

**Multipurpose Development of the Eastern Nile,  
One-System Inventory report on  
Socio-economic Characteristics of EN Basin  
Sudan**

**ENTRO**

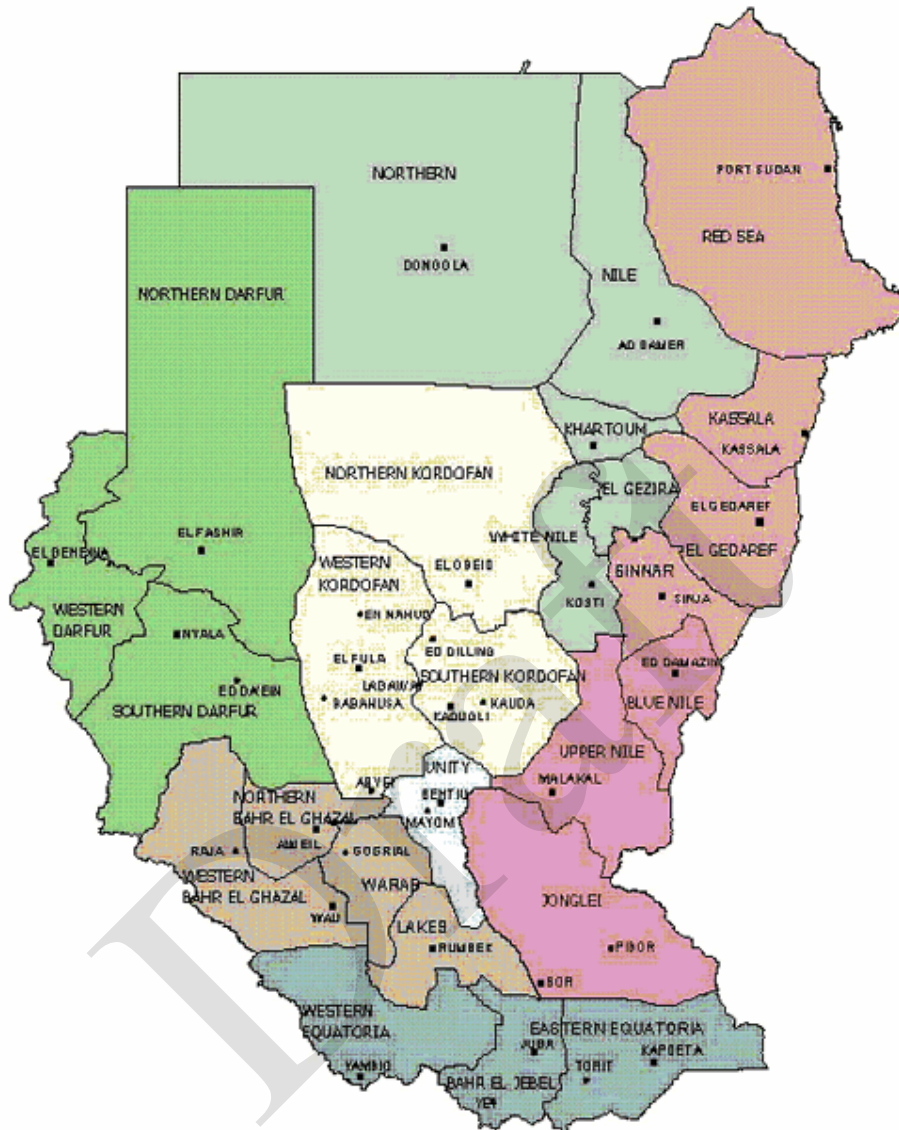
(Eastern Nile Technical Regional Office)

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## Sudan Administrative structure



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## **Annex I**

Population distribution
Selected demographic and social indicators
Health
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Life expectancy at birth
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Number of private households with head owning agri-plot
Estimates of livestock population 1999
Health facilities
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Bara-Akobo-Sobat Basin
Population percentage
Percentage distribution of population by age
Life expectancy at birth by sex
Estimates of livestock population 1999

### **Methodology and Executive Summary :**

- 1- This report depends on secondary data. i.e. data already exists in different format and in various sources, i.e.: government as well as non-government. Government data include national census, government reports, administrative units and ministries reports. Non-government sources such as academic institutions, Masters and PhDs. thesis's, assignments, NGOs etc. Web sites are also utilized for more data and information on the Nile Basin.
- 2- Socio-economic data by basin is not available. Almost all the data available, especially government data, is gathered on National and State levels, or focus on specific regions or villages as case studies. The concept of Basin, as an independent entity, is new. This created considerable difficulties since I have to gear the data to fit each of the three basins in Sudan, i.e. Tekeze-Atbara basin, Nile basin, and Akobo-Sobat basin.
- 3- Since 1993 Sudan has adopted the Federal System and as such, Sudan has been divided administratively into 26 Federal States (see map attached).
- 4- As Such, each Basin is composed of many States. Each State is sub-divided into administrative units e.g. municipalities. Each municipality is divided into localities and each locality is sub-divided into smaller administrative units, so I computed the available data by States that comprises each Sub-Basin. For example, Tekeze-Atbara basin comprises three States: Kasala, el Gadarif and Nahr El Nil Federal States. Nile basin comprises five states: Blue Nile State, Sinnar State, Geziera State, Khartoum State and Northern State. Akobo-Sobat basin comprises Jongeli State, Unity State and Upper Nile State.
- 5- Statistical data is computed to fit each basin. A summary of the data is given in table format.
- 6- Qualitative data is summarized and presented by basin. Some of the qualitative data deals with the impact of some of the developmental schemes established in each Basin. Such data is important to draw lessons from them. For example Khashm el Girba irrigated scheme in the Tekeze-Atbara basin, or Gezera scheme and Marawe dam in the Nile Basin. Because some of these Schemes had been established for more than a decade, there is a wide gap in the data, which need to be updated. Thesis and dissertation, books, articles etc are very useful in compiling qualitative data since these are written for academic purpose and the data gathered for such purpose.
- 7- Six volumes of the Sudanese National Census Bulletins are sent to ENTRO. These Bulletins contain comprehensive statistical and demographic information about each State. Some of the statistical tables below are tabulated from these volumes. Other materials like books and articles are also sent to ENTRO.
- 8- Some statistical data on the national level about Sudan is made available in appendix for comparison. For example, birth rate on the national level may be compared with birth rate at

Basin level. As far as Akobo-Sobat basin is concerned, there is a big gap in quantitative as well as qualitative data because of the civil war which continued for more than 16 years, and this region is still unstable politically.

9- The data in this report concerning Akobo-Sobat basin has been compiled from different sources, and need to be completed and verified, since it was only rough estimations

10- Since the latest census data was carried in 1993, more recent and detailed data is needed for the three Basins.

11- Data for some socio-economic indicators are non-available by Basin or State. The following indicators need either to be updated or non-existent:

a/Land tenure by Basin.

c/ Government organization (G.O.) and nongovernmental organization (N.G.O.).

d Data on actual Stake-holders at Basin level need to be updated or availed.

e/Conflicts at the local level ( by Basin): Data on conflicts between Pastoralists and sedentary groups is available but need to be updated. Data about conflict of interests among members of each group in each Basin need to be gathered and validated through field work.

f/ Data on class structure by Basin is not available.

12- What follows is a summery of socio-economic indicators for both Tekeze-Atbara and Nile Basins for comparison. Because of the in-completeness of the data on Okobo-Sobat basin, it will be presented separately later on in this report.

## Summary indicators

Fig 1.

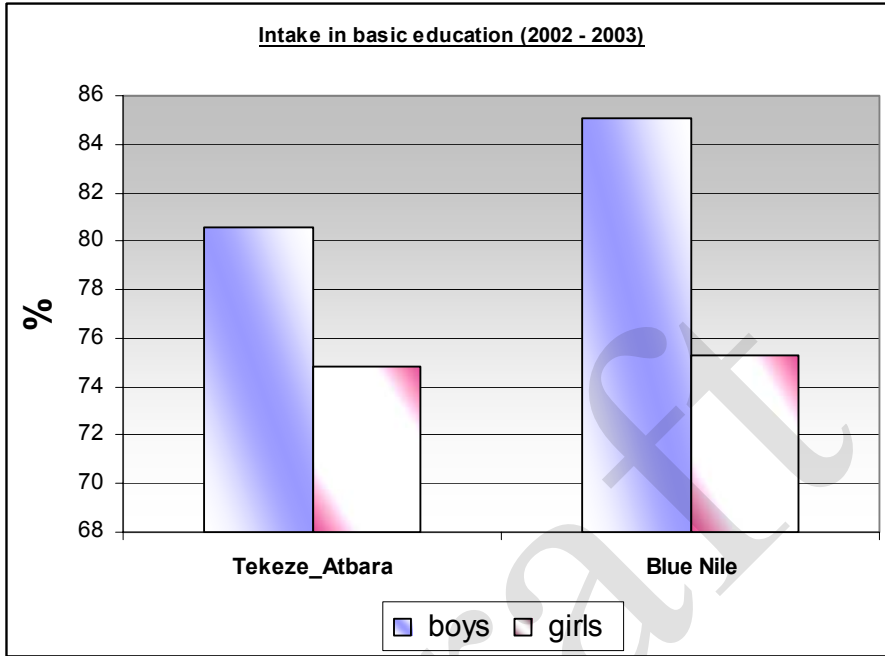


Fig 2.

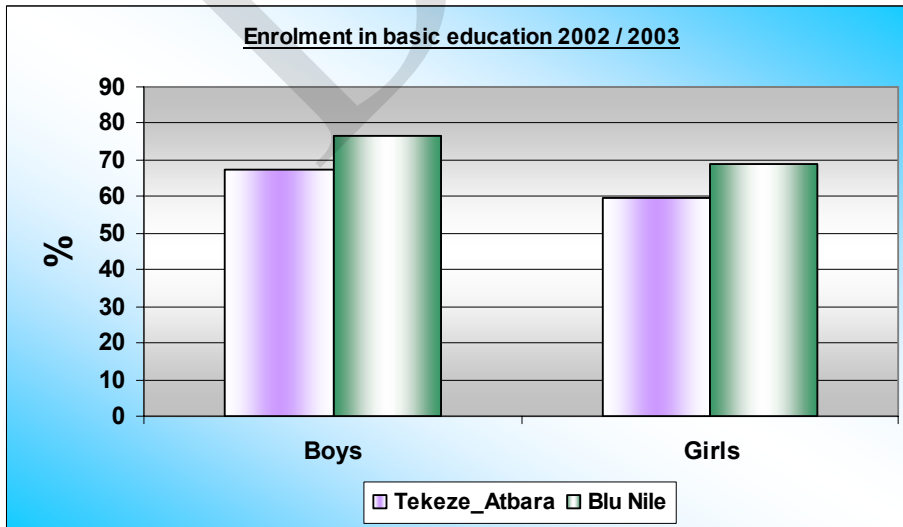




Fig 3.

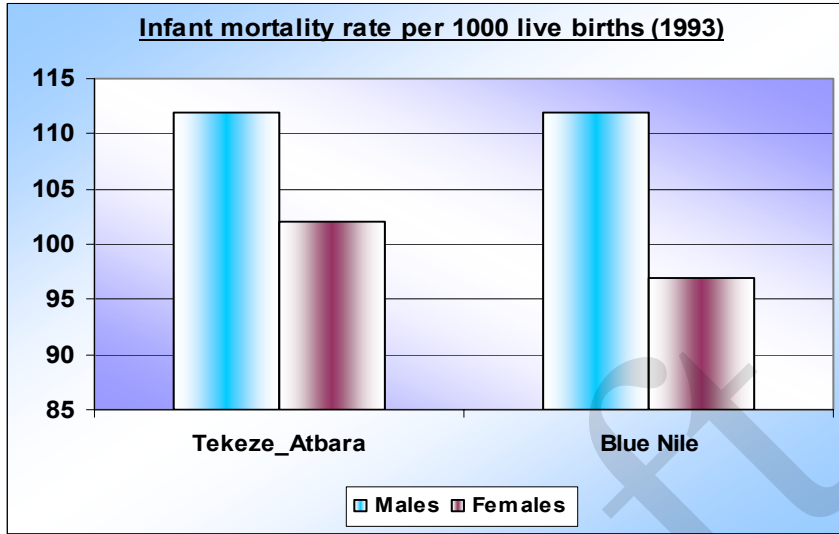


Fig4.

