PROJECT ASSISTANCE DOCUMENT (SUD/96/007/A/02/31)

AREA REHABILITATION SCHEME (ARS), ABYEI - BAHR EL ARAB

CONTENTS

List of Figures

List of Tables

Abbreviations

Glossary

Executive Summary

1. **Introducion**

1. **General**
1.1 The PA Task
1.2 Terms of Reference
1.3 Study Team
1.4 Study Programme
1.5 Study Methods
1.6 Document Organization

2. **Study Area: Physical Aspects**
2.1 Location
2.2 Physiography
2.3 The Climate
2.4 Soils and Vegetation
2.5 Drainage
2.6 Water Resources

3. **Population**
3.1 Population by Administrative Units, Gender and Mode of Living
3.2 Human Settlements and Housing conditions
3.3 Ethnic Composition
3.4 Population Dynamics
3.5 Forms of Production
3.6 Civil Strife and Ethnic Conflict
3.7 Women Status

4. **Production Systems**
4.1 Livestock Raising
4.2 Crop Production
4.3 Fisheries

5. **Community Services**
5.1 Water Supply
5.2 Education
5.3 Health

6. **Institutional Set-ups**
6.1 People's Local Government Units
6.2 Traditional and Modern Community Institutions
6.3 U.N. Organizations and NGOs

7. **Construction**
7.1 General Constraints
7.2 Livestock Constraints
7.3 Crop Farming
7.4 Fisheries
7.5 Water Supply

B. **Rehabilitation Programme**
1. Rehabilitation Strategy
2. Livestock
3. Crop Farming
4. Fisheries
5. Water Supply
6. Education
7. Health

C. **Piloting Project**
1. Targeting

APPENDICES
Appendix I: List of People Seen
Appendix II: Table 1 - Base-level Schooling - Abyei Bahr El Arab Province
Table 2 - Rehabilitation needs of the water-yards in Abyei Province
Table 3 - List of Spare parts for theWater-yards
Table 4 - Instrument & Equipment for 4 PHCUs
Table 5 - Essential Drugs Kit for RDF at PHCU level
Table 6 - Essential Drugs Kit for the Mobile Clinic (for one site)

List of Tables

1. Rainfall (mm) for some location
2. Total Population, West Kordofan State by Gender and Mode of Living, 1993, Census
3. Population Indicator-Values for WKS 1993 Census (Values were rounded, unless stated)
4. Age Structure of Urban Population (10 + Years) Abyei Province
5. Age Structure of Rural Population by Gender (10 + Years) Abyei Province
6. El Meiram Town and Displace Population (Based on MSF Estimates, October 1996)
7. Economically Active Urban Population by Age and Gender (10 + Years) Abyei Province
8. Economically Active Rural Population by Occupation, Age and Gender and Age (10 + Years) Abyei Province
9. Employment Status of Economically Active Rural Population by Gender and Age (10 + Years) Abyei Province
10. Abyei Bahr El Arab Livestock Production Indicators
11. Animal Population, Geographical and Seasonal Distribution
12. Area, Livestock Units, Animal Density and Systems Management in the Study Area
13. West Kordofan Livestock Estimates (1000)
14. Manpower in West Kordofan State (WKS) and Abyei Province
15. Vehicles in WKS and Abyei (Province)
16. Crops and Crop Productivity
17. Base Level Public Schools in Abyei Province (Summarized from Appendix II, Table 1)
18. Drop-Out in School, previously with hostels
19. Distribution of Base-Level Teachers
20. Health Facilities in Abyei Province by LC
21. Distribution of Cold Chain Equipment by Locality, Abyei Province

List of Figures.

Figure No.	Title	After Page
1.	Main Centres, Covering Project Proposed Sites, Abyei Bahr El Arab province	
2.	Land Use Regions in Abyei, Bahr El Arab Province	
3.	Soils of the Baggara Repeating Pattern	
4.	Regeba Pattern Soils	
5.	Mesiriya Grazing cycle (Also Indicating Broad Aspects of Land Use)	
6.	Diagram showing MOAAW Organization	
7.	Proposed El Fuda Centre: A Sketch of Existing Infra-structure	

Abbreviations

ADS	:	Area Development Schems
AIDS	:	Acquired Immun-deficiency Syndrome
ANC	:	Antinatal Care
API	:	American Petroleum Industry
CHW	:	Community Health Worker
FDC	:	Fisheries Development centre
FMOH	:	Federal Ministry of Health
G.W.	:	Guinea Worm Infection
H.A	:	Health Area
H.W.S.	:	Health Workers
LC(s)	:	Local Council(s)
M.A.	:	Medical Assistant
MOAAW	:	Ministry of Agriculture and Animal Wealth
NGOs	:	Non-Governmental Organization(s)
PHC	:	Primary Health Care
SMOH	:	State Ministry of Health
SOS	:	Sanitary Overseer
SWC	:	State Water Corporation
SWL	:	Static Water Level.
TBA	:	Traditional Birth Attendanct
VDC	:	Village Development Committee
VIP	:	Ventilated Improved Pit-latrine
VWCs	:	Village Water Committee(s)
WES	:	Water and Environment Sanitation Project
WKS	:	West Kordofan State.
	:	

Glossary

Amir	:	Sheikh of a tribal section
Atmur	:	Small Area of Stablized sand dune, particularly in Baggara Repeating Pattern Country
Baroya	:	Type of grazing near Bahr El Arab, consisting of the first shoots of perennial grasses in the early rains
Catena	:	Connected Series of soils with a topographical relationship, variable usage
Dar	:	Homeland areas, particularly of Baggara tribes.
Farig	:	Nomad family group, their herd of animals, or their encampment
Gardud	:	Non-craking clay flat, particularly of the Hill Catena and Regaa Repeating Pattern Country.
Goz	:	Stablized Sand Dune
Hafir	:	An earth tank or pit dug to collect and store water, hand dug or machine excavated.
Mahalya(t)	:	Local Council(s)
Mohafaza(s)	:	Province(s)
Mohafiz	:	Province Commissioner
Omda	:	Sheikh of a tribal section
Regaba	:	Meandering water course, very slight slope, connecting with "regabas" or a main river, particularly of the Regaba Repeating Pattern country
Wilaya(s)	:	State(s)

Executive Summary

1. The ARS Project, Abyei Bahr El Arab is targeting Abyei-Bahr El Arab Province located in West Kordofan State with a total population of 170 thousand persons approximately.
2. The Province is comprised of 3 Local Councils, El Muglad, El Meiram and Abyei; all combining Mesiriya and Ngok Dinka as two major populations.
3. Tribal wars coupled with civil strife have precipitated a large population of displaced groups, estimated at about 40 thousand persons, in the area from within, and nearby Bahr El Ghazal State.
4. Internal factors of resource misuse, misfunctioning of government services, combined with influx of the displaced have created situations that entail rehabilitation efforts.
5. Despite the various forms of misuses caused by ineffective developmental planning, the area shows a strong resource base that can be harressed in addressing its current problems.
6. The above is reflected in its large livestock population, extensive and varied land types, well envolved indigenous production systems, a fair infrastructure of community services, and presence of participative mechanisms in development.
7. Though ethnicity and its implications are apparent in the area, relations between the different groups tend to show workable balances that can foster project plans.
8. Of the population groups, the displaced and women live different forms of impoverishment which require special targeting.
9. Transhumant livestock raising, being the predominant activity in the project area shall be rehabilitated through improvements covering; vaccination services, monitoring of diseases, protection of rangelands, improvement of water supplies and restocking through distribution of small ruminants.
10. Crop farm being the second important activity, shall be rehabilitated through improvement of different farming systems, development of semi-mechanized activity for the displaced and provision of inputs.
11. Fisheries show a potential for development that shall be piloted, through establishing of a fisheries development centre and organization of fishermen.
12. The three above activities shall be implemented with the objectives of increasing food production in the area and improving the incomes of different groups, including women.
13. In the area of community services, the rehabilitation efforts shall embrace water supplies, education and health.
14. Essential criteria of community priorities and preparedness to participate were taken into consideration in reaching the proposed developmental activities.
15. Communities organization and fund raising through sandugs shall be the mechanisms, to be applied by the project, in implementing different activities.
16. The project shall be run from a centre at El Fuda and a sub-centre at Abyei.
17. It shall be implemented by a Steering Committee and an advisory committee, and managed by a core staff of technical personnel.

Introduction:

1. General

1.1 The PA Task

This is a project Assistance Document (SUD/96/007/A/02/31) of Area Rehabilitation, Abyei, - Bahr El Arab. The PA is prepared in the context of the (ARS) which is recently launched by UNDP in areas affected by the civil war and in frame of the on-going government efforts of "Peace from within".

Abyei, Bahr El Arab Province, forming the south western part of West Kordofan State, has been affected by the on-going civil war since 1983. Its population, comprised of Mesiriya and Dinka tribal groups have suffered many of the civil unrest repercussions, exemplified in: confusion of the transhumant grazing cycles, deterioration of the range resources, pressures of displaced groups from inside and outside the province and collapse of the infrastructure of social services.

While, the Mesiriya are pressurized in their own land, the Dinka of Abyei area and the other Dinkas of Bahr El Ghazal, in particular, have been displaced and are currently dispersed in Abyei, El Muglad, El Meiram and Babanousa towns and in most of the Mesiriya villages, living as induced war refugees. For sometime they were supported by relief handouts, however, with the scaling down of relief assistance, they are currently living on the verge of subsistence, virtually reliant on what the Mesiriya farm annually, through their involvement as share-croppers or as wage labour.

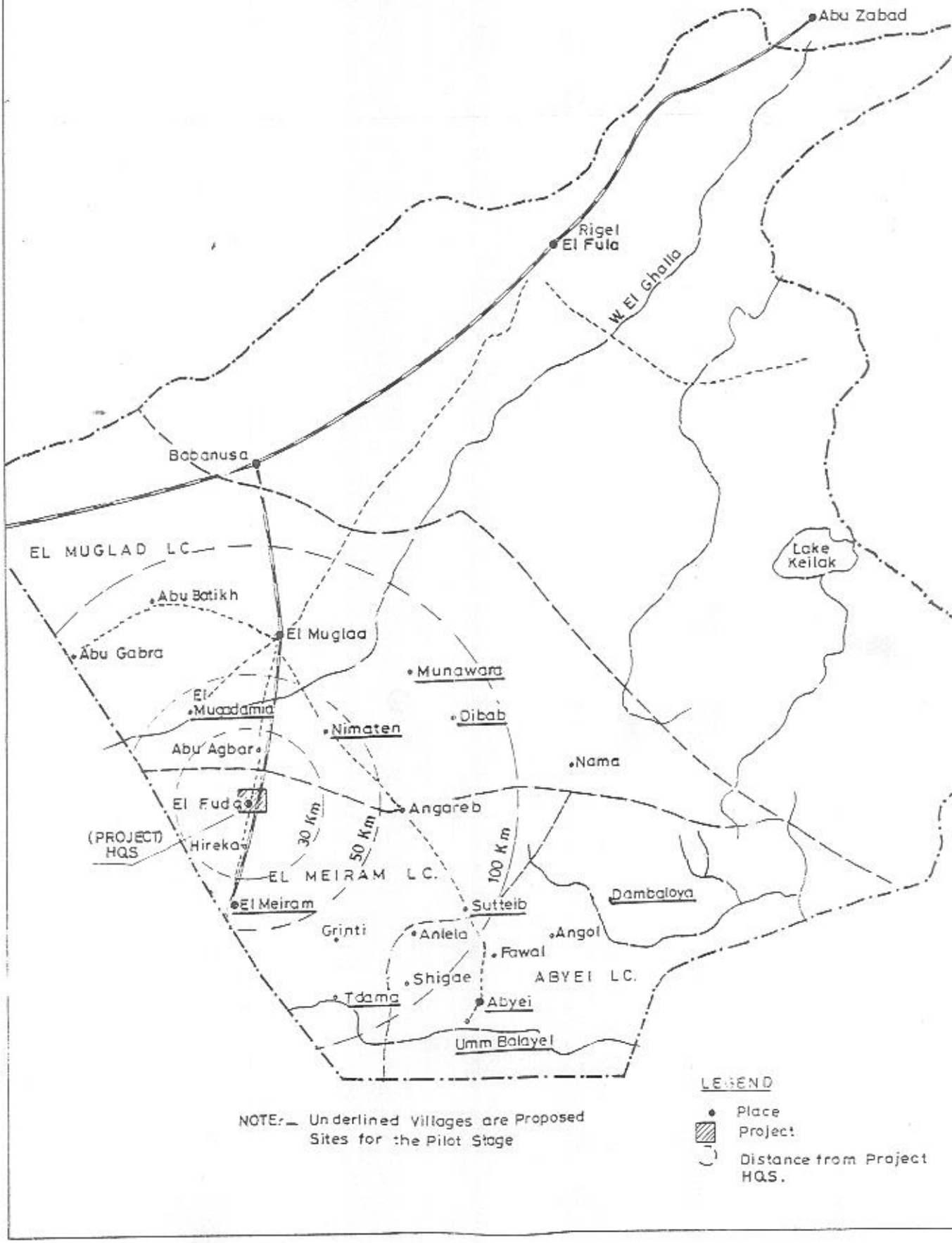
In order to assist in off-setting such difficult situations, UNDP has recently piloted the (ARS) within whose context the purpose of this PA document is to identify the elements of an area rehabilitation programme for Abyei Bahr El Arab Province; and in the frame of the programme, to implement a piloting project, which will provide some basic services, and help strengthen the coping mechanisms of communities; towards improving their income earning oportunities and the general livelihood situation.

The target beneficiaries of the project initially include displaced populations, settlers and nomads in the proposed Abyei, whose approximate area is roughly 20,000 sq. km., (See Fig. 1). The main objectives of the project are to ensure food security for the displaced, settlers and nomadic communities in their homelands; to effect transformation from relief dependency to self reliance; support human resource development for immediate job creation; promote peace through expansion and perpetuation of development opportunities; and strengthen service delivery; especially clean water, as a step to contain and eventually eradicate Ginea-worm, which currently stands as an endemic hazard reducing labour productivity.

1.2 Terms of Reference:

The specific (TOR) are spelt out as immediate development objectives, outputs and activities, in the following order:-

Fig. (1) Main Centres, Covering Project Proposed Sites,
Abyei Bahr El Arab Prov.



NOTE:— Underlined Villages are Proposed Sites for the Pilot Stage

Development
Objective

I. To consult, negotiate and launch a rehabilitation programme targeting displaced, settlers and nomads at Abyei-Bahr El Arab area.
Output 1:A detailed situational analysis to the proposed project area produced.
Activity 1.1:Identification of potential sites and target groups in concert with other agencies and NGOs operating in the area.
Activity 1.2:Survey and collection of appropriate data for planning purposes.

II. To consolidate a resettlement human development programme for the repatriated families and provide them with critical social services.
Output 2:A rehabilitation programme for selected groups developed and critical services identified.
Activity 2.1:Identification of the settlement area and community-based organizations incepted.
Activity 2.2:Provision of appropriate shelter and basic services.

III. To put together the elements of a coherent rehabilitation programme including a well articulated gender sensitive recovery initiatives.
Output 3:A coherent rehabilitation programme including a well articulated gender sensitive recovery initiative developed.
Activity 3.1:Formation of the rehabilitation programme
Activity 3.2:Identification of gender sensitive recovery initiatives.

IV. To promote capacity building through formal and informal training programmes.
Output 4:Appropriate skills acquired.
Activity 4.1:Collection of basic data on skills of target groups.
Activity 4.2:Identification of basic critical skills, appropriate training facilities available and/or needed to promote various capacities.
Activity4.3:Consolidation of needed formal and informal training programmes.

1.3 Study Team:

The study was conducted by an interdisciplinary team comprised of 8 experts covering the fields of landuse, agriculture, livestock, fisheries, sociology, water supplies, education and health. Names and qualifications are given in foot-note(*)

1. M.O. El Sammani, Landuse, Team Leader (B.A., M.Sc., M.A., Ph.D)
2. A. El Ahmadi, Agriculture (B.Sc., M.Sc., Ph.D)
3. M. Ibn Ouf, Livestock, (B.V.Sc., M. Phil.)
4. A.I. Moghrabi, Fisheries. (B.Sc., Dip., Ph.D).
5. A. Saeed, Sociology. (B.Sc., M.Sc., Ph.D)
6. H. Omer, Water Supplies. (B.Sc., M.Sc., Ph.D)
7. M. Omer, Education. (B.A., M.A., Ph.D)
8. M. El Fatih, Health. (MB BS, MSc Comm., MA)

North Kordofan State Ministry of Planning, Rural Water Corporation, Administration for Animal Resources, El Obeid Agricultural Research Station, UNICEF and Rural El Obeid ADS.

On arriving at the project area, the mission had official meetings at Rigl El Fula the Capital of West Kordofan State (WKS), El Muglad, headquarters of Abyei-Bahr El Arab Province, also headquarters of El Muglad Local Council (LC), and El Meiram and Abyei, the headquarters of the other two local councils (LCS) making together with El Muglad, Abyei-Bahr El Arab Province. The purpose of these meetings was to explain and discuss the project idea and generate office data from the concerned departments. Besides political figures (Deputy Governor - Wali - of the State, Commissioner - Mohafiz - of the province and the State ministers) and the heads of departments, the meetings were attended, especially at the local councils level, by the council's members and some of the political and local leaderships.

Guided by the interpretation of the (TOR), variability of province resource base, disribution of population and economic activities, and current status of services, 10 settlements were selected and surveyed: Ed Dabadib, Angol, Umm Balayel, Abyei, El Niaam, Shigae, El Sitteib, El Meiram, El Fuda, and El Mugadama, with brief stops at place in-between, Fig. (1). Different research methods were applied by team members, each according to his discipline. The visits were concluded, by group meetings with beneficiaries, to explore different issues and prioritize community needs.

The field activities endd by a wrap-up meeting at Rigl El Fula, chaired by the State Minister of Agriculture (also acting as Deputy Wali of the State) and attended by Ministers of Health and Engineering Affairs and chiefs of administrative and technical departments, where the team leader presented and discussed the mission's findings.

Appendix I gives the names of persons met and offices/agencies visited during the field visit.

1.5 Study Methods:

Each team member applied research methods, pertinent to his discipline for generating the information required for the preparation of the document. In all, these could be summarized into:

i. Review of the available literature.
ii. Visits to the concerned departments: Khartoum, El Obeid and West Kordofan State.
iii. Collection of office data from the different government departments in the State and Province: Rigl El Fula, El Muglad, Abyei, and El Meiram.
iv. Generation of information from the NGOs operating in the area, UNICEF, MSF, IRRA, BIR, etc.

v. Exploration of issues related to the assignment with the staff of the government departments and the NGOs.
vi. Field investigation of economic activities, population groups and community services of interest: farms, agriculture extension activities, livestock types, veterinary dispensaries, settlements and displaced population camps, local councils, water-yards, hafirs, hand-pumps, schools, hospitals, dispensaries, etc.
vii. Surveys of small samples of males, females and children for different purposes; sometimes involving the use of spread-sheet technique for the generation of quantitative data.
viii. Group interviews using PLA methods.
ix. Convening of meetings attended by community leaders and beneficiaries, to explore project objectives and the elements of the rehabilitation programme.

1.6 Document Organization:

The Table of Contents shows the detailed organization of the document; highlighted as consisting of three parts: The situational analysis, the rehabilitation programme and the piloting project.

I.SITUATION ANALYSIS

2.Study Area:Physical Aspects.

2.1 Location:

Abyei Province lies in the south edge of West Kordofan State. It was established (1995) in the context of the Federal Government's drive for consolidating administrative decentralization, started in the early 1990s. It borders on Northern Bahr El Ghazal State and Unity State to the South, South Darfur State to the West and South Kordofan State to the East. Abyei Province falls approximately between Latitudes 9 38" and 11 15" and Longitudes 27 11" and 29 45". It has a total land area of about 20,000 km2.

The physical conditions of the province have shaped the livelihood and economy of its population; being predominated in the north by the Mesiriya "Baggara" and in the south around Bahr El Arab, by the Ngok Dinka. The migration of cattle and people in West Kordofan State (WKS), are best understood by the nature of their dar (tribal territory) which entails seasonal migration into and out of dars. The alternating use of dar grazing resources during the rainy season, and out of dar resources during the dry season, has been conditioned by a multitude of factors, of soil, vegetation, climate and drainage.

2.2 Physiography:

The topographic surface of Abyei Province is almost a level plain, with a gentle gradient to the south-southeast. It has altitudes, ranging from 430 m (absl) in the vicinity of El Muglad area in the north to 380 m., southwards in Abyei area. Though a number of distinctive physiographic features are present, they are of interrelated patterns of geomorphology, soils, vegetation and drainage.

There are two major physiographic regions, which could be divided into sub-regions, Fig (2).

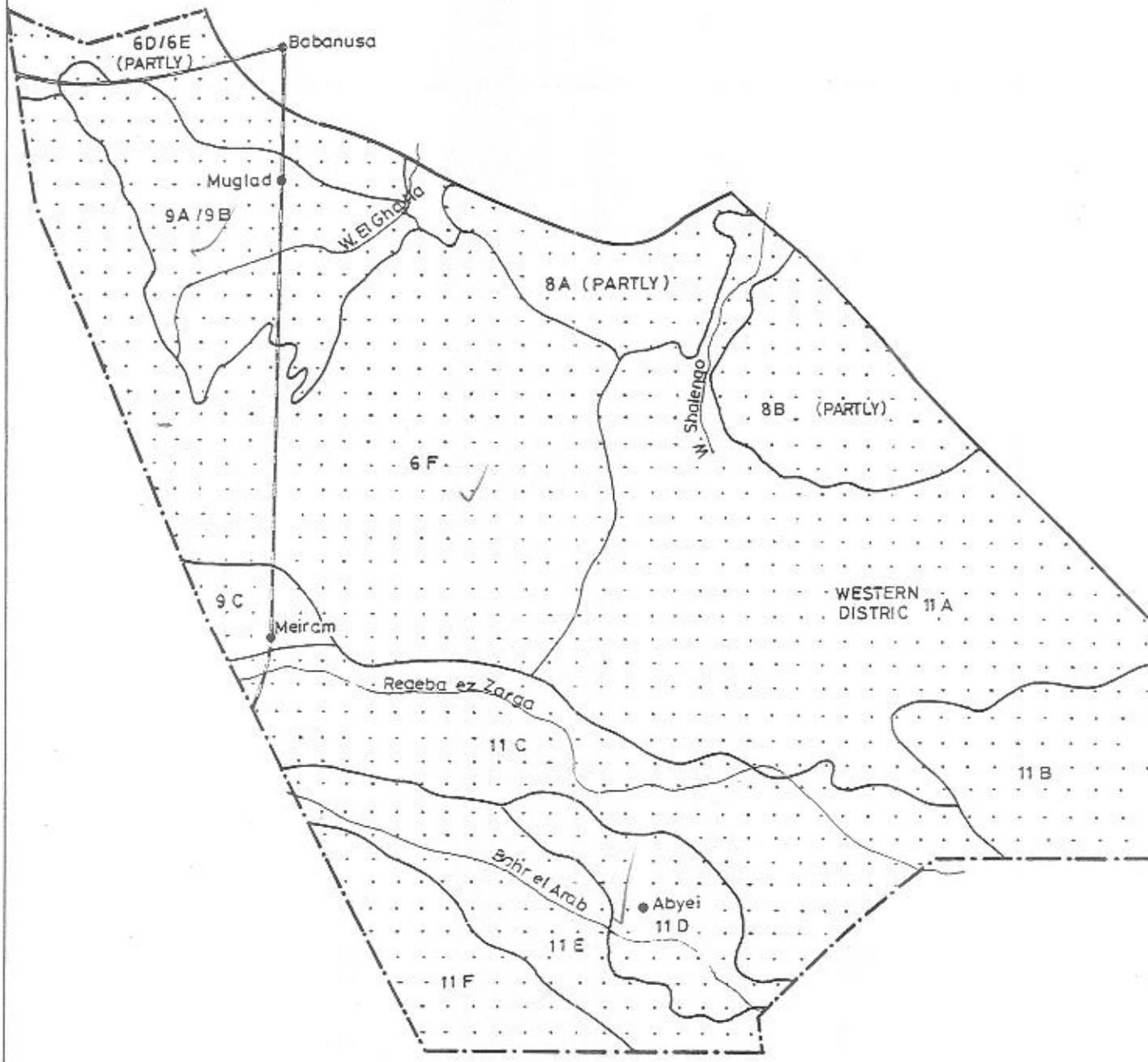
2.2.1 The Western Plains (Physiographic Region B of HTS):

This is the largest of the three physiographic regions of South Kordofan and covers an area of 41,700 km2. Sandy soils originating from Nubian sandstone cover 80% of the region. Most of the area west of Longitude 28 30'E is covered with a level or gently undulating sandsheet. In some places, sands have been resorted by alluvial action, into a series of gently undulating fans. These areas contain the landscape referred to as the Baggara Repeating Pattern, Fig (3), which takes a complex system of shallow, meandering, connected and disconnected channels, separated by sheetwash slopes.

2.2.2 The South alluvial Plains (Region C):

This region covers 18,800 km2. The flat plains are dominated by fine-textured alluvial material. The plains are traversed by a series of broad shallow former drainage channels termed "Regebas", Fig (4). The most developed regeba system is El Regeba Ez Zarga/Regeba Dawas, which runs roughly parallel to the present course of Bahr El Arab.

Fig.(2)_Land Use Regions in Abyei, Bahr el Arab Province.



