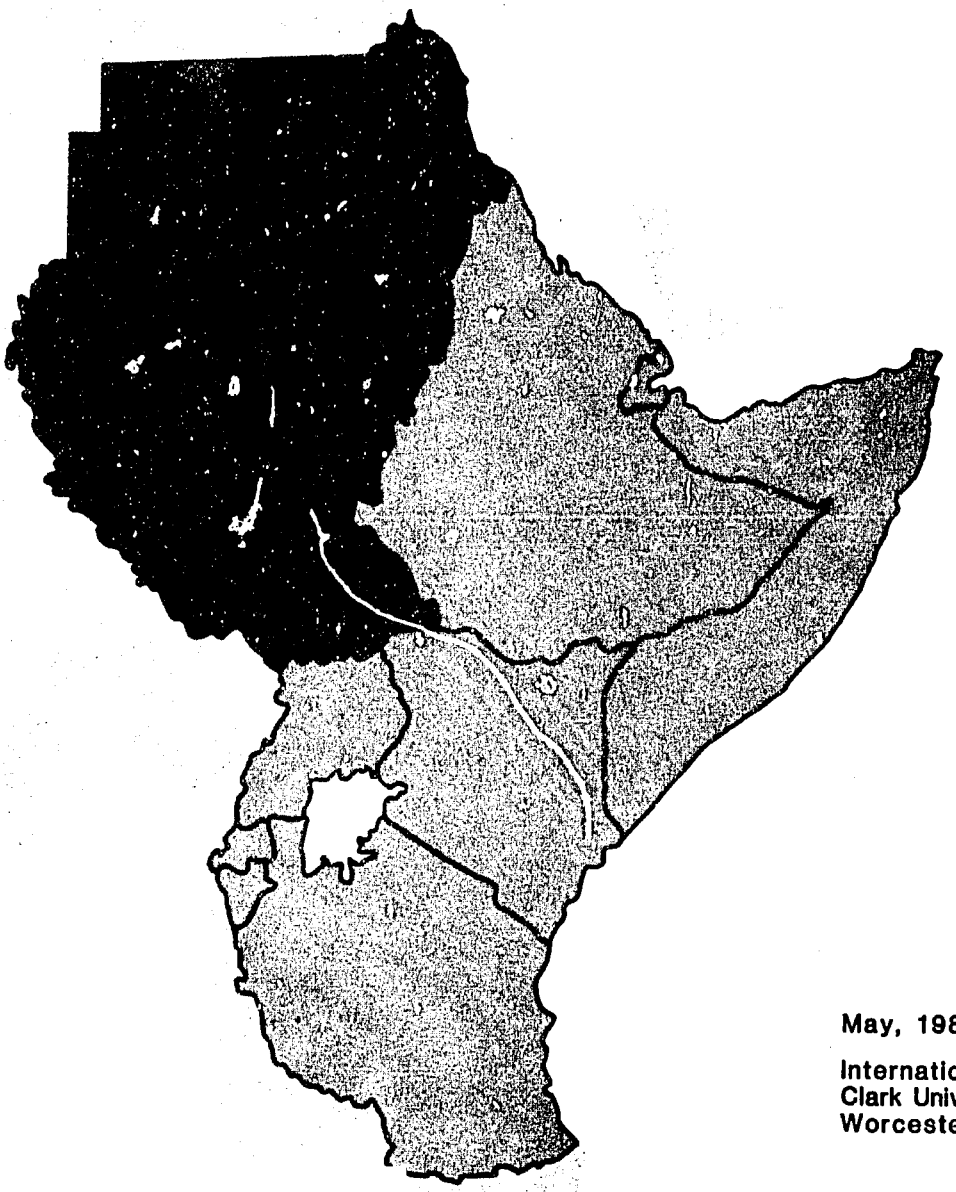
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Eastern Africa Country Profiles

SUDAN



May, 1983

International Development Program
Clark University
Worcester, Massachusetts 01610

EASTERN AFRICAN COUNTRY PROFILES

SUDAN

by

L. Berry

Revised Edition

by

L. Berry

and

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May 1983
International Development Program
Clark University
Worcester, Massachusetts 01610

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PREFACE

This Country Profile of Sudan is a revised edition prepared as one in a series of Eastern African country profiles prepared for East African mission directors. The profiles serve as overview statements of the basic characteristics of the country, its major development problems, and a discussion of the distribution of poverty. Other country profiles in the series have been prepared for Somalia, Tanzania, Kenya, Djibouti, Ethiopia, and Uganda. The first study of Sudan in 1979 involved a review of current literature and data base; the following is the updated version. L. Berry, with assistance from R. Ford, J. Hayes, A. Abdu and F. Puffer, were the previous edition's authors; S. Geistfeld with the advice of L. Berry and with the assistance of S. Steward and K. Sabasteanski has revised this version. J. Callahan of the Clark University Cartography Laboratory designed the cover and worked with P. Schmitthenner on the maps and charts; the staff of Word Processing of Worcester typed the report.