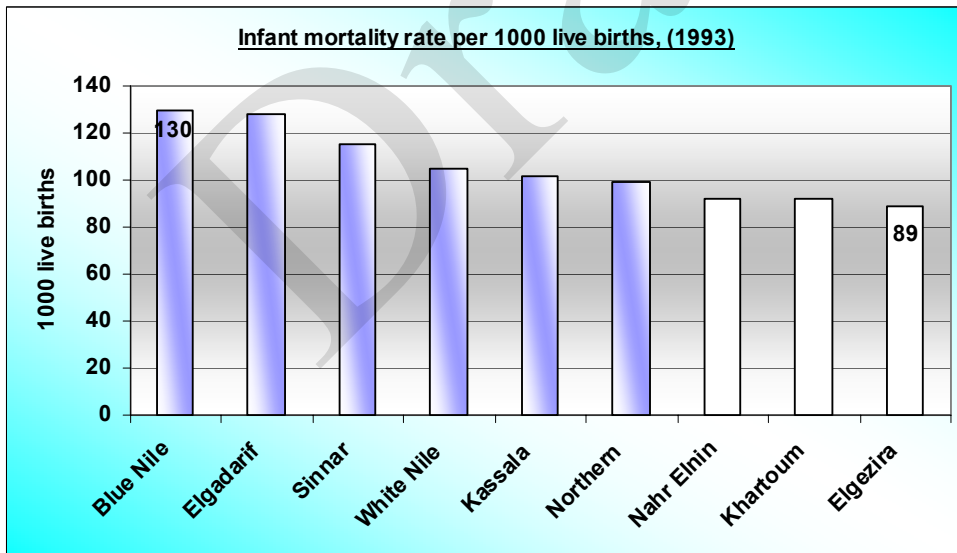
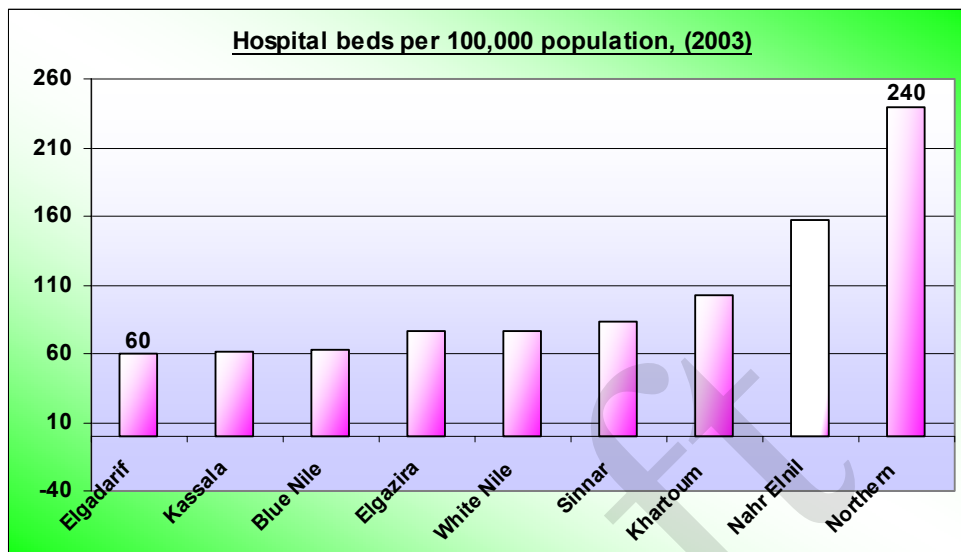


Fig 5.



**Table 1.**  
**Tekeze Atbara and Blue Nile Basins Indicators**

Indicator	Tekeze_Atbara Basin	Blue Nile Basin
<b>Demographic</b>		
Estimated Population (000) 2004		
Annual growth rate (%) 2003-2008	2.5	2.7
Urban population (% of total) 2004	34.0	35.7
Population under age 5 (% of total) 2004	15.4	15.4
Population (06-24) years (% of total) 2004	43.8	43.6
Married women (15-49) years (000) 2004	222	321
Population under 15 years (% of total) 2004	41.0	40.9
Population 60 years and over (% of total) 2004	4.5	4.4
Sex ratio males per 100 females 2004	103	102
Nomadic population (%) 1993	3.9	1.4
<b>Migration</b>		
Life-time migration In (%) 1993	4.2	10.9
Life-time migration out (%) 1993	3.4	4.8
Out-migrants within state (Rural-to-Urban) (%) 1993	28.4	29.7
Out-migrants within state (Urban-to-Rural) (%) 1993	9.6	9.9
<b>Disability</b>		
	Tekeze_Atbara Basin	Blue Nile Basin

Disability rates (per 1000) 1993	14.2	15.2
<b><u>Education</u></b>		
Intake in basic education total (%) 2002-2003	77.8	80.3
Intake in basic education boys (%) 2002-2003	80.6	85.1
Intake in basic education girls (%) 2002-2003	74.8	75.3
Enrolment rate in basic education total (%) 2002-2003	63.6	75.9
Enrolment rate in basic education boys (%) 2002-2003	67.6	76.7
Enrolment rate in basic education girls (%) 2002-2003	59.5	69.0
Literacy rate 10 years and over _ total 2000	51.0	57.2
Literacy rate 10 years and over _ males 2000	51.1	58.0
Literacy rate 10 years and over _ females 2000	50.9	56.5
<b><u>Labour force</u></b>		
Crude labour force participation rate (total) 1993	26.4	27.3
Crude labour force participation rate (females) 1993	7.3	7.0
<b><u>Fertility and Mortality</u></b>		
Infant mortality rate _ total 1993	107	105.0
Infant mortality rate _ males 1993	112	112.3
Infant mortality rate _ females 1993	102	97.0
Under 5 mortality rate _ total 1993	156	152.0
Under 5 mortality rate _ males 1993	158	158.5
Under 5 mortality rate _ females 1993	154	145.3
Life expectancy at birth _ males 1993	54	52.4
Life expectancy at birth _ females 1993	56	57.3
Total fertility rate 1999	6.2	5.8
Crude birth rate 1998-2003	37.6	37.5
Crude death rate 1998-2003	10.6	10.4
Natural increase rate per 1000 1998-2003	27	27.1
<b><u>Health</u></b>		
<b><u>population 100,000 Services Provision per</u></b>		
Hospital	1.5	1.8
Beds	92.9	106.9
<b><u>Houman Resources per 100,000 population</u></b>		
Specialists	1.7	3.9
Dentist	0.5	1.0
Doctors	8.6	17.6
Techniatians	6.0	11.8
Medical Assistants	24.6	30.1
Nurses	62.7	77.7
P.H officers /Inspectors	1.4	1.4
M.W per 100.000	38.6	44.8
H.V.per	2.0	2.4

Indicator	Tekeze_Atbara Basin	Blue Nile Basin
<b><u>The Leading causes of admission hospitals for 2003</u></b>		

<u><i>cases as % of state total discharge</i></u>		
Malaria	25.6	32.4
Pneumonia	9.7	11.8
S.S.delivery	9.8	7.0
obs &gyna	5.0	4.6
Asthma	1.6	2.3
<b>The Leading causes of deaths in hospitals 2003</b>		
<u><i>disease specific deaths as % of total state deaths</i></u>		
Malaria	14.6	24.6
Pneumonia	5.4	14.4
Septicemia	3.7	2.5
Circulatory syst.	2.7	1.8
Anaemias	4.3	4.7
Malnutrition	2.5	3.2
Dehydration	1.7	2.5
Acute renal failure	4.5	2.2
Diarrhoea & Eg.	1.3	3.7
Other heart dis.	2.2	3.6
Total (10) Deaths.	42.9	63.2
Total of other deaths	57.1	36.8
Grand total	100.0	100.0

Draft

## Sudanese Economy( summary)

### **Introduction:**

With land area of 2.5 million square kilometers, Sudan is a meeting point of river tributaries that emanate from the Ethiopian plateau and the Great Lakes. The Blue Nile with its tributaries, Dinder and Rahad, flow from east annually providing some 54 md.c.m. The Atbara tributary adds another 12 md.c.m. On the other hand, Bahr El jebal commences from lake Victoria with permanent rains, but the greater part of the runoff is lost in the Sudd area inside the Sudan. The Sobat river, which joins the White Nile at Malakal town, flows from the Ethiopian plateau and is fed from tributaries inside and outside the Sudan. Dams are constructed

the largest country in Africa. With significant human capital and a large natural resource base, Sudan offers good development potential. However, since 1983 the country has been burdened by a devastating civil war between successive governments and the Sudan Peoples Liberation Movement /Army (SPLM/A) and other rebel and opposition groups. At the same time, development has been hampered by decades of political and economic mismanagement, combined sometimes with natural disasters such as drought and flooding. As a result, levels of development vary dramatically across the country, with severe inequalities in all dimensions- access to basic services (education, health, sanitation, clean water), access to infrastructure and natural resources, access to justice, political power and protection, and income opportunities.

Being the largest country in African content, Sudan has borders with nine neighboring countries: Egypt and Libya to the north, Chad and Central Africa to the west, Congo, Uganda and Kenya to the south, Ethiopia and Eritrea to the east. In addition, a coast line extends along the Red Sea, where the countries main port, Port Sudan, is located almost opposite to the port of Jeddah of Saudi Arabia on the other side of the Red Sea. Because of its richness in agricultural land, water resources, forests, animal resources, minerals including oil and gold, and a well-educated and trained workers, the ILO mission had nominated Sudan as the potential breadbasket of the Arab as well as African countries.

### **Location, Climate, and Population:**

Sudan is located in the tropics, it lies between 30 N. and 220 N, and being so vast, has different climates as average annual rainfall differs in different parts of the country, making various vegetations and soils. For example, in the northern region, average rainfall ranges between 75 and 300 mm, while in low rainfall areas of the savanna region between 300-400 mm. In middle areas, rainfall is between 400-800 mm, and in the southern region of the

Sudan, rainfall reaches 800-1500 mm. The rainy season in most of the regions of the Sudan is normally between May and October. Temperature reaches its highest, 45°C between April and June, while winter (November-February) is relatively cold with a minimum of 16°C.

The country's population, according to 1993 census, is estimated to be 33.12 million, with an average annual growth rate of 2.6 per cent, and an average density of about 13 people per one square kilometer. The population is characterized by the fact that it is predominantly young, making the potentiality for abundant workforce, estimated at 16.6 million. The second important characteristic of the population is that there is a high percentage of the population of urban inhabitants. This, may be, is due to the phenomenon of massive migration from rural areas to urban centers. This may be due to economic planning which favored the urban vis-à-vis rural and regional, and security and political instability.

Many dams were constructed to store water for irrigation and for the generation of hydroelectric power. At the present there are three dams: Sennar (1 md.c.m.) and Rosseries (3.4 md.cm.) in the Blue Nile Basin, Khashm El girba (1.3 md.c.m.) in Tekeze-Atbara basin. However, the accumulated silt in the dam lakes had reduced their storage capacity by more than 25% in Rosseries dam and 40% in Sennar. In Khashm El girba dam it is even more than 60%. This has great impact on economic activities in each Basin, and contributed in the rate of poverty in each Basin, as will be discussed in this report. Now there is Merewe Dam, under-construction, in Nile Basin and most of the inhabitants of the area are on the process of resettling in different areas.. There is discussion on each of these dams and their socio-economic impact by basin.

#### **The structure of the Economy:**

Basically, Sudan is an agricultural country. The agricultural sector, including livestock and forestry, considered the backbone of the Sudanese economy for it contributed in 1999 more than 49.8 % of the GDP compared to the industrial sector contribution of 9.1%.

Agriculture provided more than 75% of employment in the country. Now production of crude oil (about 240,000 b/d) is becoming more important in terms of its contribution in the GDP.

Many people argued convincingly that for the Sudanese economy to take off; agriculture is the sector to be developed to accomplish economic growth and to elevate rural poverty.

In 2004, Sudan's economy continued to grow rapidly, continuing the average 6% per annum growth achieved since 2001. However the benefits of this growth remained concentrated in Khartoum and surrounding central States. Most of the economic growth is due to the rapidly growing oil sector, which started in the late 1990s and by 2004, contributed 12% of GDP. Agriculture remains the mainstay of the economy. In 2004, agriculture accounted for 29% of the GDP and was the main source of income for two in three people in the north living in rural areas, and for more than 85% of the population in southern Sudan.

Available data indicate that although Sudan's agricultural sector performed well overall, the benefits of its growth accrued principally to those with capital and land. Furthermore, as with other economic sectors, agricultural growth was concentrated in non-conflict regions.

**Roads and transportation:**

The development of the infrastructure is highly important for Sudan because of its extensive area and diverse environment and agricultural systems. Thus the railway lines draw their importance as lifelines connecting south, west and north Sudan to the main port on the Red Sea coast. Tekete-Atbara and Nile basins are well connected with railways, while Okobo-Sobat is not. In fact, the railways in Sudan is the oldest on the continent and the longest, extending for more than 4570 kilometers (km) and together with the branch lines constitute some 5500 km.

The total length of permanent roads in the country is estimated at 50000 km, of which 1700 km are tarmacked and work is underway on a number of intra- state and intra-basin highways.

Sudan Sea Line, which is government owned, has a number of vessels for the transport of commodities and passengers around the world. Apart from Port Sudan, the main port, other ports are being rehabilitated and developed such as Suakin (eastern Sudan), Ausif and Bashair from which petroleum products are exported.

**Economy:**

The livelihood of the population and the source of internal and external trade is based on primary commodities. Over 70% of Sudan employment takes place in the agricultural sub-sector of the economy. Gezera irrigated agricultural scheme (in the Nile Basin is the oldest) and the New Halfa irrigated scheme ( in Tekeze-Atbara basin) are discussed in this report, Made Sudan the principal export of cotton lint, groundnuts. Also rain fed cultivation on massive mechanized schemes, in Tekeze-Atbara and Nile Basin , in which sesame and sorghum are cultivated for local consumption as well as for cash.

Forest products which go directly to the household and to small enterprises. The household gets its charcoal and wood for brick making and furniture timber. Deforestation is taking place in Tekeze-Atbara and Nile basins because of massive rain fed agriculture as mentioned in this report.

From this brief description, it is evident that biodiversity is the source of Sudan's present wealth and the driving force of its economic activity. Although Sudan has started production and exportation of petroleum, it will continue to depend on commodity production for a long time to come.

**Social setup:**

The population of Sudan at present is estimated at 30 million. The growth rate is about 3.0% and the doubling time is 20-30 years. Population density is low but the distribution is

not even. About one third of the population is found on less than 7% of the land area and many parts of the country not occupied. Nile Basin where Gezera Agricultural Irrigated Scheme is established since 1924 is the dense area, and Tekeze-Atbara is second. In many of the inhabited areas it appears that population has approached the carrying capacity of the environment under the prevailing agricultural and animal production technology ( Atbara-Tekeze and Nile Basins). The recurrent conflicts between cultivators and herders, particularly in the arid zones , is an indicator of both degradation of resources as well as the growth of the human and livestock populations as the case in Tekeze-Atbara basin.