6D/6E__ The Magrur Qoz / The Babanusa

6F____ The Ajaira Qoz

8A ____ The Kodurke Plain

8B____ The Keilak Plain

9A/9B__ The Muglad / The Abu Beteikh Plain

9C____ The Meiram Plain

11A_ The Niama - Lake Abyad Plain

11B_ The Nogol Plain

11C_ The Regeba Plain

11D_ The Abyei Plain

11E_ The Bahr Plain

11F_ The Lol Plain

SOURCE:__ Adopted from Fig.(1.1) Hunting Technical services, South Kordofan Rural Planning Unit, Anex.7, Land Use Planning Regions PP-3, 1981

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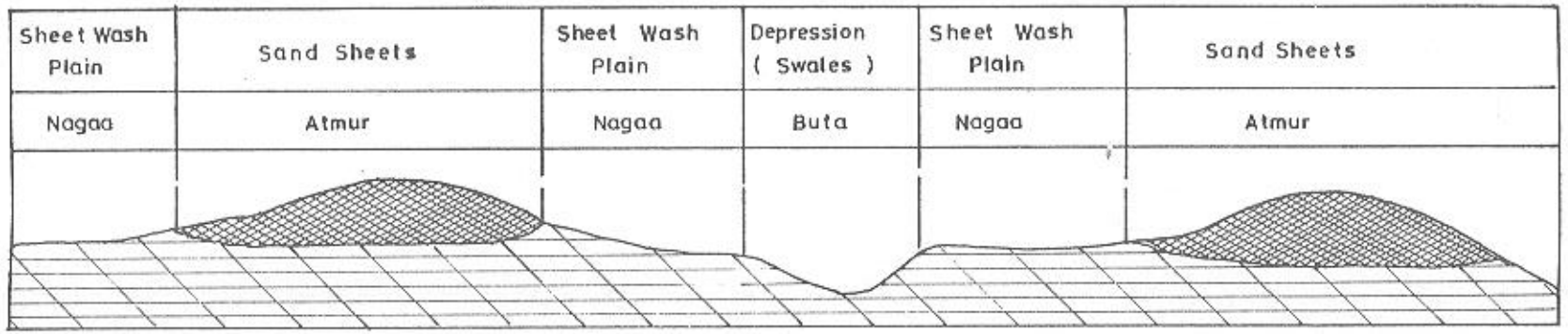
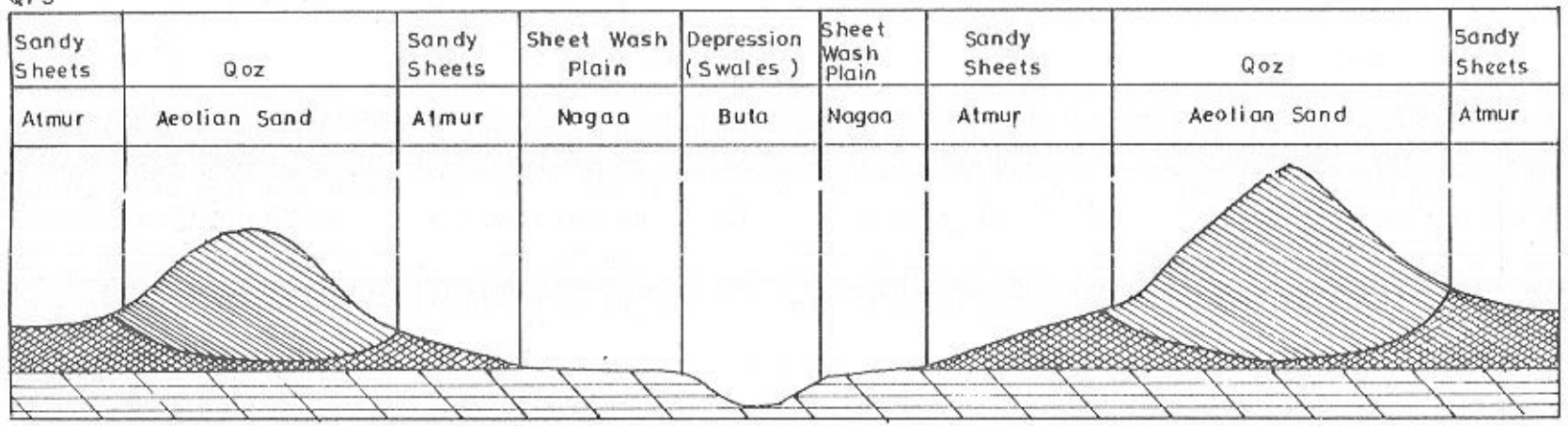
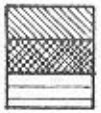
Unit QFC



Unit QFS

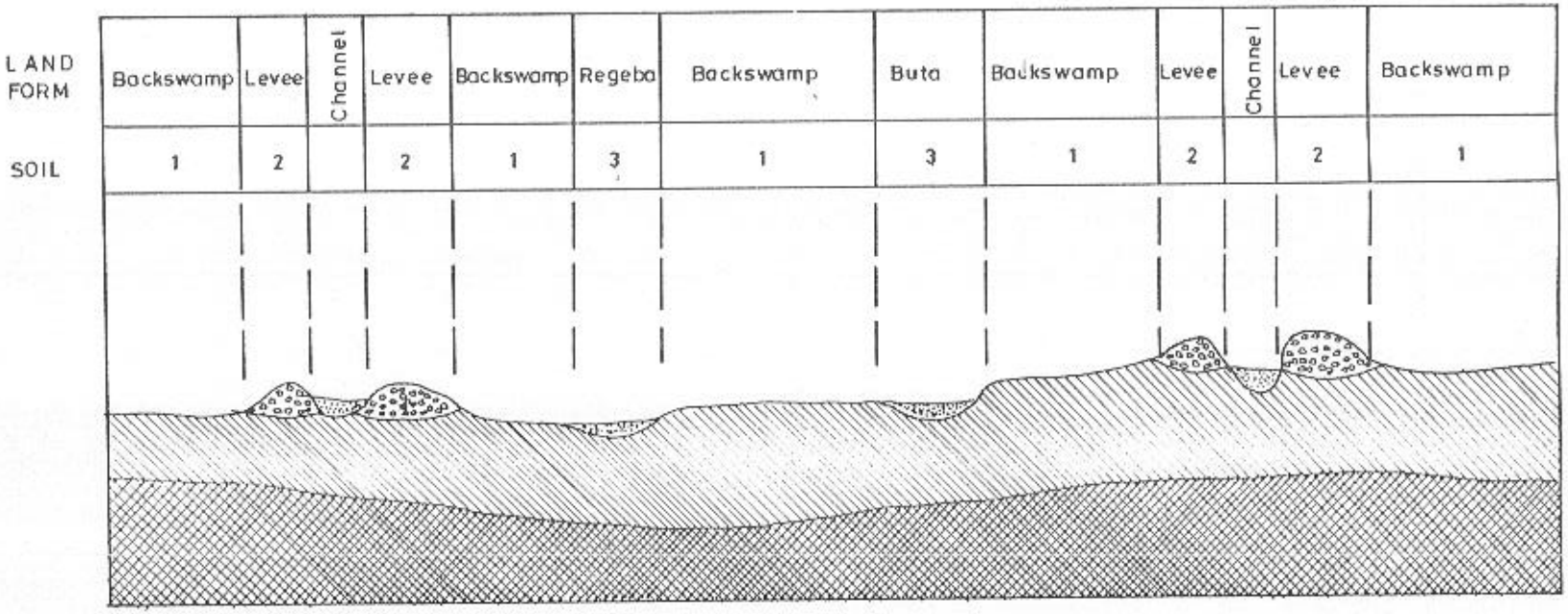




1. Aeolian land.
2. Alluvial sand redeposited by wind.
3. Fine to medium textured alluvium.

SOILS OF THE BAGGARA REPEATING PATTERN

FIG. (4)



1. Fine and medium textured alluvium
2. Coarse textured alluvium
3. Fine textured alluvium
4. Fiuvial resorted aeolian sand

REGEBA PATTERN SOILS

2.3 Climate:

2.3.1 Rainfall and Evapotranspiration:

The project area lies wholly within Sudan Savanna (Harrison and Jackson). Annual mean temperature is 27.4 C., with means of 28.1 C and 25.4 C as maximum and minmum respectively. The northern boundary of this zone has an annual rainfall of 500-600 mm. Rainfall at the southern boundary is about 800 mm. Monthly rainfall distribution for some years is shown in Table (1) for Abyei, which is at the southern boundary, Rigl El Fula at the northern boundary, and El Fuda, which is at about the middle.

The Common Country Assessment Data Base (CCA) data for the map unit, centered at Longitude 28 .42" and Latitude 10 42", gave evapotranspiration (ETP) values in mm for 1994 of : 158, 140, 136, 142 and 162 for the months June, July, August, September and October, respectively. Although these are approximate values, they are well below the 7mm/day ETP, considered to be the lower limit above which plant stress occurs. It is thus evident, that the quantity and distribution of rains and evapotranspiration values are conducive, to good production of the major crops grown in the area; and that crop failure because of moisture stress is unlikely if planting is timely.

Location	Year	May	June	July	August	Sept.	Oct.	Total
Abyei	1975	-	103	215	157	197	101	773
Abyei	1976	98	176	152	154	131	122	883
Abyei (CCA)	1994	78	112	172	192	146	72	772
El Fuda	1981	34	100	208	126	148	18	634
Rigl El Fula (CCA)	1994	78	112	172	192	146	72	772

2.4 Soils and Vegetation:

The most extensive investigations on the soils of the project area are those conducted by Hunting Technical Services - HTS (on assignment from ODA). HTS divided South Kordofan into thirty five planning regions, of which seven exist in the project area, Fig (2):

i. The Ajaira Qoz (Planning region No. 6F)
ii. The Muglad (Planning region No. 9A)
iii. The Abu Beteikh Plain (Planning region No. 9B)
iv. The Meiram Plain (Planning region No. 9C)
v. The Niama-Lake Abiad Plain (Planning region No. 11A)
vi. The Regeba Plain (Planning region No. 11C)
vii. The Abyei Plain (Planning region No. 11D)

HTS gave the prefix "WP", to designate soils of Western Plains physiographic region and the prefix "Sa" for the Southern Alluvial Plains.

The following is a brief description of the soil types found in the project area:

2.4.1 Wp1:

These are deep aeolian and reworked alluvial sandy soils. These are the "Qoz" soils. Their clay content is 5-10%. They have very low concentrations of phosphorus, potassium, and other exchangeable bases. Their cation exchange capacity (CEC) is 2-8%. Organic matter, nitrogen, and CIN ratio are also very low. Qoz soils are non-Sodic and non-Saline, but subsoils are acidic. Boran and molybdemum are commonly deficient in aeolian soils.

The two most common trees in Wp1 soils are Albizzia amara and Combretum cordofanum. These trees are usually associated with Sclerocarya birrea and the shrub Guiera senegalensis. Termenalia brownii and T. laxiflora are locally dominant on the lightest Wp1 soils and Balanites aegyptiaca and Dalbergia melanoxylen on slightly heavier Wp1 soils.

The herbaceous cover is more variable than the tree cover. The six most common harbaceous spp. Are: Eragrostis tremula, Oldenlaudia senegalansis, Aristida funiculata, Hyparrhenia sp., Schoenefeldia gracilis, and Dactyloctenum aegyptium.

For land use purposes, Wp1 soils support a substantial proportions of small-holder cultivation in the Western plains. The highest densities are around water-yards on the edge of the Ajaira Qoz (Planning Region 6F) from Fishik to Mugadama. The advantage of Wp1 soils are: light texture, excellent root penetration, ease of water extraction by plants, and feasibility of cultivation by hand tools. Major disadvantages are low fertility, rapid drainage and susceptibility to erosion by wind and rains flash when cleared of vegetation. Wp1 soils are usually cropped for 4-5 years, and left as bush fallow for 15 years or more.

2.4.2 Wp5:

These are "atmur" sandy soils, associated with Baggara Repeating pattern (along with Wp6 Naga'a non-cracking clays and Wp7 buta cracking clays.

Atmur soils are similar to Wp1 soils, except that their sand content is higher, up to 93% and is underlain at variable depths by fine-textured alluvium.

Atmur soils are prevalent in the plains of El Muglad, Abu Beteikh, and El Meiram.

The vegetation of recently cultivated Wp5 soils supports a herbaceous cover dominated by Schizachyrium exile. Undisturbed Wp5 soils support vegetation similar to that of Wp1.

2.4.3 Wp8:

These are the Shaqq, medium to coarse textured soils. Clay content of these soils is higher, are redder and support more fauna than Wp1.

Wp8 soils are cultivated alongside Wp1 soils, under a similar system of bush fallow. They are preferred by farmers, especially for grain production.

Shaqq soils support some trees, as those in Wp1, but in addition Adansonia digitata is common, in deeper Shaqq depressions. Shaqq soils support a wider range of herbs and grasses, than neighbouring Wp1 soils. Among these are species of Cassia, Cyperus, Ipomoea, Indigafera, and Oldenlandia and the grasses Digitaria sp., Echinochloa colonum and Eragrostis termula.

2.4.4 Wp9:

These are the "Baroya" soils. Typically a profile comprises 20-60 cm of unconsolidated aeolian sand overlying medium-textured alluvial material.

Baroya soils are confined to the Southern part of the Ajaira Qoz. They have strong red tones. Vegetation is similar to that of Wp1.

With the exception of very small areas around El Fuda and Id hleim (now named Al Munawara) Wp9 baroya soils are not used for cultivation.

2.4.4 Sa3:

Although the South Alluvial Plain Region contains four soil types, in the project area, only part of Sa3 is used for crop production. Sa3 soils are vertisols, with clay content of 55-80%. They occupy depressional areas in the Niama/Lake Abyad, Ngok, Regeba and Abyei Plains (Regions 11A, B, C & D). These soils are fertile and have CEC, but have low amounts of phosphorus, nitrogen and organic matter In the project area, cultivation is confined to a very small proportion (5% in the late 70's) of the Abyei Plain. In the past, cotton was grown on Sa3 around Niama.

Sa3 buta soils support extensive stands of Acacia seyal. Common species are: Borreria sp., Echinochloa pyrimidalis, E. stagnina, Hygrophila auriculata, Orysabarthii, Panicum spp., Rottoboellia oxaltata, Setaria sp., and wild sorghum.

2.5 Drainage:

Drainage is towards Bahr El Arab, in south east direction, contributing to the drainage basin of the Nile. The drainage pattern, as it stands today, represents remnants of a larger system established under more humid conditions.

However, due to subsequent aridity, prior drainage pattern has been chocked with sediments, and the tributaries have been detached and retreated upstream. Perennial drainage is non-existent; and all streams (Khors) are seasonal, with intermittent flowing during the rainy season between June and October.

Wadi El Ghalla and Shellengo are the main channels, draining the area in a south-western direction, but they disappear in their deltas before reaching Bahr El Arab. Particularly, Wadi El Ghalla dies at 26 km (at El Magddama village) south of Muglad town. While, Wadi Shellengo drains the north eastern parts of the area, towards the south west. Particularly at 115 km to 130 km south east from El Muglad, the Wadi ends into a large ill-defined depression, the southern edge of which contributes to El Regeba Ez Zaraga. Other drainage channels, include Wadi Kumak which spreads over a width of 7 km, as a sheet flow at 170 km south east of El Muglad.

Run off, not entering the drainage channels, often collects into shallow clay depressions, where isolated pools and Butas persist up to end of December.

2.6 Water Resources:

2.6.1 Surface Water Resources:

Generally, the area is rich in surface and groundwater resources. The source of surface water is obviously local rainfall and that falling on the north eastern high lands of the Nuba Mountains; generating the run off of particularly Wadi El Gahalla and Wadi Shellengo during the period June-October. Apparently, response of run off to rainfall is generally high, as a daily rainfall storm of about 34 mm could generate run off in forms of sheet and short-lived channel flow. Surface water resources lack quantification, since no flood or rain gauging stations are opeerational in the area. However, from field observation and SWC information, general surface water assessment can be made. Wadi El Gahalla discharges yearly, about 22 million M3 and Wadi Shellengo about 53 million M3 (SWC records).

On the other hand, Wadi Kuwak, which is of similar morphology to Wadi Shelengo, but with much smaller width (200m) and cross-sectional area, can discharge about one million M3, in the north eastern part of the area. Water storage in the Regab and clay depressions is also high. Field visits have revealed that the water marks (depth) at the Regaba is about 1-1.8m., while in clay depressions, Butas, is about 0.7m.

By considering a Regaba width of about 150m., of a storage capacity of about 150 x 1.4 or 210 M3 per a longitudinal metre length; and by assuming a total length of at least 200

km for the meandering system of the Regaba, the total water storage can be estimated at (210 x 200 10^3) or 42 million M3 early. Likewise, by estimating a total area of about 7500 km2 and water depth (mark) of 0.7 m, the annual storage capacity of the Butas can be estimated at 5 x 109 M3.

The available data (Nile Water Board, & HTS, 1976) indicates that the discharge of Bahr El Arab at its lower reach is about 50 million M3 yearly.

Thus the quantities of surface water resources in the area can be summarized as follows:

Source	Discharge (M3/year x 10^6)
1. Wadi El Ghalla	22
2. Wad Shellengo	53
3. Wadi Kuwak	2
4. Regaba System	42
5. Bahr El Arab	50
6. Buta System	5250
Total	5418

Despite this huge volume of surface water, evaporation mounting up to 5.5 mm/day, is the main factor contributing to the losses and the deficit in the water balance of the area. In fact, due to this rate of evaporation the following concluding remarks can be drawn:

i. The Buta and the clay depression dry up in 4 months i.e. by the end of November.
ii. The Regab, with water depth of about 1.4 m, can store water to the end of March. This postulation has been confirmed during the field visit.
iii. Not with standing evaporation, infiltration through the discharges of Wadi El Ghalla and Shellengo which terminate into deltas of permeable soils, also add to loss of waters.
iv. Bahr El Arab empties its water capacity, mostly in Bahr El Ghazal, contributing to White Nile flow.
v. Other factors, which contribute to water losses in the area are the continuous reduction in the storage capacity of the Regab, due to silting and building up of sand bars and dikes.

2.6.2 Ground Water Resources:

Abyei Province is part of an extended rift structure, filled with sedimentary formation(s), forming an aquifer complex hydrogeologically known as the Baggara Basin. The basin is composed largely of fine-grained to coarse sands and gravels; alternated by clays and mudstones. The sediments thickness which exceeds 3500 m at the central parts of the basin, have also allowed for accumulation of hydrocarbon. Presently activities for exploration, development and production of oil are taking place.

Groundwater aquifers in the basin occur at any depth below 110m, however groundwater of good quantity and quality is warranted, at depth exceeding 400 m below ground surface. Groundwater in the basin is under semi-confined conditions, and the water level varies from 60 m around El Muglad area, to about 32 m in Bahr El Arab/Abyei Area. Water in the basin is of good quality with total dissolved solids in range of 200-400 ppm and suitable for all uses. However, at El Fuda, south-west of El Muglad, the Static Water Level (SWL) is about 95 m (below ground level) resulting in the existence of a localized pocket of saline water. The source and cause of this salinity are not known yet.

As the basin is composed of thicker sediments and ground water is deep, most likely the aquifer receives little or no recharge, in forms of direct infiltration from run-off and rain. However, substantial recharge, in forms of subsurface flow, from the south-western parts, is evident. This subsurface inflow moves in easterly-northeasterly directions, more or less similar to the surface flow of Bahr El Arab, to converge into the Sudd area.

The relationship between Bahr El Arab drainage system and the Baggara Aquifer complex is influent during seasonal floods, and effluent when the river stops flowing; and is partly recharged from the sub-alluvial and the underlying unconfined aquifer. Seasonal fluctuation in the regional water level in the basin is small, not exceeding 0.5 m. This probably indicates that the basin is in an equilibrium, with no response to the present volume of recharge or abstraction of groundwater. The volume of groundwater in permanent storage in the basin is enormous.

However, because of the greater depth of the basin, the greatest portion of this storage is inaccessible by boreholes for normal uses, at least from economical point of view. Probably it is only feasible to tap the top 400 m of the basin, where the ground water instorage can reach about 150 x 10^9 M^3. So far, the quantity of the pumped water from the basin is remarkably insignificant, in comparison to the volume in permanent storage in the basin. As groundwater resources in the basin are less affected by drought and environmental changes, they should be considered among the most important elements, which determine the socio-economic development aspired for the area.

3. Population:

3.1 Population by Administrative Units, Gender and Mode of Living:

According to the 1993 Census, the total population of Sudan was 25.6 million people. By mode of living, 29% were urban, 68.1% rural and 2.6.% nomadic. The national annual average population growth rate for the period 1983-1993 was 2.6%, with 4% for urban population, 1.6% for rural sedentary population, and 0.6% for nomadic population.

West Kordofan State is comprised of 4 Provinces, with a total population of 992,173, Table (2). Population indicator values for same population are given in Table (3).

Table (2)Total Population, West Kordofan State; by Gender and Mode of Living, 1993 Census

	Male	Female	House-hold	Total
Urban	76,465	77,717	24,511	154,182
Rural	372,680	395,001	124,841	767,681
Nomadic	36,829	33,481	10,249	70,310
Total	485,974	506,199	159,601	992,173

Table (3)Population Indicator-Values for WKS, 1993 Census (Values were rounded, unless stated)

Indicator	Numerical Percentage Value
Growth rate	1.89%
Sex ratio	96/100
Mortality rate	155
Dependency	1156
Dependent Population	52
H/H size	6.2
Fertility rt.	7
CBR/1000	31
CDR/1000	19
IMR/1000	107

Abyei Province had a total population of 163,400 persons; i.e., 16% of West Kordofan State in the 1993 Census. A more recent estimate (1996) by the State Ministry of Health quotes 174,000 persons. Abyei Province has three Local Councils (LCs); the administrative centres of which are El Meiram (6,000 people), Abyei (11,180 people), and El Muglad (27,390 people). El Muglad is the largest urban centre in the province; while Abyei Town is an administrative and executive centre. The breakdown of the LCs population is as follows:

i. Abyei: 18,302 people, of whom about 12,000 are urban residents and 6,700 are living in the IDP camp.
ii. El Meiram LC has 28,000 people, of whom 4,221 are urban residents and 1,648 are IDPs living in a camp near El Meiram. The rest 22,000 are either rural villagers or pastoral nomads.
iii. El Muglad LC has 27,390 persons urban, and 40,000 rural residents; with the rest 6,000 as pastro-nomads.

The previous figures and Table (4) and (5) indicate population characteristics, and mode of living. They show that 73,692 persons (45%) are living in the three main towns; of whom 53,692 (73%) are urban residents and about 20,000 (27%) are displaced, living in camps. The rural settled villagers amount to 40,000 (persons 24.5%), while the pastoral nomads are about 60,000 people (37%).

Table (4)Age Structure of Urban Population (10 + Years) Abyei Province

Both Sexes	10+Years	10-14	15-64	65 + years
Number	17.529	3.487	13,179	593
Percent	(100%)	(19.9%)	(75.18%)	(3.38%)
Males	8,943	1,809	6,840	294
Percent	(100%)	(20.22%)	(76.48%)	(3.29%)
Females	8,586	1,678	6,609	299
Percent	(100%)	(19.54%)	(77.0%)	(3.48%)

Table (5)Age Structure of Rural Population by Gender) (10 + years) Abyei Province

Both Sexes	10+Years	10-14	15-64	65 + years
Number	40,821	7,956	21,161	2,088
Percent	(100%)	(19.49%)	(51.84%)	(5.12%)
Males	21,200	4,051	16,141	1,007
Percent	(100%)	(19.11%)	(76.14%)	(4.75%)
Females	19,621	3,903	14,617	1,080
Percent	(100%)	(19.89%)	(74.5%)	(5.5%)

3.2 Human Settlements and Housing conditions:

Abyei Province is predominantly inhabited by rural villagers and pastro-nomads. The three main towns show the following mode of settlement; Abyei comprised of five residential quarters, with IDPs living side-by-side with other residents. The Province has about one hundred human settlements of various types; made of multi-ethnic village settlements and summer camps (farigs) of pastro-nomads.

3.3 Ethnic Composition:

Abyei Province is a multi-ethnic area, with two main tribal groups; Mesiriya and Dinka Ngok, co-existing with other smaller groups which include a few Hamar, Rizeigat, Fellata and Nuba.

Mesiriya Humr are mainly cattle raisers (Baggara Arabs) adhering to the Islamic faith. They constitute about 85 percent of the total population of Abyei Province; making the predominant pastoral residents. The Dinka Ngok, who include Muslims, Christians as

well as non-believers, comprise the second largest ethnic group of indigenous people of Abyei Province. They reside mainly in Abyei LC.

Considering the ethnic composition of the population of towns: Abyei was estimated at 11,181 persons in 1996, of whom 6,669 were displaced. The composition of resident host population is 42%. Dinka Ngok, 17% Humr 2% NGOs and Government officials. The displaced population in Abyei is mainly Dinkas of varied sub-tribal affiliations, constituting 24% of the town population; broken into Dinka: Reck, Malwal, Bor, Agar, Aliab, Atuig with the presence of Nuer 15%.

El Meiram had a total of 28,000 people in 1996; with 18,000 persons as town residents and 10,000 persons displaced. The residents were about 95% Mesiriya, with minorities of Nuba, Zaghawa, Hamar and Fellata. One camp where 1700 displaced people were accommodated, included mainly Dinka Reck from Gogrial and Dinka Malwal from Aweil and Wau in Bahr El Ghazal State to the South. Another camp at El Tohma had 1600 people. The age structure for El Meiram displaced population showed that: 25.6% under five and 31% under 15 years of age, Table (6).

Table (6)El Meiram Town and Displaced Population (Based on MSF Estimates, October 1996)

	No. of	No. of	Male			Female		
Meiram	H/H	Persons	0-5	5-15	>-15	0-5	5-15	>-15
Town	783	4221	576	646	863	524	591	101
Camp	369	1648	191	264	234	200	323	436
Total	1152	5869	767	913	1097	724	914	537

3.4 Population Dynamics:

3.4.1 Demographic Characteristics:

The main demographic characteristics (Table) show the following:

* The population growth rate (1983-93) is 1.98%/annum, compared to a national average of 2.88%
* Household size is 6.2 prsons, while the national average is 6.
* Total fertility rate is 7.1 children, while the national figure is 6.8.
* Under-five mortality rate, per 1000 live births, is 155 compared to the national average of 157. Infant mortality rate is 107 while the national average is 108 deaths per 1000 live births.
* Crude death rate is 19/1000, compared to 16 for the nation.
* Widowhood and divorce among females (12 + years) is higher than the national average.

The age structure of the population, is illustrated by Tables (7) and (8) for the urban and rual population respectively.

3.4.2 Economic Characteristics:

Tables (7), (8) and (9) (based on 1993 Census) reveal data on Abyei Province economically active urban and rural population, and on the status of rural employment by gender.

Table (7)Economically Active Urban Population by Age and Gender (10 + years) Abyei Province

Both Sexes	10+Years	10-14	15-64	65 + years
Number	17,529	3,487	13,179	593
Percent	(100%)	(19.9%)	(75.18%)	(3.38%)
Males	8,943	1,809	6,840	294
Percent	(100%)	(20.22%)	(76.48%)	(3.29%)
Females	8,586	1,678	6,609	299
Percent	(100%)	(19.54%)	(77.0%)	(3.48%)

Table (8)Economically Active Rural Population by Occupation, Age and Gender (10 + years) Abyei Province

Both Sexes	10+Years	10-14	15-64	65 + years
Number	30,130	3,197	26,268	539
Percent	(100%)	(10.1%)	(87.18%)	(1.79%)
Males	17,370	1,456	15,375	539
Percent	(100%)	(8.38%)	(88.5%)	(3.10%)
Females	12,760	1,741	10,742	127
Percent	(100%)	(13.64%)	(84.18%)	(1.0%)

Major groups of occupations, population 10 + years:
Agriculture86%
Elementary Occupations10.93%
Crafts and Trades1.03%
Technicians, etc..0.70%
Occupations not stated1.00%
Occupations (other)0.60%

Table (9)Employment Status of Economically Active Rural Population by Gender and Age (10 + years) Abyei Province

Both Sexes	10+Years	10-14	15-64	65 + years
Number	30,130	3,197	26,268	665
Percent	(100%)	(10.61%)	(87.18%)	(2.21%)
Males	17,370	1,456	15,735	538
Percent	(100%)	(8.38%)	(90.59%)	(3.10%)
Females	12,760	1,741	10,893	127
Percent	(100%)	(13.64%)	(85.37)	(1.00%)

The population of Abyei Province is predominantly employed in agriculture, 86%, and in elementary occupations, 10.93. Those who engage in crafts and other trades comprise only 1%, while those working as technicians are only 0.7%. Unemployment of able-bodied (15-64 years) population is not known in Abyei Province. However, under-employment /under-payment of wage-workers seem to be instrumental aspects of poverty. There is a high percentage (41%) of the rural labour force who are unpayed family workers in the extended family systems.

3.5 Forms of Production:

3.5.1 Economic Systems:

Two economic systems of production prevail over Abyei Province, in different forms and arrangements: firstly; livestock raising which takes; a) transhumant semi-nomadic pastoralism, of mainly cattle herds, and b) sheep-herding of small ruminants, mixed with a few cattle in the vicinity of village settlements.

The second major system of production is small-holder rainfed crop farming, where family household labour determines the size of the cultivated land area. Both staple food grains, mainly millet and sorghum, and cash crops, mainly groundnuts and Kerkade are grown, with gum Arabic tapped as a cash crop.

Besides these two main systems, fish production, dry or green, is practised, especially in the vicinity of Abyei town. Residents and displaced people know how to fish. It is a daily practice that a person catches a fish or two for a meal. Some residents also occasionally opt for a larger catch to sell it at the market-place.