Any comments or corrections concerning the general approach or the document in particular will be gratefully appreciated.

CHAPTER I. INTRODUCTION

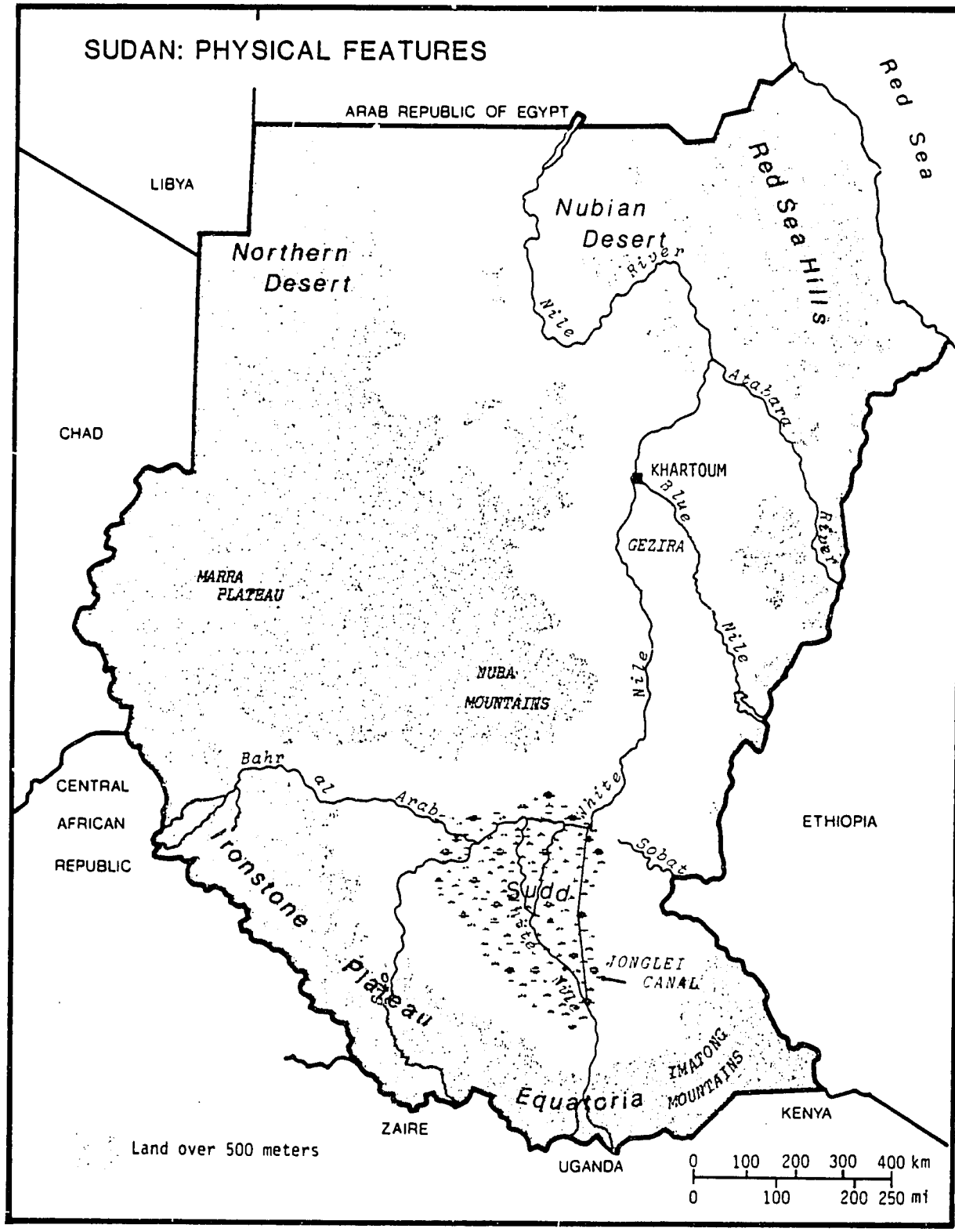
This country profile is an introduction to development issues in the Sudan for USAID personnel. It will review three different approaches: (1) a general overview of the country, people, economy, culture, and resources; (2) a summary analysis of the current development issues facing the country; and (3) an assessment of the distribution of poverty in Sudan.