At present, the population of Sudan lives off land resources and their biodiversity. This takes the form of rain fed and irrigated agriculture, wood and non-wood forest products and livestock production. The agricultural sector contributed to the GDP about 40%. The experience of drought and desertification and displacement have taught ordinary citizen that his livelihood is vulnerable if he continues to adopt his present survival strategies, which are becoming environmentally unfriendly.

**Legal and Institutional Aspects:**

There are several laws, acts and ordinances that deal with the environment, either for protection or conservation. These are sector based, i.e. environmental legislation dealing with land tenure, forestry, wildlife, fisheries, agriculture, livestock, public health etc. The sectoral legislation is closely connected to the structure of the government ministries, departments and parastatal corporations. The legislation has mainly regulatory powers of harvesting some resources and powers of penalty for violation. The essence is both protection and conservation. The sector legislation is in some respect a reflection of the terms of reference of the different ministries and their internal structures. There is a need for these legislation to advance from the protection of resources to the conservation and sustainable use. Also there is an urgent need to clarify the roles of the different levels of the government systems (mentioned above in this report) with respect to responsibilities for planning of development. Precise roles for these levels are yet to be developed and implemented



**Table 2.****Tekeze\_Atbara basin**

There are three States on this Basin; Nahr Elni, Kassala and Elgadarif.

Indicator	Tekeze_Atbara Basin				Source
	Aver-age	State			
		Nahr-Elnil	Kass-ala	Elgadarif	
<b>Demographic</b>					
Estimated Population (000) 2004		972	1625	1674	Data sheet,2004,CBS
Annual growth rate (%) 2003-2008	2.5	1.81	2.51	3.19	Data sheet,2004,CBS
Urban population (% of total) 2004	34.0	35.42	36.14	30.29	Data sheet,2004,CBS
Population under age 5 (% of total) 2004	15.4	14.48	15.58	16.14	Data sheet,2004,CBS
Population (06-24) years (% of total) 2004	43.8	42.82	43.94	44.68	Data sheet,2004,CBS
Married women (15-49) years (000) 2004	222	134	265	267	Data sheet,2004,CBS
Population under 15 years (% of total) 2004	41.0	40.17	40.88	41.96	Data sheet,2004,CBS
Population 60 years and over (% of total) 2004	4.5	5.46	4.41	3.74	Data sheet,2004,CBS
Sex ratio males per 100 females 2004	103	96	118	96	Data sheet,2004,CBS
Nomadic population (%) 1993	3.9	0.8	9.7	1.3	Analytical report,1996, CBS

The estimated total population of Basin is 4,271,000 with average annual growth rate of 2.5 % . The height growth of 3.2 % was scored in El Gadarif state. Children under 14 years of age constitute 41 % of the population while the old persons (60 and over) constitute 4.5 percent of the population. What follows is the presentation of data by States. Tekeze-Atbara basin contains three Federal States. These States are: Nahr Elnil State, Kassal State and El Gadarif State :

**1-Nahr Elnil State:****Geographic Location:**

The State expands between Lat.22.35 east 16.22 West. It borders the North State Kartoum State, Kasala State and Red Sea State (see map attached).

The Desert expands all over the State, and there are small hills scattered here and there. Temperature is high in summer and cold in winter and there is little precipitation. administratively, the State is organized into 5 Muhafast and 26 Mahalya, of which 7 Mahalyat are towns while 19 Mahalat are rural. The five Muhafazats are Al Damar, Shendi, Matamma. Barbar and Abu Hamad.

**Ethnic composition:**

The main ethnic groups inhabiting the State are Al Gaalyin, Al Rubatab, Al Merafab, Al Omerab, AL Fadiniyaand Almanasir.

**Economic Resources:**

The River Nile is the most dominant economic resource in the State. River Nile Crosses the State from south to north and then joined by Atbara River at Atbara town. Besides, there are many seasonal wadies, or small rivers, like wadi al Atmore, and under-ground water is important in the State for both drinking and cultivation. Cultivation of various crops along the banks of the River Nile, as well as the banks of Atbara River, is the main economic activities

of the inhabitants. Crops cultivated include Wheat, Beans, Durra, vegetables etc. These are for local consumption as well as for cash. The State has a good deal of animal husbandry, estimated as more than 1274395 head of cattle, sheep and camels etc

#### Industry:

There are a quite good number of industrial activities in the State compared with other States in Sudan. There is the famous Portland Cement Factory in Atbara town. There is also Shendi and Norab Textile Factories.

#### Natural Resources:

The state is considered very meager in trees and forests. Trees grow along the bank of River Nile. Forest land constitute .4% (about 116,608 feddans) of the total area of the State. That is the reason for the government of Sudan to consider this forest area as conservation land. Desertification is considered the greatest danger in the State.

There are few electrical plants, mainly at big towns in the State like Attbara town, Barber town Shendi and Al Damar. There is one all season road connecting the State with Khartoum city. Atbara town is the center of railways and there are so many railways connecting the State with other regions. There are some NGOS but all are national.

#### Population growth and structure:

The population of Nahr-El-Nil State had grown from 650,052 in 19 83 to 781,583 in 1993, amounting to an average annual growth rate of 1.58 percent. The sex ratio of the population worked out to 94 males per 100 females. The average size of households was 6.1 people per household. The age distribution of population follows the normal pattern with 13.5 percent in the age of 0-4 age group and declining steadily to 1.8 percent in the 75 and over age group. The percentage of population in 0-4 age group is higher in rural areas (14.2 percent) than in urban areas (11.5 percent) of the population, which is probably due to higher fertility in rural areas. Children under 14 years of age constitute 40.7 percent of the population while the working ages (15-59) amounted to 52.4 percent of population. Old persons (60 and above) constitute 6.9percent of the population. The dependency ratio works out to 909 dependents for 1000 persons of working age. Crude birth rate is 30.6 per 1000.

The State has an active population of 190,927 out of 538,685 in the age group 10 and over, or 35.4 percent of the population is economically active. The refined activity rates for males and females are 67.5 percent and 7.0 percent respectively. The unemployment rate in the State, is 10.5 percent of active population for sexes, 8.0 percent for males and 32.0 percent for females. The literacy rate for persons 6 years and over is 63.6 percent for both sexes – 71.5 percent for males and 56.5 percent for females.

## **2-Kasala State**

### **Geographical Location:**

The state expands between lati. 45-14 and 40- 17 north, and long. 40-24 and 27 east. It borders Eritrea and the Red sea State from the east, Naher Al Nil state and Khartoum State at southwest, Gadarif State from the west. Total size of the State is 42220 kilometer.

Administratively the State is divided into five Muhafazat and 17 Mahalyat. These Muhafazats are:

1/ Muhafazat Kassala which is su-divided into 4 Mahalyat.

2/ Muhafazat Atbara River, sub-divided into 4 mahalyat.

3/ Muhafzat Sitait, sub-divided into 3 Mmahalyat.

4/ Muhafazat Al Gash, sob-divided into 3 Mahalyt.

5/ Muhafazat Hamishcorabe, sub-divided into 3 Mahalyat

The big towns in the State are, Kassala, New Halfa, Khashm-el Girba, Aroma and Hamishcorabe.

### **Ethnic Composition:**

There are many tribes and ethnic groups, inhabiting the State. The main tribes are Beja tribe, which speak Beja dialect, the Hadandwa tribe Bani Amir tribe, immigrant Nigerian ethnic groups, Nubians who were resettled in New Halfa after been moved from old Halfa when Swan Dam was constructed. There are also Eritrean refugees in the State.

### **Natural Resources:**

Atbara River and al Gash River are cross the State, both of them are seasonal Rivers. Besides, there are so many seasonal khors (small rivers) during the rainy season. Because of the availability of water, the State is famous of being an agricultural State. All agricultural types of cultivation are practiced rain fed, irrigated, river cultivation etc. The State is also famous of its animal husbandry. There are more than 3167000 sheep in the State. In addition, the State is potential for tourism. There is so many cites which are so attractive to tourists, and could attract national as well as foreign tourist. The State is also famous as trading center for border trade with Eritreaas well as with other parts of the country.

### **Population size and distribution:**

The population of Kasala State had grown from 76367 in 1983 to 12345623 in 1993, amounting to an annual growth rate of 4.73 percent. The sex ratio of population works out to 107 males per100. The average size of the household works out to5.8 persons per household. The age distribution of the population follows the normal pattern with 13.8 percent in the 0-4 age group and decline steadily to 1.0 percent in the 75 and over age group. The percentage of population in 0-4 age group is slightly higher in rural areas ( 14.6 percent) due t higher fertility in rural areas. Children under 14 years of age constitute 44.6 percent of the population

while the working ages (15-59) amounted to 50.9 percent of population. Old persons (60 and over) constitute 4.5 percent of the population. The dependency ratio works out to 965 dependants for 1000 persons of working age.

#### Economic Characteristics:

The State has an active population of 312,548 out of a population of 702,610 in the age group of 10 and over, or 44.5 percent of the population is economically active. The refined activity rate for males and females are 74.1 percent and 13.0 percent respectively. The latter is low due to traditions restricting participation of women as well as under reporting of women in traditional agricultural activities. The activity rate for males are 69.6 percent in urban and 76.4 percent for the rural. The activity rates for females are 12.0 percent in urban and 13.5 percent in the rural.

The unemployment rate in the State is 23.9 percent of active population for both sexes, 19.1 percent for males and 52.8 percent for females. The unemployment rate in urban areas is 15.8 percent for males and 39.9 percent for females. The unemployment rate for rural areas work out to 20.7 percent for males and 58.9 percent for females. A large proportion of the unemployed in both rural and urban areas and among males and females are those seeking work for the first time.

#### Educational characteristics:

The literacy rate for persons 6 years and over is 43.1 percent for both sexes – 50.6 percent for males and 35.3 percent for females. In urban the literacy rate is 63.6 percent for both sexes, 40.1 percent for males and 25.3 percent for females. The crude enrolment ratio for the primary school age group (6-11) is 39.1 percent for both sexes- 42.9 percent for males and 35.2 percent for females. The crude enrolment ratio for general secondary age group (12-14) works out to 52.0 percent for both sexes -56.6 percent for males and 46.6 percent for females.

#### Social and household characteristics:

The major ethnic groups in the State is Hadandowa and Bani Amir accounting for 26 percent and 15 percent of the population respectively. Beja speakers constitute 43.9 percent of the population of the State, the next important language is Arabic with 30.6 percent of the population.

The percentage of population who lived in own dwellings is 60 percent in urban and 80.5 percent in rural areas. Urban areas of the State is better off than rural areas in respect to availability of general electricity supply: 38 percent of urban population has electricity against only 5.4 percent in rural areas. In urban areas 82.5 percent of the population have piped water while only 10 percent of rural population have piped water. 56 percent of rural population depended upon wells and donkey for their water supply, and 28 percent on river and turaa.

### **3-Gadarif State.**

Area and location.

The State is neighboring the Ethiopian borders, between Latitudes 35-33west and 30-36 east, and longitudes 12.45south 40.15 north.

Total area is 7523 square kilometer.

Land:

Most of its lands are flat cotton soil, sloping gradually from south towards the north. The land is crossed by several seasonal rivers and wadies (valleys). There are also scattered small hills such as: Bella hill, Tiraif, Balos. Kartot, Matroh and Kasmor hill. Average seasonal rainfall is between 400-900 m/year.

#### Population:

According to 1993 National Census, total number of population is 1143362, 36.9% of this live in urban centers and 63.1 in the rural areas.

There are three main towns (Gadarif town, Rahad, Galabt and Fashaga).

Administratively the State is divided into 4 Muhafazats (municipals), each one composed of several Mahalyat (localities). Total number of localities is 23.

#### Ethnic and Tribal composition:

The State hosts multi-ethnic and diversified tribal groups, such as:

Shukrya tribe which is mainly pastoralist raising camel and cattle and practicing small scale seasonal shifting agriculture.

Habanya tribe who are settled and practiced rain-fed mechanized cultivation and also raise cattle.

Bani Amir tribe who are mainly nomadic raising camel and cattle. Each one of these tribes subdivided to smaller units like lineages and households etc.

#### **Khashm El Girba Dam:**

The 1959 Nile Water Agreement allowed Egypt to construct the High Dam at Aswan and to inundate large Egyptian and Sudanese Areas on the banks of the Nile. The area inundated was inhabited by the Nubians and used for agricultural production. The same Agreement permitted the Sudan to utilize additional waters of the Nile Basin. It was decided to use the water of Atbara river, a tributary of the Nile, for development of agricultural lands on which the Nubian (Halfawin people) who were affected by Aswan Dam, could be resettled. Besides, the indigenous inhabitants of the Atbara-Settet Basin would be resident farmers. The main ethnic groups in the Basin are the Shukrya and the Hadandawa, both are pastoralist tribes. There were 21968 tenants on the scheme, 11632 of whom are Shukrya, 6407 are Nubians and the remaining 3929 are mostly Hadandawa and Beja.

The Khashum El Girba Scheme was established in 1964, on a large plain area of the Atbara-Settet Basin, on the western side of Atbara river, and north of the village of Khash el Girba, which gave the project its name, until the Government of Sudan changed the name to New Halfa.

The project was to contribute to an increase in export earnings by production of cotton and groundnuts and make the national economy less dependent on food imports by production of wheat and sugar. While sugar is produced on a state-owned cane plantation, the other crops are grown by tenants on 15 feddan (= 6.3 hectares) farms. Tenancies are given on lease basis to selected applicants, and tenants are not allowed to cultivate other crops on their holdings, nor to feed herds of animals inside the scheme, except one cow and 5 goats /sheep.