3.5.2 Division of Labour at Household Level:

For pastoral people in the area, the division of labour in the household is determined by the welfare of livestock and the ability of family members to deliver towards that. Both males and females contribute according to age and manual labour capacities. The same

division of labour is observed in farming, among those cultivating H/Hs, where agricultural operations are carried out according to sex and age of H/H members.

3.6 Civil Strife and Ethnic Conflict:

The North-South conflict in Sudan affects Abyei Province in many ways and at different levels. In the 1960s and 70s, when acts of war and violence were limited to Equatoria, social conflict in Abyei was at a low level of complexity. It was limited to scattered tribal incidents, between the two major ethnic groups of pastoralists, Humr and Dinka Ngok; and couched primarily under competition over grazing and water resources. As acts of violence and war expanded into the Southern parts of Kordofan in the 1980s, Abyei area witnessed the shutting down of Abyei Development Scheme which had been sponsored by USAID, under Harvard Institute for International Development (HIID). The 1990s witnessed relative calm and peaceful co-existence between the different ethnicities in the area. Acts of tribal conflict have ceased, due to realization by these groups, of the need to mutually co-exist and to jointly maximize the use of the available resources, for the persistence of their animal wealth. There have been no reports of tribal attack from any party on the other.

This relative calm and atmosphere of peace has made of Abyei a safe-refuge for war-affected people from the war-zone farther south. Abyei Province has become the gateway, into Northern Sudan, from the war-ridden Bahr El Ghazal and Unity States in the South. By sheer geographic location, Abyei receives waves of displaced people, whenever there is escalation of conflict, war-related operations and acts of violence.

4.7 Women Status:
4.7.1 Current Situation:
4.7.1.1 Property Rights:

Tribal pastoral society is somehow flexible, with respect to male/female role-playing and expression of individual views. Among the transhumant, making the bulk of the population of the project area, cattle is the repository of value and social prestige, for both males and females. Land ownership is not an issue of gender disparity; simply because land among pastoral communities is community owned and utilized in so far as it is the "giver" of pasture and water. Gender dichotomies do not seem to have generated sufficient awareness/consciousness among pastoralists, that may precipitate a social problem out of the present status of women. Evolutionary change, through education seems to be the best long-term vehicle to precipitate the type of awareness that may engender the process.

The cattle herd being the communal property of the household, female members of the nuclear family are assigned livestock heads, on the same footing as their male brothers; depending on the "right-de-passage" they pass through from birth-to-puberty-to-getting married. On establishing a family, of her own/his own, youngesters may only then take away "their" heads of livestock that had been assigned to them by their father, during

their individual development, from childhood to manhood/womanhood. He/she can at this point, as a newly-wed, start his/her own herd and establish a separate homestead for him/herself.

4.7.1.2 Roles and Responsibilities:

A. Livestock Raising

Other than their known domestic responsibilities of reproduction, home-caring, food preparation, fetching of water and fire-wood, etc., women are involved in the economic activities of the H/H, being livestock raising, crop farming, or wage labour earnings in case of the displaced; or those poor, without livestock. Women are found too, practising enterprising activities in the few urban places, including peddling, selling of food, and the likes.

Among the Mesiriya, women participate significantly in livestock responsibilities. Small ruminants managment is devoted to women, when these animals are within reach of Dars. Division of labour starts, as early as, when female children are about 3 years of age. They take care of young unweaned lambs and kids. At 6 years of age, they take small ruminants to grazing areas and bring them back, late in the afternoon. They develop high skills of knowning their animals, when mixed with others, and knowing mothers of the young lambs and kids, when they return home. Daily reports are conveyed to older family members. Above 6 years of age, girls can harness small ruminants, milk them and prepare light meals for their young brothers and sisters and to old people when need arises.

Between 12 - 17 years of age, girls are prepared and trained for wedding and marital life. At this age, most girls know their own nucleus livestock, that is gifted to them by relatives, close friends at social occasions; with some of them buying their own animals. Girls and women milk animals, process the milk into local yogourt, ghee and butter and sell these products at local markets. The cash income raised contributes to fulfilling women requirements that are difficult to be obtained from family budget. Delivery assistance to problems of small animals, weaning and treatment of sick animals are also provided by women. There is a developing strong awareness of women towards pultry; being exclusively owned by them.

The above description applies to some degree, also to the women situation among the Dinkas; with a stronger place of women/cattle attributes of wealth, in their case; for marriage dowry is paid in cattle. As cattle is the medium of marriage among the Dinka, and is being generated from a wider circle of relatives on the brides' side, women through this role, instill a measure of stability in the social organization and life of the society.

B. Crop Farming:

Under the two transhumant systems, women in the past played a minor role in crop farming, being considered up to very recent times, as a subsidary activity to livestock raising; judged on the small cropping of millet/sorghum to meet part of the H/H grain supply, especially among the Dinkas. With the expansion in farm size and the adoption of groundnut as a cash crop, by the Mesiriya, women role in farming has increased, yet still depended on the cattle wealth of the H/H. It could also be partly attributed to the easy access of the Mesiriya farmer to an abundant labour source from the displaced Dinkas, through share-cropping arrangements or direct hiring; and partly to women association with the herd and the income returns she derives from it. However, jubrakas i.e. home gardens, being specifically women farming plots, for the production of rain-fed vegetables and quick-maturing crops, are frequently seen in most settlements. They are usually attempted by women of those H/Hs who have settled down for long time, or by poorer families, who are no more relying on herding, as their main source of livelihood.

For the displaced Dinkas, farming presents the main activity for the whole H/H, including women. The share-cropping and the wage labour contracts entered into by the head of the H/H with the Mesiriya farmers draw on the labour of all of the members of the H/H. It is usual to see displaced Dinka families living on farms during the rainy season and in villages during the dry season.

The out of normal situation of the displaced Dinka women, without home, a herd to live on, and a land to cultivate, and at the same time charged with the responsibilities of a family, that is not producing enough to sustain itself, really puts her in a state of despiration. In her attempts to supplement the meagre return from farming indulgements, she searches the vegetation cover in the surroundings of homes, for wild foods and for fetching hay and wood to sell.

C. Off-farm Activities:

The two most prevalent activities practised are the urban type of enterprising dealings being mentioned previously, and handicrafts. The latter are mostly practised by the Mesiriya women, mainly in areas of; leather works, mat-making, and pottery. The production is small, targeted to meet the H/H needs in the first place, with some articles finding their way to the market. Traditional as it stands, is of limited potential in improving women income.

3.7.2 Women Strategic Needs:

Distinction is to be made here, between the Mesiriya woman who is living a normal life, and the displaced Dinka woman who is suffering an induced war situation. For the former, improvement of the economy of the H/H, in areas of livestock raising and agriculture and the enhancement of social services: water supply, health and education, under the proposed project, shall have development impacts of promoting women status.

As for the Dinka woman, a more direct effort of rehabilitation, centred on basic needs of improving food and income situations is to be targeted first, in preparation for a social up- lift stage, through the provision of services.

Under the two situations, women are to be reached by development, through researching their specific needs, encouraging them to organize themselves, voice their priorities and effectively participate in solving their problems. In such societies, where male dominance is high, the support of gender sensitive persons, to women cause and their need for promotion, is highly beneficial.

4. Production Systems:
4.1. Livestock Raising
4.1.1. Livestock Types.

Western Kordofan is considered as a livestock state, where the raising of animals constitutes the major economic and social activity. Estimates available show that the state possesses; 3 million head of cattle, 4 million sheep, 1.6 million goats, 1.5 million camels and some 72 thousands horses and donkeys, (State Ministry of Agriculture, Department of Animal Resources El Fula, Report to the Mission, 1997).

The presence of the above varieties reflects the suitability of the area, in terms of pasture, rainfall and other relevant climatic conditions to livestock raising. Through years, people gained tremendous experience in raising livestock to sustain a way of life, as a source of food and income, and for social prestige.

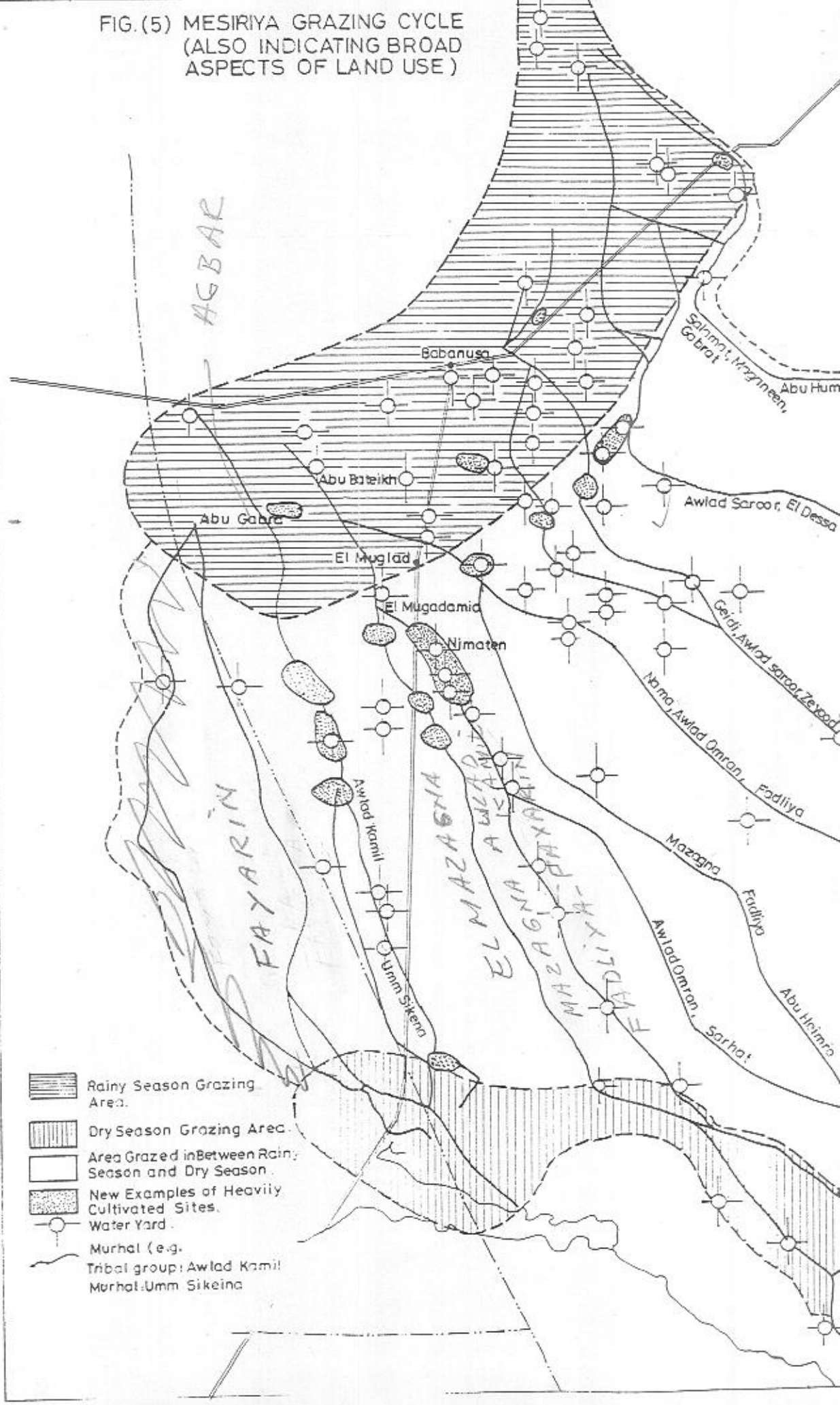
4.2.1. Transhumant Systems:

Two transhumant systems prevail in the area:

4.1.2.1. Mesiriya Transhumant System:

The Mesiriya developed their own system of management of their herds throughout the year. Based on kinship and social relationships, the Mesiriya are divided into subtribes; with one or more subtribal group, pursuing a migration route, in their North-South movement. The migration route is usually 20-40 Km wide; with movement conditional by the grazing and water supply situation. Along the same routes, settlements of the same subtribe, in the form of villages and hamlets, are found to be scattered over the area. Each route is given a name and is used by specific groups Fig. (5).

FIG. (5) MESIRIYA GRAZING CYCLE
(ALSO INDICATING BROAD
ASPECTS OF LAND USE)



No.	Subtribe	Name of Route
1.	Awlad Omran and Fadliya	Nama
2.	Mazaghna and Fadliya	Abu Haimro
3.	Awlad Omran	Sarhat
4.	Awlad Kamil and Mazaghna	Al-Angareib
5.	Awlad Kamil	Al-Zarafat
6.	Awlad Kamil	Umm Sakkina
7.	Fiarine	Al-Murhaka
8.	Fiarine	Al-Arad
9.	Fiarine	Faras

On dividing the Mesiriya pasture land from east to west, the first three routes are called Eastern routes, the second three routes, the middle routes, and the last three, the Western routes. Considering the Mesiriya pasture land from North to South, it is also divided into three regions according to movement and grazing pattern. The Northern region (El Muglad) is called the autumn (El Mukharif) grazing zone. Animals spend the period from July to October in this area. The southern region is partly winter and mainly summer (El Masayif) grazing zone; where animals spend the period from November to May. While the area in between the two is grazed in course of movement between north and south.

4.1.2.2 Ngok Transhumant System:

The Ngok Dinka used to make the predominant population of Abyei-Bahr El Arab area. Dinka Manyowar and Dinka Deel were also present. The Dinkas used to move for shorter distances, due to the abundance of pasture and the adaptation of their livestock to the local environmental conditions. Their movement was restricted to around Bahr El-Arab, south to Aweil and north to Abyei and adjacent regabas.

At present, and due to the effects of insecurity and tribal conflicts, many of the better-off Dinkas, have moved to towns in the North; while of those remaining behind, some have lost their land as well as their livestock. However, and despite the above havocs, a significant number of Dinkas keep their animals south of Bahr El-Arab with their relatives. It is worth recording here that during the field visit, none of the Dinka herds were observed.

4.1.2.3 Other Transhumant Groups:

Some of the Hamar sub-tribal groups frequent the area with their herds of camels and sheep during the dry season. Though, they used to penetrate deep south, recently their numbers have been reduced, due to difficulties arising from conflicts over grazing and the failing supply from water-yards.

Other Dinkas in the area include Dinka Abyor, Dinka Anyal, Dinka Marting, Dinka Ashak, Dinka Alley and Dinka Bongo; mostly coming from Northern Bahr El Ghazal. Those Dinkas have lost their land and livestock, and are now living in peace camps; working for wage or renting small agricultural holdings.

4.1.3 Basic Population and Livestock Indicators:

4.1.3.1 Hunting figures (1981) Modified:

Table (10) summarizes the basic population and livestock data of the study area. The total area of Abyei District is) roughly 30 thousand square kilometers (according to the Hunting TS) inhabited by 163 thousand people (25,000 households) and 1.6 million heads of livestock (775,000 livestock units).

On average, the individual possesses 9.8 animals and the family possess 63.5 animals. The present carrying capacity of the land averages 26.3 animals/square kilometer. These figures support the basic assumption that the livestock sector dominates the socio-economic activities in the study area.

For reasons of simplification, the study area was divided into seven regions (according to Hunting Technical Services, 1981) so as to discuss the target population groups, Table (11) and Fig. (5). Table (11) shows the animals population, and the geographical and seasonal distribution of livestock over the seven regions in wet and dry seasons. Cattle presents the major livestock species in the area (77%). Sheep come second to cattle (18%) followed by goats (4.5%) and donkeys (0.5%). Camels are present in small numbers and at particular seasons and years.

Table (10)Abyei Bahr El-Arab Livestock Production Indicators.

Total area (km2)	29,410*
Total Population	163,400**
Households	25,175**
Number of Livestock	1,599,315*
Livestock units	774,465*
Animals/person	9.8*
Animals/household	63.5***
Land/person(km2)	0.18***
Land/household (km2)	1.17***
Livestock units/km2	26.3***

Sources:*Hunting Technical Services, 1981.
**Population Census, 1993.
***Current Survey Estimates.

Table (11) Animal Population, Geographical and Seasonal Distribution

			Cattle	Sheep	Goats	Camals	Donkeys	Total
1.	Muglad and Abu Beteikh	Wet	143815	49906	30189	-	2376	226286
		Dry	15930	17105	4936	313	261	38545
2.	The Ajaira Qoz	Wet	335841	47163	3083	-	848	86995
		Dry	74289	22964	3314	-	541	102108
3.	The Meiram	Wet	129	142	776	-	19	1066
		Dry	1096	-	191	-	32	1319
4.	The Miama (Lake Abyad)	Wet	-	-	-	-	-	-
		Dry	195913	33191	3756	262	1747	234869
5.	Ngol	Wet	-	-	-	-	-	-
		Dry	35597	8140	2185	-	-	45922
6.	Regeba, Abyei and Bahar	Wet	4823	8387	8807	-	210	22227
		Dry	362116	95194	12721	419	2097	472547
7.	Lol	Wet	235	-	41	-	-	276
		Dry	55555	9308	2074	-	277	67214
	All	Wet	484843	105598	42896	-	3453	636790
		Dry	740496	185902	29177	994	5956	962525
	Total		**1225339**	**291500**	**72073**	**994**	**9409**	**1599315**
	% Species		**77%**	**18%**	**4.5%**	**Neg.**	**0.6%**	**100%**

Source: Hunting Technical Services, 1981 (Modified).

60%of the animals were present in the area during the dry season (January) and 40% during the wet season (September). In contrast to this, most of the animals of El-Muglad and Ajaira Qoz are found in the dars in the wet season, while in the other regions most of animals are present in the dry season.

Table (12) provides information on the area of each of the seven regions, the livestock units, animal density (carrying capacity) and the system of management prevailing in each region in the wet and dry seasons. Most of the animals of El-Muglad and Ajaira Qoz are found in autumn, while most of the animals of Niama and Regaba regions are found during the dry season.

Heavy animal density is observed during the rainy season in El-Muglad and Ajaira Qoz, while another heavy density is observed at Niama and Regeba regions during summer. Other regions, however, experience low livestock and population densities. It has to be strongly pointed out here, that the system of management (migratory or sedentary) applies to livestock and not to livestock owners. It does seem that, overall, half the animals migrate North-South, while the other half moves around the dars.

Table (12)Area, Livestock Units, Animal Density and Systems of Management in the Study Area.

	Location		Area (Km2)	300 kg. Livestock Unit	Density (Units/km2)	System of Management
1.	Muglad and Abu Beteikh	Wet)	2610	111530	42.7	Migratory
		Dry)		13920	5.3	Sedentary
2.	The Ajaira Qoz	Wet)	7710	274130	32.1	Migratory
		Dry)		56750	7.4	Sedentary
3.	The Meiram	Wet)	320	160	0.5	Migratory
		Dry)		820	2.5	Sedentary
4.	The Miama (Lake Abyad)	Wet)	8730	-	-	-
		Dry)		145740	16.7	Migratory
5.	Ngoi	Wet)	1670	-	--	-
		Dry)		26570	15.9	Migratory
6.	Regeba, Abyei and Bahar	Wet)	6990	5120	1.0	Sedentary
		Dry)		271000	38.8	Migratory
7.	Lol	Wet)	1380	170	0.1	Sedentary
		Dry)		41190	29.8	Migratory
	Sub-total	Wet)	29410	364110	12.4	Migratory and Sedentary
		Dry)		410355	14.0	Almost migratory
	Total		**29410**	**774465**	**26.3**	**Migratory and Sedentary**

*Based on 300 kg. Camel, 216 kg. Cattle, 30 kg. Sheep, 18 kg. Goats and 150 kg donkeys.
(Hunting Technical Services, 1981).

4.1.3.2 Change Aspects Since 1981

It is accepted now, that the traditional nomadic movement experienced in the past does not exist as it used to be before. Movement of man with animals is restricted to livestock herders, while families if they ever move, do so within very limited distances. This change in behaviour may be attributed partly to increased insecurity during movement, and partly to social change; besides, obviously, high and low animal densities, in a particular area, are closely related to high and low pasture quality, type of soil and presence or absence of disease vectors.

Table (13) shows the most recent livestock estimates, reported by the State Ministry of Agriculture, Department of Animal Resources.

When these figures are compared with those reported by Hunting (1981), some changes could be observed.

Table (13) West Kordofan Livestock Estimates (1000)

District	Cattle	Sheep	Goats	Camels	Horses	Donkeys	Total
Abyei	1250	250	206	67	7	12	1825
Laggawa	1430	4000	200	8	9	15	2162
En Nuhud	195	1450	500	700	5	9	2895
Ghubeish	125	1800	200	750	5	10	2290
Total	3000	4000	1600	1464	26	47	10136

Source: Animal Resources Directorate, State Ministry of Agriculture, West Kordofan State, 1997.

Cattle were less by 25 thousand heads (2%). Sheep were more by 41.5 thousand heads (17%). Goats were less by 143 thousand (70%). Camels and horses almost disappeared, and donkeys were less by 7 thousand (58%). Total number of livestock was less by 226 thousand heads (12%).

These changes seem to be surprising at the first look, in view of the growth rate of the national herd, that ranged between 3.5-6% per annum (Department of Planning, Annual Report (1995), Ministry of Animal Resources). Such changes may be explained as follows:

i. Due to dryness of regebas, insecurity in Bahr El Arab, some animals moved into Northern Bahr El Ghazal, particularly those of the Dinka Ngok. This explains the small decrease in cattle and the marked decrease in goats; since most of the poor Dinkas raise goats.
ii. Increase in sheep numbers is obvious, due to the increased economic value of this species in local and foreign markets. Crossing of the indigenous sheep with Hamar sheep is also well marked. Sheep is also easy to manage in limited grazing areas.

iii. Goats at present, do not attract Mesiriyas, due to their relatively low value at markets. It is also socially considered, as the animal of the poor. Many Mesiriyas replaced goats by cattle and sheep.
iv. Expansion in cultivated areas for cash crops (millet + groundnuts) restricted to some extent grazing lands. In this respect, cultivation became more attractive, due to the availability of cheap labour provided by the displaced communities.
v. There is a noticeable increase in commercial farming, using modern mechanization (Tractors seen at El Meiram).
vi. The trend towards settlement is well observed. This is further encouraged by concern about education, health, security and other benefits of settled life.
vii. The collapse and failure of many water-yards have been followed by confusion of livestock movement, along different routes, that caused imbalances in grazing areas.
viii. Deterioration in veterinary services and appearance of diseases played a major role in decreasing camels, donkeys and horses (Trypasomiasis, calf mortality (camels) African horse sickness, Equine Strepthothricosis (donkeys and horses) and other non-specific diseases.
ix. As a result of many of the above mentioned factors, there is an evident environmental change that works against increasing livestock numbers.
x. It is apparent that nomadism is currently faced by many of the above problems and others to come (petrol industry), putting the pastoral systems under challenge of mere existence. This is a prediction and a belief of many scientists.

4.1.4 Pasture and Livestock Feeds:

Annual rainfall in the study area ranges between 500-800 mm. However, fluctuations in amounts and distribution cause a real concern to livestock owners, and as a result changes in the movement calender take place. The seasonal movement of livestock is governed by a number of factors; mainly:

* Pasture intensity
* Availability of water
* Presence of diseases vectors
* Appearance of epidemic diseases
* Insecurity expectations.

Pasture looks to be abundant, as livestock owners did not report pasture shortage as a constraint. Interviews with livestock owners and herders revealed the prevalence of a number of major pasture plants of preference to animals:

* Lissake (Zornia glochidiata): A legumenous creeper, inhibits other plants growth; highly palatable and accepted by all livestock species.

* Abu Asabi (Dactyloctenium aegyptium): A salty legumenous plant, abundant in Qoz, Muglad and Gardood soils; highly preferred by donkeys and horses, in particular, and other livestock in general.
* Beghail (Garjoob) (Blepharis linariifolia): Another legume, that reaches three feet high, with a cotton like biossom; consumed by all animals.
* Umm Chir: A wild sorghum variety, present in clay soils, along the Bahr and regeba banks.
* Al Shirbake: Another type of wild legume; highly preferred by ruminants.
* Al Birdi (Chlorophytum tuberosum): Grows and lives in water; present in the Bahr and adjacent regabas.
* Umm Soofa: A water plant, present at the same places of Al-Birdi; highly palatable for all livestock.
* Al-Fula (Echinochloa Pyramidalis): A legume that dominates pasture plants in regabas and around water ponds.

Other pasture plants are also present, with varying intensities; consumed by animals when the above mentioned forage plants are scarce. All legumes mentioned above, when taken by animals at the stage prior to flowering, cause serious poisoning; especially when large numbers of animals compete for fodder around water centres. Animals that stay with families in the Dar (5-10%) depend on the collected agricultural by-products; sorghum, sesame, ground-nut stove and hulls, Kerkade and collections of pasture plants.

In the past, pasture management, conservation and protection were strictly adhered to, by both government and chiefs of the tribes, at all levels. Cattle routes to the south and back were predetermined for all tribes and sub-tribes. Firelines were opened and their importance was generally observed by all livestock owners. Unfortunately, the management rules and the firelines implementation were abandoned for the last 5-8 years.

Forest deterioration to serious levels, all over the study area, can not be missed. Economic wood trees are shrinking in area. Features of forest elimination - natural or man-made-are obvious. Wildlife (plants or animals) is disappearing all together. Beyond doubt, forest and wild life relate closely to the total environment and affect directly the livestock future.

4.1.5. Livestock Health and Disease:

Experience shows that, livestock owners take much care about animal health, to the extent that it is given priority over their own health. Generally, all animals, seen or examined during the study tour, were in a reasonable health and nutritional condition. The majority of livestock was at the time of the teams visit, beyond our reach south of Bahr El Arab. Animals presented at the livestock markets were prime in health and condition.

In spite of the above rough assessment, animal diseases remain to be of paramount concern to livestock owners. The prevalent diseases by type of animal are:

4.1.5.1. Diseases of Cattle:

i) Rinderpest
ii) Contageous bovine pleuropneumonia
iii) Haemorrhagic septicaemia
iv) Black Quarters
v) Bovine trypansomiasis
vi) Anthrax
vii) Foot and mouth disease

4.1.5.2. Diseases of sheep and goats:

i) Sheep pox
ii) Contageous ovine pleuropneumonia
iii) Contageous caprine pleuropneumonia
iv) Scrapies

4.1.5.3. Diseases of Equines:

i) African horse sickness
ii) Equine streptothricosis

4.1.5.4. Diseases of all domestic animals:

i) Ticks and tick borne diseases
ii) Helminthiasis - particularly fascioliasis and round worms
iii) Miscellaneous bacterial and fungal diseases

Disease transmission is mainly through water centres and intensively grazed areas.

