camel load for Ls.12;
f) migration to areas beyond the boundaries of their territory, e.g. to the Gezira Scheme, the Three Towns, Port Sudan and Saudi Arabia;
g) production and/or sale of charcoal;
h) felling, collection and sale of firewood at local urban centres for Ls.3 per camel load;
i) local wage labour, e.g. at water wells; and
j) collection of animal dung; arising as a prosperous trade.

2.13. Decline of Centres.

Many once-flourishing centres declined in function, influence and size. El Safiya was an administrative and a market centre during the colonial period, and was bigger than Hamrat El Wuz. Most of the merchants and traders have deserted the town because of the general degradation of the area, particularly in livestock and crop production. The number of shops in the market place decreased from 20 to 5; and the population decreased from about 710 in 1975 to about 220 now (1983). About 20 mud and dry earth houses and 7 straw-huts are now vacant, i.e. deserted.

Umm Inderaba, which had once been a flourishing trekking site, has now died out because of livestock deaths and concomitant decline in trekking activities. The only remaining sign of that stock trade is that some traders buy weak animals, keep them on feed and sell them later.

3. People's Perception of Degradation :

It seems that the process of environmental degradation has passed through the following stages :-

a) The local ecosystem was up to the late sixties rich, intact, and in equilibrium. Grazing was rich and sufficient; water supply was adequate, and more bore holes and other water sources were being provided, and the nomads were building up their herds. The cost of sustenance for both man and animal was much lower than later.

b) A stage of gradual decline of the various constituents of the ecosystem followed, but with anticipation by the local populace that things might improve. It was a stage of general skepticism about the future.

c) The advent of the current stage has been marked by the contention of the local people, through experience and practice, that the decline of the ecosystem is cumulative, and is ever-lasting. Consequently, people started to look for alternative and adaptive forms of resilience such as emmigration, reduction of stock, other forms of employment, and changing the herd composition.

People's perception of degradation relates the change processes to many causes. The first of these is change in the amount and pattern of rainfall. People believe that rainfall in the past was more intensive and with more rain days than at present - as manifested in higher crop yields and better pasture. The first significant drought they experienced was in 1960.

Climatologists agree that there have been identifiable climatic fluctuations in the area, but these fluctuations are within the expected limits. It is, therefore, safe to assume that environmental degradation is essentially a function of human practice. The main human activities in the area are cultivation, animal raising and removal of the tree cover for other uses. People see that these

activities have resulted in the degradation of the land to an extent inhibitive of regeneration of trees and the sprout of grasses. The soil of such sites become vulnerable to wind erosion which defoliates the top soil, and the area becomes marginal or critical.

They also remark that the nature and intensity of the various human practices conducive to environmental degradation vary from one area to another. In the north western area, for instance, degradation has originated mainly from increase in the number of water points and of animals; while in the north eastern part of Dar Kababish degradation can be related to devastation of grazing, manifested by wood cutting to be marketed at Omdurman. In the northern areas, like El Safiya, Wadi El Milk and Abu Girein, degradation has been more serious although no cultivation is practised; deterioration of the eco-system here is attributable to ecological changes and to more significant rainfall fluctuations.

It is also affirmed from interview findings that in the past agricultural land was limited to specific favourable areas, mostly in the southern part of Dar Kababish. Gradually, more nomads, generally with herds of less than 100 animals, were attracted to the cultivation

of staple crops, mainly dukhn. The intermixing of the two economies and cultures - cultivation and animal raising - was smooth and frictionless, and the two economies were feeding into one another. The predominant system of shifting cultivation had a fallow period long enough to allow for the natural regeneration of vegetation and the restoration of soil fertility. The spreading thinly of livestock over large areas was least disturbing to the equilibrium of the ecosystem.

People summarize the new developments that have adversely affected the ecosystem in the following :-

a) The building up of livestock numbers in some areas, giving rise to overstocking and overgrazing.

b) The increase of population and the continual sedentarization of nomads have swelled existing communities and have given birth to new settlements. This has been aided by the discovery of new water sites and the drilling of more wells, especially during the Anti-Thirst Campaign.

c) The increasing death rate among some livestock communities has pushed more people to depend more on agricultural pursuits. This, coupled with the increasing commercialization of traditional agriculture, has brought extensive

areas under agricultural production, has reduced the fallow period, has decreased grazing lands, and has thus both expanded and intensified the process of environmental degradation.

d) Some people, e.g., who receive remittance from family members and relatives working outside the area, are in a better position since they tend to hire agricultural labour, and thus expand their base of commercial agriculture.

e) The eastern area of Dar Kababish is severely damaged because of the large-scale commercialization of livestock. The area is heavily used by large herds driven from as distant places as Nyala and El Fasher on their way to the Three Towns or to the international market. All these animals concentrate on the border area between Omdurman and Umm Inderaba.