**Management:**

Sanctioned by a tenancy agreement, a system of division of responsibilities exists between management (The Agricultural Production Corporation) and tenants, particularly with respect to cotton production. The corporation is responsible for the overall development, and the various operations are carried out partly by the management, partly by the tenants who may employ hired labor. Thus production on the scheme is scheduled with tight timetables, and the core feature is the organization of centrally controlled, technical service upon which production on the holdings depends. Tenancies are arranged for the convenience of operation of the central service and irrigation, which is the responsibility of the Ministry of Irrigations branch offices at Khashm el Girba and New Halfa.

The Scheme is provided with irrigation water through an integrated network which comprises the following components:

- 1- Khashm El Girba Dam (on Atbara river).
- 2- Main canal
- 3- Branches
- 4- Major canals
- 5- Miner canals
- 6- Small canals
- 7- Field channels
- 8- Drainage system network.

The flow in this complex network, from the dam up to the collector and escape drain, is basically by gravity (as the Gezira scheme described below), except a very small part at the beginning of the Scheme, where pumping, from the main canal, is used to irrigate about 28600 fed. (7% of the total area) of relatively high land which could not be commanded by gravity.

Khashm El Girba dam was constructed to control the torrential behavior of the flow of Atbara river, which commences in six months, July-December. About 85% of this flow takes place in three months. The main functions of the Dam are:

- a- provide irrigation water for New Halfa agricultural corporation, sugar farm and other irrigation water users.
- b- Limited hydro electrical generation
- c- Provide drinking water for the New Halfa town and villages in the Scheme.

The designed storage capacity of the Dam is 1.3 milliards cubic meters.

This Dam was the first phase in a series of dams for the full utilization of this valuable water resource. It was anticipated that a second dam shall be needed after 30 years, to compensate the expected storage loss due to siltation in the reservoir of this dam. A third dam shall be needed after another 30 years later.

According to the last survey conducted in 1993, the Dam capacity had drastically decreased to only 0.6 millions cubic meters. It is believed that the reservoir has reached regime storage and no more reduction of storage is expected. The annual water balance in the last 10 years confirmed this.

**Stakeholders:**

All the above mentioned water infrastructures in the Scheme are owned by Sudan Government. New Halfa Agricultural Corporation (NHAC) is responsible for the management and maintenance of minor and small canals while the Ministry of

Irrigation (MOR) is responsible for the Dam, main canals branches and minor canals that serves all users.

**Distribution of tenancies:**

Among the Nubian, ( who were transferred from Old Halfa because of the building of Swan Dam), holdings were to be distributed according to a priority system based on:

- 1/ ability to cultivate
- 2 /reliance on agriculture as a means of support
- 3/ dependent family
- 4/ residence in the Scheme
- 5/ extent of freehold land already held (when they were in Old Halfa).

In practice, most people who were married , had family and a house in Old Halfa, were given tenancies: teachers, clerks, cooks and drivers along with those who used to be active cultivators. Because of this policy, the Scheme management had to accept what is known as ( the Wakil) institution. That is, a number of tenants never settled down in the Scheme, and several among those who did never took up cultivation, but left their lands for a father, a brother or any other person who then acted on their behalf. As such, accumulation of tenancies and absenteeism are phenomena as old as the project itself.

In the nomadic areas, there could be no distribution of lands based on earlier agricultural experience, and the government worked mainly through the native administration- who in some cases have been accused of appropriating lands primarily for themselves and their families.

There are 24 Nubian villages inside the Scheme, with 250-300 household each. Each village has its own primary school, piped water supply, sanitation facilities, midwife and a medical assistant, and some of the villages are electricity supplied.

In the nomadic areas, there are 33 villages of various size. Houses have not, as in the Nubian case, been constructed for the settlers. Mud and straw together with wood and bamboo poles have been used in the construction of their dwellings, but a number of tenants ( nomads) still live in traditional tents inside the Scheme. Inadequate and much less extensive social services and amenities were provided for. The settled nomads showed initiatives for building schools by their own.

**Lessons drawn from this Development Scheme:**

Since its establishment in 1964, the Scheme has proved disappointment to both the Sudanese Government and the tenants, and at present situation is more serious. Yields have been low and fluctuating, and production costs are steadily rising with no comparable price hike. Tenant households, now more than ever, are unable to live off one tenancy only and must either have other sources of income, cultivate several tenancies, or leave the Scheme.

The other reason for failure is that:

1/ Khash El Girba dam , which was designed to hold 1.3 billion cubic meter of water has had its capacity reduced every year due to silting by alluvial deposits from the Atbara river. In 1975 the capacity of the Dam was 0.75 billion cubic mere, while in 1997 was 0.6 billion cubic meter ( see Assessment Evaluation Study 2003 attached).

2/ Variability of rainfall: Crop production fluctuates enormously due to climatic reasons, and in the nomadic areas, the rate of fluctuation reached as much as 30%. The critical period is July-September, when the rainy season sets in at the same

time as cotton and groundnuts are sown. Precipitation sometimes obstructs agricultural operations and makes access to the fields impossible. usually there is continuous rains up to the first week of September, and it is impossible not only to carry out the different operations on time but also to clear the weeds that grew very fast.

3/Weed infestation: Weed is a major threat to the Scheme. The reasons for weed infestation are many, including high rainfall, fallow lands functioning as breeding areas, lack of equipments, lack of heavy sub-soil ploughs and insufficient allocations for control operations. The cleaning of weeds becomes a share of the production costs for each tenancy. Conferences are held between the Scheme administration and the tenants to agree on how to control weeds ( see photos attached).

4/ Other problems relate to the kind of crops cultivated, specially groundnut which both the Nubian tenants as well as the nomad tenants are reluctant to cultivate. Also the problem of animal trespass specially during the dry season ( December to April/May) when the Sachem has to be protected against animal trespass. The police and sometimes the Sudanese Army are used to defend the Scheme from animal trespass.

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**Table 3.**  
**Tekeze\_Atbara Basin Indicators**

Indicator	Tekeze_Atbara Basin			
	Average	State		
		Nahr Elnil	Kassala	Elgadarif
<b>Migration</b>				
Life-time migration In (%) 1993	4.2	1.5	4.2	6.8
Life-time migration out (%) 1993	3.4	5.6	2.6	2.1
Out-migrants within state (Rural-to-Urban) (%) 1993	28.4	42.0	15.9	27.2
Out-migrants within state (Urban-to-Rural) (%) 1993	9.6	3.6	16	9.2
<b>Disability</b>				
Disability rates (per 1000) 1993	14.2	16.8	12.3	13.4
<b>Education</b>				
Intake in basic education total (%) 2002-2003	77.8	97.9	74.9	60.5
Intake in basic education boys (%) 2002-2003	80.6	101.7	77.5	62.7
Intake in basic education girls (%) 2002-2003	74.8	93.8	72.3	58.3
Enrolment rate in basic education total (%) 2002-2003	63.6	86.3	51.4	53.0
Enrolment rate in basic education boys (%) 2002-2003	67.6	88.0	56.0	58.8
Enrolment rate in basic education girls (%) 2002-2003	59.5	84.5	46.8	47.1
Literacy rate 10 years and over _ total 2000	51.0	71.7	38.0	43.3
Literacy rate 10 years and over _ males 2000	51.1	71.9	38.1	43.2
Literacy rate 10 years and over _ females 2000	50.9	71.5	37.8	43.3
<b>Labour force</b>				
Crude labour force participation rate (total) 1993	26.4	25.4	28.0	25.7
Crude labour force participation rate (females) 1993	7.3	5.1	8.2	8.6

Indicator	Tekeze Atbara Basin			
	Average	State		
		Nahr Elnil	Kassala	Elgadarif
<b>Fertility and Mortality</b>				
Infant mortality rate _ total 1993	107	92	102	128
Infant mortality rate _ males 1993	112	95	107	135
Infant mortality rate _ females 1993	102	88	96	122
Under 5 mortality rate _ total 1993	156	131	147	190
Under 5 mortality rate _ males 1993	158	132	150	193
Under 5 mortality rate _ females 1993	154	130	144	187
Life expectancy at birth _ males 1993	54	57.0	53.5	50.5
Life expectancy at birth _ females 1993	56	58.8	55.4	52.6
Total fertility rate 1999	6.2	4.7	7.0	7.0
Crude birth rate 1998-2003	37.6	34.7	37.8	40.3
Crude death rate 1998-2003	10.6	9.7	10.5	11.7
Natural increase rate per 1000 1998-2003	27	25	27	29
<b>Tekeze Atbara Basin</b>				
Indicator	Average	State		
		Nahr Elnil	Kassala	Elgadarif
<b>Health</b>				
<b><u>per 100,000 Services Provision population</u></b>				
Hospital	1.5	2.9	0.6	1
Beds	92.9	156.6	61.7	60.5
<b><u>Houman Resources per 100,000 population</u></b>				
Specialists	1.7	2.3	1.5	1.2
Dentist	0.5	1.2	0.2	0.2
Doctors	8.6	14	5.3	6.5
Techniatians	6.0	8.5	3.7	5.7
Medical Assistants	24.6	38.1	22.9	12.8
Nurses	62.7	84.3	54.8	48.9
P.H officers /Inspectors	1.4	1.4	1.6	1.2
M.W per 100.000	38.6	42.9	39.9	32.9
H.V.per	2.0	2.6	2.1	1.4
<b><u>The Leading causes of admission hospitals for 2003 cases as % of state total</u></b>				

<u>discharge</u>				
Malaria	25.6	26.7	28.7	21.5
Pneumonia	9.7	10.5	6.3	12.3
S.S.delivery	9.8	8.9	14.3	6.1
obs &gyna	5.0	2.2	7.7	5.0
Asthma	1.6	1.4	0.8	2.7
<b>The Leading causes of deaths in hospitals 2003</b>				
<u>disease specific deaths as % of total state deaths</u>				
Malaria	14.6	7.9	25.1	10.9
Pneumonia	5.4	4.6	6.6	4.9
Septicemia	3.7	5.9	2.7	2.5
Circulatory syst.	2.7	1.8	1.5	4.9
Anaemias	4.3	2.3	4.7	5.9
Malnutrition	2.5	0.8	1.0	5.8
Dehydration	1.7	0	0.5	4.6
Acute renal failure	4.5	6.9	4.4	2.1
Diarrhoea & Eg.	1.3	1.0	1.0	1.8
Other heart dis.	2.2	1.3	4.2	1.0
Total (10) Deaths.	42.9	32.6	51.6	44.6
Total of other deaths	57.1	67.4	48.4	55.4
Grand total	100.0	100	100	100
CBS=Central Burea of Statistics				
MOE=Ministry of Education				
MOH=Ministry of Health				
MICS=Multiple Indicator Cluster Survey				
SMS=Safe Motherhood Survey				

## **Blue Nile Basin**

Nile Basin can not be considered as a One Basin ( as, for example, Takezee- Atbara or Okobo-Sobat Basins), because it extends from the Blue Nile State bordering Ethiopia, from the south east, down wards to the Northern State, bordering Egypt at the north. In fact the Basin hosts more than five States, and transcends different environmental,, ecological, social and economic variations. As such, and for the purpose of data collection and data analysis, we will divide it into two main zones, northern and southern, such is the diversity between the desert north and the scrub and tropical forest of the south.

- 1- The southern zone extends from the Sudan- Ethiopian borders to Khartoum state. Thus, this zone includes the Blue Nile State, Sinnar State, Geziera State and Khartoum State.
- 2- The north zone extends from north of Khartoum State down ward to the Northern State, bordering Egypt.

### **Ethnic composition of the southern zone:**

This is the most diversified zone in terms of ethnic composition. Starting from the south to the north, and especially in Blue Nile State, the indigenous ethnic groups are; the Ingassana, the Berta (some are in Ethiopia and others in Sudan), the Watawit who are a cross-bread between northern Sudanese tribes like the Jaalyin, the Danagla, and the Berta tribe. Here are also other indigenous tribe like the Gumuz, the Hamaj, the Funj etc. Most of these ethnic groups are traditional farmers, cultivating staple crops for household consumption. They practice shifting cultivation, where the site of the farm shifts after being cultivated for four to five years. They live in small scattered villages.

As such land is owned by the tribe ( no-mans-land), yet each member of the tribe has the right to use the land but no registration. As far as the land is used by the member of the tribe, no one claims it, but when abandoned (as in shifting cultivation), then any one from the tribe has the right to utilize it.

Other activities include animal husbandry. The Ingasana are pastoralist who move with their cattle seasonally. The other ethnic groups own few cows and goats for house consumption.

The Berta ( and the Dawala) used to practice artesian gold mining. The area bordering Ethiopia, called Bani Shangol mountains, is historically famous of its gold.

Nomadic tribes usually raise their cattle in this zone seasonally, especially in the dry season, which starts from March to June. These are Rufaa El Hoi nomads and the Om Bararo ( western tribes coming from Nigeria).

In the early 1960s, Sudan government leased vast areas in this regional one for mechanized rain fed agriculture. Al most all the mechanized schemes were leased to merchants and business men from Khartoum and other part of Sudan . The indigenous inhabitants of the region were not illegible, because the regulations set by the government for the competition emphasized the financial capability and previous experience in mechanized farming, and both criteria's were in-applicable to the ingenious population of the region.. When the mechanized scheme were distributed no consideration was given to the nomadic groups who used to raise the livestock in the region. As such, conflict over land, especially

between the owners of these mechanized rain fed agricultural schemes and the nomads, become so prevalent. The indigenous population became seasonal wage laborers. Many ethnic groups, especially the Ingassana, the Gumuz and the Berta joined the SPLM( Southern People Liberation Movement lead by the deceased John Garang). The region witnessed severe wars and the SPLA captured many important towns and villages. As such activities in the rain fed mechanized agricultural schemes were halted since 1997 up to now.