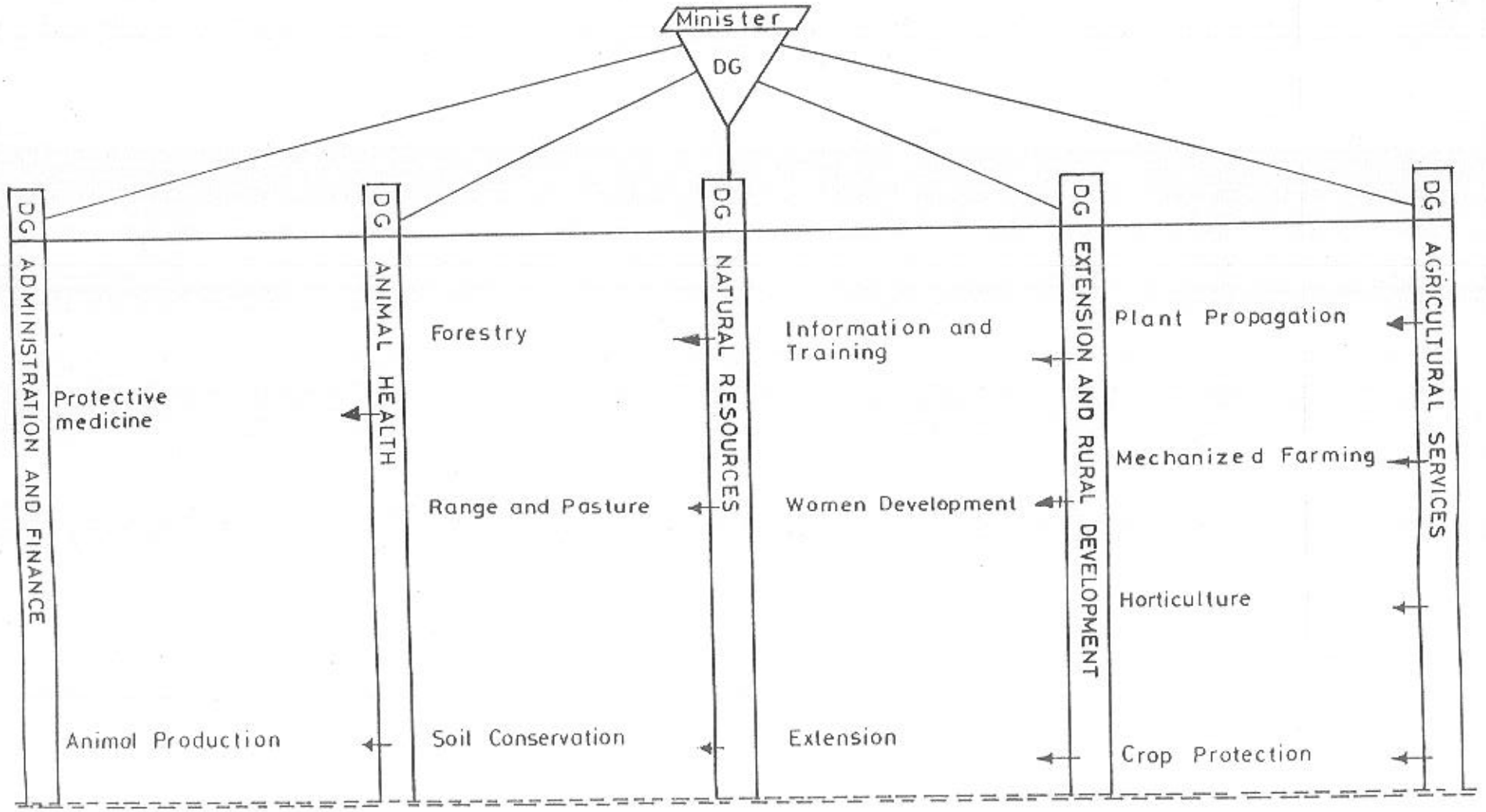
4.1.6. Status of Veterinary Services:

4.1.6.1. Institutions and Manpower:

Veterinary services are provided through the Directorate of Animal Resources, under the State Ministry of Agriculture, Fig. (6). The directorate shoulders the responsibilities of disease control, disease reporting, treatment of sick animals, provision of training and executing the development programmes, targeting livestock production and livestock improvement strategies.

Table (14) shows the number of the different categories of manpower involved in livestock services in WKS state and Abyei District. The shortage of highly and

Fig.(6) Diagram Showing MOAAW Organization



moderately skilled personnel is obvious. Most of the veterinary assistants and attendants are above 50 years of age, and have limited veterinary training and education. More shortage of staff is observed in Abyei District, although more than 60% of livestock moves in and out of the district annually. A strong and positive sign was the numbers of trained paravets and their distribution over the state districts. The fact that one veterinary officer is responsible for more than 1.6 million heads of livestock stationed at El Muglad should not be overpassed.

Table (14) Manpower in West Kordofan State (WKS) and Abyei Province.

	WKS	Abyei Province
Veterinarians	11	1
Technicians	2	-
Vet. Assistance	63	2
Animal Attendants	114	23
Drivers	14	1
Clerks	4	1
Store-keepers	1	-
Accountants	4	1
Paravets	51	15

4.1.6.2 Vehicles and Equipments:

Twelve cars were listed in the state, four of which were allotted to Abyei District. One Land-Cruiser and one Leyland lorry were observed in working condition. All other cars were out of function, due to lack of major spare-parts and maintenance facilities, Table (15).

Table (15) Vehicles in WKS and Abyei (Province)

	WKS	Abyei Province
Leyland	7	2
Nissan	1	-
Land-Rover	2	1
Land-Cruiser	2	1

The main reported snags were engine overhaul (6 cars), diesel pump change (6 cars), wheel tyres (all cars), break system (7 cars), batteries (7 cars) and other minor snags. There is a single Land-Rover found in El Muglad and out of order. Such maintenance requirements are only available in El Obeid or En-Nahud.

Equipments cited were fridges, deep-freezers, light microscopes and surgical instruments. Most of the equipments were in poor condition and lack maintenance. Microscopes lack stains, media and incubators. Surgical instruments were old and lack support material.

None of the new technologies were seen in the Central Veterinary Hospital or at El Muglad.

4.1.6.3 Offices and Staff Accommodation:

Lack of mobility, facility and efficient communication made the state in general, and the study area in particular a difficult place for qualified staff. Most of the staff stayed for less than one year and left for one reason or another.

There is a well established building of the headquarters of the Directorate of Animal Resources at El-Fula. It includes the personnel offices, as well as, the veterinary hospital. El-Muglad Veterinary Offices are new and in good condition. Abyei Veterinary office is wrecked, and at present is used as a petrol store for the district. Maintaining this office, and reopening it, is of primary importance. El-Meiram has no veterinary office, although some three junior veterinary staff are present. Building a two-room veterinary office seems to be essential, with a significant contribution by the local authorities.

Staff accommodation is not existing anywhere. All the staff, whether from within or outside the state, should manage their accommodation on their own. At Abyei, four rooms were used by the Veterinary attendants in the past. Now these rooms are empty and need to be maintained and supplied with public services. Guest rooms or houses are lacking in the whole state. These houses were found to be essential for visits by veterinary authorities and seasonal visiting vaccination teams.

4.1.6.4 Budget and Financial Support:

A thorough discussion with the Director of Animal Resources at El Fula, and the district veterinary officer at El Muglad, and the Veterinary Assistant at Abyei, revealed a serious problem of budget and finance to veterinary services. Only 15 million pounds were approved this year, out of a proposed sum of 136 million pounds. Half of the approved budget was to be made available by the veterinary authority. At El-Muglad, Abyei and El-Meiram, the situation is even worse. There was no budget allowances at all at the locality level. Salaries were late 2-4 months. All competed for the minimal resources available at the headquarters.

4.1.6.5. Impact of lack of Veterinary Services:

Routine veterinary services were erratic for the last 4-5 years. Annual and seasonal vaccination teams did not show regularly. Vaccine and drug shortage were common. Efficient disease control strategy is lacking, due to failure to fulfill budget and financial commitments. Shortage in petrol and mobile facilities are common major problems. Timely availability of vaccines and drugs was not guaranteed. Response to disease reports is weak. More than that laboratory investigation and confirmation teams were not reported to have visited these areas for more than 7 years.

Livestock owners said that they were ready to pay whatever cost of veterinary interventions, as they usually spent significant sums of money for curing their livestock. While touring the different gatherings; villages, water centres and livestock markets, veterinary drugs were found to be sold and bought, like other goods irrespective of storing conditions, proper handling, expiry or price limitations. The problem of animal health is worsened by underdosing, mistaken diagnosis and complementation with traditional drug interventions.

Equine species and camels coming from the north find it difficult to adapt to the environmental differences prevailing in the area. However, during dry years, these species are forced to come to the area, and as a result come out with many diseases. While epidemiological surveys in relation to spread, prevalence, evidence of diseases, and so forth, are completely lacking.

4.1.7. Contribution of Livestock to Food Security:

The nutritional status of most of adult Mesiriya is about average, as it has been observed during the visit to the area . However, pregnant women and children do suffer from malnutrition, with particular emphasis on Vitamin A deficiency (It is also noticed in livestock during late summer). Cooked and fresh vegetables do not present a concern in the daily routine needs. Chronic diseases - Malaria, Chistosomiasis and internal parasites - aggrevate the condition.

Unfortunately, the general opinion about pastoralists is that, they produce enough milk and milk by-products, to sustain the family requirements throughout the year. Interviews on Mesiriyas cattle productivity showed that, on average a cow produces 1.5 litres of milk/day, for a maximum of 150 days (location length). Such production is only maintained during the wet season and early winter. Only 20% of breeding females were reported to calve during this period. Most of Mesiriya were complaining bitterly of serious shortages of milk supply. In support of that, the price of milk at Abyei, El Meiram and El Muglad is the same as that at Khartoum (Ls. 900/Kg). At El Muglad the team was served tea with powder milk.

Some poor Mesiriya lost their livestock altogether due to war, insecurity and forceful diyas. (Compensation in cattle to persons killed from other side), while some others lost because of banditry action. In addition to the above, there is a significant variation between households in herd size, quality, ability to cultivate food and cash crops, etc... Disparity in wealth shows itself in many ways among the Mesiriya.

More seriously still is the situation of Dinkas and the displaced groups, where livestock does not exist, and a few number of settled Dinkas depend on only 3-7 goats, with milk to the family practically unavailable.

Meat consumption by pastoralists is traditionally low, compared to urban consumption. It is estimated at 2-3.5 Kg/person/year (Ministry of Animal Resources - Unpublished

Report, 1997). Pastoralists slaughter animals at occasions and mostly depend on weak animals that fail to survive. Dinkas traditionally slaughter only few healthy animals, due to ritual believes.

Wildlife as a source of meat is becoming scarce, due to changes in the environment, war and traffic intensity. Even when milk and meat were available, income levels and seasonality did not allow purchasing these commodities (major sales from local butchers is ¼ Kg/household).

It could be concluded from the above discussion, that the contribution of livestock to food is low for average Mesiriyas, little for settled Dinkas and poor Mesiriyas, and negligible for displaced groups. Protein and vitamin A deficiencies, parasitism are general problems of children, mothers and all displaced. There is a marked seasonality of livestock productivity. Summer and autumn seem to be hard for families (no milk, meat or others). Improvement of livestock productivity and efficiency needs a complex infrastructure of services, which is not existing at present.

4.2. Crop Production:

4.2.1. Farming Systems:

Although livestock raising is the main occupation of the vast majority of all ethnic groups in Abyei Province, subsistence crop production has always been practised, by both sedentary populations and transhumants. The drought of the 80's and the recent armed conflict in the neighbouring Southern states have increased the demand for food and provided an incentive for grain production, beyond subsistence level. Two farming systems can be recognized in the project area:

4.2.1.1. Traditional Small-holder System:

It is the most widespread, with the following major characteristics:

i) The holding size is within a wide range. A sample of 25 farmers, surveyed at different localities, cultivated a total area of 524 ha, Table (16) giving an average holding size of about 21 ha, with a range of 5 to 62 ha. Information from the state Ministry of Agriculture and Animal Wealth (MOAAR) indicated that the average holding was 18 ha, but some able farmers may cultivate up to 500 ha.

ii) Production is at subsistence level. Though cash crops (groundnut and Kerkade) are raised, the priority is for staple grains, millet and sorghum.

Table (16)Crops and Crop Productivity.

Crop	Crop Area (ha) per farmer		% of cultivated area	Yield (Sack/ha)	
	Average	Range		Average	Range
Pearl millet	7.4	0-29.2	35	1.9	0-4.0
Sorghum	4.8	0-21.9	23	2.4	0-6.4
Groundnut	6.2	0-29.2	30	22.1	0-41.1
Water melon	1.2	0-14.6	6	--(a)	--(a)
Karkadeh	0.6	0-5.8	3	4.8 (b)	2.8 - 6.0 (b)
Cowpea	0.5	0-5.8	2	2.9 (c)	--
Sesame	0.1	0-1.5	1	2.7 (c)	--

Sources:Based on data obtained from field

Notes:
a.The crop was destroyed by pests; only one farmer obtained some yield.
b.Yield in Kantars (=45 kg) ha.
c.Based on yield obtained by only one farmer.

iii) Farm labour for agricultural operations is mostly provided by the H/H members. Financially able farmers enter into share-cropping arrangements, and/or employ farm labour.

iv) Modern agricultural inputs such as machinery, fertilizers, crop protection facilities and improved seed are almost lacking.

v) Agronomic practices are based on traditional indigenous technical knowledge. Most farmers are not aware of recommendations based on research findings.

vi) Credit to small-holders is either absent or not easily accessible.

An important subsystem is the Jubraka, a traditional house garden; developed as an integral part of the homestead, and is usually the domain of women, who provide most its labour requirements. The main function of the Jubraka is to alleviate hunger during the period from July to October. Early maturing varieties of field crops and vegetables are usually grown on it.

4.2.1.2. Mechanized Small-holder Farming:

In this system, tractors and other suitable farm machinery are used, to prepare land. Also in the case of sorghum, tractors are used for seeding the land which is divided among groups of farmers. This system was first implemented in Abyei area in 1973 season by the Agricultural Modernization Corporation, which used to operate in the Nuba Mountains.

At that time, 6 tractors and suitable agricultural implements were provided, to serve schemes in the clay plains with a total area of 4577 feddans being developed. By 1978, however, only 1000 feddans were prepared; of which about 500 feddans were sown by machine, mainly because of maintenance problems.

The present government revived the small-holder mechanized schemes, by providing two tractors and disc harrows, with seeder box, to two of the Dinka "Amirs" in Abyei area, and not to a government organization. The result, however, is not encouraging; for the two tractors are now not functioning, because those in charge of managing them did not succeed in providing the needed spare/parts.

4.2.1.3. Huntings Farming Systems

On the basis of their 1980 investigations, HTS distinguished three of what they termed "systems of rural economy". However when only crops are considered, they might as well be regarded as cropping systems. They comprised:

a) The millet-groundnut system.
b) The millet-migratory herding system.
c) The sorghum system of Abyei plains.

The first system is predominant among the sedentary Qoz populations in the north. At that time, the system was of minor importance in the project area and was confined to the Ajaira Qoz, the Muglad and Abu Beteikh Plain (Planning Regions 9A, 9B, and 6F).

The millet-migratory herding system, practised by the Mesiriya Humr transhumants is centred on El Muglad (Planning Region A), but extends into Abu Beteikh and the Ajaira Qoz. As the name implies, this system combines millet cultivation, with livestock production. The two activities, however, are not integrated. Grazing and cultivated areas are separated. Because of the priority given to livestock, the timing of millet planting and harvesting are restricted to times compatible with herd movements, herd labour requirements, and availability of pasture and water. However, labour required for millet occurs at times when herd labour requirement is at its lowest. HTS reported that the labour force (aged 30 years and above) engaged in millet production was composed of twice as many women as men.

The Abyei Plain (Planning Region 11D) is inhabited by the Ngok Dinka, who like the Mesiriya Humr, practise a crop production system complementary to a migratory herding system. The main farms, located in the clays, are planted to sorghum and are almost exclusively worked out by men. "Jubrakas" located on the sandy ridges are also the normal sites for homesteads. In addition to quick maturing sorghum, other crops such as sesame, groundnut, maize and some vegetables are grown.

4.2.2. Crops Under Production:

4.2.2.1. Pearl Millet (Pennisetum typhoides)

Pearl millet is the major staple cereal grown by the transhumant in Qoz soils. Only one local cultivar is grown and farmers did not give it a specific name. Such names as Dymbi and Kordofani, known in Northern Kordofan, are not used. However, the grown cultivar appears to be similar to those varieties, in being late, with yellow seed, and prone to attack by various pests and diseases.

Pearl millet is not grown by Dinka tribes of Abyei area.

4.2.2.2. Sorghum (Sorghum bicolor)

For the Mesiriya sorghum comes second to millet, as a staple cereal. The predominant cultivator is local "Zinnari". This is a late-maturing varity, adapted to "Qoz" soils. It has white large seeds, and under favourable conditions produces impressive heads. It is susceptible to prevalent diseases and pests.

In contrast, the Dinkas depend solely on sorghum, as their staple cereal. They grow a number of cultivators with different agronomic and grain quality attributes. The most important cultivator is Rowath. It is claimed to have some disease and bird resistance. Rowath has the additional advantage of giving a second crop, by developing productive tillers. Compared to other cultivators, Rowath is of medium maturity, and is ready for harvest in October. It is the preferred cultivator for dehulling.

Nai (or Nyai) is an early maturing cultivator, claimed to mature in less than two months. It is said to be particularly susceptible to bird damage. It is more likely that it is attacked by birds, because it will be the only crop in the field, and not because of some special qualities that attract birds to it.

Of less importance are the two cultivators Diil, which is very late, taking up to 6 months to mature, and Amarak, which is considered to be of excellent quality.

4.2.2.3 Groundnut (Arachis hypogaea)

Groundnut is becoming an important cash crop in the area. Oil extraction, using camel driven local mills is also practised. The only cultivator under production is Barberton, introduced in Sudan over sixty years ago. Barberton was a major improvement, over the previously cultivated small-seeded runner types, which were predominant in Western Sudan.

4.2.2.4 Water Melon:

Rainfed production of good quality water melon, as a cash crop, seems to be a recent development in the area. Introduced cultivars, with thick rind which could withstand transport and storage are preferred. Charlston grey is predominant.

4.2.2.5. Kardadeh (Hibiscus subdrifa)

As indicated in Table (16) very small areas of this cash crop are grown in the province. Local cultivars, claimed to be of superior quality, are grown.

4.2.2.6. Cowpea (Vigna anguiculata)

Among interviewed farmers, only two grew cowpea last season. The cultivars grown are the late maturing runner types. Dinka farmers grow several types, exhibiting different seed colours and sizes. Transhumant prefer the large-seeded white types.

4.2.2.7. Sesame (Sesamum orientals)

As with cowpea, only two farmers grew sesame last season. Although no figures were obtained from Dinka farmers on the areas they planted to sesame, the way they intercrop sesame with sorghum indicates that the sesame area is about half that of sorghum.

Although the sample size, upon which crop areas were estimated was so small, as to throw doubt on the reliability of the estimates, it is unlikely that a larger sample would have indicated a significantly different proportion.

4.2.2.8. Horticultural Crops

According to MOAAR, there are about 3500 feddans in the state, suitable for horticultural production. Yields in t/ha. were estimated at up to 12 for tomatoes, 6 for potato, 8-10 for egg plant, 1.5-3 for pepper and 4 for okra. Banana yields were estimated at 5.5 t/ha and those of lime at about 4 t/ha. Irrigation by pumps is provided by wells at a depth of 2-6 metres, in the project area.

There is one nursery at Abyei, but is in need of rehabilitation.

4.2.2.9. Crop Distribution

According to HTS 1981 Report, the distribution of sorghum and millet in the project area followed a very distinct pattern. In Abyei plain, sorghum covered 80% of the cropped area, whereas in the northern parts, millet constituted 90% of the cropped area.

It is interesting to compare the distribution of areas among the three major crops, millet, groundnut and sorghum at present, with those in the 1981 HTS report. (Presumably from a 1980-81 survey) for millet-migratory herding system. For the total cultivated areas of 6,900 ha in the Ajaira Qoz, HTS reported the following percentages: 85, 10 and 5 for millet, ground and sorghum respectively, which confirms that the millet-groundnut system is of minor importance in this area.

Using data obtained from six indigenous farmers interviewed at Magaddama in the Ajaira Qoz, the corresponding percentages were: 44, 32 and 24, based on a total cropped area of 152 ha. Two displaced Dinka farmers in the same village planted 71% of their 20 ha land to sorghum, 25% to groundnut and 4% to water melon. Despite the possible errors in estimates arising from small sample size, there is a trend towards cultivation of more groundnut and sorghum in the area. Increase in groundnut areas is probably due to need for cash, while the increase in areas planted to sorghum is most likely associated with the migration of Dinka displaced, who do not grow millet, to the northern parts of the project area.

4.2.3 Agronomic Practices

4.2.3.1 Rotations and Crop Sequence

Interviewed farmers did not seem to comprehend questions on crop rotations, but were able to provide answers to questions on crop sequence; on the basis of which, it was concluded that, a three-course rotation of groundnut sorghum-millet was being followed.

From a landuse point of view, it is important to consider the crop-fallow rotation, known as shifting cultivation. In this system, land is cropped until yields decline, when it is abandoned and allowed to revert to bush, for a period long enough for soil to regain fertility. The length of this bush-fallow period depends on soil type. Hunting Technical Services (HTS), on the basis of field investigations concluded that, for Qoz soils the fallow period is three times as long as the period the land was under crop i.e. a 3:1 fallow to crop ratio. The ratio for cracking clays is 1:1

4.2.3.2 Plant Population and Spacing

Plant spacing used by farmers for sorghum and millet is about 90 x 90 cm, and 30 x 30 cm for groundnut. Twenty seeds/hole are planted for sorghum and millet, and thinned later to 3-4 plants/hole. Two seeds are planted in case of groundnut and no thinning is practised. Since these spacings give plant populations, similar to those used by research scientist, spacing does not seem to be a significant factor, contributing to the low yields obtained by traditional farmers.

4.2.3.3 Application of Phosphorus:

Numerous on-station and on-farm research, by ARC, GTZ, Global 2000, and Mechanized Farming Corporation, unequivically demonstrated the economics of fertilizer, under rainfed conditions. Nonetheless, the infrastructure required for the adoption of this practice, by traditional farmers, has not started yet.

4.2.4 Pests and Diseases:

With the aid of coloured plates of various pests and diseases of sorghum and millet, interviewed farmers were able to identify pests and diseases prevalent in their areas.

All farmers agreed that the parasitic weed, striga (Striga hermonthica) and birds (Quelea sp.) were the most serious pests on sorghum and millet. Insect pests included stemborers on sorghum and millet, termites on groundnut, and bugs on water melon. Diseases included smuts on sorghum and millet and downy mildew on millets.

Only one farmer was identified as having used a seed dressing. Birds constitute a national pest and is supposed to be controlled by the Federal Ministry of Agriculture.

4.2.5 Institutional Linkages:

4.2.5.1 MOAAR Level:

The structure of MOAAR, Fig. (6) is very satisfactory. To facilitate the rehabilitation efforts there is a need to develop the institutional framework and formulate policies to implement on a sustainable basis the suggested interventions.

MOOAR should improve the capacities of its line departments through:-

a) Filling all vacancies with qualified staff.
b) Preparing and implementing a training programme for staff at all levels.
c) Providing at reasonable levels work facilities such as vehicle, equipment, supplies, and operational budgets.

The linkage is to be strengthened, between MOAAR line departments, and their couterparts in the Agricultural Research Corporation, and the Federal Ministry of Agriculture and Forests, through:-

a) Participation in planning, implementing, monitoring and evaluating project activities.
b) Joint membership in coordination forums.
c) Participation in training activities, conferences, and field days.
d) Exchange of publications.

The most effective way to link research and extension is the participation of both researchers and extensionists, in planning and implementing an on-farm research programme, suitable for the project area.

4.2.5.2 Community Level:

On the same consideration of facilitating project implementation, community-based organizations need to be developed through:-

a) Conducting intensive animation sessions with the communities in the project villages, and promulgate the project's message of grassroot participation, the bottom-up approach to development, and the idea of the "Sandug" revolving fund.
b) Form through election or consensus, Village Development Committees, with the participation of local authorities.
c) Properly register VDC with local authorities.
d) Form associations for off-farm ventures, including women associations, and in consultation with local authorities.
e) Agree on rules, guidelines, and procedures to be followed by the VDCs and associations in performing their activities.

4.2.5.3 Conducting a Base-line survey:

Conduct a diagostic base-line survey of the villages included in the pilot phase.

4.2.6 Contribution of Crop Production to Food Security:

In their Report on the Western Development Plan, HTS made calculations for grain (sorghum and millet) consumption and production, assuming yield lands of 600 and 400

Kg/ha for sorghum and millet respectively, and 180 and 135 Kg of annual consumption, for sedentary and nomadic populations, respectively. The estimated grain deficit, for both urban and rural population, was about 14,500 tonnes. In this regard, HTS made an almost prophetic statement: "Clearly the unsatisfactory condition of crop production requires a new and more substantial effort to avert, the development of a serious crisis, which would follow a short series of years with poor rainfall. This of course occurred and drought reached a climax in 1984.

The civil war which started in 1983 aggravated the situation further. At present the displaced are moving northwards in increasing numbers, adding more pressure, on already insufficient food supplies and services. The Director General MOAAR informed the mission, that the food deficit was estimated at 30,000 tonnes but at present is believed to be about 40,000 tonnes. Of the human populations in the area, the most vulnerable are the displaced, who may not have immediate access to land. The majority of those, who were allotted land last year, did not obtain enough production to carry them through the coming hunger period, from May or June up to October. The specter of famine is certainly haunting this group. Other vulnerable groups include, transhumant who lost their cattle during the war, and the disadvantaged groups of women and children. Many of these groups may not be around to reap the benefits of the envisaged rehabilitation project. They need relief... now.

4.3 Fisheries:

4.3.1 Drainage System:

Very little information is available on Bahr El Arab, from hydrological and ecological points of view. It is not even listed in Hurst's monumental study "The Nile Basin".

Bahr El Arab is a tributary of Bahr El Ghazal, a minor tributary of the White Nile. It is only minor in its contribution to the annual discharge of the Nile, which is meagre, 0.6 billion meter cube, of a total 84 b.m.s. It must be mentioned that, Bahr El Ghazal has an extensive intricate system of tributaries, the dominating feature of the hydrology of which is that is tran\verses a flat basin and consequently loses the bulk of its discharge to the large swamp system bordering those of Bahr El Jebel.

However, one is probably justified to assume that its hydrology is not unsimilar to that of other seasonal tributaries of the Nile system. It collects the run-off of a large basin and starts flowing in May/June, each year, and ceases running around the end of October. It probably transports increasing amoutns of silt annually which is a reflection to the deterioration and degredation of its watershed. This is probably caused by an increasing trend in aridity and excessive use of fire, as a management tool, in the absence of firelines. Large pools remain in the channels of the dry river bed throughout the summer period.

4.3.2 Production Systems:

The extent and areas of pools have never been assessed before. According to various sources in the area there are several fishing sites on the tributaries (nine), the major ones being at El Dambaloya, El Girinti and Mymora. The large potential should be at the main stream of Bahr El Arab (El Gurff) about 6 Km south of Abyei. Unfortunately the team was not allowed to visit the area for security reasons.

There are no dedicated or specialized fishermen, no fishing camps and no fishermen communities. Fishing activities are only undertaken as a last resort, if they have nothing better to do. It holds the bottom position in the ladder of economic priorities; even below that of honey collecting. Current constraints include:-

i) Lack of trained fishermen.
ii) Lack of fundamental knowledge on fishing grounds, potential, seasonality, etc..
iii) Long distances and inadequacy of marketing outlets.
iv) Unavailability of fishing and handling gear (especially boats).
v) Lack of commitment and tradition of fishing, both on the official and popular levels.
vi) The large-scale of long-lines, which are unselective and cause fish diseases.

The situation at this point is that, there is no derth of information on availability of fish to capture. The equipment in use include; long-lines, spearing, cast nets and small gill-nets (in order of priority).

The greatest bulk of the fish is sundried for export, mainly to Kosti. However, it seems that appreciable amounts of sun-dried fish are produced in the area. The estimated amount at El Dambaloya for one whole season, running from January to May, was about one thousand Kantars (100 Lb.). The price of one kantar at El Dambaloya was between Ls.55 to 60 thousand pounds, i.e. the volume of trade was about 60 million Sudanese pounds.

The most important commercial species include, clarias (Garmut, locally Balbout), Heterotis (Noak, locally Abu Ora), Distichodus (Karish) and Gymnarchus (Weer, locally Umm Sout) Tilapia (Bulti), Proterpterus (Umm Kuru) and Polypterus (Dabeib at Hut), are also present.