For the reader who wishes to pursue any of these issues in more detail, Clark University's International Development Program in the United States will help to obtain additional materials; in Sudan, the Economic and Social Research Council, the Faculty of Agriculture, and organizations such as the Institute for Environmental Studies, all located at the University of Khartoum, will provide information. The National Research Council in Sudan also produces many worthwhile documents.

Reliable data are hard to obtain on many aspects of the Sudan. Agricultural statistics for production outside the modern sector are not readily available and information on employment, income and livelihood are likewise scarce. On the other hand, there are some excellent resource surveys with detailed maps and analyses of local areas, especially in Kordofan and Darfur.

Although considered "least developed" by the United Nations, Sudan has the potential to become one of the world's richest nations. There are more than 220 million acres of agricultural land with presently only 17 million cultivated acres. Many rivers and lakes, including the Nile, are potential locations for development plans and activities. Before Sudan becomes the "breadbasket" of the Middle East and other parts of the world, however, it will need a great deal of investment directed towards development projects.

FIGURE 1



SOURCE: Oxford Map of Sudan 1980.

FIGURE 2



SOURCE: World Bank 1982; Oxford Map of Sudan 1980.

Sudan is the largest country in Africa, covering nearly a million square miles, including almost rainless desert in the north and tropical woodland and swamp in the south. It is primarily an agricultural and pastoral society. Agriculture for the market economy is concentrated in the driest parts of the country, where there is irrigation; in comparison, the higher rainfall zones of the south produce very little for commercial export. The Nile is the "backbone" of the country, appearing on the map (Figure 1) to combine the northern region and southern region into an integrated river basin. Yet the north and south are quite separate and distinct areas. The Nile is a vital conduit of water to the north and an all-season link between the two zones, but most of Sudan's people live outside the influence of the Nile in the northern plainlands of Kordofan, Darfur, and on the plateau of Equatoria.

Since the 1960s, Sudan has experienced a rapid population growth. The current rate of annual growth is approximately 2.8 percent. The total population was estimated to be 18.3 million in 1980 (World Bank 1982, 110). The people of Sudan pursue a variety of lifestyles: over 2 million nomadic or semi-nomadic people; 1.5 million who live in greater Khartoum; 1.5 million in other towns, 2 million who live on large irrigation schemes along the Blue and White Nile interfluves; and 12 million who support themselves through a combination of animal husbandry and crop rearing. Of the latter 12 million, .75 million live in the south. Urban areas account for 23 percent of the population, 67 percent are in the rural areas and 10 percent are nomads according to 1979 estimates (Sudan, Government of 1983 [?], 7).

There are approximately two head of livestock for every person in the Sudan. Livestock form an important part of every livelihood and social system, including those of the irrigation areas. Cattle are found everywhere except in the driest areas.

The irrigated areas and more recently large scale mechanized agricultural projects have been the hallmark of Sudanese development, at least as viewed by government and in regards to the export trade. The Gezira and its extensions cover almost four million acres of irrigated land which is more than half of the country's irrigated land. Mechanized agriculture on the clay plains has created almost five million acres of grainland and considerable wealth for some. On the other hand, a stagnant traditional sector with no short term prospects for change exists. Many parts of the west and the south exemplify these conditions.

In Chapter 2, the profile presents a general introduction to the Republic of Sudan. Chapter 3 defines fourteen key development issues including some not currently of direct concern to USAID programs. It was felt that a national overview is important in any country review.

Chapter 4 is an analysis of wealth and poverty in the country. Despite the 1976 publication of an International Labour Organisation report on income and expenditures, there is a dearth of recent and local data. Using what information is available, poverty is shown to exist in each of the livelihood systems in Sudan, including the urban areas, particularly in the south and to a lesser degree the west.

CHAPTER 2. BACKGROUND TO SUDAN

2.1 HISTORY

The character and constitution of Sudan reflects the influences of both the Mediterranean-Middle Eastern world and sub-Saharan Africa. These influences are apparent in the traditions, religions and the political and economic structures of Sudan.