Also, many people fled their villages and came to Damazin and Rosseris towns as refugees. The government considered this region as war area and all NGOs were not allowed to practice their activities in the region.

#### **Rosseris Dam:**

Rosseris Dam was built in early 1960s at Damazin town (now the capital of the Blue Nile State), about 500 kilometers south-east of Khartoum, the capital of Sudan. The 280 mw hydro-electric plant located at the Dam, supplies nearly half the country power output, though generation varies greatly through the year with changing river flows. The Dam provides also irrigation water for the Gezera Plain (which will be discussed below). The Nile rises dramatically in the flood season between July and September when the Dam's five massive sluice gates are opened to permit silt to flow down the Nile and to avoid siltation of the reservoir. Damazin and Rosseris towns are the only towns in the Blue Nile State supplied with electricity. All the villages and towns in the State do not enjoy electricity or piped water. These are some of the grievances advocated by the indigenous inhabitants of the region.

#### **Sinnar Dam:**

The other Dam built in this region of the Nile Basin is Sinnar Dam. The Dam was built in 1925, mainly to irrigate the Gezera agricultural Scheme. Gezera Scheme was created under the management of British commercial Companies (The Sudan Plantation Syndicate SPS, with the aid of a large loan guaranteed by the British government in 1920s. Gaitskill (see Barnett 1977) argued that the Gezera Scheme was a remarkable example of development achieved by combining the entrepreneurial spirit of private enterprise with the paternalistic spirit of colonial government.

The reason behind the establishment of the Scheme was the pressure exerted by cotton manufacturer in United Kingdom, the British Cotton Growers. The failure of American and Egyptian crops in 1909 brought home the Lancashire Spinners the peril of relying on these two countries, especially for the longer and finer cotton. Besides, in the years prior to the First World War, the British textile industry was facing rapidly increasing competition from Europe, the United States and the Far East.

Gezera, island or peninsula, is a vast area of land which lies between the Blue Nile and the White Nile. But, in particular, it refers to that area which is irrigated and used for growing cotton, the staple export crop of the country.

Detailed historical and ethnographic information on the Scheme is available, and can not be presented here. Yet a general description of the way in which the Gezera Scheme is organized, and its impact on people will be sufficient here.

The Gezera scheme constitutes 12 per cent of the total area cultivated in the Sudan. It used to produce 75 per cent of the country's long staple cotton. In the past, between 30 per cent to 40 per cent of world production of extra long staple

cotton has come from the Sudan. Although cotton is obviously the main crop which is grown in the Gezera, others are also cultivated. Dura, or sorghum vulgare, is the staple food crop of the people. Farmers cultivate many varieties of sorghum. Lobia or dolichos lalab, is grown as an animal fodder, and in times of hardship, the beans it produces are eaten by the people. Groundnuts, or arachis hypogaea, and wheat are also grown. In recent years the Gezera area produces as much as 50 per cent of the Sudan's wheat and 1 per cent of the total groundnuts production. There are also vegetables gardens intended to improve the diet of the people. In a farming operation of this magnitude, a rotation system is necessary. It is necessary for many reasons such as conservation of land fertility, and to prevent the carry over of diseases and pests from one year to the next.

Within the Gezera Scheme, the land is owned by the government. It is lease by the government at an annual rate. It is argued that because of this absolute control of the land by the government, a feature of the Scheme since its inception, which has been a contributory factor to its success. Because of this arrangement, a tenant can not mortgage his land, and this avoids subdivision and impoverishment.

Moreover, the government control of the land area has permitted the kind of large scale, long-term planning which has been necessary.

Under the irrigation regime from 1925, inhabitants of the area became tenants, allocated a holding of land to be worked on an annual basis under the direction of the government. The tenancies were allocated first of all to those who had proprietary rights. But as they are not allowed to occupy more than they could work with their families, few men received more than two thirty feddan units.

Each of these was to be cultivated each year, ten feddans under cotton, 21/2 feddans under lobia, 21/2 under dura and fifteen feddans left as fallow. When a landowner had received his allocation, if he had a greater area of land than this, he was allowed to nominate a member of his family to occupy tenancies. If there were no more nominees, the tenancies were allocated to other villagers who wanted to cultivate. A tenancy can be inherited by a man's sons, daughters or wives.

When I was an undergraduate student at Khartoum University, I had the chance to work with Dr. Tonny Barnett, who was doing a comprehensive study of the Gezera scheme. He published an interesting book on the Scheme called: The Gezera Scheme, an Illusion of Development. The complete reference will be sighted at the end of the report, but I have provided ENTRO with a copy of the book.

**Table 5.**  
**Summary indicators**

Indicator	Blue Nile Basin						
	Average	State					
		Northern	Khartoum	Elgezira	Sinnar	Blue Nile	White Nile
<b><u>Migration</u></b>							
Life-time migration In (%) 1993	10.9	1.6	45.1	8.5	2.5	2.7	5.2
Life-time migration out (%) 1993	4.8	6.9	3.3	8.1	3.8	0.8	5.9
Out-migrants within state (Rural-to-Urban) (%) 1993	29.7	51.6	3.6	38.8	26.4	27.9	29.7
Out-migrants within state (Urban-to-Rural) (%) 1993	9.9	1.5	28.0	6.2	8.5	8.9	6.4
<b><u>Disability</u></b>							
Disability rates (per 1000) 1993	15.2	17.9	11.6	15.2	16.1	12.5	17.7
<b><u>Education</u></b>							
Intake in basic education total (%) 2002-2003	80.3	99.4	89.0	87.3	68.4	57.8	79.9
Intake in basic education boys (%) 2002-2003	85.1	99.1	87.4	92.1	84.6	64.3	83.3
Intake in basic education girls (%) 2002-2003	75.3	99.7	90.7	82.4	51.8	50.9	76.4
Enrolment rate in basic education total (%) 2002-2003	75.9	100.0	83.9	97.7	63.3	47.0	63.6
Enrolment rate in basic education boys (%) 2002-2003	76.7	102.9	85.3	84.2	66.2	54.2	67.5
Enrolment rate in basic education girls (%) 2002-2003	69.0	97.1	82.4	75.2	60.4	39.3	59.7
Literacy rate 10 years and over _ total 2000	57.2	71.5	74.9	58.6	50.0	36.7	51.6
Literacy rate 10 years and over _ males 2000	58.0	72.2	75.9	59.5	50.0	38.4	51.8
Literacy rate 10 years and over _ females 2000	56.5	71.0	73.9	57.7	49.9	35.2	51.4
<b><u>Labour force</u></b>							
Crude labour force participation rate (total) 1993	27.3	25.3	30.2	25.5	26.4	29.9	26.4
Crude labour force participation rate (females) 1993	7.0	4.3	9.3	7.4	5.2	7.8	8.1
<b><u>Fertility and Mortality</u></b>							
Infant mortality rate _ total 1993	105.0	99	92	89	115	130	105
Infant mortality rate _ males 1993	112.3	108	98	101	121	137	109
Infant mortality rate _ females 1993	97.0	90	85	76	109	122	100
Under 5 mortality rate _ total 1993	152.0	143	131	126	168	192	152
Under 5 mortality rate _ males 1993	158.5	152	137	141	171	197	153
Under 5 mortality rate _ females 1993	145.3	134	125	111	165	187	150
Life expectancy at birth _ males 1993	52.4	45.7	56.1	55.6	53.1	49.0	55.1
Life expectancy at birth _ females 1993	57.3	58.7	59.8	61.3	55.5	51.2	57.1
Total fertility rate 1999	5.8	4.8	4.8	5.5	5.9	7.1	6.4
Crude birth rate 1998-2003	37.5	34.0	33.7	38.5	39.9	38.5	40.4
Crude death rate 1998-2003	10.4	10.8	8.8	9.5	10.9	12.3	10.0
Natural increase rate per 1000 1998-2003	27.1	23	25	29	29	26	30.4

Indicator	Blue Nile Basin						
	Average	State					
		Northern	Khartoum	Elgezira	Sinnar	Blue Nile	White Nile
<b>Health</b>							
<b>per 100,000 population Services Provision</b>							
Hospital	1.8	4.9	0.8	1.3	1	1.7	1.1
Beds	106.9	240.1	103	75.5	83.8	63.2	76
<b>Houman Resources per 100,000 population</b>							
Specialists	3.9	3.3	12.5	2.6	2	1	2.1
Dentist	1.0	0.8	3.1	0.6	0.6	0.3	0.3
Doctors	17.6	17.9	48.9	10.9	9.4	9.8	8.6
Techniatians	11.8	8.3	39.3	6.4	4.1	5.9	7.0
Medical Assistants	30.1	53.4	39.1	23.8	19.8	18.1	26.3
Nurses	77.7	110.1	82.7	52.5	129.8	39.4	51.5
P.H officers /Inspectors	1.4	1.1	2.3	2.1	0.7	1.1	1.3
M.W per 100.000	44.8	74.9	36.8	37.0	53.6	31.2	35.5
H.V.per	2.4	2.4	2.2	2.2	2.3	3.3	2.1
<b>The Leading causes of admission hospitals for 2003</b>							
<b>cases as % of state total discharge</b>							
Malaria	32.4	20.8	9.6	30.1	51.7	45.1	37.0
Pneumonia	11.8	14.1	11.6	13	7.7	11	13.1
S.S.delivery	7.0	6.3	8.9	5.7	6.5	2.4	12
obs &gyna	4.6	2.3	4.8	7.5	5.9	2.6	4.6
Asthma	2.3	2.1	8.7	1.3	0.5	0.8	0.6
<b>The Leading causes of deaths in hospitals 2003</b>							
<b>disease specific deaths as % of total state deaths</b>							
Malaria	24.6	14.5	7.7	8.1	23	44.6	49.6
Pneumonia	14.4	8.0	7.0	12.6	29.6	14.1	15.2
Septicemia	2.5	1.1	7.5	5.5	0.8	0	0.2
Circulatory syst.	1.8	0	6.8	3.0	1.1	0	0
Anaemias	4.7	4.7	3.5	4.4	6.2	4.6	4.5
Malnutrition	3.2	1.1	3.1	5.3	0.4	9.5	0
Dehydration	2.5	1.8	4.0	5.6	0.8	0.7	1.8
Acute renal failure	2.2	3.3	4.3	5.2	0	0	0.6
Diarrhoea & Eg.	3.7	4.3	3.8	0	3.6	9.5	1.0
Other heart dis.	3.6	6.2	3.0	4.8	1.7	0	6.0
Total (10) Deaths.	63.2	44.9	50.6	54.7	67.0	83.0	78.8
Total of other deaths	36.8	55.1	49.4	45.3	33.0	17.0	21.2
Grand total	100.0	100	100	100	100	100	100



**Table 4.**

There are six states in this basin; Northern, Khartoum, Elgazira, Sinnar, Blue Nile and White Nile.

Indicator	Blue Nile Basin							Source
	Average	State						
		Northern	Khartoum	Elgezira	Sinnar	Blue Nile	White Nile	
<b>Demographic</b>								
Estimated Population (000) 2004		624	5553	3797	1301	716	1636	Data sheet,2004,CBS
Annual growth rate (%) 2003-2008	2.7	1.58	3.67	2.79	2.53	2.92	2.47	Data sheet,2004,CBS
Urban population (% of total) 2004	35.7	16.06	87.2	23.53	29.67	26.88	30.72	Data sheet,2004,CBS
Population under age 5 (% of total) 2004	15.4	14.12	14.37	15.88	16.2	15.38	16.47	Data sheet,2004,CBS
Population (06-24) years (% of total) 2004	43.6	41.12	39.85	43.51	45.84	45.66	45.86	Data sheet,2004,CBS
Married women (15-49) years (000) 2004	321	81	741	520	202	125	259	Data sheet,2004,CBS
Population under 15 years (% of total) 2004	40.9	39.14	36.18	41.73	43.23	41.03	44.36	Data sheet,2004,CBS
Population 60 years and over (% of total) 2004	4.4	6.04	3.87	4.44	4.01	3.78	3.97	Data sheet,2004,CBS
Sex ratio males per 100 females 2004	102		105	112	98	96	99	Data sheet,2004,CBS
Nomadic population (%) 1993	1.4	1.6	0.5	0.5	2.2	1.8	1.9	Analytical report,1996,CBS

The estimated total population of Nile Basin is 13,627,000 with average annual growth rate of 2.7 % . The height growth of 3.7 % was scored in Khartoum. Children under 14 years of age constitute 41 % of the population while the old persons (60 and over) constitute 4.4 percent of the population. Blue Nile Basin contains six Federal States. These are Northern State, Khartoum State, Al Gezera State Sinnar State, Blue Nile State and White Nile State. What Follows is quantitative and qualitative description of the Basin by each State:

## **1. Northern State:**

### Geographical Location

The State extends bet lat.30-32 east, and lat. 16-22 north. It borders three State: Naher el Nil State from south east, north Kordufan from south west, North Darfur from the west and Khartoum State from south east (seen map attached).

Most of State land is desert land, and the desert is encroaching towards the Nile banks. The State suffers from desertification. There are three famous deserts expanding in the State: Attmore or Nubian Desert, Bayoda Desert and the western Libyan Desert.

The climatic conditions are difficult, no few rains (55mm) but the winter season is very cold.

According to the administrative organization the State is composed of four Muhafazat, each Muhafaza is divided administrative into smaller units called Mahalya. The total numbers of Mahalyat in the State is thirteen. Of these, there are three Mahalyas considered as towns (Dongala town, Halfa town, and Kariema town) and 20 rural Mahalya.