4.3.3 Socio-Economic Importance of Fisheries:

An unspecified amount of fish is consumed locally, as fresh fish and is very important addition to the diet of all ethnic and social groups. Traditionally and culturally it is more important to the Nilotic tribes. Local knowledge and local preferences include Mandayshi (press dried fingerlings) and Abbuth (ground powder-dried pressed) which are particular to the area, and could keep for a long period of time. The local market for commercial fishing is small due to the small buying power of the local communities. All age groups of both gender practise spear fishing to supplement their diet.

Extreme poverty is prevalent in Abyei area, especially among the displaced, whose nutritional status is far below the real healthy balanced needs. They are not able to afford buying milk or meat, (even if available). Their culture is not that of meat eating except in special occasions. Fisheries development will therefore, provide cheap affordable and accessible high quality protein, in reasonable quantities in a protein-hungry environment. Fish could also be stored for a large part of the year, and transported to other areas, sold for a good price; hence providing a source of sustainable income for the displaced.

5. COMMUNITY SERVICES

5.1 Water Supply:

5.1.1 Types of Supply:

The Population of Abyei Province obtains its water supply from three main sources: traditional surface and groundwater sources, hafirs, and wateryards.

5.1.1.1 Traditional Water Sources:

Traditional water sources utilize both surface and groundwater resources. The latter include depressions, butas and regab. These sources, though higly seasonal are usually sufficient to meet livestock watering and domestic needs during the Period June to December. However, some deeper regab can supply water up to end of March. The traditional surface water sources are highly affected by environmental changes fluctuation of rainfall, evaporation, and are susceptible to contamination. Apparently, the storage capacities of the butas and the regab are in a continuous reduction, due to accumulation of silt and advancement of sand from the north.

When the regab and the meandering khors dry up, perennial supplies are often tapped from shallow traditional wells, dug into the stream beds. Most of these wells tap sub-fluvial and inter-fluvial aquifers; composed of fine-grained sands, overlain by semi-permeable sand clay and silt. The aquifer is rechargeable annually by direct infilteration. The wells are dug to a depth and diameter of 4-6 and 1.2-1.5m, respectively, and are lined with wood. Normally, the yield of a traditional well varies from 250-400 gallon/day, and is used mainly for the watering of goats, limited number of cattle not exceeding 15 heads, and for drinking purposes. The water quality of these wells, in terms of TDS, mounting to 230 ppm, is generally good; however, susceptible to surface contamination and silting by seasonal flood.

5.1.1.2. Hafirs:

Hafirs are government-developed surface water sources. A Hafir is a man-made depression, to harvest and store seasonal surface water (run off). There are about 6 Hafirs, mainly constructed pre-1960. in the south eastern part of the area with a design capacity of 15000 M3 each. Ever since, these Hafirs received little or no maintenance, and have been affected by desilting. Consequently, their current initial storage capacity has been reduced to less than 80%. Hafir water is usually turbid and of poor quality. None of the hafirs in the area is equipped with any physical or treatment facilities. All Hafirs are in need of fencings, desilting, cleaning of the feeding canals, rehabilitation and reconstruction of inlets and outlets structures.

5.1.1.3. Water-yards

Water-yards are the major and the most sophisticated sources of water supply in the area. The term "water-yard" is given to a groundwater extraction and distribution complex, which includes one or more boreholes, fitted with reciprocating pump, driven by diesel engines, and equipped by a storage tank, animal-watering troughs, water taps and human filling benches.

The water-yards facilities are enclosed about 80 by 60m. Most of the boreholes have been drilled to depths of 190-350m. through the aquifer complex of the Baggara basin, and lined with 150 mm diameter steel casings, meeting API standards. The Pumps are mainly of the reciprocating types with low yielding design capacity of 7 M3/hour. The engines which drive the pumps are 6-8 HP Lister type. The tanks ard usually at an elevation of 3m., have capacities in range of 25-40 m3, fed by a 50mm or 75mm delivery main from the pump, and a 75 mm gravity main that leads the water to the distribution area.

There are about 56 water-yards, with a total of 71 bore-holes in Abyei Province, mainly distributed along the nomads S-N migration routes, Fig(5). The present mechhanical, physical and environmental conditions of these water-yards are extremely poor. At all water-yards visited during the survey, engine mountings were loose, with oil leakages and mechanical wear. Pumps were worn, bearings on the drive wheel spindle and the pin on the fulcrum pole were excessively loose, and the whole assembly was not securely attached to the foundations. Consequently, pump rods suffered from the invasion of fine-grained sands, causing a continuous wear out of the pumps, working barrels and the bearings.

Within the water-yard, all taps were broken down, troughs were not sufficient and their surroundings were eroded and muddy. In addition to that, the water-yards had no fence, or poorly installed; with humans and animals mixed and quite often helped themselves from the same troughs. It was found that, water-yards users were veguely aware of the problems of watering humans and animals at the same distribution points. As most, users had pointed out that, they often drank water, they already knew as unhealthy, simply because it was the only water available to them.

At the time of the visit, 25 out of 57 water-yards were non-operational (broken down), and the remaining 32 operated with an efficiency of less than 50% of their initial design capacities, appendix II Table 2. Water-yards suffer presently many forms of deterioration, with evident adverse impact on the supply situation.

a) Forms of Deterioration

i) Aging, as 80% of them had exceeded their useful life span (25 years).
ii) Invasion of fine grained sands, attacking pumps bearings, working barrels; leading to complete silting of boreholes.
iii) Low yielding due to the hydrogeological nature of the aquifer (the Um Ruwaba

Aquifer) coupled with the type of pump installed (reciprocating).

iv) Scarcity and high cost of spare parts and fuel.

v) Poor and rigid design of water-yards; had not catered for humans/animals separation, with installation of optimum watering troughs and taps, compatible with the number of users.

vi) Poor and inefficient maintenance and management systems.

vii) Unclear and rigid SWC policy, towards community involvement in operation maintenance and management of water-yards.

viii) Insufficient government budgets and logistic support to carry out periodic maintenance by SWC.

ix) Poor road condition particularly in the southern parts, which are almost inaccessible for about 5 months (June to October) of the year.

x) Overall/regional environmental changes, such as; early drying up of the traditional surface water sources, damages caused by the civil war, increased pressure on water-yards, frequent breakdown and degradation of surrounding.

b) Impact on Water Service

The above factors have clearly impacted on the quality of services offered by the water-yards. Apparently the resultant effects are

i) Low per capita consumption; ranging to about 8 L/day or less, among the displaced.

ii) Poor accessibility to water: measured in terms of time spent in fetching and collection of water. As estimated by this survey, nearly 140 man/days, per year, per family, are lost in provision of water for humans and animals.

iii) Poor reliability and sustainability of water-yards; viewed in terms of breakdown frequency and stoppage. Frequency of breakdown ranges from 7 times/month, during the months January to June; to about 11 times/month, during the period July to December. Water-yards stoppage for repair, and/or shortage of fuel, varies from 0.5-10 days, excluding those completely non-operational.

iv) Poor water hygiene and sanitation: although water produced by the boreholes is originally of good quality, the poor conditions of wateryards, lack of drainage channels, non-seperation between humans and animals lack of hygiene education; always expose the water to poor sanitary and hygienic situation.

v) Affordability of water supply: officially, water from water-yards is priced at Ls.10/4- gall on Jerrycan. However, due to frequent breakdowns and needs for major repairs, almost on monthly basis, extra charges, mounting to 200% of the official price are to be imposed by the communities. In case of stoppage, longer than one day, the cost of water could reach up to Ls.100/tin. Judged on poor rural incomes, especially among the displaced, such a price is high. Most households considered a water Price beyond Ls.10/tin as excessively high.

vi) Environmental degradation: water-yards in the province were basically located nearly at15-20 Km apart, on the nomads N-S migration routes (Murhals) Fig.(5). According to Land Use Department (at that time) this spacing was optimum, for easing the pressure on natural resources by keeping a fair distribution of human

settlements and livestock in the area. However, due to the decline in the productivity and reliability of water-yards, coupled by rainfall fluctuation and the silting up of butas and regab, the operating water-yards have attracted more people and livestock beyond the carrying capacity of the land. Also due to increased settlement, the sedentary communities around these water-yards are heavily, practising wood cutting and farming. These activities combined with concentration of animals, constitute some of the major factors of environmental degradation, seen around some water-yards, especially the south eastern parts, dominated by the sandy (Qoz) soils.

5.1.2 Water Sector:

5.1.2.1 The State Water Corporation (SWC):

The organization structures responsible for maintenance, development and management of water sources, particularly water-yards, is the State Water Corporation(SWC) based at El Fula and with provincial depot at El Muglad. The SWC at El Muglad is considered as a maintenance centre, running three maintenance crews, of 5 skilled persons each. The total manpower of SWC at El Muglad is 139 persons, of whom about 100 work as clerks, operators and guards at the water-yards; while the maintenance centre includes two mechanical engineers, 2 technicians, 15 skilled men and an administration staff of 7 persons. The maintenance centre is provided by a modern workshop (constructed 1985 by a Yougoslavian Aid) equipped with welding and grinding machineries, tools and 5 vehicles, of which only one is operational at present.

SWC collects and manages all the water revenue, on the responsibility of providing all the maintenance and operation services to water-yards. In reality, SWC (maintenance centre) responds to rural communities requests of maintenance needs on cost. The communities are made to pay for the spareparts, transport, incentives of the repairs crews, fuel and lubricants; while SWC pays the salaries of the staff, at the water-yards. Clearly SWC suffers from a number of constraints, the most important of which are:-

* Frequent changes experienced by the rural water sector, greatly affecting its stability and the level of services it provides.
* Lack of clarity in SWC policies, as regards the management of water-yards and the role of the rural communities in that respect.
* Cut of budgets and shortage in funds.
* Poor logistic and communication services

As the responsibilities of SWC for the maintenance of the water-yards have been greatly decreased, and at the same time the role and involvement of rural communities through their village committees have been increased, presently at all water-yards there exist one form or another of village water committee (VWC) embodying, operation, maintenance and management responsibilities. Besides, securing fuel for daily operation, the VWCs quite often purchase from their own finances spare-parts and engines at high cost.

The rural communities and the VWCs rate the services provided by SWC as inadequate, irregular and of high cost. With the increased role and involvement of rural communities in wateryards management the state government vis-a-vis the SWC are principally willing to legislate this community based management effort. In fact, through their long involvement in the running of water-yards, most of the rural communities have acquired skills and knowledge in operation and maintenance, which can be promoted to an acceptable level through training.

5.1.2.2 UNICEF Involvement

The Non Governmental Organizations working in water development include; UNICEF Water and Environmental Sanitation (WES) project, based at El Fula. Truely WES is a UNICEF aided government project. WES activities include; drilling of slim boreholes and fitting them by hand pumps (India Mark II), construction of drainage aprons, training of village committees (in operation maintenance and management of hand pumps and in sanitation) and construction of ventilated improved pitlatrines (VIPs). WES priority target areas are those infested by Guinea worm and/or areas with no access to clean water. Each slim well is to serve about 200 people, and each village should have at least two wells, in case one fails. Successful slim wells, fitted with hand pumps are usually deeper than 30m, but not more than 80m.

Annual plans for handpump installations are formulated jointly by the relevant state departments including SWC, Ministry of Health, Ministry of Finance and Economic Planning and UNICEF, through co-signing yearly agreements which make their plans of action. WES seeks the active participation and full motivation of the communities. The targeted communities are to organize village health and water committees from males and females, then receive training on handpump maintenance, health education, and sanitation.

Out of a cost of 5 million Sudanese Pounds(US$ 3500) for the construction of a handpump in West Kordofan State, the community contributes about 30%, while the local council and the State Government contribute 10% each. The balance, in form of materials, equipment and machineries, is provided by UNICEF.

WES project office at El Fula is staffed by

* A project manager (Hydrogeologist)
* 2 hydrogeologists.
* A drilling crew.
* A hand pumps installation team.
* Handpumps training mechanics.
* 2 health education teams.
* Community mobilizers.
* 2 latrine installation teams.

* Supporting staff for administration, finance and mechanical engineering services.

With the above capacity, WES can construct yearly, up to about 200 handpumps and 3000 latrines, not with standing the community and the state government back-up support.

In collaboration with the State Ministry of Health and CARTER Centre for eradication of Guinea Worm, so far, WES project has limited its activities to distribution of water filters, water hygiene and sanitary education, to household members, in Abyei and El Meiram Local Councils.

5.2. Education:

5.2.1 Enrollment:

5.2.1.1 Base Level Public Schools:

Abyei Province is served by 28 base level public schools. Table (17). The total number of pupils enrolled at present is 8180.

Table (17)Base Level Public Schools in Abyei Province (Summarized from Appendix II Table (1)

LC	No. of Schools	No. of Pupils		Total
		Males	Females	
El Muglad	16	3288	2216	5504
Abyei	1	270	521	791
El Meiram	11	1323	567	1890
Total	28	5132	3053	8180

The major points to be drawn on enrollment at base-level schools are:-

i) Schooling distribution is greatly uneven; 62% of schools, and over 70% of the total number of pupils, are in the towns of El Muglad, El Meiram and Abyei, leaving a poor structure in the rural areas. Average class pupils is about 45 in urban areas, and 25 in villages.

ii) Except for Abyei, all hostels in the province were closed down since July 1996, following a Fedral Ministerial directive resulting in a drastic drop-out of pupils, Table (18)

iii) There existed 9 schools in Abyei in the 1980s. The 1985-88 native war displaced a large population, and schools were destroyed or occupied by the army. In 1988, 5 of the evaculated schools were re-established into one secure compound in Abyei, Appendix II, Table (1) with 1100 pupils in 1996. Presently, and for starvation problems, the number dropped down to 554; of which over 60% are displaced Dinka, 30% are Abyei Dinka, and 10% are Mesiriya and others.

iv) Hostel pupils in Abyei are fed by the Sudanese Church Organization giving dura

and other rations, however not on regular bases.

v) Schooling is nonetheless supported by NGOs schools, run by either the Muwafag or Da'wa Islamic Organizations in El Meiram and Abyei, or the Catholic Church confined to Abyei town.

Table (18)Drop-Out in Schools, Previously with Hostels.

Name of School	Pupils	
	1994/95	1996/97
Nimaten - Mixed	223	100
Agbash Kuru - Mixed	112	108
Abu Batikh - Mixed	108	48
Abu Agbar - Mixed	40	30
Fishik - Mixed	153	110
Digdeg - Mixed	189	29
Total	827	425

Source: Field Survey Datat

5.2.1.2 Secondary Schools:

Secondary schooling in the whole province is confined to only 2 schools, namely: El Muglad Boys School, 2 steams, with 340 pupils; and El Muglad Girls School, 2 streams, with 265 pupils.

Hence, roughly expressed, out of the 8180 pupils enrolled at base level schools in the Province, only about 600 pupils find the opportunity to secondary schools.

5.2.2 School Buildings

All schools suffer building inadequacies and maintenance problems. Old schools in town are built of bricks, cement blocks, or local materials stablized with mud. The majority of schools in the rural areas (over 75%) including also some in the towns are built of temporary material (wood and straw). Such buildings do not keep out rain waters neither do they ensure enough shelter from sun rays. Moreover, the buildings lack the necessary hygienic latrines to serve large numbers of Pupils. Most rural schools include teacher residences (built of wood and straw) which are hardly of acceptable level of accommodation. While most schools suffer from drastic water shortage especially in summer.

5.2.3 Furniture and Equipment:

Evident shortages in terms of furniture and equipment are experienced by most schools. Pupils who sit on benches and desks are less than 20%, mostly in towns. About 10% of pupils sit on pieces of wood or bricks; while 65 to 70% of pupils sit on plain ground, under a straw shelter. Many teachers do not have chairs and desks to sit on. A whole school may possess a small cupboard to store its total property.

Textbooks are enormously deficient in towns, and wholly absent in villages. The few available books are kept for teachers' use. Government provision of school equipment, teaching media, and stationary have stopped for the last 7 years. UNICEF provides each pupil throughout the Province with 3 notebooks which is too small for schooling needs at higher classes.

5.2.4 Teachers:

Table (19):Distribution of Base-Level Teachers

LC	Males	Females	Total
El Muglad	95	45	140
Abyei	9	3	12
El Meiram	20	26	46
TOTAL	124	74	198

Source:Field Survey Data

Judging by the number of schools and the standards to be applied, the present number of teachers represents one third of the actual demand Table (19). Besides, the number currently available is decreasing every other day. Salaries are extremely low. A trained teacher working over 15 years receives about Ls. 45,000, which is just enough to provide one meal for a single person for a month. Moreover, the salaries are not paid on time; sometimes they are several months late. In response to that, the local authorities decided on giving an incentive of Ls. 30,000, on a teachers' salary working in the province. Though approved a long time back, the payments were never made because of lack of money.

It seems that the main incentive for these teachers, to continue working is serving their communities which are mostly composed of relatives; as over 90% of the teachers in villages were born and grown up in the area. Also, their wives and families mostly belong to the local structure.

Trained teachers do not exceed 20%; with an average of 1-2, out of a total of 7-8 of teachers in a single school. Those appointed as teachers, after immediately finishing secondary school, are all untrained.

5.2.5 Nomadic (Mobile) Schools:

The idea of mobile schools for nomads is an old one, which was recently revived. Late in 1995, in collaboration with UNICEF, WSK undertook the following actions:

* Established, under State Ministry of Education, an administration unit for nomadic schools,

* chose 22 trained teachers to run the schools.
* enrolled 22 class Pupils as a first intake in the mobile school areas; and
* provided a car to survey areas and execute the project.

The Project was evaluated towards the end of 1996. Additional 30 schools were launched.

The idea is that a single teacher moves with nomads along their grazing route, teaching their children. After 4 years of mobile schooling, pupils are sent to hostel schools, to complete the remaining 4 years of the base level.

The Government provides trained teachers and textbooks. UNICEF offers stationary, a tent and a solar-energy lamp. In addition, the nomads meet the school teachers living, travel expenses and donote some animals (10 sheep and a cow) as an incentive for the teacher.

The present number of mobile schools in the province covers: 7 classes opened last years (A1-Dambaloya; Fawal; Angol; Shigai; Gerinti and Konga), and 2 added this year (Antela, and Tigil). Those opened last year have 2 classes by now, while those added this year have a first year class.

Four of these schools were visited by the mission (A1-Dambaloya; Angol; Shigai; and Tigil). Several observations may be recorded:

* Visited schools were not mobile; but fixed at places of seasonal cultivation.
* The teaching period was about 3 to 4 months, depending on travel circumstances and the rainy season condition.
* Nomads' acceptance, enrollment and support were high.
* Pupils' performance showed intelligence and strong learning desire; some walked for more than 2 hours to reach the school.
* Textbooks were absent and salaries were received late.

Despite these shortcomings, the mobile school seems to offer education for economically active nomads children. Yet, it can never be an alternate to hostels. Pupils drop-out is still huge.

5.2.6. Informal Education

Adult and women education is at minimum, confined mainly to some religious information; with illiteracy rate exceeding 95%. Informal schooling includes: mosques and churches, Quranic schools (or Khalwas); adult education; and women training centres.

Mosques are all over the province; a village may have more than two. Religious lessons are offered regularly to both sexes. Khalwas are as widely spread as mosques. Their number and intake are larger than that of primary schools. Khalwas teach koran besides elementary reading and writing. Learners are from both sexes and at all ages. Khalwa teachers are either paid directly by learners, or indirectly through spiritual curing payments and the like.

In Abyei, a Catholic church provides adult education, women textile training, sports activities for adolescents, as well as, few kindergartens. The church also supervises many of the social activities throughout the broad spectrum of displaced Christians.

Many Village schools run adult classes in the evenings, but not on regular bases. Adult learners are from both sexes, and payments are arranged with teachers. The major problem of adult education is the discontinuity; a class may start with over 409 learners and within a few weeks it comes down to less than 10.

Women activity training centres exist only in big towns (El Muglad, Abyei, and Meiram), playing only a marginal role. Women education becomes effective only through the widespread of village schools. Female teachers, at present, make about 40% of staffing.

5.2.7. Administration of Education

The State Ministry of Education is in charge of education in the 3 provinces. The Ministry has offices at the level of the 3 LCs. Curriculum, book production, and some of the training are provided by the Federal Ministry in Khartoum. Personnel appointment and salaries are decided at the state level, in coordination with the centre. Managers of education at the 3 LCs undertake the local administration and supervision responsibilities.

5.2.8. Public Participation

Education is an insured long-term human investment. Yet, in the short-run, it incurs high expenditure. Post independence governments expanded schooling and spent vigorously on it. Towards late 70s, self-help service was introduced. The government share decreased steadily since then, till it became almost confined to textbooks, and administration and salaries.

In June 1996 following, a Federal directive, a State Ministerial Decree abolished hostels in the area. The Decree stated that, the stop may be gradual, and the running costs are to be shared by the local communities. Yet, the Province authorities closed hostels at all levels instantly, which resulted in an enormous drop out of pupils.

In turn, the participation by communities gradually increased, to cover larger and more basic items. After 1990, voluntarily through social mobilization, or involuntarily through taxes, people found themselves increasing paying, for buildings, furniture, books

and equipment, and lately for teachers' cash incentives. Over and above pupils pay annual schooling fees, which differ slightly from one place to the other.

Based on field investigations, people in the area emphasized the need for enhanced schooling and showed their readiness to participate in any suggested form. Fueled by the bitterness of being themselves left ignorant or illiterate, they rated education as a second development priority after water supply.

5.3. Health.

5.3.1.Disease Situation.

Health and development are certainly inseparable. Those targeted by development activities should be in a state of health that permits them to lead an economically and socially productive life. Many health and health related problems seem to stand in the way of communities in Abyei Province to attain an acceptable health level. These problems are partly due to the effects of the civil war, the mode of living pursued in the area (settled, nomadic and displaced); as well as being part of the general deterioration in health care, which is resulting from the continuing decline in government budget and expenditure on health; as it is the case in other parts of the country.

The pattern of disease in Abyei Province, generally bears close resembalance to that in most parts of Western Sudan. Malaria is the most prevalent disease among the three categories of population. Children under 5, however, suffer greatly from diarrhaeal disease (DD). Acute respiratory infections (ARI), malnutrition measles and whooping cough are also prevalent; with high incidence among the settled and the displaced Dinka. Maternal health problems in the province included, Anaemia, high incidence of abortion Haemortages, pelvic inflamatory diseases viscovaginal fistulae; as well as, various forms of sexually transmitted diseases.

Diseases, that seemed to be more specific to the area, included a relatively high prevalence of Guinea worm infection. The SMOH (1996) estimated that, 94% of all cases of G.W. in the state were reported from Abyei and El Meiram localities. Another survey, also confirmed that, out of 38 endemic villages in the state, 25 villages lie within the boundaries of these two localities. The G.W. infection affects mainly the Dinka groups. Also viscral leshmaniaisis (Kala Azar) seemed to be a prominent feature among both Arabs and Dinka. Schitosoma Huematobium infection was mainly seen among settled gross. Although S.T.D. (sexuall.y transmitted diseases) were reported to have a high prevalence, AIDS in particular, did not seem to be a prominent feature, according to the practicing doctors in the area.

5.3.2. Health Services

Health services, in response to these problems appeared to be very deficient. There were only two hospitals in the province; in El Muglad and Abyei towns. The one in Abyei town, however, is in a very poor condition; run by a Medical Assistant (MA) and working with a capacity of a dispensary. There is also one dispensary and one health centre in El Meirarm. Regarding other community health facilities, out of the 49 PHCUs (Primary Health Care Units), only 33 can be assumed as functioning. They all suffer chronic shortage of drugs, instruments and other needed supplies. The two main displaced camps were mainly served by NG0s, providing out-patient and feeding centres services, Table (20).

Table (20)Health Facilities in Abyei Province by LC.

Local Council	Type of Health Unit			
	PHCU	Disp.	Hosp.	Health Centre
El Muglad	16	-	1	-
Abyei	7	-	1	-
El Meiram	10	1	-	1
Total	33	1	2	1

Source:Field Survey Data.

5.3.2.1 Manpower

The health manpower, to provide health care in the province, as seen in Table (21) were 187 personnel in total. More than 70% of them (134) were stationed in El Muglad locality and hospital, which is the only functioning hospital in the entire province. El Muglad hospital itself is served by two medical officers and one physician. There is no surgeon or gynaecologist in the three localities.

The majority of the population(settled, displaced and nomadic) were supposed to be served by CHWs (Community Health Workers). Over 50 of these CHWs were trained and deployed to provide health care in the three localities, on static and mobile basis. Some of these CHWs have either changed jobs, or moved north. The majority, however, remained in the area, practicing on private basis. The result of this was that, many of the established PHCUs were deserted, and nomads were left without mobile CHWS to serve them.

Table (21)Distribution of Various Types of Health Workers in Abyei Province by LC.

Local Council	Type of Health Worker						
	Drs.	MA.	H.V.	CHW	VMW	TBA	Nurses
El Muglad	3	14	2	16	6	11	82
Abyei	-	3	1	7	3	1	12
El Meiram	1*	3	1	10	2	4	5
Total	4	20	4	33	11	16	99

Source:Field Survey Data
*Expatriate.

The most important reasons, leading to this situation, included lack of supervision and support from the SMOH, as well as, poor supplies of drugs and other consumables. Another very important factor was the low salaries, these CHWS were receiving. In most cases, according to the CHWS, even these very low salaries were quite irregular. This was coupled with poor community participation. Many of the communities served by these GHWS regarded them as government employees, thus failing to understand the whole concept of the CHW.

5.3.2.2 Drug Supply

The introduction of the cost sharing policy in health care in the country, seemed to worsen the situation of health care in Abyei Province. The CHWs, MAS and nurses here, seemed to make use of the fact that, the free drug supplies, to their units have stopped, as part of the new policy. Thus, they indulged in procuring and selling drugs on private basis. Due to lack of other alternatives and high demand, these health workers started to make very large profits from this business. The business seemed to be so profitable that some health workers, originally not from the province, left their jobs in other parts of the country, to get involved in the practice of drug selling on the weekly market days in the three localities.

Drugs in these weekly village markets were displayed on tables, under the direct sun, like any other commodity. They were dispensed (sold) without even medical examination or history taking. The patient either directly asks for a certain drug, or in the best of cases, says his complaints and take away, whatever drug given to him on paying the price. In case of shortage of money, the patient may get away with half the needed course, or even one or two capsules, according to his ability to pay. By observation, drugs sold in these weekly market days, were poorly packed, poorly stored and many of them were actually expired. Our investigation also revealed, that the profits thus created encouraged other non-health workers, and mostly illiterates, to be involved in drug selling in the same way.

5.3.2.3 Immunization Services.

The health care thus provided, is clearly very deficient, and mostly curative. Regarding promotive and preventive health care, immunization services seemed to be the only component, showing any signs of activity. Immunization services were concentrated in the main three towns of El Muglad, Abyei and El Meiram. Immunization services for other villages, and especially for nomads, were either very deficient, or completely lacking.

Most of the Health workers in the area were trained on providing immunization services, as revealed by various interviews. The problem, however, seemed to be with the inavailability of vaccines, due to low storing capacity of the cold chain in the province; being comprised only of 3 solar units, one ice pack freezer, and 3 vaccine refrigerators, plus a number of cold boxes and vaccine carriers Table, (22). Inavailability of vaccines, close to nomads and settled population, outside the three main towns in the province, seemed to be a major constraint in providing immunization services for these communities.