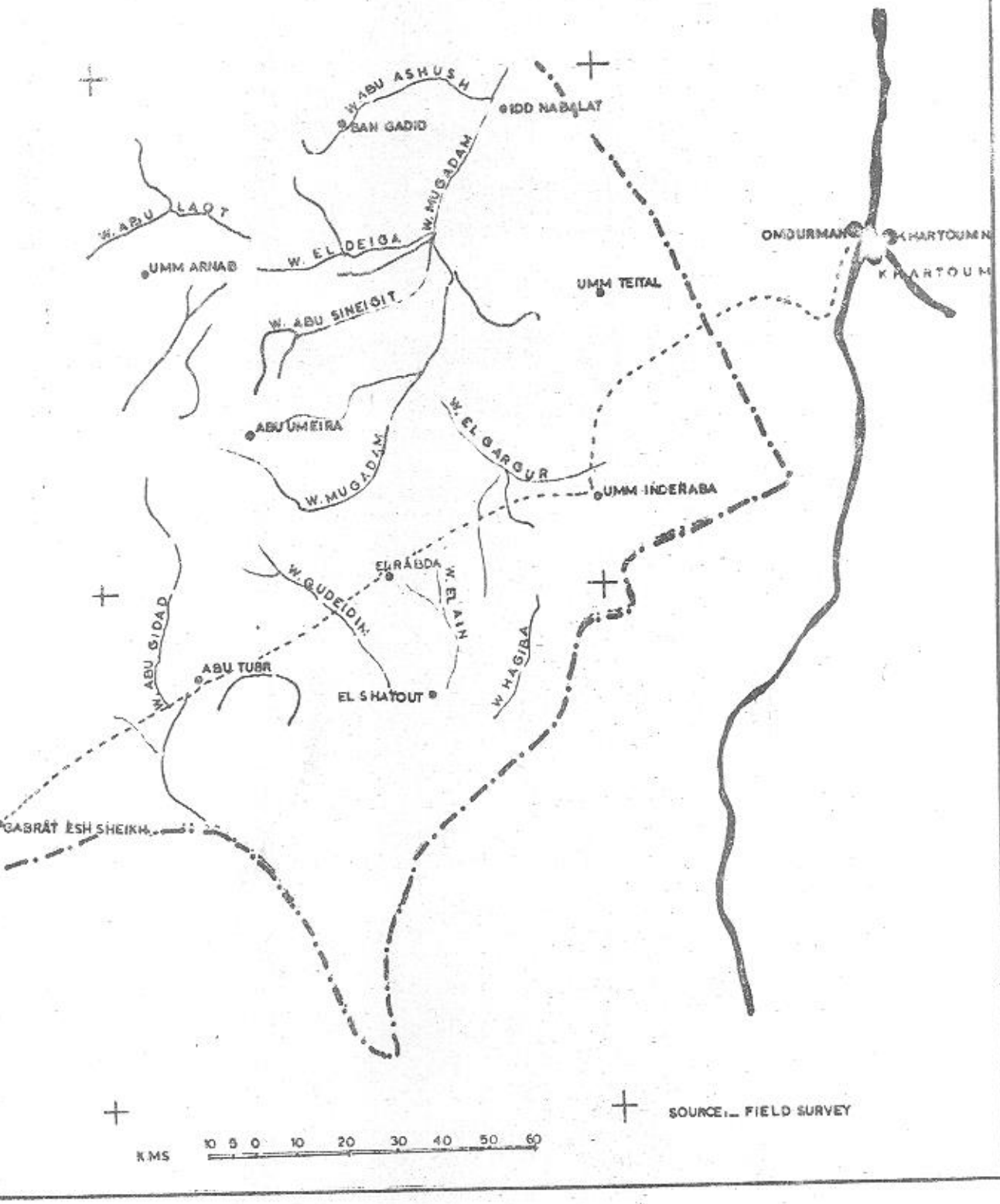
Finally, they complain with bitterness about commercial wood felling, taking place in the eastern half of Sodiri district. Commercial wood felling has been an important activity in the areas of Umm Inderaba, Gabrat Esh Sheikh, El Shatout, El Ushara and El Rabda. In Umm Inderaba area wood felled or collected is camel loaded by camel owners from El Gamouiya tribe and marketed at Omdurman. Each person would lead three loaded camels and after a three-day journey would sell/load the camel for Ls.12. In