The geographic region known as Sudan has supported civilizations for thousands of years. Paleolithic and Neolithic remains of early man can be found in northern Sudan. Dating from approximately 4000 BC, the banks of the Nile were populated first by nomads and later by farmers. Tomb inscriptions and other archeological evidence have preserved a written history of the ancient Sudanese trade with India, Africa and the Mediterranean; manufacture of iron; and under the political rule of the Egyptian pharaohs, construction of temples and pyramids. The pharaohs ruled for centuries until the Cush Dynasty established a stronghold of power in the tenth century and by 750 BC, the dynasty established sovereignty over all of Egypt and Sudan. The thousand year rule of the Cush Dynasty diminished significantly until 4 AD when the Meroitic Kingdom achieved a period of independent central government.

The next wave of conquerors into Sudan were the Nubians who introduced the Coptic (Christian) Church to northern Sudan. The emerging Christian kingdoms then flourished throughout Sudan. These kingdoms were barriers against the southward influx of Islam, which had already established itself as a religious and political stronghold in the Middle East and North Africa by mid 600 AD. After centuries of Arab immigration and trade, the area was transformed into a mainly Arabized and Islamized society by the 14th century.

The Islamic Sultanate of the Funj was established in 1504 with the final collapse of the Nubian Christian Kingdoms. The Funj was a confederation of tribal chieftainships who ruled from Sennar on the Blue Nile. The authority of the Sultanate was widely recognized but eventually diminished, until 1821, when Sennar collapsed before the Turkish-Egyptian forces of Muhammad Ali Pasha.

Egyptian-Ottoman rule was established in Sudan, with Khartoum as the administrative capital. The Sudanese administration under the Ottoman empire was corrupt and inefficient. The government's control was eventually weakened after several decades, but not before the considerable social and economic destruction throughout the country. In 1881, Muhammad Ahmad Ibn Abdallah, declared himself Mahdi, or holy savior, of the Sudan. He called for a rebellion against the Turkish rule and for the reformation of Islam. The rebellion under his leadership transformed itself into a national jihad, a religious struggle, which resulted in the fall of Khartoum in 1885. In the course of this warfare, the Mahdi's forces killed British Colonel Charles Gordon--a British hero of the Crimean and Asian campaigns. In 1898, the Mahdist State fell to Anglo-Egyptian conquerors.

British retaliation and the scramble for Africa among the European powers dominated the last decades of the nineteenth century in Sudan. From 1896 to 1898, Lord Herbert Horatio Kitchener led an army column and fleet of gunboats up the Nile. Railroads were built along the river in order to assure the British interest in control of the upper Nile. Kitchener's conquests included the eventual occupation of Omdurman, fighting off the French who challenged Britain's sovereignty over the Sudan, as well as destroying many of the followers of the Mahdi. For the next fifty years, Sudan was a British protectorate known as the Anglo-Egyptian Sudan.

British conquest by Kitchener did not end Sudanese opposition to colonial rule. For most of the British occupation, revolts, nationalist movements and religious uprisings occurred frequently. British administrators responded to the rebellions in two ways: with military troops and with "development". The British colonialists relied essentially on military force and security to maintain their position of dominance which ended with the independence of Sudan. The impact of British "development" projects was profound and remnants of their presence still exist.

Development projects ranged from bringing in Christian missionaries, especially to the south, to establishing schools and health clinics. The British colonists introduced cotton as a major commercial crop which was facilitated by major investment in irrigation in the Gezira. The Gezira irrigation project is recognized as one of the most successful irrigation projects in Africa--the Gezira began exporting cotton in the 1920's and has continued to the present day. The British colonial system also introduced a system of national marketing boards and parastatal organizations to manage the major sectors in the government which continue to be active under the Sudanese government. The precedents established by the colonial administration under Britain have continued to the present day, although in considerably modified forms.

British colonial rule was finally ended when the Sudan attained independence on January 1, 1956. The country was renamed Sudan in 1975.

2.2 POLITICAL SETTING

The most significant changes in Sudanese politics have come from the north; the most influential political forces have been Islamic and British. Conquering armies, traders, religious penetration, colonial structures and

administration have been some of the sources of change in Sudan.