5.3.2.4 Feeding Centres

Diarrhael diseases, as mentioned earlier, were highly prevalent among children < 5 in the province. The diarrhael disease control programme did not seem to have any out reach services for the affected population. Child nutrition activities, on the other hand, were mainly confined to feeding centre services, run by NG0s at camps level. A major problem here is that, severely malnourished children, who were discharged after rehabilitation, were sent back to their poor and needy families. Most of the time they develop the same condition and get readmitted. The feeding centres, both in Abyei and El Meiram camps, suffer occasional shortage in Unimex supplies for feeding malnourished children, lactating mothers and elderly.

Table(22)Distribution of Cold Chain Equipment by Locality, Abyei Province.

Locality	Cold Chain Equipment		
	Solar Refr.	Ice Pack Freezer	Vaccine Refrig.
El Muglad	1	-	1
Abyei	1	1	1
El Meiram	1	-	1
Total	3	1	3

Source: Field Survey Data.

5.3.2.5 Maternal Services

Regarding maternal health services, there were two health visitors in El Muglad, one in Abyei hospital and the other in El Meiram MSF clinic. They were providing antinatal care services (ANC) for mothers at town level. None of them has any out reach activity. The same applies to the eleven village midwives (VMW), 6 of whom were in El Muglad. The rest of the population were served by only 6 Trained Traditional Birth Attendants (TTBAs). Most of the deliveries thus were attended by untrained TBAs, and especially so among Dinka. This may partly explain the high incidences of abortion, sepsis Haemorrahages and viscovaginal vistulae, reported by both CHWs and community groups.

5.3.3 Health Awareness

The health problems, discussed earlier, seemed to be further aggravated by factors relating to the communities themselves. The illiteracy rate is very high among rural population of the three groups(settled, nomadic and displaced).

This as expected, is coupled with very low levels of awareness, regarding personal hygiene, modes of disease transmission, and how they may protect themselves and their children from disease. This low awareness, which favours free disease transmission, is further aggravated by bad sanitation, lack of pit latrines and the habit of defecation in the open, seen among all groups.

Regarding, their treatment seeking behaviour, many of them especially Dinka, rely on herbalists and traditional medicine. According to health workers (HWs) usually report late to medical care where found. Nomads on the other hand, live in close association with their herds. Their environment is thus quite favourable to transmission of diseases, such as diarrhaeal disease, Bovine Tuberculosis (T.B.) Kala Azar and Tetanus. The displaced groups arrive starving and harbouring many diseases, e.g. Tuberculosis (T.B) G.W. inflection, Kala Azar, DD (Diarrhaeal Disease), measles and malnutrition. Vitamin A deficiency seemed to be also a prominent feature among all groups, especially Dinka, due to poor nutrition. Scarcity of water at certain periods of the year, for the three categories of population, seemed to result in further deterioration of health. This, as seen earlier, is manifested in other problems; the high occurrence of DD, Enteric fever, skin diseases and eye infections.

5.3.4 Community Participation:

The tradition of self-help and "Nafir" appeared to be quite common, among these communities. Many of the settled communities in the past have actually built their PHCUS with local material. The key informant interviews and focus group discussions, among settled groups, revealed that there is a very good potential for revitalization of the health care, through community participation. The involvement of the community in the management of RDF, as could be volunteered by the groups, is an important safeguard

against failure of the system. Most of them believed that, the poor services and high the prices that people are experiencing now, in obtaining the service, would motivate them to support such a system.

6. Institutional Set-ups:

6.1. People's Local Government Units.

6.1.1 The 1995 Local Government Act:

In 1995, the government implemented a Local Government Act of Decentralization. The main features of the act could be highlighted as follows: referring all matters to popular circles, basing decision-making on consultation, generation and allocation of budget by LCs, promotion of self-help as a support source, and reducing the role of the executive bodies, to act as implementors of people's priorities.

Based on the act, the old "grand" administrative regions were redivided into a hierarchy of states "Wilaya(s)", provinces "Mohafaza(s)", and local councils "Mihalya(t)". The first two are entrusted with the political roles of guidance, mobilization and supervision. While the LCs in the above set up , stand as corporate bodies, charged with the grass-root role of, running people's development; including planning, expenditure on activities and community services. Within the adopted divisions, the project is presently comprised of a Mohafaza, Abyei Bahr El Arab, and three LCs; El Muglad, El Meiram and Abyei.

6.1.2. The LCs Organization :

The LC is to work towards the development of its populace, and through it as a base unit, the development of the Mohafaza and the Wilaya. The councils' organization consists of an electorate body of councilors, a number of functional committees, and an executive staff of a local government officer, administrative and financial support personnel, and some technical departments. The executive officer acts as a secretary to the council and implements its decisions in consultation with the president of the council.

6.1.3. Revenue and Expenditure:

According to 1995 Act, the LC is to generate its own finance, to run its activities. The main sources of finance in the case of the project area LCs, are animal tax, crop tax, levies on services, and other royalities. Out of the tax amount raised by the LC, 30% go to the Wilaya (Ministry of Finance) 5% to the Mohafaza and 5% in support of poorer LCs.

The experience of the last two years budget shows clearly that the LCs have been short of raising adequate finances to meet their expenditure obligations. It is just enough to

mention their continuous deficit in expending on Chapter One, i.e. salaries of the staff under the LC. Though the philosophy on which the 1995 Act was founded bears much sense, its implications on the LCs performance has been accompanied by many short-comings:

i) Poor comprehension and response to implementation of the Act by the people.
ii) Inadequate finances, for the kind of taxes assigned to the LCs, are difficult to exact and collect.
iii) Poor Planning and programme implementation for lack of funds.
iv) Low performance of social services for lack of support.
v) Flight of staff and inability to attract effective cadres.

Despite the above constraints, the LCs, as organs with people's representation, and as having a core staff of administrative and technical personnel, could be co-opted by the ARS project to provide support to its activities including; assistance in screening priorities, selection of piloting sites, mobilization of communities, use of their staff in implementing activities and securing the participation of beneficiaries.

6.2. Traditional and Modern Community Institutions:

The traditional institutions cover; the native administration set-up and those evolved by the communities within their social organization. The native administration has well developed tribal hierarchies of representation, descending from the Amir at the head of the tribe/sub-tribe, to Omdas (Sultans among the Dinkas) and Sheikhs at the middle and lower tiers, respectively. The setup draws its alligence and legal status from the tribal culture and heritage, being embodied in the structure of tribal kinship divisions. Its leadership, whatever the level, is held in high trust by followers, as representing them to the outside world. As they represent distinct population divisions, on agnatic lines, their structure could be used by the ARS Project in promoting its activities at points requiring contact with communities.

Modern institutions cover those organized under the government political system and/or created by the civil administration. The most important ones, in existence in the project area, are the People's Salvation Committees, representing one or more village, the Parents Teachers Councils and the Village Water Committees. The latter two could be off-shoots of the former. With the increased reliance on self-help, in the recent decade or two, the above mentioned organs have become largely involved in the provision and running of community services. Through practice, they have acquired to some degree, the necessary expertise in dealing with their communities, as well as, the concerned formal institutions. Though in organizing the project, representation at beneficiaries level is suggested to take place through people's free selection of their committees, the project may seek the assistance of these bodies, especially at its early stage of implementation.

6.3. U.N. Organizations and NG0s:

UNICEF is the one UN organization operating in the project area. The thrust of its intervention is in low cost water technology - slim bore-holes and hand pumps, with a sanitation component accompanying the activity. It works closely with the State Water Corporation (SWC) (See Section 5.1.2.2). It is also involved in the health programmes, through supporting immunization and drug supply and training; besides, in the area of education, mainly in mobile schools for the nomads, availing of notebooks and teachers' training.

As to NG0s, 6 of them are running programmes in the area (under the government founded Peace and Rehabilitation organization). These are, The Islamic Relief and Rehabilitation Agency (IRRA), Bir International, Sudanese Red Crescent, Mowafag, Society of Sudan Catholic Churches and MSF (France). Mention of the activities of these organizations have already come under the previous sections of the report, particularly in relation to education and health.

The ARS Abyei would not overlap the activities already undertaken by the above organizations; however, could draw from the lessons and experiences acquired by them, through the implementation of their programmes. Where necessary, especially in the case of UNICEF, the ARS Abyei would copt for its assistance in implementing the water supply, health and sanitation activities, on a Bamako initiative, as well as, in the fields of education.

7. Constraints:

7.1. General Constraints

7.1.1 The study area is remote; its southern part inaccessible during the rainy season. Overhead costs of the project could be high.

7.1.2 Support services at the project site are absent. Repair and maintenance facilities are difficult to obtain.

7.1.3 Tribal conflicts do not allow proper decision making. Pressures and influences are strong.

7.1.4 Increasing displacement of Dinka population might overset project plans and resources.

7.1.5 There is a probability of using project facilities in other political or security purposes.

7.1.6 Women Development is not rated high in community concerns.

7.2. Livestock Constraints

7.2.1 Continuous decay of veterinary services in all aspects.

7.2.2 Absence of an alerting system against epidemic and pandemic livestock diseases.

7.2.3 Occurrence of droughts, coupled with misfunctioning of water-yards, closure of Regebas affect livestock numbers and productivity.

7.2.4 War and insecurity, causing fluctuations in H/hold economy.

7.2.5 Overgrazing, resulting in still poorer pastures and low livestock performance.
7.2.6 Poverty of some Mesiriyas, Dinkas and all the displaced, reducing food security in the area.

7.2.1 Crop Farming:
7.2.2 Low soil fertility and limited areas of preferred soils.
7.2.3 The cropping system is based on a dangerously narrow genetic base, with only one predominant cultivar for each of the three main crops; sorghum, millet and groundnuts.
7.3.1. Lack of pest control measures.
7.3.2. Understaffed and inadequately equipped extension service.
7.3.3. Weak infrastructure.
7.3.4. Poor agronomic practices.
7.3.5. Inadequacies in availability conservation and management of water.
7.3.6. Increased pressure on limited resources caused by the influx of displaced people.
7.3.7. Weak research - extension - farmer linkages.

7.4. Fisheries :
7.4.1. Poor development of the activity in terms of resource use and productivity.
7.4.2. Absence of basic information on potential for development, fishing communities and marketing.
7.4.3. Poverty and lack of organization of the displaced Dinkas as an immediate constraint to the activity.
7.4.4. Inaccessibility to areas of high potential due to insecurity.

7.5. Water Supply
7.5.1. Technical Constraints
7.5.1.1 Poor coverage by water supply sources and low yielding of pumping systems.
7.5.1.2 Aging and poor design of water supply systems.
7.5.1.3 Scarcity and high prices of spare parts and fuel,

7.5.2. Managerial Constraints:
7.5.2.1 Poor and inefficient maintenance services.
7.5.2.2 Unclear and rigid SWC Policies, regarding community-based management of water supply systems.
7.5.2.3 Lack of back-up support and legislation to community initiatives and efforts, in operation maintenance and management of water supply systems.
7.5.2.4 Instability in SWC and undefined relations and roles of the parties involved.
7.5.2.5 Lack of training among communities and the LCs members, as regards, Operation, maintenance and management of water sources.
7.5.2.6 Emphasis by SWC on technical capabilities over personnel and human resource development.
7.5.2.7 Shortage in government funds and budgets, to rehabilitate and/or construct water supply sources.
7.5.2.8 Poor logistical support, particularly communication services, coupled with bad

accessibility to the area, for almost 5 months in a years.

7.5.3. Environmental Constraints

7.5.3.1 Continuous decline and spatial variation in rainfall.

7.5.3.2 Silting and earlier depletion of surface water sources, including Bahr El Arab and its associated systems.

7.5.3.3 Destruction caused by civil wars, particularly of some wateryards.

7.5.3.4 Land degradation, reduced range productivity, and biodiversity.

7.6. Education

7.6.1 Lack of budget for running the service.

7.6.2 Extremely poor and deficient infrastructure.

7.6.3 Instability in levels, caused by the abolishing of boarding houses, with high pupils drop out.

7.6.4 Acute poverty of teachers, leading to poor performance and escaping the job.

7.6.5 Lack of school books equipment and teaching aids.

7.6.6 Poor informal education with absence of voccational training.

7.6.7 Inequity in access of displaced to education facilities.

7.6.8 General preference to boys education, as compared to girls.

7.7. Health

7.7.1 Population and Environment

7.7.1.1. High illiteracy rate and low health awareness among most of the target population.

7.7.1.2. Poor community participation and involvement in solving health problems.

7.7.1.3. Poor environmental sanitation that favour free disease transmission.

7.7.1.4. Poor quality water and food scarcity, especially among the displaced.

7.7.2. Health Services and Policies

7.7.2.1 Poor health infrastructures and equipment coupled with relatively few and inaccessible facilities.

7.7.2.2 Chronic and continuing shortage of health workers of all types, especially GHW and TTBA.

7.7.2.3 Poor implementation of the cost sharing policy in services, with implications on the level of health.

7.7.2.4 Absence of supervision and support to community health services,

II. REHABILITATION PROGRAMME

II.Rehabilitation Programme.

1.Rehabilitation Strategy:

The following strategic goals were taken into consideration in the formulation of the rehabilitation programme:

1.1 Effective Targeting : as to cover the 3 identified target groups of the project area population: the transhumant, sub-grouped into Mesiriya and Dinka, and the displaced, wholly comprised of Dinkas. This entailed a balanced grouping and application of the project components in the piloting phase; with a suggested equity in the delivery of project inputs to reach the three beneficiary groups for the full-fledged programme.

1.2 Women being Reached: despite the fact that, women needs and involvement were being voiced as low by the different male communities, the programming of the project activities has accorded a high priority to improving the women situation. This is envisaged to take place on two dimensions: overall H/H improvement, and by specific targeting. Improvement of production-based activities of the H/H, in crop farming and livestock raising, and the betterment of social services; water supply, health education etc., shall enhance the current living conditions of women; while through special targeting, in areas of economic activities and mass-education; including jubraka farming, distribution of goats and chickens to the displaced, availing of credit for enterprising activities, promotion of handicrafts, midwivery service and health and nutrition education, women involvement would be further maximized. Being pursued on a flexible mechanism of implementation, the combined effect of both components would adequately meet the requirements of the piloting phase, in catering for women development.

1.3 Acting within Human/Resources Balances: though there exist clear symbiotic relations between the Mesiriya and Dinkas, in many spheres of living, well exemplified in the inter dependancies in resource uses, through the development of the grazing cycles, annually pursued; labour requirements for herding and agriculture; sharing of yearly crop harvests, especially grains for food needs; use of the same services facilities; and maintenance of security; there exist eminent development needs of each population, that, have to be satisfactorily met. Hence, initiation of development through the different formulated components, has taken into consideration, ensuring desired balances between the two populations.

1.4 Integration through Development: Acting on the internal dynamics of community relations, entailed also, other than balancing different community needs, strengthening the integration between the different communities, whenever feasible. Except for special development needs, such as for the displaced, or as dictated by resource location, e.g. fisheries, most project interventions are allocated with the aim of benefiting the elements of both communities; being under farming improvements, livestock raising, or the rehabilitation of services.

1.5 Founding Project on People's Priorities: the interventions making the formulation programme substance were reached through dialoguing with different communities, by

surveying their needs and priorities. Among the Mesiriya, the provision of water supplies for human and livestock uses, the rehabilitation of schools and health services came as the main priorities; while among the displaced, food shortage and income generation were the cited needs. The Mesiriya communities showed a high preparedness to contribute to meeting the costs of improvements in the three ranked priorities. The displaced, being mostly under an improvised situation, are only in a position to contribute their labour. Implementing the Programme, bears an unlimited scope of pushing various activities, especially with the Mesiriya communities, with the advantage of trying different interventions at different places; which could be strengthened by adopting a flexible approach of use of food for "work" with the displaced, to maximize their opportunities of involvement.

1.6 Food for "Work" Through a Flexible Stand: There is a clear food gap in the area, regarding the displaced groups. Relief food is not encouraged by the government. The displaced are currently dependent in part, for their annual grain supply, on the returns of share-cropping and farm labour earnings with the Mesiriya farmers. Outside these, wage labour opportunities are strictly limited in the Project area. For the other part of their food needs, they are actually dependent on wild fruits, namely the seeds and leaves of Balanites aegytpica. A secure and a regular grain supply is needed, in making for the food gap presently suffered by the displaced, and in preparing them for involvement in more gainful and sustainable activities; starting with crop farming. It is therefore essential to consider, in implementing the different project interventions, innovative applications of food for "work" i.e. for agriculture, in construction, and if feasible, the other indirect fields of education, training, health, etc..

1.7 Building Participative Capacities: The implementation of the various components shall be fully based on beneficiaries participation, which entails People's organization and training, leading to self-management. Participation would be fostered among the three targeted groups, as well as, women; requiring of all, contribution of resources, in form of finances, labour and skills; as to their abilities. As conditioned by the actual field situations, participation forums shall be created, on considerations of integrating the different groups together when feasible; or being realized for separate groups, if need calls for that. Effective training and monitoring by the project shall target empowering the different communities, to ensure gaining of skills and experiences and the strengthening of self-reliance; being the essentials for the sustainability of the different activities, and as basic gains by the displaced, on repatriation.

1.8 Project to be run from a centre and a sub-centre: in realization of the largeness of the project area, and the internal power structure of the different population groups, the project shall be run from a centre, chosen to be El Fuda, and a sub-centre at Abyei. Abyei is physically impossible to be selected as the project centre, for its remoteness and for being locked from the rest of the area during the rainy season. El Fuda has the advantages of being located, to some degree, mid-way within the project area, closer to those parts that need intensification of project activities; plus the presence in it, of the infrastructure of a previous agricultural development project, that could be rehabilitated to accommodate the ARS project. It is to be targeted that, through the progress of project activities, Abyei would be strengthened to emerge as of equal weight to El Fuda.

1.9 Expanding Project Activities on New Findings: the components of the Rehabilitation

Programme, so far reached, were based on the brief surveys conducted during the study, and on the available literature about the area. The current programme would be built upon, by incorporating new components through the investigation of areas and activities, of which no adequate information is available at present. At this stage three studies are recommended to be carried out, parallely with the piloting phase: the hydrological aspects of Bahr El Arab and Regabas land systems; a baseline survey of the project area, and a situation analysis of women status under the different communities. The findings of the three studies would provide essential materials for the formulation of the comprehensive programme.

2. Livestock

Within the rehabilitation general strategy, the livestock rehabilitation programme will cover the following activities:-

2.1 Rehabilitation of Disease Control Programme:

As revealed by the situation analysis, vaccination campaigns were diminished to the level of casually responding to disease reports. Annual vaccination dropped to figures of thousands instead of millions of livestock. Although livestock numbers were shown to be 1.6 million in the study area, a similar number is anticipated to appear in the area for vaccination, in case veterinary services are improved such as under the project.

A five year vaccination programme will be adequate to provide an immunity level of around 85%. During the first two years of the project lifetime (5 years) vaccination could be done twice a year, to cover the missed and unvaccinated animals. This could be easily managed through the transhumant trip south and the return north.

Cattle will be the main animals to be vaccinated against rinderpest, Haemorrhagic Septicaemia, Black Quarters, Anthrax and Contageous bovine pleuropneumionia (if made available). Sheep can be vaccinated against Rinderpest and equines against African horse sickness (if made available).

2.2.Promotion of Disease Surveillance and Disease Diagnosis Facilities:

During the Project life-time a system of well developed routine reporting, recording and diagnostic procedures should be one of the major indicators of success or failure of the project. Economic losses due to disease and disease control are tremendous. Highly selected disease control strategies are needed to reduce disease prevalence and disease outbreak.

In this respect, mobile veterinary clinics should be brought to life again. The mobile clinics help in many ways; in providing the cold chain system for vaccine storage, in availing laboratory facilities for diagnosis and treatment, and in facilitating an optimal working atmosphere, by reaching animals and people in their place. They can also be helpful in raising public awareness and for education and training through extension programmes.

2.3Training of Paravets:

Paravets training proved to be highly successful, particularly when ones own livestock is at risk. The major disadvantage of paravets is in using their training in generating commercial benefits, and denying people access to veterinary help. Increasing the number of trained herdsmen as paravets, under the close supervision of the veterinary authorities, with the application of some form of contract with the beneficiary communities will effectively reduce such disadvantages.

During the Project life-time it is anticipated that 200 paravets will be trained, supervised and put to work under community social contracts. Training will take 8-12 weeks in basic veterinary care, disease reporting and case recording. Under the project, and for the first time, women will be trained in small ruminant primary care and poultry production.

2.4Increasing Women Participation in Livestock Activities:

The role of women in livestock management is well established; however for social reasons, it has not been adequately developed. There is an increasing awareness among males, that women's role needs to be promoted.

It is feasible to provide proper training for women, to address issues of milk hygiene, milk processing, helping sick animals, particularly in birth assistance. Providing women, especially among the displaced, with small ruminants on credit is recommended to improve their wealth status and increase their income abilities. Introduction of poultry breeds (Fayoumi) (Zambian), etc.. and providing basic poultry management techniques could be a real addition.

The issue of upgrading the status of women was extensively discussed in meetings, e.g. at El Meiram and a strong support of the initiative was brought to consensus. Women leaders at locality level could be the first pioneers.

2.5Generation and Management of Revolving Funds:

Generation of community funds, possibly through Sandugs for the support of previously discussed programmes, and the ones to come, is to be seriously considered in realizing these programmes, and as a test to community commitment.

Fund raising in the veterinary profession is a simple and well practised technique. Experience has shown (from OXFAM work) that communities could be drawn to the idea, through contributing seed money, organizing the selling of vaccines and veterinary medicine, plus charging service fees that are far less than the market; which in all, shall result in the generation of a significant profit, to be used in building the fund and extending the services.

Fund formation entails realizing many essentials, including: the legal aspects and local authority approval, organization of communities, training in management; accounting, auditing and monitoring of the fund, as crucial to its sustainability. It is expected that, up

to 30% of the cost of vaccines and medicines could be raised from communities, as seed money, at the initial stage of fund establishment.

2.6.Rehabilitation of Abyei clinic, and Establishment of El Meiram Veterinary Clinic:

The Presence of an active veterinary clinic in an area ensures:

* Proper reporting of epidemics, endemics and new diseases.
* Handling of diseases in a rational manner to prevent their spread.
* Increasing government and public awareness of the serious drawbacks of livestock diseases.
* Initiation of effective measures for improving livestock performance within local conditions.

Abyei and El Meiram are of the places expected to be highly targeted by the project. The first presents a centre that shall serve the Dinka livestock and the displaced; while the second shall provide services to an admixture of Mesiriya, Dinka and displaced. Besides, there is a high level of community awareness and participation in El Meiram, as compared to the other parts of the project area.

2.7 Improvement of Livestock, Through Introduction of Better Local Breeds:

It was difficult to believe that with these tremendous livestock numbers, milk is scarce and expensive even within the household consumption needs. Mesiriya and Dinkas are similar in this respect.

Market demands, on the other hand - national and international have shifted to quality instead of quantity. Young, healthy fat animals create a better demand and a better price as well. Discussion with livestock owners revealed the need for such better animals. While touring the area, Kenana breeds were seen along the road and some Fresian blood was observed.

Such activity cannot be left to whatever opportunities available to the breeder, in absence of awareness of the advantages/disadvantages of introducing new breeds without necessary precautions. From discussions with different groups, there appeared three possible lines of action, that can be adopted in livestock improvement:

* To start with Kenana and Butana bulls, to produce more milk and to eliminate small size Nilotic breeds.
* To encourage the already starting cross-breeding of local sheep with Hamar desert sheep.
* To introduce donkeys from the North to improve the local breeds.

It does seem logical and practical to start with indigenous breeds that can tolerate the environmental and management conditions prevailing in the study area. In this respect, and within the same activity, the project should encourage annual animal shows, to the level of providing real incentive, to enhance local selection of better breed lines.

2.8. Identification of Information Gaps and Research Needs:

Information system building and documentation is still at its infancy, nationwide. Many intelligent efforts and initiatives have been made through years, while most of new ideas are repetitions of the past trials of success and failure.

It is hoped that the rehabilitation programme will provide updated information about the trends of people priorities their contribution and their future expectations in the fields of pastoralism and associated livestock activities. Social, environmental and disease patterns change considerably in time, magnitude and effect on society. The project shall provide an opportunity to address the real problems of people and to suggest at large future research needs.

3. Crop Farming

3.1 Introduction of New Crop Varieties:

New improved crop varieties shall be introduced into the cropping system to diversify production, increase productivity, improve food security and household income. The varieties suggested are:

a)	Sorghum	:	Yar Washa, Arous El Rimal (1513444) Wad Ahmed
b)	Groundnut	:	Sodiri
c)	Cowpea	:	Ein El Ghazal, Dahab El Qoz (especially for Jubraka)
d)	Sesame	:	Zira'a 7.

3.2 Agumentation of Manual Labour with Partial Mechanization:

Suggested improvements in this area shall impact on increasing the acreage cultivated, reduce cost of farming, improve farming practices, enable application of improved soil moisture techniques and possible expansion into compacted soils. The above could be realized through:

a) Equipment: introduction of animal-drawn implements: Nuba hoe/Masra plough, and seeder.
b) Soil water Conservation: utilize the new researh-developed technology of chisel ploughing and contour bunding, to improve the physical properties of "Gardud" and other types of compacted soils.
c) Provision of small scale diesel-operated threshers for groundnut and cereals.

3.3Improvement of Soil Fertility

This shall be realized by shortening the rest period required for Qoz soils and restore fertility through the application of phosphorous fertilizers at the recommended rate of 64 Kg,/feddan, side-banded or incorporated before or at of planting.

3.4 Enhancement of Farming Opportunities of Displaced:

The food shortage currently experienced by the displaced is in effect a result of their limited access to land, to farm. Being dispersed within the Mesiriya Dar, are without rights to own land. Those few among them, who rent land or the majority who practise share-cropping/working as wage labour, end up not producing enough to feed their families. One possible alternative for improving their farming situation is to give them access to semi-mechanized blocks, in the Southern parts of the project area. In case land issues arise, these could be resolved by the concerned LCs. A start could be made by rehabilitating the two tractors at Abyei, already availed to two of the Dinka Amirs, who attempted to work on the same idea last year; with the provision of two new tractors, with accessories.

3.5 Pest Management:

This is to be approached by implementing:

a) A programme for monitoring and controlling Quelea, to be developed through a co-operative effort between MOAAR and the Federal Ministry of Agriculture and Forests.
b) Provision of seed dressings for the major crops.
c) In cooperation with ARC to launch a striga control programme to implement the package developed by ARC. The package comprises resistant varieties, herbicides, and cultural practices.

3.6. Promotion of Horticultural Production

Horticultural production is essential for developing the project area; with potentials in rain-fed vegetables and under irrigation. Other than agumenting food supply, it provides alternative sources of employment and income, including women. Abyei and El Meiram LCs have the resources, where the activity could be promoted. Two interventions are proposed:

a) Rehabilitation of the nursery at Abyei and establishment of a new one at El Meiram.
b) Utilization of the services of a national consultant to conduct a detailed study of the potential and economic viability of irrigated horticultural production in the project area.

3.7 "Jubraka" production system :

Promotion of this activity, shall be based on conducting a comprehensive study of the "Jubraka" production system in the villages covered by the project, with a view of providing information on:

a) The actual contribution of the "Jubraka" to the household food needs.
b) The agronomic practices followed in establishing and managing the crops in the Jubraka and the reasons for adopting particular practices.
c) Preferred crops and characteristics of varieties.
d) The role of women in the system.

For the coming season, and while the above study is in progress, selected "Jubrakas" would be provided with seeds, of early maturing varieties of field crops and vegetables, and phosphorous fertilizer for observation.

4. Fisheries

The rehabilitation programme aims at promoting subsistence and artisal fisheries and does not address the commercial sector. Its primary objective is increasing fish production and consumption in the area, and improving the income of the population, especially the displaced groups. This will be done through:

4.1Establishment of a Fisheries Development Centre (FDC) at Abyei:

The proposed centre shall provide a focal point for orgainzation and training of fishermen; extension and marketing activities. It will also house a store for gear and equipment to be made available to fishermen groups on a revolving fund basis, as well as, the establishment of dried fish storage.