Gabrat Esh Sheikh area both local traders and merchants from Ed Dueim usually organize groups to fell wood which would be exported to Omdurman. Umm Inderaba and Gabrat Esh Sheikh are also important centres for the collection of charcoal to be marketed in Omdurman and Dongola, Fig. (27).

Wood for fuel or for charcoal production is also felled or collected from about the latitude of Gambir and Abu Hashim. Here, the Wadis are particularly attractive to cutters, and deforestation is most serious. The Wadis' deforestation has a twofold effect: firstly, it has enhanced run-off and, therefore, reduced the replenishing process and the Wadi sub-surface water which is an important water source during the dry period; secondly, obstructions on the bed of Wadi Abu Hashim have prohibited water from reaching the lower reaches of the Wadi, e.g. El Safiya area.

Recently, lorries have come into this activity. Trucks bringing consumer goods to the area carry back loads of firewood and charcoal to the urban centres. Local prices have thus skyrocketed, and a sack of charcoal costs about LS. 5 at Umm Inderaba.

FIG (27) HEAVILY DEPLEATED AREA SUPPLYING FUEL WOOD AND CHARCOAL TO THE THREE TOWNS (WESTERN LIMIT LAT 31° E



Wood for construction purposes used to be plentiful and was cut at will by the local people. Now it has become quite scarce, and is obtained from distant woods. Because of the growing scarcity of construction wood, people are increasingly resorting, specially in the bigger settlements, to dry earth structures, bricks, and in good years, to dukhn stalks.

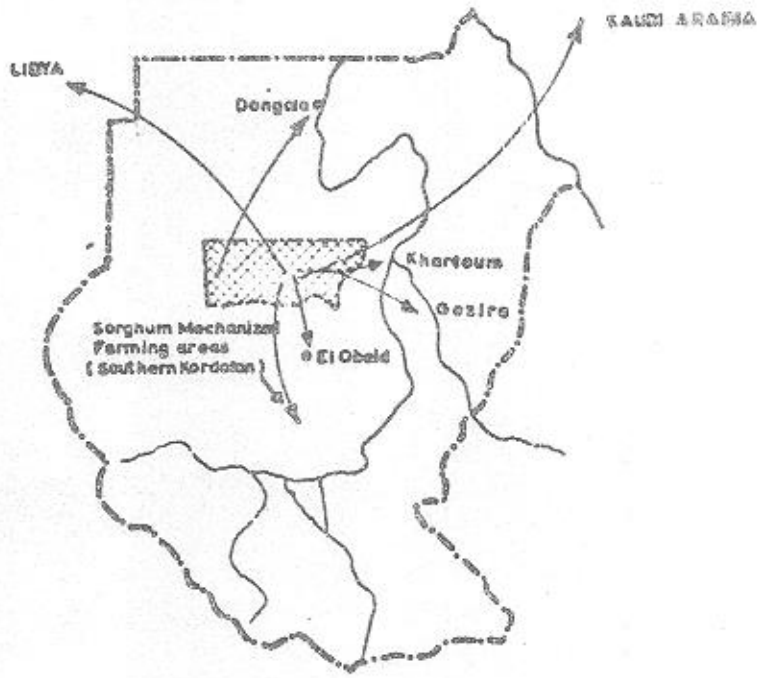
4. Population Migration : An Inevitable Consequence:

In this final section of the study population migration is presented as a logical consequence of the change impacts taking place in the district at present. It is evident that the cummulative effects of all listed forms of environmental degradation are leading to a desertion of the Kababish to their home land, well demonstrated by the extensive invasion of herds to Southern Kordofan and Darfur, and the emmigration of population for employment outside the district, Fig.(28).

4.1. Motives of Migration

Interviews in various parts of Dar Kababish revealed that economic conditions are the predominant motivating forces behind emmigration. In other words, nomads leave the land because of adverse economic conditions created

FIG (28)
MAJOR MIGRATION STREAMS FROM DAR KABABISH



SOURCE : FIELD SURVEY

by unemployment or underemployment. It seems that the actual reason for migration is looking for employment per se rather than for a better job or economic betterment. However, dissatisfaction with rural jobs or rural income is also an equal force in motivating emigration. This is brought about by returnee migrants on potential ones.