### Ethnic Composition:

The State inhabitants, like most of the other States in Sudan, are multy-ethnic. Major ethnic groups are Danagla, Halfawien, Bidirya, Manasir, Mahas, Shaiygia, nomadic Arabs etc.

### Natural Resources:

According to the final tabulations of the forth population census carried out on April 1993, the population of the Northern State grown from 432,086 in 1983 to 511,693 in 1993, amounting to an average annual growth rate of 1.66 percent. The sex ratio of population works out to 91 males per 100 females. The average size of household works out to 5.6 persons per household. The age distribution of population follows the normal pattern with 12.3 percent in the 0-4 age group and declining steadily to 1.8 percent in the 75 and over age. The percentage of population 0-4age group is slightly higher in rural areas (13.4 percent) which is probably due o high fertility in rural areas. Children under 14 years of age constitute 37.9 percent of the population while the working age (15-59) amounted to 54.9 percent of the population. Old persons (60 and over) constitute 7.2 percent of the population. The dependency ratio works out to 820 dependants for 1000 persons of working age. Among persons, 12 years of age and over, never married persons constitute 46.0 percent while currently married amounted to 44.2 percent.

The literacy rate for persons 6 years and over is 65.7 percent for both sexes-74.3 percent for males and 58.0 percent for females. In urban areas the literacy rate is 75.1 percent

for both sexes, 81.2 percent for males and 69.0 percent for females. In rural areas, the literacy rate is 64.3 percent for other sexes, 73.3 percent for males and 56.9 percent for females. The crude enrolment ratio for general secondary age group (12-14) works out 82.1 percent for both sexes -84.0 percent for males and 80.1 percent for females. The crude enrolment ratio for the secondary age group (15-17) works out to 63.8 percent for both sexes - 64.4 percent for males and 63.1 percent for females. The crude enrolment for the tertiary level age group (18-24) works out to 24.4 percent for both sexes – 26.5 percent for males and 22.6 percent for female. While the sex differential persists in crude enrolment ratio as well as the literacy rate for the Northern State, the rates for males is only slightly higher than for females. The State has an active population of 127,627 out of 363,349 in the age group 10 and over, or 35.1 percent of the population is economically active. The refined activity rates for males and females are 68.9 percent and 5.9 percent respectively. The census explained the low rate of females due to traditions restricting participation of women as well as under reporting of women in traditional agricultural activities. The activity rates for males are 70.0 percent in urban and 68.8 percent in rural, and the activity rates for females are 11.6 percent in urban and 5.2 percent in rural. The unemployment rate in the State is 8.8 percent of active population for both sexes, 7.4 percent for males and 23.1 percent for females. Attached with this report a detailed statistical data covering various aspects in the State e.g. Number of households and their population by sex and types of residence according to State, Mohafaza and town/rural council etc.

## **2. Blue Nile State**

### **Geographical Location:**

The State extends between lat. 23,8-35,15 east and 9,20-12-24 north. It borders Ethiopia from the east, and Upper Nile State from the south and south west, and Sinnar State from the north and the north east. Total area of the State is about 26,708 kilometer.

### **Demographic composition:**

The population of the Blue Nile State had grown from 325,630 in 1983 to 512,843 in 1993, amounting to an average annual growth rate of 4.46 percent. The sex ratio of the population is 108 males per 100 females. The average size of household is 6.4 persons per household. The age distribution of the population is 17.6 percent in the 0-4 age group, and declining steadily to 1.4 percent in the 75 and over age group. The percentage of the population in 0-4 age group is slightly higher in rural areas (18.2 percent) which are due to high fertility in rural areas. Children under 14 years of age constitute 48.1 percent of the population, while the working age (15-59) is 47.0 percent of the population. Old persons (60 and over) constitute 4.9 percent of the population. The dependency ratio is 1128 dependents

for 1000 persons of working age. Among persons 12 years of age and over, 43.8 percent are never married.

Population distribution and migration:

Ten percent of 1000 persons enumerated in Blue Nile State are foreign born and most of them are in the age group of 35 and over. Urban population of the Blue Nile State is 20.7 percent, 21.1 percent among males and 20.2 percent females. The largest urban settlement in the State is Damazin with population of 72,000, the Rosseris town with 34,000.

**Educational characteristics:**

The literacy rate for persons 6 years and over is 30.0 percent for both sexes, 38.9 percent for males and 20.6 percent for females. In urban areas the literacy rate is 58.5 percent for both sexes, 68.8 percent for males and 46.9 for females. In rural areas the literacy rate is 22.2 percent for both sexes, 30.5 percent for males and 13.4 percent for females. The crude enrolment ratio for the primary school age group (6-11) is 29.1 percent for both sexes, 32.4 percent for males and 25.4 percent for females. The crude enrolment ratio for general secondary age group (12-14) is 39.0 percent for both sexes, 43.9 percent for males and 33.4 percent for females.

The major ethnic groups in the State are Funj and Nigerian tribes accounting to 36.5 percent and 20.7 percent of the population respectively. Other major groups are Hamaj, Ingassana Berta, Gumuz, Dwalla etc. The percentages of these groups need to be investigated. The Blue Nile State Witnessed prolongs wars and conflicts under the leadership of Malik Agar, from The Ingassana tribe and supported by the PSLA. Part of the State is occupied, and still under the authority of the SPLA.

Damazin Dam Is a biggest investment in the State, which produces one third of national electricity, transported to Khartom. Indigenous population always complains that they did not benefit from the Dam. Also there are major lands put to mechanized scheme cultivation (mainly sorghum and sesames). Merchants own most of these lands from Khartoum and other regions. Indigenous people argue bitterly that they were impoverished because they lost their land and become seasonal labors.

**3. Sinnar State:**

The population of Sinnar State had grown from 730,651 in 1983 to 977,650 in 1993, amounting to an average annual growth rate of 2.86 percent. The sex ratio of population is 100 males per 100 females. The average size of household is 6.2 persons per household. The age distribution of population follows the normal pattern with 15.8 percent in 0-4 age group and declining steadily to 1.7 percent in the 75 age group. The percentage of population in 0-4 age group is higher in rural areas (16.8 percent) than in urban areas (13.8) which are, probably, due to higher fertility in rural areas. Children under 14 years of age constitute 46.7

percent of the population while the working ages (15-59) amounted to 47.5 percent of the population. Old persons (60 and over) constitute 5.8 percent of the population. The dependency ratio works out to 1105 dependent for 1000 persons of working age. Only 6.9 out of 1000 persons enumerated in Sinnar State are foreign born and most of them are found in the age groups 5-25.

Urban population in Sinnar State is 24.4 percent of the population. The largest urban settlement in the State is Sinnar town, which had a population of 72,000. The other important urban centers are Sinja and Mayrno having a population of 39,000 and 24,000 respectively.

Economic Characteristics:

The State has an active population of 252,287 out of 633,593 in the age group 10 and over, or 39.8 percent of the population is economically active. The refined activity rates for males and females are 73.2 percent and 7.8 percent respectively. The activity rates for males are 68.9 percent in urban and 74.8 percent in the rural. The activity rate for females are 10.8 percent in urban and 6.6 percent in rural. The latter is low due to traditions restricting participation of women as well as under reporting of women in traditional agricultural activities.

The unemployment rate in the State is 17.0 percent of active population for both sexes, 14.4 percent for males and 41.4 percent for females. The unemployment in urban areas is 13.1 percent for males and 27.1 percent for females. The unemployment for rural areas is 14.8 percent for males and 49.6 percent for females.

Only 34.0 percent of the population has piped water and 33.5 percent of the population of the State depend upon wells and donkey for their water supply. For more detailed demographic and statistical data see: The Fourth Population Census of Sudan 1993, Final Tabulation, Sinnar State, (attached).

## **Annotated bibliography**

### **( Tekeze-Atbara basin)**

#### **1. Ezdehar Mohamed Ahmed Yousif**

*Assessment of Coping Mechanisms to Desertification A case study of Um Jawasir*  
*Msc.. Thesis U.of K. feb.2005*

The Thesis deals with the impact of climate changes on vulnerable communities in Northern State. Two main tribes in the region the Habania and the Hawawir. The Thesis claims that the main thrust for sustainability indicators for renewable natural resource management, in agriculture and rural development in particular, has its origins in the sustainable development paradigm. The objectives of the Thesis are to explore the potential role of the sustainable livelihood assets of household under prevailing climate change and desert encroachment, thus enabling them to adapt. Umjawasir was taken as a case study, which lies at the southern part of Marawi province. The Thesis concludes that in Umjawasir most of the small farmers rely on subsistence and cash crops, which are barely sufficient, and animal breeding is the second source of income, no surplus money is generated to be invested. The study area suffers from desert encroachment and long-term climatic changes. Decrease in rainfall and animal and man activities are the main reasons for the desertification of the study area.

ADARA –Non Government Organization- contributed positively in resettlement of Hawawir nomadic tribe in the region. The thesis describes the different economic activities in the region, and how crop cultivation and animal husbandry are combined together as means of survival. The Thesis also described the various types of labor availability and labor management (both family labor and hired labor).

#### **2. Tarig Bashir Abdalla**

*The Determinants of Agricultural Production and the Optimum-Cropping Pattern in Northern State, Sudan.*

*Msc.. Thesis U.of K. March 2005*

The main objective of the Study is to evaluate farming system in the Northern State. The Thesis described the study area showing that farmers live on both sides of the Nile banks, where the environmental condition are suitable for growing horticultural and fields crops. It claims that most of the country's demand for broad beans, spices and almost all date palms production is met by the State. Besides, the State has a comparative advantages in wheat production.

Despite this, the Thesis claims that agricultural production in the Northern State faces problems of high cost of production, low crop yields, low prices and accordingly low farmers income. The Study described and investigated the socio-economic characteristics of farmers,

efficiency of resource use, identification of constraint facing agricultural production in the State and examined the effects of certain scenarios on farmers income, resource use and crop mix.

The Thesis showed that the main crops cultivated in large areas in Merowe were broad beans and wheat. Broad beans, as a major crop, were cultivated in large areas followed by wheat. In Dongala locality, the two main crops cultivated were also broad beans and wheat but were of equal area. Yields of both crops were low, and yields of other potential crops like tomato garlic and onion were low.

The study recommend the use of comparative and absolute advantages ,hence, wheat should not be produce in the state under the present level of productivity and low prices and instead produce tomato, onion and broad beans in Merowe locality and broad beans, garlic and fennel in Dongla locality. For the production of wheat crop on commercial basis, the thesis recommends the improvement of it's productively and prices. The study recommends farmers in both localities o adopt crop rotation in shut a way that lands cultivated in summer season should not be cultivated in winter season in the same year so as o improve the fertility o marginal and less productive lands. The study also recommends the improvement of extension services, credit facilities and availability of agricultural inputs.

### **3. Osman Gaffar Osman**

*Factors Affecting Agricultural Production in Northern Province.*

*Msc. Thesis U.of K. 1986*

The Thesis examines to what extent do land and migration affect agricultural production and production relation in Northern Province, case study of Dongala locality. The study describes population composition, land tenure, age and sex structure etc. The study argues that Northern Province is characterize by scarcity of land. The land has been limited by environment and high migration of its main labor force. Land in the Northern Province is also influenced by the availability of water, the Nile being the main source of water supply. Underground water is limited to the area near the river

The study stated that, although migration affects the age and sex structure of the population in the area, it plays a very important role in agricultural production in Donglola. Migrants are the main source capital in agriculture production. Migrants remittances are invested in the purchases of pumps and purchase of improved agricultural implements and seeds, which leads to high yields. The study mentioned that agricultural yields are comparatively higher in Dongla than in the other parts of the country. The main reasons being the high fertility of the soil and better land management. This is despite the fact that female labor is dominant in agriculture. Females perform tasks done mainly by male who migrate the region.

The study analyzed information on household members and size, structure and occupational structure the labor force and the economic structure of both family and hired labor, land holding, crop production, crop yields and factors affecting productivity. Source of finance, cost production and marketing are described.

#### **4. Mohamed Mahgoob El Bashir**

*Economic and Social Impact of Rural development Projects*

*Case study of Kaboushiay Agricultural Scheme, Nahar El Nil State*

*Msc. U. of K. 2005*

The main objective of the study is to identify the socio-economic impact of the scheme on the inhabitant of the region. The study hypothesis is that the Kaboushiay scheme failed to achieve its main objectives as it lacks the main components of sustainable development, together with ignoring public participation in planning. This failure has led to socio-economic and ecological degradation. Data was collected through different means primary and secondary. A questionnaire was administered on random sampling of the target population.

The study demonstrate that despite of the conducive physical and environmental conditions for growing various crops in the study area, the lack of proper planning was one of the main reason of the scheme failure. The study conclude that farmers left their villages in search for better living conditions, villages in the scheme are suffering from bad health conditions. The study recommends the urgent provision of infrastructure such as health services, education, finance, extension services etc.

#### **6- Amal Dirar El Sheih Idris**

*Community Participation Approach in Rural development*

*Case study of Area Development Schemes Central Butana (ADSCB).*

*Msc. U. of K. 2001*

The main objective of the study is to discuss, analyze and assessment of the community participation (bottom-up) development approach adopted by ADSCB which aims at the promotion and achievement of sustainable rural development in Sudan. The study investigated the forms, degrees and levels of community participation and assessed the role of the local institutions and culture in development process.

The study showed that there is a considerable gap between participation in theory and in reality (implementation) in which the involvement and participation of local people was limited to the identification of priorities of the project activities, while the Project administration carried out the overall project activities e.g., decision making and implementation.