Basically; the FDC will have facilities for demonstration, new boats and gear, and for short training courses on the use and maintenance of making of nets, as well as handling and storage of fish. The centre will also provide a control point for fishing activities, as well, rendering marketing services. This will be carried out in collaboration with the other activities of the ARS, which shall be housed at the same centre (in capacity of project sub-centre to proposed El Fuda).

The FDC will be headed by a manager and one master fisherman. The manager would preferably be a graduate of University of Juba (Natural Resources, Fisheries) seconded from the Fisheries Administration, or appointed directly to the project. He will be responsible for training, as well as, the management of the Revolving Fund, sale of equipment, chanalization of marketing, etc..

4.2. Fish Landing Stations :

The programme will endeavour to establish fish-landing stations. The start ones will be such located, as to enable demonstration of trials, generation of results, and monitoring of activities, to serve objectives such as conservation of the resource and chanalization of the trade. The other stations will gradually be commissioned, depending on the performance of the earlier ones. It must be remembered that, most fisheries activities defend on retrospective performance. The present project does not lean on past records in the area, since none exist.

4.3 Development of Linkages:

The programme will cover a wide geographical area and involve a number of entities. Organizational aspects will be of critical importance. At this point in time, both the Fisheries Administration and Fisheries Research do not have any form of existence in the State. Linkages need to be developed with the Fisheries Administration, in an advisory capacity, especially at the early stage of programme implementation.

4.3 Water Supply

Activities to be undertaken under the water supply component include the following :-

5.1Rehabilitation of Water-yards:

Rehabilitation Of wateryards is composed of the following activities:-

5.1.1. Technical-assessment of the water-yards to identify their rehabilitation needs and the feasibility of rehabilitation (Cost/benefit).

5.1.2. Physical rehabilitation of wateryards, including fencing, on new design and layout, which is to be based on: daily water demand at peak months; maximum number of users (humans and animals), productivity of the water-yard; accessibility in terms of water collection, time and facilities; and improvement of sanitation and environment.

5.1.3. Involvement of communities to undertake physical rehabilitation activities, with facilitation of the project. The role of communities should be maximized to create a sense of ownership.

5.1.4. Mechanical rehabilitation of water-yards based on the actual conditions of the mechanical units, and other facilities in the water-yard compound. According to available information based on SWC records, the current mechanical rehabilitation needs can be summarized as follows:-

	Rehabilitation Work	Number of Sites
i.	Desilting	13
ii.	Construction of pump houses	10
iii.	Civil works (pump foundation)	10
iv.	Replacement of working barrels	10
v.	Replacement of Lister engines	5
vi.	Welding, cleaning and painting of tanks	10
vii.	Installation of taps, filling benches and troughs	24

A list of these sites (water-yards) and their mechanical needs is shown in Appendix II Table (2) .

The project is to coordinate with SWC the implementation of mechanical rehabilitation. SWC would also take the responsibility of training the Village Water Committees (VWCs) in the mechanical aspects of water-yard running.

5.1.5. Formation and Training of the VWCs with The Objectives of:-

i) Increasing the skill and capacities of the communities in operation, maintenance and management of their water-yards in a sustainable manner.
ii) Improving environmental and hygienic conditions of the water-yards.

5.1.6. Training Substance :

i) General topics to cover aspects of community-based management, mobilization, problems identification, importance of improved water supply system and relationship between water, sanitation, disease and environment.
ii) Managerial topics to include: introduction to management, plans for minor repairs, book-keeping, accounting and auditing systems, principles of water cost recovery and development of rules and regulations.
iii) Technical topics including : principles of water-yards technology, potential problems of the water-yards, performance of minor repairs, and implementation of physical rehabilitation,

5.2 Establishment of Revolving Funds for Depot of Spare parts.

The project will facilitate and participate with the LCs in providing the initial (seed) capital for the establishment of revolving funds for creation of depots of spare parts to be availed on cost. Technical specifications of the spare parts remain the responsibility of SWC. The project and the LCs will develop the management and the administration procedures for storing and issuing of spare parts, which would be replenished continuously on revolving basis. List of the spares is given Appendix II, Table (3)

5.3 Drilling of Slim Boreholes Installed with Hand Pumps:

In Abyei and El Meiram Rural Councils, Guinea worm prevails. Local communities and the displaced have no access to potable water, while depth to ground water (about 35m) permits drilling of slim-boreholes installed with hand-pumps. This should be preceded by hydrogeophysical investigations, to explore feasibility of the sites for construction of hand pumps. So far, about 50 villages (sites) in Abyei and El Meiram Rual Councils have demanded construction of hand pumps, with readiness to contribute to the cost.

As WES project is mandated to construct hand pumps, and has developed a considerable technical expertises in this respect, the project is to integrate its activities with that of WES project. The two projects can co-sign a working plan.

5.4 Development of Surface Water Sources

Development of surface water sources, mainly for livestock and to a lesser extent humans; to include the following:

5.4.1 Rehabilitation improvement of clay depressions, mainly by desilting and control of sands advacement. Improvement of these depressions requires fencing and utilization of solar engines for pumping water from the source into troughs.

5.4.2 Construction of small capacity Hafirs (7000 M3) employing food for work. Such hafirs are needed at places of high agricultural production and livestock concentration with little access to drinking water. Feasibility of this approach can be assessed during the piloting phase.

5.4.3 Formation of an earth moving unit, to promote surface water sources. The LCs and the Ministry of Engineering Affairs have explicitly expressed their readiness to contribute significantly to the formation of such unit.

5.4.4 Conducting of hydrological and environmental studies of Bahr El Arab and associated systems, to be initiated during the piloting phase.

5.4.5 Promotion of Hygiene and Environmental Sanitation

5.5.1 Establishment of nurseries, annexed to the rehabilitated water-yards and hand pumps, utilizing the spill water.

5.5.2 Conducting of water hypiene and environmental education at villages, houses, and schools.

5.5.3 Construction of ventilated improved pitlatrines (VIPs) at a number of houses in the villages and the displaced camps.

6. Education:

In order of priority, the rehabilitation programme would look into the followings : eminent school buildings, furniture and equipment, pupil hostels and teachers' sustenance and training. In connection with mobile and informal schooling, improvements are to take place by addressing the existing gaps.

6.1. Eminent School Buildings

The programme cannot target supporting current needs for buildings, through allocation of direct expenditure funds, for the needs would, ineffectively absorb any support made, without achieving substantial results. Since education provision comes as a second priority in community needs, the programme can only aim to assist communities to organize themselves, prioritize their needs, and generate their own resources; through village Sandugs, to continually improve the schooling system, including buildings.

Luckly, a local experience in this regard is already at work. The headmaster of Munnawara School had to find money sources to build the school and improve the service. He organized collection of groundnut seeds from pupils' parents, and with the help of the village community and teachers through a Nafir, they succeeded in cultivating a farm of groundnuts. From the proceeds of farming, they founded a grocery and a bakery, now belonging to the school; and on their profit they built an office and two classrooms.

Assisting in setting up such programmes, would guarantee continual support to schools buildings, furniture, and equipment; also and perhaps more importantly, keep teachers in the job, through some additional payments from the Sandugs. Some initial capital from the project may be needed to organize one or two examples during the piloting phase.

Nevertheless, the persistent deficit in LCs budgets, and their failure to provide the simplest and most prominent needs, such as textbooks and teaching aide, makes WKS financial support to the LCs, in the area of education, as inevitable.

6.2 Pupil Hostels

Owing to the drastic pupil drains, establishing some form of a self-help hostel is a basic need. The drain is mainly due to the sudden abolishment of hostels. The recommendation, in this regard, is to assist establishing one hostel in a settlement on one of the transhumant migratory routes, and one in a displaced Dinka camp, through the participation of communities and ~ LCs; to demonstrate the change effect in school performance, under good pupils accommodation; so that other communities would see the difference and adopt the idea.

Fortunately, Nimaten School had already a similar projects which is working nicely. 34 pupils are currently living in a self-help hostel, paying half the cost of food, through individual shares in kind; with the LC Education Administration paying the balance. Future contribution by pupils may also take the form of payment in animals, to cover the cost of other schooling items as well.

In areas of displaced Dinka, particularly Abyei, hostels are still functioning, but without a secure source of food. The Society of Catholic Churches helps in making provisions, however, not regularly. For the special circumstances of the area, Abyei hostels need to be assisted, possibly and (if it makes sense) through food for learning. Something also has to be done about the curriculum, in order that schooling becomes more compatible with local cultures.

6.3. Mobile Schools

These are operated without hostels, for pupils are supposed to be on the move with their families. Yet, hostels are a condition for the continuation of pupils education after the 4th. year. So far, there exist no plans to address this issue. Under the current situation, the experiment of mobile schools needs to be assessed, before considering any form of assistance.

6.4. Teachers Training:

Experience in other areas (e.g. South Kordofan, North Darfur, Kassala and other states) shows that a number of organizations, such as UNICEF and some NGOs have supported programmes of teachers training, with LCs, contributing to the cost. This same formula may be called for here, but profound questions arise.

It was already reported that, trained teachers do not exceed 20% of the available staff, mostly graduates of intermediate and secondary educational institutes, which train in methods of teaching, rather than deeper subject information. Training, as such, was designed for teachers to work on 4-year and 6-year primary schools (before 1971), and (after the 1971) respectively, following the change in the national educational ladder. Since the Base Level now (after 1993) is of 8-year duration, subjects to be taught at the 7th and 8th levels need a new teacher training styles, which may best be provided, for a year or 2, at the Faculty of Education, Dilling University. Yet, this issue seems to be a too early concern compared to the need for some adhoc training, and equally keeping the teachers on the job through improved payment, even being untrained.

6.5. Informal Education

Throughout the Mesiriya villages, and among some of the displaced Muslim Dinkas, Khalwas play a big role, and have to be encouraged. All ages, males and females are accepted, though most are at an early schooling age. They also enroll adults and many of the school drop-outs. Being traditional institutions of high acceptance, they warrant

being supported through organization of revolving funds, similar to those proposed for schools, to secure food for learners and maintain their continuity.

For the displaced non-muslim Dinkas, the alternative are the Camboni Catholic Schools, with the Society of Sudanese Churches Providing for their running. However, the magnitude of the situation needs bigger funds than the society could afford. Somehow, through capital Support, "food for learning" and organization of revolving funds improvements can be brought.

The lacking behind of adult education, including women, through maintaining reasonable classes is basically due to the poor structure of schooling. This can be upgraded, once school performance is improved and teachers' needs are satisfied.

Women training centres are lacking, and those that exist, serve only a small number of urban women. If women development is ever seriously targeted, it should be through enhanced village schooling. Female teachers at villages are close to 40% of the present teaching staff. Some activities like literacy classes, mass education and home-economics could be attempted through them.

7. Health

The main areas of rehabilitation would address: .the low population health awareness and poor community involvement in improving their own health; the seriously deficient community health services, with many PHCUs deserted, and most CHWs either left the job or indulging in mal-practice; the severe shortage as well as, mal-distribution of trained birth attendants and other health cadre; and the appropriate approaches through which health services may respond to the differing needs of the population. All to be tackled, with due consideration to the existing health policies, namely PHC and Health Area policies, to which both FMOH and SMOH are highly committed.

7.1. Training of Community Based Health Providers

Three main categories; CHW, TBAs and VMWs. should be considered here:

7.1.1 CHWs, as indicated, would be in need of refresher training. A one month refresher course, focusing mainly on promotive preventive health, and rational drug use will be adequate. The training which may take place at El Muglad should be done in phased rounds.

7.1.2 TBAs training programme should be designed to avail this important health worker. The target should be one TTBA for each 2000 population. Age, stability in the community, as well as, past experiences as TBA should guide the selection. The training which can take place at El Muglad may benefit from UNICEF experience in this field.

7.1.3 Village midwives (VMW) who are expected to extend better maternal and child health cares, compared to TTBAs, should also be made available. The target

should be one VMW for each 4000 population. The training should take place at En Nuhud Midwifery School. Selection, which would be done through full community involvement, may include criteria such as; age, literacy, willingness to work, and stability in the community, National MCH Dept. supported by WHO, UNICEF provide full assistance to such courses. The local councils and concerned communities contribute to the cost of the training.

7.2 Setting up Revolving Drug Funds (RDP):

Regular supply of relevant and effective drugs, at affordable prices, will improve health status and health practices, as well as, help in regaining of community confidence in their health units, The module envisaged, consists mainly of setting up of a revolving drug fund, for each PHCU, to which the community would be contributing and closely managing. The main features of RDF may comprise:

7.2.1 Determination of types of drugs and quantities for each PHCU; this is already determined by the PHC department.

7.2.2 Collection of drug requirement for each PHCU; can take place in Rigl El Fula and later on at El Muglad, El Meiram and Abyei.

7.2.3 Availing the seed money to start the fund; communities here may: a) get the first drug kit as donation, e.g. from B.I. Programme or any NGO. b) use community shares.

7.2.4 Setting of drug prices at village level; to be fixed by the VDC; taking into consideration PHCU running and RDF administrative costs.

7.2.5 RDF management; this is mainly a VDC role. It should include all aspects of revenue collection and expenditure.

7.2.6 Community Mobilization; to be undertaken by the CHW and UDC members, through community orientation, which may include rational drug use and drug prices at village level, which is to preceed the RDF implementation.

7.2.7 Training Requirements; including a short 2-3 days training of the CHW and two VDC members from each PHCU, on RDF financial management and rational drug use.

7.2.8 Measurement of output; to be done in terms of drugs availability and smooth functioning of RDFs in various villages, as well as, community perceived quality of care.

7.3. Improving Environmental Sanitation

The focus would be here on safe human excreta and disposal, and refuge collection. The progrgmme should start by targeting settled communities and camp residing displaced Dinka. The main programme interventions may include :

7.3.1. Ventilated Improved 'Pit Latrines (VIP):

The target would be one VIP for each household. This should be implemented on participatory basis with the concerned community. Assistance of UNICEF may be vital in this activity. Food for work may be used to motivate very poor families, especially among displaced Dinka to participate. The Output may be measured in terms of percentages of households with properly used VIPs.

7.3.2 Donkey-Cart Refuge Collection and Disposal

A donkey and a cart would be made available for each village, through local councils, or community donations. Under the management of the VDC, each, household will be charged a fee for the service. This should meet the systems running cost.

7.3.3. Mobilization and Community Education

This may comprise messages on the role of VIP and refuse collection, in disease prevention, as well as, proper use of VIP. Such messages may be communicated through the existing CHW. The output may be measured in terms of number of education sessions held per month for each PHCU.

7.4. Feeding Centres Activities:

The severely malnourished children, when discharged in good condition, would return for admission due to poor family conditions. Efforts should be coordinated with other programme components, towards improving the living and working conditions of the displaced families to break this vicious circle.

7.5. Improving Immunization Services:

Efforts would focus here, on increasing the cold chain storing capacity at community level; thus bringing the vaccines as close as possible to them. Experience have shown the practicability of using solar units in this area. Careful selection of certain sites for solar units installation should be done. Manpower to man these units may be trained, through EPI authorities (KRT). The solar units procurement may be coordinated through EPI (KRT) and UNICEF. The output may be measured as increase in the immunization coverage levels for these areas.

7.6. Rural Hospitals in the Province :

The importance of establishing an operational rural hospital in each of the three LCs cannot be over-emphasized. El Muglad hospital will not be able to cope with the expected increase in demand for hospital care, following, the revitalization of the community health services in the Province. Possibilities for establishing other

functional rural hospitals include Abyei and El Meiram towns. Abyei should be targeted first.Efforts and support, already extended to this hospital, by MSF (France) should be coupled with additional efforts from the SMOH, through UNICEF and other NGOS in the area. The target should be to establish a hospital with an operation theature, capable at least of performing Life Saving Surgical Emergency Service, e.g. caeserian section, appendixectomy, laboratory, etc. El Meiram Health Centre run by MSF (France) may be upgraded in the future to a rural hospital.

The establishment of at least one hospital in each of the three local councils, will facilitate very much the implementation of two most important health programmes, namely; the Health Area and the B.I. programme in the province. Funds, as well as, technical assistance and support to these two programmes are already available, through FMOH/WHO and UNICEF. These rural hospitals would also act as basis for mobile clinic services, as well as, for supervision and support to all health services in the three local councils.

III. PILOTING PROJECT.

The Piloting Project:

1. Targeting :

1.1. Summary :

Guided by the content and approaches of the rehabilitation programme, a summary Chart (I) was prepared, giving project activities, targets and siting; embracing 27 interventions, supported by explanatory tables, diagrams and maps, given as appendices.

1.2. Scope of Project :

The activities recommended were reached on considerations of :-

i) Triability of identified project components.
ii) Coverage of 3 different groups, settled transhument and displaced.
iii) Addressing community basic needs and Priorities.
iv) Testing the potential of community participation and self-management.
v) Building on what exists in terms of resources and expertise.
vi) Integration of activities on same sites, wherever feasible.
vii) Streamlining of support inputs from different sources; project assistance, agencies and organizations working in the area, LCs and beneficiaries.

1.3 Selection of Piloting Sites :

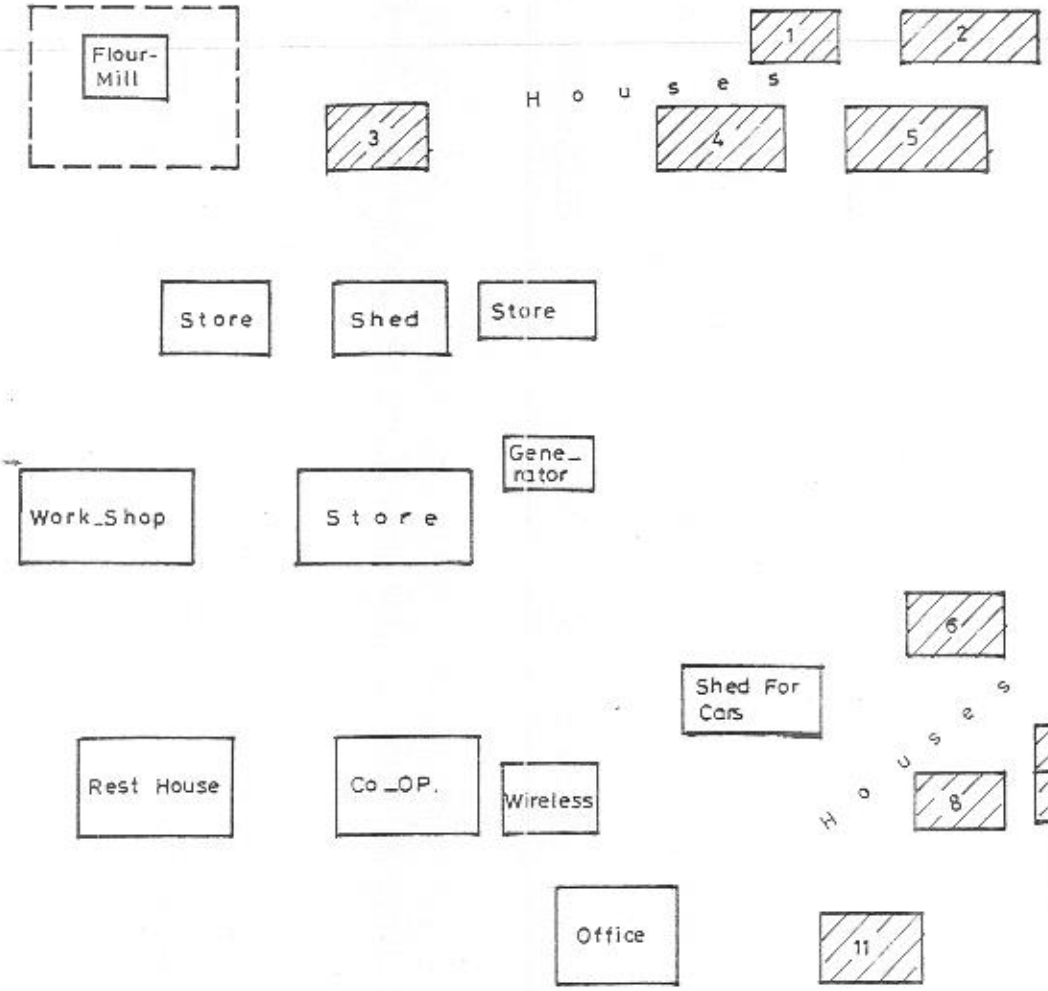
The project piloting sites Fig (1) were selected on the following criteria:-

i) A high need for assistance, across different components.
ii) Ecological diversity, modeling and representation, i.e. settled/displaced; males/females; Qoz/semi-mechanized, fisheries, established herds/small ruminants; water-yards/Hafirs/Slim wells; PHCUS/Immunization; School buildings/teachers training, etc.
iii) Preparedness of communities to participate.
iv) Already acquired experiences, and ongoing trials.
v) Integration of activities by site.

1.4. Project Headquarters

Chosen to be El Fuda on the recommendation of West Kordofan State authorities and suitability of sites, Fig (7) to be read with Fig. (1). The proposed intervention sites could be mainputlated on implementation, on considerations of distance and accessibility, for effective project management as dictated by field conditions.

Fig.(7) Proposed El Fuda Centre
A Sketch of Existing infra_structure



SOME EXPLANATORY NOTES._

a) EL FUDA VILLAGE

- Has 70 Houses.
- 3000 Population in Village and surroundings.
- One Basic Mixed School.
- A Health Care Unit.
- A Mosque.
- 8 Shops.
- Two Meat Shops.

b) DITANCES AND TRAVEL TIME TO SOME CITED CEN

	Km.	Hours
• El Fuda __ El Meiram.	30	1
• El Fuda __ El Muglad.	70	2.5
• El Fuda __ Abyei.	150	5
• El Fuda __ El Siteib.	30	1
• El Fuda __ El Mugadama.	50	2
• El Fuda __ El Dabadib.	100	3
• El Fuda __ El Dambaloya.	150	5

c) EXISTING INFRASTRUCTURE OF PREVIOUS AGRICULTURAL PROJECT

- 11 Staff Houses. (6 Need Maintenance).
- One Rest House, (Needs Maintenance).
- One Office Complex. (Needs Maintenance).
- Wireless. (Operating).
- Generator. (Operating.
- One Workshop. (In Good Shape).
- Three Stores (In Good Shape).
- Two Sheds (In Good Shape).
- Water Supply is obtained 14 Km. away by Tractor and Trailor.

1.5. Project Organization :

The project shall be implemented by two co-ordinating committees and a management staff.

1.5.1. Steering Committee, with representation of:

* UNDP
* National Execution Management Support Unit(NEX MSU).
* West Kordofan State.
* Project Management.

1.5.2. Advisory Committee, with representation of:

* West Kordofan State Minister of Agriculture, as Chairman
* Administration for Planning and Development(WSK) as Secretary
* Commissioner, Abyei-Bahr El Arab Province.
* Executive Officers 3 LCs
* Line Departments.
* Un System and NGOs in area, as observers.
* Project Management.

1.5.3. Project Management :

To be constituted of:

* Project co-ordinator: agriculturist/livestock specialist Cum extension/rural Sociology/ community development.
* Extensionist with training in PRA.
* WID Worker.
* Fisheries Officer.
* Administration/-finance officer.

1.6 Project Inputs (To be costed) see Chart (I), Covering also:

i) 4 Toyota Land cruisers.
ii) Maintenance of buildings at El Fuda.
iii) Project shall use available radio-phone and diesel generator at El Fuda.

1.6.2 Livestock :

i) Vaccines and medicines.
ii) Veterinary Supplies and Maintenance.
iii) Purchase of mobile clinics.
iv) Purchase of small ruminants and chickens.

v) Training of para-vets.
vi) Technical Support and monitoring.
vii) Laboratory testing.
viii) Programme support.
ix) Capacity Building
x) Transport; clearing and forwarding.

1.6.3 Crop Farming:

i) Improved seeds.
ii) Animal Traction Implements.
iii) Chisel Plough.
iv) Purchase of two tractors.
v) Rehabilitation of two "Amirs" tractors.
vi) Purchase of Phosphorous fertilizers.
vii) Support to Queala control.
viii) Development of Abyei and El Meiram Nurseries.
ix) Support to Jubraka Farming.

1.6.4 Fisheries:

i) Centre Development.
ii) Planked canoes (Sharoaks).
iii) Nets.
iv) Nylon twine and accessories.
v) Handling equipment (empty barrels, Knives, rope, salt, etc..).

1.6.5. Water Supply :

i) Rehabilitation of water-yards; fencing, mechanical rehabilitation, etc..
ii) Support to spare-parts store.
iii) Construction of Hafir, design capacity 7000 M3, with food for work provided.
iv) Drilling of 10 Slim-wells, with installation of hand-pumps.
v) Support to hygiene, Sanitation and environmental education.

1.6. 6. Education :

i) Assistance to rehabilitation of schools.
ii) Assistance to people's run hostels.
iii) Support to teachers training and salary topping.
iv) Assistance to provision of school furniture, books and teaching aids.
v) Support to Khalwas and Camboni classes through food for "learning".

1.7. Health

i) Assistance to rehabilitation of community health services (List of equipment and medicines, Appendix , Table 4, 5, 8 & 6).
ii) Assistance to training of TBAS.
iii) Assistance to running of mobile clinics.
iv) Assistance to immunization coverage.
v) Assistance to rehabilitation of Abyei hospital.

Chart 1 **Summary of Activities, Targets and Siting**

Component		Piloting	Target	Siting
1. Livestock Raising	1.1	Rehabilitation of vaccination programme	Transhumant Mesiriya and Dinka (1 million heads of cattle).	Rainy season - Ajaira Qoz.
	1.2	Monitoring of animal diseases	Transhumant, Mesiriya and Dinka.	From Rehabilitated Abyei and Meiram Veterinary clinics, and mobile vaccination teams.
	1.3	Establishment of Revolving Funds.	Transhumant, Two sub-tribal groups, one Mesiriya, the other Dinka.	Rainy season encampments and/or migration routes.
	1.4	Distribution of small ruminants.	200 displaced Dinka women.	To be selected from villages reached by other piloting activities.
	1.5	Opening of fire-lines.	Mesiriya transhumant.	Part(s) of Qoz, most susceptible to fire.
2. Crop Farming	2.1	Distribution of improved seeds.	120 Mesiriya and 120 displaced Dinka farmers.	40 farmers each, Dibab, El Mugadama, El Sitteib.
	2.2	Animal traction trials.	60 Mesiriya and displaced Dinka farmers of above 120.	20 farmers each, Dibab, El Mugdama, El Sitteib.
	2.3	Application of chisel ploughing and contour bunding on Gardud soils.	60 Mesiriya and displaced Dinka farmers, rest of above 150.	20 farmers each, Dibab, El Mugadama, El Sitteib.
	2.4	Application of Phosphorous fertilizers.	Same 120 Mesiriya and displaced Dinka farmers.	Dibab, El Mugadama, El Sitteib.
	2.5	Introduction of tractorization to develop semi-mechanized farming.	200 displaced Dinka plus some Mesiriya farmers.	Abyei, Umm Balayel.
	2.6	Queala control.	Cropped area in 3 LCs.	Emphasis, Dibab, El Mugadama, El Sitteib, Abyei, Umm Balayel.