Returnee migrants bring with them material belongings as well as new ideas and new attitudes which can generate social change and better standards of living. This is evident in the increasing costs of marriages which are a direct result of international migration to Arab countries, like Saudi Arabia and Libya.

Social change is also expressed in new folklore songs that praise migrants and emmigration to Arab countries. This trend has a profound impact on the young and the educated who are the potential migrants. Undoubtedly, they will endeavour to emmigrate to make money and achieve the high social status of those who already migrated. Higher social status is attained by gifts and presents to relatives and friends-especially to females, on marriages, extravagant spending, and goods such as watches, clothes, tape recorders, radios, etc..

4.2. Migrant Characteristics :

Interviews findings established the fact that the process of movement is selective. Those who leave the land are different demographically and sociologically from those who do not. Evidence of such variation exists in the age and sex structure of migrants. There is a preponderance of males among migrants, and they by far outnumber females. Migration involves travelling over long distances and being exposed to socially and culturally different ways of life. Because of this, women are not allowed to travel alone, and consequently, primarily men migrate. Thus the excess of males reflects their greater independence and the impact of social and religious restrictions which deter Kababish women from pursuing careers outside their homes.

In addition to sex inbalance, emmigrants from the Kababish are predominantly young adults. People are of course more mobile in their late teens and early twenties. Normally this is the period when schooling is terminated and entrance into the labour force and the formation of family units begin. Besides, because of uncertainty of the future, males in this age group also migrate to escape the hardships of nomadic life.

Moreover it is believed that the younger the migrant arrives at a destination the longer will be his period of residence and the greater his chances of successfully adapting to new ways of life and improving his social and economic status.

4.3. Destinations :

Emigration is a recent phenomenon in Dar Kababish, it started in the early sixties but took momentum in the early seventies. The first migrations were by the Medoib tribe to the Gezira Abba, because they were Ansar-followers of the Mahdi. The main reason behind this movement was adverse climatic conditions, low productivity and loss of livestock.

Evidence from interviews in the main settlements of Dar Kababish has established that the magnitude of migration is increasing and there is a diversity of destinations, Fig.(28) both internally and internationally.

It has also been observed that the direction of migration is influenced by family ties, i.e., people from the same tribe migrate to same destinations. Family ties encourage a process of visits to relatives which facilitates the exchange of the type of information that

usually influence potential migrants. This leads to the development of chain migration which is above all, a reflection of the close tribal links that form an integral part of the migration process within Dar Kababish tribal context.

Many of the Kababish have moved to the fringes of Omdurman and Khartoum and worked in trade, firewood, and manual jobs such as sewerage cleaning and as casual labourers. Some migrate seasonally to the Gezira for cotton picking while others go to the mechanized sorghum schemes in Southern Kordofan for dura harvesting.

The majority of the Hawawir have migrated to Debba in the Northern Province while some moved into Omdurman and Khartoum North working in diary farms in the latter, and in brick making in El Gereif.

The Kawahala on the other hand moved to El Dein in Southern Darfur, and to Omdurman and to El Obeid.

International migration started first to Libya from Western Dar Kababish. Presently the majority head to Saudi Arabia, Iraq and Yemen. Migration to these countries at first attracted the most qualified elements from the various tribes, but it gradually diffused to

most of the young adults in almost all tribal groups. It is motivated by remittances and cash brought by migrants. Annual savings ranges between seven and twelve thousand pounds. Some of the savings are spent on consumer goods, gifts to families, merchandize, marriages, livestock etc..

4.4. Impact of Migration :

One of the strongest impacts of migration is the remittance money sent by migrants to their immediate family or relatives at their home area. For those remaining behind in the village, migrants are the source of cash for material improvement and investment. There is no doubt that migrants' remittances are a major factor in improving the standard of living of migrants and their families as well as offsetting the difficult economic conditions that face the local tribesmen.

Moreover migrants' saving have contributed to social and economic change through investment and spending. It is noticed that investment is no longer directed towards livestock only because of fear of high losses. Money saved by Kababish and other tribes members whether within the Sudan or abroad, is invested in other productive economic persuits such as lorries, trade or agriculture.