Women in the area were marginalized and their participation in the project was limited. The study concluded that the main constraints facing the project were:

- 1/ Economic constraints for people in the area spend much of their time in pursuing day to day basic needs.
- 2/ Marginalizing of women participation in development process.
- 3/ Conflict of interest and concentration of power in certain social and political groups.
- 4/ The project administration adopted some kind of top-down policies during decision making and implementation phases. In addition, there is a lack of mutual confidence between staff and the beneficiaries.
- 5/ High illiteracy rate among local people in the area.

### **5. New Halfa Agricultural Scheme**

New Halfa Agricultural Scheme (NHAS) is one of the promising agricultural schemes in Sudan, since it is the second biggest scheme in terms of size, after the Gezira Scheme. The Scheme extends between latitude 15-17 north, and about 360 kilometer from Khartoum. Total number of the tenants in the Scheme is 24455. Rainfall is between 200-250 mm, with heavy dark and cracking soil. It started agricultural production in 1964/1967 after the building of Khash el Girba Dam on Atbara River. The Dam was constructed to reserve 1.3-milliard quippic of water, now only 0.6 because of silting. There are three Turbines for generating electricity to the Halfa town and to the newly established villages in the Scheme.

The main reasons for the establishment of the Scheme were:

- 1/ To resettle Wadi Halfa immigrants after the construction of Swan High Dam.
- 2/ Resettle the nomadic tribes of the eastern Sudan, mainly Shukrya, Hadandawa, Baahin etc.
- 3/ Utilization of Atbara river water for developing the area by providing sustainable development projects.
- 4/ Production of cash crops for exportation (mainly cotton).
- 5/ Create new jobs.

### **(Blue Nile Basin)**

#### **1-Hayat Abdullah Bakhiet El Imam**

*The Incidence of Rural Poverty and sustainable Human Development Polices in Sudan.*

*A case study of El Zeiab Rural Area.*

*Ph.D. U.of K 2005*

The main objective of the study is to explain the causes and effect of rural poverty in Sudan, and to show its impact on population, so as to suggest policy options that would be helpful for reducing rural poverty and facilitating sustainable human development in the rural areas of Sudan. The study argues that ,in the last ten years (1992-2002) Sudan has witnessed

an accelerating spread of poverty, in such a way that individuals and households are becoming unable to satisfy their basic needs. This study has been of particular relevance for the reason that the increasing rate of rural poverty is already reaching unacceptable levels. Indeed, poverty is contradictory to human dignity and rights. And it bears negative effect on human development and individual achievements. It also increases social inequality and political instability, and therefore leads to the displacement of people.

The study adopted the following hypothesis:

- 1/ There is a relationship between development policies and the spread of poverty in rural areas.
- 2/ Development policies in Sudan have mostly favored the centre. These essential (top-down) policies have been principal literature of poverty in rural Sudan.
- 3/ The rural poor are not integrated into the development process, and do not participate in the making of decisions that affect their own lives.
- 4/ The national political, social and economic policies have concentrated on investment, finance and social services in urban areas, leading to greater unbalanced development, and increasing migration from rural to urban areas.

Different methods of data collection are used. The UNDP Human Development indicators of poverty, such as low income and deterioration in primary health care and basic education were used to show the incidence of rural poverty on population.

The study concluded that in all successive government of Sudan, before and after independence 1956, has failed to inst sufficiently in the rural areas. They concentrated on investment (financial and social services, such as primary health care and basic education) in urban areas, neglecting rural areas. This situation has led to greater imbalance in development, has pushed the rural population to migrate to urban areas, searching or better opportunities of employment and welfare live. It also argues that top –bottom development policies in Sudan have not been successful for a number of institutional and structural reasons. These policies have been an important reason for poverty. A truly sustainable human development policy for rural areas implies the need for (bottom- up) approach so as to enable the rural poor to analyze their own poverty and design heir own agenda for fighting poverty. Poor people in rural areas have-not participate in decision-making, and they have not been integrated in the development process.

## **2-Al Hadi Ibrahim Osman**

*Some Aspects of Small Farmers Credit Question*

*The case of Singa*

*Msc. U.of K. 1999*

The main goal of the thesis is to study the credit system in rural areas, and the relationship between Shail lenders, the Agricultural bank, and the small farmers. The study also seeks to investigate the practice of shail system and its effects on rural production process and to evaluate the performance of the ABS concerning credit provision and other services.

The study holds the hypothesis that the flourishing and the persistence of Shail relations in rural Sudan and the lending behavior of the ABS are reflection of the capitalist system and the inherent urban biased planning that serve the interest of the dominant socio-economic groups at the expense of the rural masses.

The study proved that traditional farming is no longer subsistent, as it has been thought of, and small farmers have become more responsive to the market demands under the policy of free market and liberalization adopted by the government. Farmers no longer borrow to meet consumption needs or paying for social and ceremonial obligation as before. Most of the credit directed to investment in agriculture. Shail lenders are dominant in rural financing markets. The ABS is biased for urban merchants visa-vis rural farmers and thus did not replace the traditional Shail system.

The study recommended the full democratization of economic and social life, the provision of basic infrastructures and social services.

**Annex I**  
**Statistical Tables (Sudan)**

**Table 6.**  
**1999 -2004 Population Estimates**

Total	Males	Females	Year
30326	15276	15050	1999
31081	15602	15479	2000
31913	16071	15842	2001
32769	16516	16535	2002
33648	16952	16696	2003
34512	17390	17122	2004

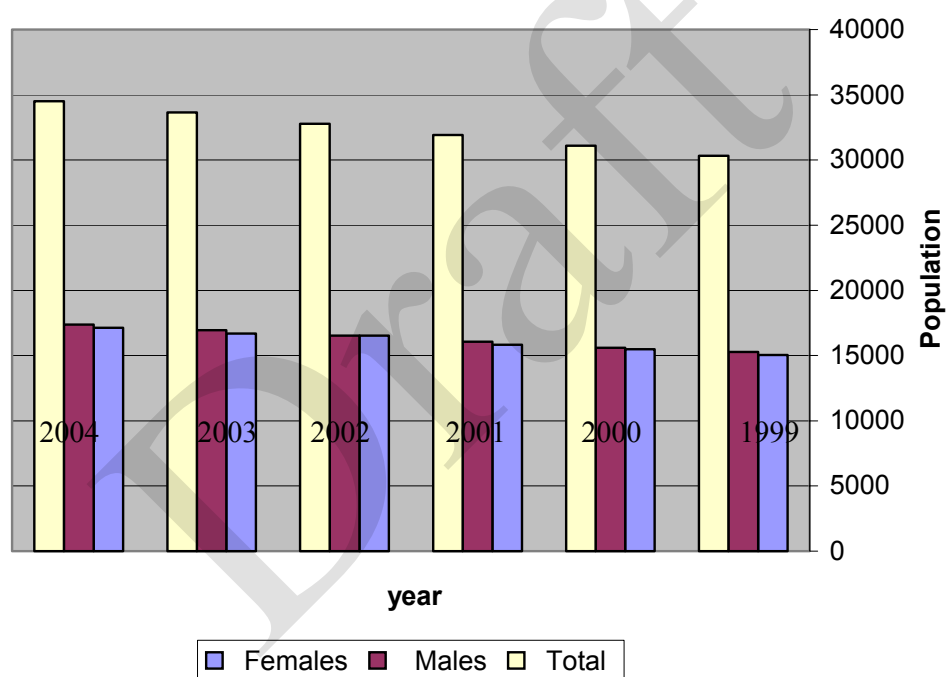


Table 7.  
**Population Distribution**  
**According to the States of Sudan 2003/2004**

State	2004		2003	
	Population	%	Population	%
Sudan	34512	100.0	33648	100.0
Northern	624	1.8	614	1.8
Nahr Annil	972	2.8	654	2.8
Red Sea	734	2.1	732	2.2
Algedarif	1674	4.9	1621	4.8
Kassala	1625	4.7	1584	4.7
Khartoum	5552	16.1	5352	16.0
Algezira	3796	11.0	3692	11.0
Sinnar	1301	3.8	1268	3.8
White Nile	1636	4.7	1595	4.7
Blue Nile	716	2.1	695	2.1
N. Kordofan	1578	4.6	1554	4.6
W.kordofan	1203	3.5	1183	3.5
S. Kordofan	1174	3.4	1158	3.4
N. Darfur	1655	4.8	1603	4.8
W. Darfur	3171	9.2	3064	9.1
S. Darfur	3171	9.2	3064	9.1
S. States	5366	15.5	5285	15.7
Bahr Elghazal	2550	7.4	2491	4.4
Equatoria	1310	3.8	1300	3.9

Sources: Central Bureau of Statistics

**Table 8.**  
**Selected Demographic and Social Indicators**

demographic indicator	Indicator
Population Growth Rate 1998/2003	2.63
Urban Population (% of total Pop)2003	35.52
School Age population (6-24)(% of total population)2003	44.79
Pop Under 15 year of age (% of total population 2003)	42.04
Pop Under 5 year of age (% of total population 2003)	15.76
Population 60 + (% of total population 02003)	3.94
Dependency Ratio (per 1000 Population )1999	862.0
Life Expectancy at Birth (in tears )1993	
Males	52.5
Female	55.5
Both Sexes	54.0
Crude Death 1998/2003 ( per 1000 Population	11.5
Infant Mortality Rate :1999	68.0
Under 5 years Mortality Rate 1999 ( per 1000 live births)	104.0
Maternal Mortality 1999 (per100000 Births)	509.0
Crude birth rate 1998/2003 (per 100 population)	37.8
Total fertility rate :1999	5.9
Female headed Household (% of Total households )1999	12.0

B/ Social Indicators	Indicator
Literacy rate (age 15+) ( % of per Age 15& above )2000	
Males	50.6
Females	49.2
Both Sexes	49.9
Literacy rate (age (15-24) 2000	
Males	57.2
Females	53.0
Both sexes	48.3
Knowledge of any Family Planning Method (% of Females age 15-49) 1999	61.0
Infertility (%) 1999	3.0
Place of Delivery (%) 1999	
Home	86.0
Private Hospital	1.0
Birth attendant (%) 1999	
Trained professional	57.0
TBA Trained or untrained	31.0
Only relative or none	14.0
Female (age 15-49) who have ever hard of	43.0

IV/AIDS (%) 1999	
Main source of drinking water (%) 2000	
Piped into dwelling	
Reservoir tap	24.0
Well	7.0
River/Spring	28.4
Rain water	14.7
Other	8.1
	6.0

AI demographic indicator	Indicator
Population Growth Rate 1998/2003	2.63
Urban Population (% of total Pop)2003	35.52
School Age population (6-24)(% of total population)2003	44.79
Pop Under 15 year of age (% of total population 2003)	42.04
Pop Under 5 year of age (% of total population 2003)	15.76
Population 60 + (% of total population 02003)	3.94
Dependency Ratio (per 1000 Population )1999	862.0
Life Expectancy at Brith (in tears )1993	
Males	52.5
Female	55.5
Both Sexes	54.0
Curde Death 1998/2003 ( per 1000 Population	11.5
Infant Mortality Rate :1999	68.0
Under 5 years Mortality Rate 1999 ( per 1000 live births)	104.0
Maternal Mortality 1999 (per100000 Births)	509.0
Crude birth rate 1998/2003 (per 100 population)	37.8
Total fertility rate :1999	5.9
Female headed Household (% of Total households )1999	12.0

B/ Social Indicators	Indicator
Literacy rate (age 15+) ( % of per Age 15& above )2000	
Males	50.6
Females	49.2
Both Sexes	49.9
Literacy rate (age (15-24) 2000	
Males	57.2
Females	53.0
Both sexes	48.3
Knowledge of any Family Planning Method (% of Females age 15-49) 1999	61.0
Infertility (%) 1999	3.0
Birth attendant (%) 1999	
Trained professional	57.0

TBA Trained or untrained	31.0
Only relative or none	14.0
demographic indicator	Indicator
Population Growth Rate 1998/2003	2.63
Urban Population (% of total Pop)2003	35.52
School Age population (6-24)(% of total population)2003	44.79
Pop Under 15 year of age (% of total population 2003)	42.04
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Piped into dwelling	
Reservoir tap	24.0
Well	7.0
River/Spring	28.4
Rain water	14.7
Other	8.1
	6.0