Component		Piloting	Target	Siting
	2.7	Improvement of Jubraka farming.	100 farming women, Mesiriya and displaced Dinka.	Dibab, El Mugadama, El Sitteib, Umm Balayel.
	2.8	Development of horticulture.	30 farmers, males and females.	Abyei, El Meiram, with development of a nursery at each.
3. Fishing	3.1	Fisheries Development Centre.	60 Fishermen, operating from 10 fish landing stations, 6 each.	Abyei, Bahr El Arab system and Regab areas.
4. Water Supply	4.1	Rehabilitation of water-yards.	Settlements with water-yards supply.	a) El Mugadama, 15 thousand host, 20 thousand displaced population. b) El Sitteib 9 thousand host population, 7 thousand displaced. c) Umm Balayel, 9 thousand displaced plus transhumant Mesiriya.
	4.2	Construction of one Hafir.	Population to be provided with water by Hafirs.	Tadama, 5 thousand host, 4 thousand displaced population.
	4.3	Drilling of slim wells and installation of hand pumps.	Populations dependent on contaminated water sources, with high infestation of Guinea worm.	10 sites in Abyei LC, estimated 20 thousand population, mostly displaced.
	4.4	Establishment of a spare-parts store.	Water-yards maintenance and management, through beneficiaries contributions.	El Mugadama, El Sitteib, Umm Ballayel.
5 Education	5.1	Self-help rehabilitation of school buildings.	Base-schools, through village Sandugs, support to gainful activities initiated by the people and using food for agriculture and food for learning.	Nimaten, Munawara, Dibab, Abyei.

Component		Piloting	Target	Siting
	5.2	"Peoples" run pupil hostels.	Base schools, through village Sandug, support to gainful activities initiated by the people and using food for agriculture and food for learning.	Nimaten, Munawara, Dibab, Abyei.
	5.3	Teachers training and salary topping.	Untrained Base schools teachers; starting with a round of 40 teachers, through project assistance, LCS support, village Sandugs.	Selected from 3 LCs schools, including untrained teachers from Niamten, Munawara, Dibab, and Abyei.
	5.4	Provision of school furniture books, and teaching aids.	Base schools, through village Sandugs, LCs support, project assistance, and organizations operating in area.	Niamten, Munawara, Dibab, Abyei.
	5.5	Activiation of informal education through Khalwas and Camboni classes.	Pre-school children, drop-outs and adults, through support to community gainful activities, food for agriculture and food for learning.	Niamten, Munawara, Dibab, Abyei.
6. Health	6.1	Rehabilitation of community health services.	PHCUs, through physical rehabilitation, by several communities, provision of equipment by project, setting up of drug revolving funds.	El Fuda, El Munawara, El Sitteib, Umm Ballayel.
	6.2	Training of TBAs.	24 TBAs, trained in 2 rounds, at El Muglad Nursing School, chosen from the 3 LCs.	TBAs from El Munawara, El Sitteib and Umm Ballayel to be included.

Component		Piloting	Target	Siting
	6.3	Running of a Mobile clinic.	Transhumant and gatherings at weekly markets, utilizing mobility of veterinary clinic.	El Mugadama, El Munawara, Dibab, El Dambaloyia, El Sitteib, Umm Ballayel.
	6.4	Improving Immunization services.	Better Immunization coverage in 3 LCs.	El Mugadama, El Munawara, Dibab, El Dambaloyia, El Sitteib, Umm Balayel, to be covered.

APPENDICES

APPENDIX 1

PERSONS MET

List of People Seen.
(Arranged Alphabetically)

	Name	Institution
A.	**KHARTOUM**	
1.	Bakheita El Tahir	Bamako Initiative Programme Coordinator.
2.	Katherine Awate	Health Section/UNICEF.
3.	Hamza Omer Hamza	Deputy Director, EPI.
4.	Hassan Khidir	Health Section/UNICEF.
5.	Mujica, F.	UNICEF, WES Project Coordinator.
6.	Rugaya A. Yagoub	Emergency Section/UNICEF.
7.	Sayed Mohi El Din	Health Area Implementor Coordinator.
B.	**EL OBEID:**	
1.	Abdel Bari Hassan	UNICEF.
2.	Ahmed Obeid Alla	S. Minister of Agriculture.
3.	El Gilani A. Abdalla	El Obeid Agricultural Research Station.
4.	Faysal	Animal Production Department (El Obeid Agricultural Research Station).
5.	Faysal Jumaa	Planning Department North Kordofan.
6.	Hamdoon M. Tiea	Dean, Faculty of Education, Kordofan University.
7.	Ismail El Rahil	ADS Director.
8.	Khalid El Tigani	Veterinary Doctor.
9.	M. El Mahdi Siddig	Director General, Water Corporation, North Kordofan.
10.	Mohamed Ibrahim Suliman	ARS Director, Kadugli.
11.	Mohamed Mukhtar	El Obeid Agricultural Research Corporation.
12.	Saied A. Awadalla	UNICEF.
13.	Salah M. Mahgoub	Director, Rural Water Corporation, North Kordofan.
C.	**RIGL EL FULA**	
1.	Abdel Hameed A. Hamid	State Director General of Forestry.
2.	Abdel Rahim M. El Faki	State Director General of Education.
3.	Ali A. M. Siddig	State Water Corporation.
4.	El Tahir Osman	State Director General, Social Welfare.
5.	Hamdeen H. Hamdeen (Dr.)	State Director General of Health.
6.	Hamid Ahmed Ali (Dr.)	Ex-Director Animal Resources.
7.	Kheiri El Bereir	Deputy State Wali and Minister of Agriculture.
8.	M. El Habieb A. Badi	State Director for Development Planning.
9.	M. Ibrahim El Usta	W. Kordofan State, Local Government Director General.
10.	M. Ibrahim M. Taha	State Director for Development Planning.
11.	M. Nageeb (Dr.)	W. Kordofan State Minister of Health.

12.	Mohamed Ahmed Ali Mansour	State Director General of Agriculture.
13.	Rahama A. Azaz (Dr.)	State Director General of Veterinary Services.
14.	Siddig K. Ismail	Statistics State Director General Statistics.
D.	**EL MUGLAD**	
1.	Abdalla Mahdi El Shafie	EPI Operation Officer.
2.	Abdel Azim El Haboub	Commissioner, Abyei-Bahr El Arab Province.
3.	El Tayeb El Gemabie (Dr.)	Hospital Medical Director.
4.	Hussein M. Hussein	El Bir, Abyei Area, Director.
5.	Hussein Saied (Dr.)	Abyei Consultant Physician.
6.	Nadia Adam Breima	Youth Training Director.
7.	Saad Arabi Saad	Province Police Director.
8.	Sabiel Abbakar	Survey Technician.
9.	Salah Gibril Ako	Local Government Officer.
10.	Shomo Hurgas	Education Director, Muglad.
11.	Um Ghalla Hamid	Health Visitor - Muglad.
12.	Yagoub M. Tahir (Dr.)	Medical Inspector.
E.	**EL MEIRAM**	
1.	Ahmed A. Iheimer	El Fuda Project Director.
2.	Ahmed M. Osman	Laboratory Technician.
3.	El Hag El Mahdi Suliman	UNICEF.
4.	Fadlalla M. Fadul	IRRA.
5.	Ibrahim Ali Tibieg	CHW.
6.	Mohamed Ahmed Kajam	Immunization Officer.
7.	Osman Zaki El Din	Sanitary Overseer.
8.	Salah Harfouche	MSF France Field Coordinator.
9.	Vieneras Coraline (Dr.)	MSF.
	EL MEIRAM	
F.	**OTHER PERSONS**	
1.	Abdel Rahman Jumaa	Pharmacy Owner.
2.	Adam Musalam	
3.	Ahmed Mareig	Omda.
4.	Bakheit Bellal	Omda.
5.	Bakheit El Nail	Omda.
6.	El Hireka Osman	A/Amir.
7.	El Kheir El Faheim	Constituency, Parliament Member.
8.	Hamdoun El Hireka.	
9.	Hamid Mahmoud	
10.	Khalafalla Hussein	Butcher.
11.	Madoul Allock	
12.	Mohamed El Fadil	Omda.
13.	Mohamed Suliman	
14.	Mussalam Abu El Qasim	Amir.
G.	**ABYEI**	
1.	Afag Deng Beyong	CHW.

2.	Ahmed M. Ali	Red Crescent Field Director.
3.	Francis B. Battal	UNICEF.
4.	Ibrahim Khalifa	Army Officer.
5.	James Loto Oteem	Immunication Officer.
6.	Meriam Ellore	Health Visitor, Abyei Town.
7.	Omer El Faroug	IARA.
8.	Zakaria Ateem	MA Hospital Director.
H.	**ABYEI: OTHER PERSONS:**	
1.	Hassan Arob	
2.	Deng Ajack	

Appendix II - Table 1 **Base-Level Schooling - Abyei Bahr El Arab Province.**
(Underlined Names are School that used to have Hostels.

	Name of School	Classes								Total		Total	Teachers		Total
		1	2	3	4	5	6	7	8	Males	Females		Males	Females	
1.	El Muglad and LC														
1.1	El Muglad Town:														
	Western Boys	62	48	55	53	40	43	27	35	363	--	363	2	7	9
	Southern Boys	44	58	47	47	51	41	43	26	357	--	357	2	8	10
	Eastern Boys	67	41	35	37	43	47	32	27	329	--	329	2	8	10
	El-Bandar Boys	69	57	53	56	41	33	35	29	373	--	373	3	6	9
	Northern Boys	61	65	54	51	40	40	35	20	366	--	366	3	6	9
	El-Shuhada Boys	--	72	90	70	67	--	--	--	299	--	299	2	6	8
	Western Girls	86	64	58	57	53	55	65	34	--	472	472	1	7	8
	Eastern Girls	76	72	71	53	46	41	58	35	--	452	452	2	7	9
	Eastern Girls	85	62	64	62	54	37	55	47	--	466	466	1	8	9
	El-Zahraa Girls	--	53	34	38	27	30	45	13	--	240	240	1	7	8
	El-Batrol Girls	--	60	29	40	36	--	--	--	--	165	165	-	4	4
	El-Wuhda Girls														
1.2	El Muglad LC.														
	Mugaddama (Mixed)	26	47	58	45	34	21	17	20	209	59	268	3	3	6
	Munawara (Mixed)	61	41	45	29	19	--	14	--	196	13	209	2	4	6
	Nimaaten (Mixed)	22	22	14	14	12	9	7	--	71	29	100	2	4	6
	El-Dibab (Mixed)	71	63	52	37	23	17	--	--	219	43	262	3	3	6
	Agbash Kur (Mixed)	34	23	24	20	17	--	--	--	102	16	118	4	-	4
	Abu Bateikh (Mixed)	11	11	11	9	6	--	--	--	24	24	48	2	1	3
	Fishik (Mixed)	50	50	25	32	--	12	--	--	150	19	169	1	2	3

	Name of School	Classes								Total		Total	Teachers		Total
		1	2	3	4	5	6	7	8	Males	Females		Males	Females	
	Digdeg (Mixed)	--	11	10	8	--	--	--	--	26	3	29	2	-	2
	Abu Agbar (Mixed)	--	14	7	18	--	--	--	--	31	8	39	2	-	2
	Umm Sham (Mixed)	--	12	10	5	--	--	--	--	13	14	27	1	-	1
	Mugadama Girls	11	28	--	--	--	--	--	--	--	39	39	-	2	2
	Munawara Girls	27	24	19	--	15	--	--	--	--	85	85	-	2	2
	Abu Gabra (Mixed)	37	35	--	--	--	--	--	--	44	28	72	2	-	2
	El-Gidehat (Mixed)	35	52	--	--	--	--	--	--	58	29	87	1	-	1
	El-Hummed (Mixed)	35	35	--	--	--	--	--	--	58	12	70	1	-	1
2.	El Meiram Town & LC.														
2.1	El Meiram Town:														
	El Farug Boys	56	68	60	42	33	25	32	45	361	--	361	4	3	7
	Khalid Boys	40	25	45	30	22	--	--	23	185	--	185	4	4	8
	El Safa Girls	45	60	53	36	50	28	36	37	--	350	350	2	4	6
2.2	El Miram LC.														
	El Fuda (Mixed)	43	18	--	--	--	--	--	--	53	8	61	1	-	1
	Umm Dris (Mixed)	45	26	25	26	12	--	--	--	113	21	134	2	1	3
	El Setteib (Mixed)	24	16	9	8	--	--	--	--	37	20	57	1	2	3
3.	Abyei Town & LC.														
3.1	Abyei Compound	42	62	115	118	109	52	40	16	392	162	554	4	3	7

		No. of classes	Pupils		
			Boys	Girls	Total
4.	Private Schools				
4.1	Abyei				
	Muwafag (Islamic) (Mixed)	2	25	17	42
	Camboni (Christian)	6	225	149	374
	Sunday (Christian)	3	114	108	222
	Total	11	364	274	638
4.2	El Meiram				
	Muwafag (Mixed) at Meiram	5	152	77	229
	Muwafag (Mixed at Umm Bashar	3	104	36	140
	El Da'wa: Baraa (Mixed)	4	123	34	157
	El Da'wa: El Fardos (Mixed)	2	45	25	70

5. Damaged Schools in Abyei:

5.1 Urban Abyei

Old Abyei Primary,	founded 1943	now the Compound Center
Abyei for Boys(A)	founded 1957	now Military area
Abyei for Boys(B)	founded 1971	now Military area
Abyei for Girls	founded 1956	now fully destroyed.
Abyei Intermediate	founded 1978	now Military area

5.2 Rural Abyei

Angadil Primary	founded 1970	now destroyed, village evacuated.
El Banton Primary	founded 1970	now destroyed, village evacuated
Ni'am Primary	founded 1973	now destroyed, village evacuated
Umm Balayel Primary	founded 1981	now destroyed, village evacuated
Taj Allei Primary	founded 1980	now destroyed, village evacuated

Source: Field Survey Data

Appendix II, Table (2)
Rehabilitation needs of wateryards in Abyei Province

No	Wateryard	Rehabilitation										
		Mech repairs	fencing	desilting	Pump House	Mech + pump unit	Working Barrel	Tank Repair	Trough	Taps	Foundation + floorTaps	Drai syste
1	Elsetaib	X	X	X	X		X		X	X		X
2	Muglad E.	X	X	X								X
3	Muglad C.		X	X			X				X	X
4	Muglad N.		X	X			X		X	X		X
5	Muglad W.		X	X					X	X	X	X
6	Naam		X	X		X		X	X	X		X
7	Shwarb	X	X	X	X				X	X		X
8	Fesheek	X	X	X				X	X	X		X
9	Mugaddama	X	X	X			X	X	X	X		X
10	Nematain	X	X	X			X		X	X		X
11	Abu Betiakh		X	X	X		X		X	X	X	X
12	Al Aga'ad		X	X					X	X		X
13	Shateen	X	X	X		X			X	X	X	X
14	Muglad Chev.		X		X							X
15	El Mugabi	X	X		X	X		X	X	X	X	X
16	Mounurra	X	X		X				X	X		X
17	Um Sham	X	X		X		X		X	X	X	X
18	El Hemaid	X	X				X		X	X	X	X
19	El Agabesh	X	X					X	X	X	X	X
20	Abyei East		X		X				X	X		X
21	El Debab	X	X		X		X		X	X		X
22	Abu Hamiro		X			X	X		X	X		X
23	El Gangai	X	X			X			X	X	X	X
24	Defocaa		X					X	X	X		X
25	Somuaa'	X	X					X				X
26	El Meiram		X					X	X	X		X
27	Um Ballail	X	X		X			X	X	X		X
28	Araduba		X					X	X	X	X	X

Appendix II, Table (3)
List of Spare parts For Water-yards (A) Lister engine

No.	Item	Qty
1	Nozzle	50
2	Plunger	50
3	C/S bush	50
4	C/R bush	50
5	Rocker bush	50 pair
6	Piston	50
7	Piston Rings	50 set
8	Rocker shaft	50
9	Felt ring	50 pair
10	Rubber ring	50 pair
11	Gasket	50 set
12	Push Rod	50
13	Ideler gear	50
14	Cam shaft Assy	50
15	C/R bearing standard	50 pair
16	C/R bearing 0,01	50 pair
17	C/R bearing 0,02	50 pair
18	C/R bearing 0,03	50 pair
19	C/R bearing 0,04	50 pair
20	Governor Assy	50
21	End Bearing	50 pair
22	Fuel Pipe	50
23	Oil dipper	50
24	Cylinder head gasket	50
25	C/ shaft	20
26	Connecting Rod Assy	20
27	Cylinder block	20
28	Cylinder liner	20
29	Cylinder Head	20
30	Fuel pump	20
31	Fuel injector assy	20
32	Oil pump	20
33	Cam shaft cover	20
34	End bearing	20
35	Fuel piping	20 set
36	Starting handle	20
37	Valve adjusting	20 pair
38	Oil pump plunge	20
39	Oil pump compressor	20
40	Oil pump seal	20
41	Clutch coupling	20

Appendix II, Table (3)
List of Spare parts For Water-yards (B) Edeco pump

No.	Item	Qty
1	Main Gear	10
2	Pinion Gear	10
3	Clamp	10
4	Clamp	10
5	Main shaft	10
6	Bearing - Mainshaft	10
7	Bearing pinion	10
8	Oil Seal - Pinion main	10
9	Oil Seal - Pinion main	10
10	Pitman pin lower	10
11	Pitman pin upper	10
12	Pitman bearing upper	10
13	Pully	5
14	Main Gear	10
15	Gear - Pinion	10
16	Main shaft	10
17	Pinion - shaft	10
18	Bearing	60
19	Oil seal - Main shaft	20
20	Oil seal - Pinion shaft	20
21	Polan Key	20
22	Pinion Key	20
23	Gasket - cover	20
24	Oil chain	10
25	Bearing pitman pin lower	20
26	Beraing pitman pin upper	20
27	Pitman pin with nut upper	20
28	Pitman pin with nut lower	20
29	Walking beam - head	10
30	Arm hinges	10
31	Wire rope sling	50
32	Wire rope ½"	5
33	Shaft dia 1 1/8"	20
34	Leather cup 3 ¾"	3000
35	Rubber cup 1 1/8"	1000
36	Vee belt 165	10 set
37	Stuffing box	20
38	Vee belt 158	20

Appendix II, Table (3)
List of Spare parts For Water-yards (C) Scholler Pump

No.	Item	Qty
1	Main Gear	5
2	Pinion Gear	5
3	Main Shaft	5
4	Pinion Shaft	5
5	Clamp	5
6	Pinion Clamp	5
7	Bearing main shaft	5
8	Bearing pinion shaft	5
9	Pitman	5
10	Polan Oil seal	5
11	Pinion Oil seal	5
12	Polan pulley	5

Appendix II, Table (4)
Instrument & Equipment for 4 PHCUs

ITEM NUMBER	STOCK DESCRIPTION	STOCKING UNIT TOT.	QTY	UNIT PRICE
1.	Bowl Sponge 1200 ML Stainless Steel	0225400 Each	8	2.18
2.	Tongue Depressor 155 MM Metal	0620000 Each	8	0.59
3.	Forceps Hemostat Straight Kelly 146MM SS	0724500 Each	12	1.75
4.	Forceps Dressing Spring-Type 155MM SS	0721000 Each	12	0.87
5.	Funnel Catheter 90ML Polypropylene	0240000 Each	4	6.62
6.	Cup-Medicine 30ML Polypropylene	0324970 Each	12	0.01
7.	Irrigator 1.5LTR Stainless Steel	0250000 Each	8	6.21
MA 7-0500	Tubing Medical Latex Rubber 150CM	0382000 Lgth	8	0.85
8.	Jar Dressing W/Cover 0.945 Litre Stainless Steel	0254500 Each	8	4.42
9.	Lamp Alcohol with screw cap 60ML Metal	0530000 Each	8	2.50
10.	Needle Suture, Surgeons Regular, 3.8 Circle	0759315 Pkt	48	1.24
11.	Needle Suture, 3/8CIRC Round PT #12 PKT of 6	0759345 Pkt	48	1.23
12.	Syringe Hypo 5ML Luer Glass	0784000 Each	24	0.64
13.	Probe General Operating Flexible with Eye 115MM	0759800 Each	8	0.37
14.	Scissors Dissect Curved Mayo 145MM B/B SS	0770500 Each	8	1.74
15.	Thermometer Clinical Oral Dual Cels/Fahr Scale	0481050 Each	24	0.62
16.	Tourniquet Latex Rubber 75CM	0385000 Each	4	0.43
17.	Disinfector Instrument 222x82x41 MM Stainless	0167000 Each	8	5.12
18.	Bowl Sponge 1200ML Stainless Steel	0225400 Each	4	2.18
19.	Basin Wash Shallow 4-LTR Autoclavable Polyprop	0216020 Each	4	3.97
20.	Table, Examining Folding 2-Section with Pad	0184500 Each	4	257.52
21.	Dish, Soap with Drain Tray Polypropylene	0326200 Each	4	2.34
22.	Lantern Kerosene Pressure 1.183LTR 2.5Pint 400MM	0532300 Each	4	55.13
23.	Basin Wash Shallow 4 Litre SS	0216000 Each	4	4.66

ITEM NUMBER	STOCK DESCRIPTION	STOCKING UNIT TOT.	QTY	UNIT PRICE
24.	Disinfector Intr. Solling Type 320x170x100MM Fuel	0162000 Each	4	18.42
25.	Towel Huck, 430x500MM (17x20")	0575000 Each	4	0.23
26.	Towel, Turkish, Approx. 500x900MM (19.5 x 35.5")	0575205 Each	4	1.36
27.	Stand Single-Bowl Type without Bowl	0151001 Each	4	52.68
28.	Bag for Physician W/Zipper & Lining Canvas Empty	0512000 Each	4	28.94
29.	Needle Hypo 0.70x32MMx22GX1-1/4" Luer Box of 12	0750500 Box	96	0.45
30.	Mug Drinking 350 ML Melamine	2069000 Each	4	1.00
31.	Blanket Wool-Blend Institutional 1.5x2M Adult SZ	5003500 Each	4	6.71
32.	Spoon Cooking Slotted Bowl 380MM Long SS	2083500 Each	4	1.24
33.	Spoon Tea Large Stainless Steel	2086700 Each	4	0.30

Appendix II, Table (5)
Essential Drugs Kit for RDF at PHCU Level

Code No.	Description	Pack Size	Qty/1000 TE	Qty /Set	Unit
15-556-50	Metronidazole Tab 205MG/1000	1000	2000	2	TIN
67-025-15	Metronidazole Susp 25 MG/MI	1	40	40	BTL
15-140-05	Atropine Tab IMG/100	100	100	1	TIN
15-320-00	Chloroquine Tab 150MG/1000	1000	2000	2	TI
15-339-75	Chloroquine Syp 50MG/5ML 60ML	1	150	150	BTL
15-559-65	Paracetamol Tab 500MG/1000	1000	2000	2	TIN
15-559-90	Paracetamol Syp 125MG/5ML	1.0	200	200	BTL
15-611-10	Oral Rehydration Salt 1L 100	100.0	200	2	SACHET
15-040-00	Aluminium Hydroxide 500MG/1000	1000.0	1000	1	TIN
15-060-02	Acetylsalicylic Acid 300MG/1000	1000.0	1000	1	TIN
15-371-00	Sulfa. Trim. Tab 400+80MG/500	500.0	2000	4	TIN
15-606-82	Procaine B.P 3G/50	50.0	50	1	BOX
15-500-10	Ferr. Folic Tab 60+0.25MG/1000	1000.0	1000.0	1	TIN
15-553-55	Mebendazole Tab 100MG/100	100.0	100	1	TIN
15-600-00	Piperazine Tab 500MG/5MI 30MI	1.0	1	1	BTL
15-195-00	Benz. Benzoate 25% 1L	1.0	2.0	2	BTL
15-100-00	Tetracycline Oph 1% 5G	100.0	100.0	1	BOX
15-520-02	Gentian Violet Pwdr 25G	1.0	2	2	BTL
15-315-10	Chorhexidine conc. 5% 100ML	1.0	1	1	BTL
07-824-05	Syringes Hypo 5ML Luer Disp/100	100	400	4	BOX
07-474-32	Needle Hyp 0,80.40MM/21G.1,5/100	100	400	4	BOX
15-438-15	Water for Inj 10MI/50	50	500	10	BOX
05-214-25	Envelopes for Tab pkt/100	100	2000	20	PKT
05-196-00	Cotton wool Absor. 500G	1	3	3	ROLL
05-121-00	Bandage Gauze 25MM. 9M	12	80	7	ROLL
05-030-00	Plaster Adhesive Zinc 0.75MM.5M Roll	1	5	5	ROLL
05-218-75	Gauze Absorb 200MM.6M	1	3	3	ROLL
15-01-00	Equinefrine. HCL 1ML/10	10	10	1	BOX
15-639-00	Senna Tab 7.5MG/100	100	100	1	TIN
15-531-00	Iodine Sol 5% 30MI	1	6	6	BTL
04-810-52	Thermometer Clinical Oral	1	2	2	EACH

NB * Quantities of drugs specified above are estimates, due to unreliable marbidity data at village level. The subsequent order should be based on previous consumption pattern as is in the case in most PHCUs in the country.

Appendix II, Table (6)
Essential Drugs Kit for the Mobile Clinic (for one site)

19 Item No.	20 Description	21 FOC Item (Y/N)	22 UNIPAC Stock or Commodity Code	23 Quantity (per set)	24 Unit
1.	Metronidazole Tab 250 MG 1000		1555650	2	Pack
2.	Airopine Tab 1MG 100		1514020	1	Pack
3.	Chloroquine Tab 150MG 1000		1532000	2	Pack
4.	Chloroquine Syrup 50/5ML 60ML		1533975	150	Botl
5.	Paracetamol Tab 500MG 1000		1555965	2	Pack
6.	Oral Rehydration Salts Powder Sachet for 1L 100		1561110	2	Box
7.	Amoxycillin Pwdr/oral susp. 125MG/5ML, 60ML		1505045	50	Botl
8.	Acetylsalicylic Acid Tab 300MG 1000		1506002	1	Pack
9.	Sulfamethoxazole + Trimethoprim Tab 400+80MG 500		1537100	4	Pack
10.	Procaine Benzyl Penicillin Inj. 1G Box/50 + Dil.		1560676	1	Set
11.	Ferrous Salt+Folic Acid Tab 60+0.2MG 1000		1550010	1	Pack
12.	Mebendazole Tab 100MG 100		1555355	1	Pack
13.	Piperazine Tab 500MG 1000		1560000	1	Pack
14.	Benzyl Benzoate Lotion 25% IL BTL		1519500	1	Botl
15.	Teracycline HCL OPH Dint 1% 5G		1510000	100	Tube
16.	Gentian Violet Pwdr 25G		1552002	1	Pack
17.	Chorhexidine Conc. Soln 5% Botl 100ML		1531510	1	Botl
18.	Syringe Hypo 5ML Luer Disposable Box/100		0782405	3	Box
19.	Needle Hypo 0.80 X 40MM/21G X 1.5" Luer Disp. Box/100		0747432	3	Box
20.	Water for Injection 5Ml - Box/10 Ampoules		1543815	1	Box
21.	Envelopes for Tablets Polyethylene Pkt of 100		0521425	10	Pkt
22.	Cotton Wool Absorbent Non-Sterile 500g		0519600	3	Roll

23.	Bandage Gauze Non-Sterile 25 mm X 9m		0512100	7	Roll
24.	Plaster Adhesive Zinc Oxide 75mm X 5m Roll		0503000	5	Roll
25.	Gauze Absorbent Non-Sterile 200mm X 6m		0521875	3	Roll
26.	Epinephrine HCL Inj 1mg/ml 10 X 1ml		1501000	1	Box
27.	Iodine Soln 2.5% 30ml **		1553100	6	Botl
28.	Thermometer Clinic Oral/Rectal Cels/Fahr		0481052	1	Each

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Annex 5: Population, Social Organization, and Production Systems.
Annex 6: Economics and Marketing.
Annex 7: Land Use and Planning Regions.