However the increasing migration from Dar Kababish has its negative impacts. First the various tribal groups are certainly loosing their young economic active sector of the population, resulting in more dependence on the old and children in running economic activities. This of course entails a loss in productivity whether in pastoral nomadism or in agriculture. Moreover migration has lead to imbalance in the sex ratio which as mentioned by most tribesmen is causing social problems such as less and more expensive marriages.

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ANNEX (1)

CLASSIFICATION OF EXISTING SERVICES BY CENTRE ____ SODIRI DISTRICT

No. OF SITE ON MAP FIG.(12)	NAME OF CENTRE	ADMINISTRATION						EDUCATION							HEALTH			AGRICULTURE						ANIMAL PRODUCTION			MARKETING		COOPERATIVES							WATER SUPPLY			
		Regional Council Centre	Rural Council Centre	Court	Police Market or Post	Nazara Centre	Rest House	Elementary School for Girls	Elementary School for Boys	Intermediate School for Girls	Intermediate School for Boys	Secondary School for Girls	Secondary School for Boys		Hospital	Dispensary	Dressing Station	Dept. of Agriculture Office	Agricultural Research Station	Extension Office	Crop Protection Office	Forestry Office		Range Management Office	Veterinary Dispensary	Slaughtery House	Crop Market	Livestock Market	Co-operation Office	Consumer C. Society	Flour Mill C. Society	Marking and Credit C. Soc.	General Purpose C. Soc.	Agriculture C. Society	Crop Harvesting C. Society	Other C. Society	Bore-hole	Hafir	Dam	Open Shaft. Well
1	Sunta Umm Qussa																																					
2	Maya																																					
3	Rahad ed Dabeib																																					
4	Mashagga																																					
5	Hamadiya																																					
6	Mufennih																																					
7	Umm Kherig																																					
8	J. El Atshan																																					
9	Tingari																																					
10	Abu Suneit																																					
11	Tinna																																					
12	El Safiya																																					
13	Kagmar																																					
14	Umm Badr																																					
15	El Hagab																																					
16	J. Kheteimaya																																					
17	Udeid Rahs																																					
18	Ganbur																																					
19	Idd el Merikh																																					
20	Rawaiba																																					
21	Abu Ung																																					
22	Umm Sunta																																					
23	Umm Inderaba																																					
24	Hamrat el Wuz																																					
25	Shatout																																					

ANNEX (1)

CLASSIFICATION OF EXISTING SERVICES BY CENTRE ___ SODIRI DISTRICT

No. OF SITE ON MAP FIG.(12)	NAME OF CENTRE	ADMINISTRATION						EDUCATION						HEALTH			AGRICULTURE					ANIMAL PRODUC. TION			MARK. ETING	CO-OPERATIVES							WATER SUPPLY			
		Regional Council Centre	Rural Council Centre	Court	Police Merkez or Post	Nazara Centre	Rest House	Elementary School for Girls	Elementary School for Boys	Intermediate School for Girls	Intermediate School for Boys	Secondary School for Girls	Secondary School for Boys	Hospital	Dispensary	Dressing Station	Dept of Agriculture Office	Agricultural Research Station	Extension Office	Crop Protection Office	Forestry Office	Range Management Office	Veterinary Dispensary	Slaughtery House	Crop Market	Livestock Market	Cooperation Office	Consumer C. Society	Flour Mill C. Society	Marketing and Credit C. Soc	General Purpose C. Soc.	Agriculture C. Society	Crop Harvesting C. Society	Other C. Society	Bore. Hole	Hafir	Dam	Open Shaft. Well
26	Er Rabda																																		
27	Umm Batateikh																																		
28	Frid el Maged																																		
29	J.El Sungur																																		
30	Gabrat esh Sheikh																																		
31	Kabsh Nor																																		
32	Idd Sharaka																																		
33	Hamrat esh Sheikh																																		
34	El Fula																																		
35	Sodiri																																		
36	Maza																																		
37	Hashas																																		
38	Hufrat el Arab																																		
39	Ban Gedid																																		
40	Sunta en Nile																																		
41	Sawani Ellai																																		
42	Hawawir																																		
43	El Baggariya																																		
44	Umm Kherwaa																																		
45	Bir Abu Zaeima																																		
46	Gabrat Umm Gama																																		
47	Abu Umeira																																		
48	Nureiz																																		
49	Gireih el Sarha																																		