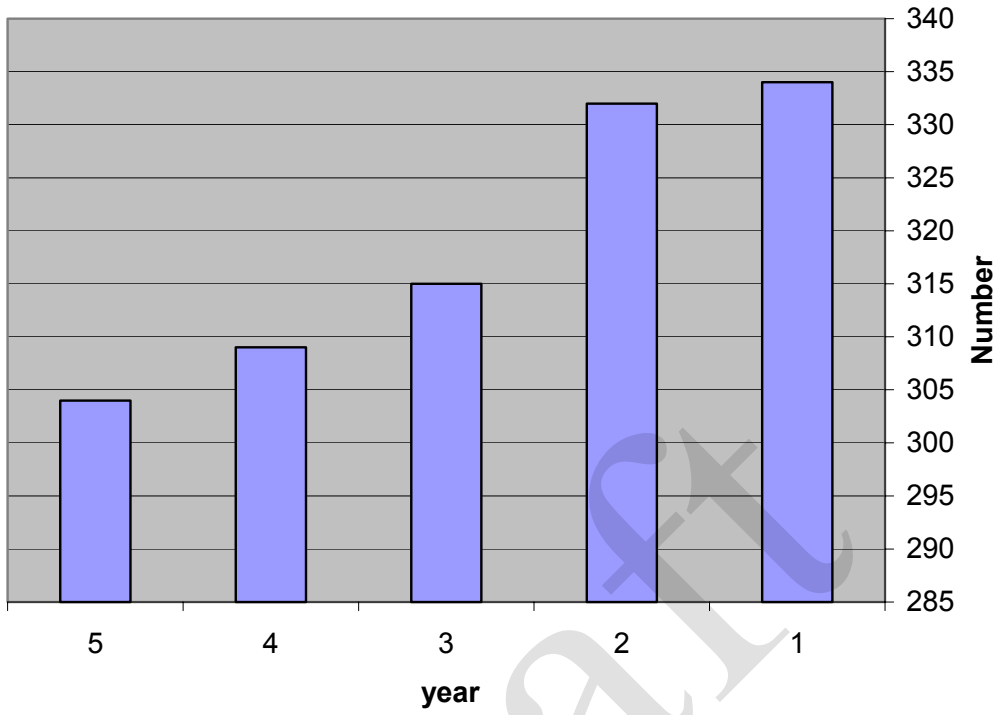


## Demographic and Social Indicators

Table 9.  
Health  
1999-2003

Specification	2003	2002	2001	2000	1999
No. of Hospitals	334	332	315	309	304
No. of Hospital Beds	23976	23820	23168	23076	23103
No. of Health Centers	964	1012	969	915	849
No. Dispensaries	1612	1486	1489	1475	1438
No. of Dress Stations	1129	1270	1243	1236	1253
No. of Primary H. C. Units	2401	2518	2438	2558	2652
No. of Physicians .	6193	5765	5561	4992	4424
No. of Diarists	244	210	230	222	199
No. of Pharmacists	674	596	533	306	357
I No. of Medical Assistants	6730	6748	6610	6193	6052
No. of Nurses	17174	16531	16199	17526	18292
No. of X-Ray Units	105	101	90	83	81
No. of Blood Banks	78	61	53	55	50
Hospitals Per (100,000) of Population	1.0	1.0	1.0	1.0	1.0
Beds Per (100,000) of Population	71.3	72.6	73	74.2	76.2
Physicians Per (100,000) of Population	18.4	17.6	17.0	16.0	15.0
specialists Per (100,000) of Population	3.1	3.0	3.0	2.6	2.4
Demists Per (100,000) of Population	0.7	0.6	1.0	0.7	0.7
Per(100.000)of Population	2.0	2.0	2.0	1.0	1.2

### Number of Hospitals

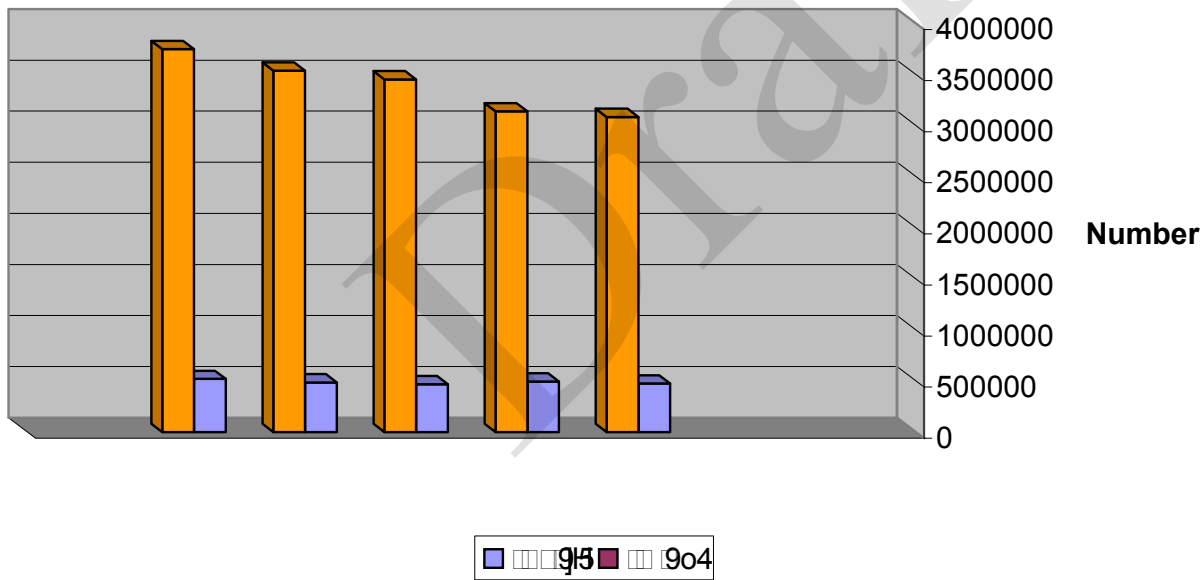


**Education**

**Table 10**

**General Education 1998/1999 - 2002/2003**

Secondary Level			Basic Level			Year
No. Teachers	No. of Schools	No. of Students	No. Teachers	No. of Schools	No. of Stud....	
14377	1694	476051	117151	11589	3083650	1998-1999
17073	1878	495279	122719	11923	3137494	2000-1999
21223	2013	468392	125391	12539	3451611	2001-2000
21325	2094	485953	128483	12085	3537279	2001-12002
22442	2234	520047	131912	13287	3748309	2002-2003



**Table 11.**  
**High Education**  
**1998/1999- 2002/2003**

Number of Graduates			Number of Students Registered In High Education Institutions			Year
Total	Private	Government	Total	Private	Government	
38209	7511	30698	200538	37945	162593	1998/1999
28048	4184	23864	181421	33466	147955	1999/2000
36870	N.A	N.A	254705	37441	217264	2000/2001
42459	10978	31481	280780	46517	234263	2001/2002
43477	N.A	N.A	311609	47806	263803	2002/2003

Source: Ministry of High Education (N.A: Not Available)

Table 12.  
Tribal and Ethnic groups:

Ethnic group	Total /	Male	females	Urban	rural
Hadendowa	485316	253153	232163	86540	398777
Bani Amer	385735	208016	177720	161499	224237
Other Beja	2717168	137652	134065	112193	159525
Other Arab Tribes	35078	173919	171159	72874	272204
Refugees	N.A.	N.A.	N.A.	N.A.	
Nigerian immigrants	N.A.				

Immigrants mainly Nubians who have been transferred from old Halfa

Source: compiled from Sudan Census Data 1993

Table 13.  
Percentage distribution of pop. according to the three States:

Rates	0-14 %	15-59 %	60+ %	100%
Nahr el nil	42.9	51.8	5.3	100
Kasla	45.4	50.7	3.9	100
El Gadarf	46.9	49.4	3.7	100
Total	45.1	50.6	4.3	1000

Computed from Sudan Census 1993

Table 14.  
Percentage distribution of pop. by mode of living 1998-2001

Tekeze –Atbra basin states	2001		2000		1999		1998	
	%	Pop (000)	%	Pop	%	Pop. (000)	%	Pop.(000)
Nahr El nil	2.9	918	2.9	900	2.9	883	2.9	866
Kasala	4.7	1507	4.7	1469	4.7	1435	4.7	1398
El gGadarif	4.7	1515	4.7	1465	4.7	1420	4.7	1370
Total	9.3	3940	9.3	3434	9.3	3738	9.3	3634

Compiled from:Source: Statistical Year Book 2001

Table 15

Life Expectancy at birth by sex 1993 Census:

Tekeze-Atbara by State	Males	Females
Sudan	52.5	55.5
Nahr Elnil	57.0	58.8
Kasala	53.5	55.4
El Gadarif	50.5	52.6
Total	53.6	55.6

Source: Statistical Year Book 2001

Table 16.

Sorghum Production: Area in (000) fed, Production in (000)m.ton and average yield kg/fed 2000/2001

Production Site	Area	Prod.	Yd.
Irrigated Sector			
Nahr El nil	22	13	570
El ahd	100	105	1045
New Halfa	49	37	760
El Gash	43	30	700
Tokar	9	4	400
Kasala	1	1	700
total	224	190	32275

Source: Statistical year Book 2001

Table 17

Sorghum Production: Area in(000)fed, Production in (000)m.ton and Average yield kg/fed 1998/1999-2000/2001

2001/2000	area	Pro.	yd	2000/1999			1999/1998		
Mechanized Rained sector									
Kasala	280	35	130	70	13	180	810	219	270
El Gadarif	2625	495	188	2869	315	110	4501	1215	270
Total	2905	550	318	2905	328	290	5311	1434	540

Compiled from: Statistical Year Book 2001.

Table 18.

Number of private households (000), with head owning Agricultural plot and persons (000) in private Households owning agricultural plot by sex 1993.

Tekeze- Atbara States	household	Urban			Household	Rural		
		Both sexes	Males	Females		Both sex	Male	females
Nahr Elnil	5	7	5	2	33	46	35	11
Kasala	9	12	9	3	47	54	48	6
El Gadarif	11	15	12	3	92	146	106	40
Total	25	34	26	8	172	246	189	57

Table 19.  
Estimates of Livestock population 1999

Tekeze- Atbara States	Total	Camels	Goats	Sheep	Cattles
Nahr Elnil	2076042	72676	1033345	887763	82258
Kasala	2672402	408240	1059214	844297	360650
El gadarif	3778804	157094	909019	1826149	886542
Total	8527248	638010	3001578	3558209	1329450

Source: tabulated from The Statistical year Book 2001.

Table 20  
Health Facilities 1999

Tekeze- Atbara state	No. of hospitals	No. of beds	Dispensaries	Dressing stations	P.H.C.U.
Nahr el Nil	21	1257	100	84	72
Kasala	12	1157	79	51	51
El gadarif	15	1011	50	71	100
Total	48	3425	229	206	223

Source: Compiled from the Statistical year Book 2001

Table 21.  
Hospitals and beds per 100000 pop. For years 1999-2001

Tekeze-Atbara States	2001 h.per 10000 pop	B.per 100000		
Nah el nil	2.3	152	2.5	156
Kasal	0.8	75.6	0.8	74
El Gadarif	1	63	1.0	67
Total	4.1	290.6	4.3	296

Source: tabulated from: statistical Year Book 2001

Table 22  
Enrolment rate in basic education, by sex 2000/2001

Tekeze- setit- Atbara States	Enrolment rate%			Pop.(6-13)years			N0.of pupils		
	Total	Girls	Boys	Total	Girls	Boys	Total	Girls	boys
<b>All Sudan</b>	<b>53.4</b>	<b>49.3</b>	<b>57.4</b>	<b>6460151</b>	<b>3173368</b>	<b>3286783</b>	<b>3451611</b>	<b>1565090</b>	<b>1886521</b>
Nahr elnil	82.1	80.5	83.7	199452	98050	101402	163800	78920	84880
El gadarif	43.7	38.6	48.7	363337	178713	184624	158935	69024	89911
Kasala	33.5	30.0	36.9	403492	200906	202586	135018	60287	74731
Total	53.1	49.7	56.4	966281	477669	590014	457753	208231	249522

Tabulated from various sources

Table 23.

**Bara-Akobo-Sobat Basin**

Population and corresponding percentages for the years 1998-2001

Baro-Akobo- Sobat states	2000		2000		1999		%	Pop.(000)
	%	Pop.(000)	%	Pop(000)	%	Pop(000)		
Upper Nile	4.6	1466	4.7	1453	4.7	1440	4.8	1426
Bahr Elgabal	7.4	2377	7.5	2321	7.5	2269	7.5	2214
Equatorial	4.0	1273	4.0	1261	4.1	1248	4.2	1235
Total	5.3	5116	5.4	5035	5.4	4957	5.5	4875

Source: tabulated from Statistical Year Book.2001

Table 24.

Percentage Distribution of pop. By mode of living 1998-2001

Bara-akobo- Sobat Region	2001		2000		1999		1998	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	rural
Upper Nile	21.6	78.4	21.0	79.0	20.4	79.6	20.9	79.1
Bahr Elgazal	14.9	85.1	14.6	85.4	14.1	85.9	12.0	88.0
Equatoria	26.2	73.8	25.6	74.4	24.9	75.1	16.2	83.8
Total	20.9	79.1	20.4	79.6	19.8	2406	16.4	83.6

Source: tabulated National Census Data, Year Book 2001

Table 25.

Percentage distribution by age group 1993-2000

Barro- akobo- sobat by region	1993			1998			1999			2000		
	0-	15-	60+	0-	15-	60+	0-	15-	60+	0-	15-	60+
	14%	56		14	59		14	59		14	59	
Upper Nile	47.0	50.2	2.4	47.6	50.6	2.5	46.0	51.5	2.5	46.3	52.0	2.2
Bahr Elgazal	42.7	54.2	3.1	42.7	54.2	3.1	42.4	54.5	3.1	42.2	58.6	3.2
Equatoria	45.0	52.7	2.3	45.0	52.7	2.4	44.6	53.0	2.4	44.2	53.3	2.5

Source: Tabulated from National Census 2001.

Table26.

Life Expectancy at birth by sex 19993

Barro-akobo-Sobat by region	Male	female
<b>Southern Regions</b>	<b>45.9</b>	<b>48.7</b>
Upper Nile	52.7	53.7
Bahr Elghazal	44.5	48.3
Equatoria	43.1	45.6
Total	46.8	49.2

Source: Compiled from Statistical Year Book 2001

Table 27.

Estimates of livestock pop 1999

Barro-	Total	Camels	Goats	Sheep	Cattle
Akobo-sobat					
Eqatoria	5501138	0	2042317	1062310	1417411
Bahr	323499	0	2478131	22803317	10408382
Elghazal					
Bahr Elgabal	3012494	0	1039426	1177553	795515
Elbohairat	3654317	0	1317202	1146005	1191110
Total	12491448	0	6877076	26189185	13812418

Source: Tabulated from statistical Year Book 2001

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# Sudan Nile Basin