Islam had spread throughout northern Sudan by the nineteenth century. In 1821, Muhammad Ali conquered Sudan, bringing it under Turkish-Egyptian rule. The southern area's impenetrable swamps as well as the unfavorable conditions for cattle and horses prevented the Egyptians from conquering all of what is now Sudan. It was the establishment of trade routes to the non-Islamic south that merged the north and the south; at this time the present day borders of Sudan were secured. The Egyptians were responsible not only for the introduction of the Arabic language, but also for the solidification of Islam in Sudan.

The Turko-Egyptian rule lasted until 1881 when the Sudanese revolted under the leadership of Muhammad Ahmad, the Mahdi. The Mahdi established an indigenous state which was based on the Holy Law of Islam, or the Shari'a. The theocratic Mahdist state survived only until 1898 when it was overcome by Anglo-Egyptian conquerors. To many Sudanese, the Mahdi still appears as the pioneer of Sudanese independence and as the creator of a Sudanese national identity.

From 1899 to 1955, Sudan was an Anglo-Egyptian colony in theory, but was a British colony in fact. Gradually the entire country came under the control and influence of Britain. A British-styled administration was established, a social infrastructure begun and an externally oriented commercial base laid. These innovations stimulated the growth of a Sudanese middle class with an emerging political identity of their own. This occurred mainly in the northern regions while no such counterpart political activity or movements existed in the south.

The political movement of the north led to the formation of a Sudanese nationalist group, known as the Graduate Congress. It was modeled upon

Egyptian nationalist movements which were vigorously modernist Islamic and opposed to foreign influence. To weaken the Sudanese nationalist movement, the British began to separate the north and the south as regions with conflicting interests by Indirect Rule. Administrative activities and policies were now carried out through tribal sheiks or chiefs. Tribal rivalry between the north and south had been diminished under the Mahdist state.

The "Southern Policy" was also introduced by the British in an attempt to control the emerging Sudanese nationalist movements. Various British administrative actions were employed to gradually sever relations between the northern and southern regions. However on January 1, 1956, when independence was achieved the north and south regions both became independent. Almost inevitably, the predominately northern rulers of the new government were unable to maintain unity for any length of time between the two areas, and hostile actions broke out shortly after independence.

A number of political parties emerged after independence as well as before and immediately after World War II. These parties were led by powerful Muslim sects which included the Ansars whose political front was the Umma Party and the Khatmia whose political front was the People's Democratic Party. The Ansars were followers of the Mahdi and their power base was located in western-central Sudan. The Khatmia were followers of the Khatmia family, the chief rivals of the Mahdists, with a power base located primarily in Kassala Province. A third leading group was the National Unionist Party which drew its support mainly from the educated and urban middle class in Sudan. The Sudanese Communist Party drew support from the urban educated as well as the industrial and railway workers unions.

Political instability characterized the governments of newly independent Sudan. After a brief period (1956-1958) of coalition and parliamentary rule,

the army established a military dictatorship in 1958. As a result of the military regime's inability to control or deal with the hostilities in the south and the unrest in the north, the regime's authority was taken over by parliamentary rule which turned out to be ineffectual.

In May 1969, the army took control again under the leadership of General Gaafar Nimeiri who is currently the President of Sudan. Successive governments had all faced several major problems: the country's dependence on the sole cash crop of cotton; unrest in southern Sudan which was inherited from the British colonial regime and the attempts of writing a national constitution agreeable to the majority. The Nimeiri government adopted a progressive anti-imperialist stance and attempted to implement radical reforms. Some of the reforms and measures carried out were the following: close ties were formed with the trade unions and the Communist Party; all political parties were formally dissolved; efforts were made to dissolve the economic power of the religious sects; and there was an attempt to create a single state party, the Sudanese Socialist Union (SSU). The first phase of Nimeiri's regime, from May 1969 to July 1971, declared a commitment to a program of "Sudanese Socialism".

In July 1971, an attempted coup led by the communists under army officers failed after three days. President Nimeiri had declared in November 1970, that Sudan, Egypt under Sadat and Libya under Gaddafi had decided to unite into one federal state, which was unacceptable to the communists. After the aborted coup, the communists were purged from their government positions and many were imprisoned.

Nimeiri's major achievement was the Addis Ababa Agreement between the Sudanese government and the Anya Nya southern Sudanese rebels. He recognized that the reality of the south's problems could only effectively be dealt with

through political negotiations. The long standing dispute was settled on the basis of regional autonomy for the three southern provinces. In March 1972, the Addis agreement was signed, granting the south a certain amount of autonomy within the republic and ending what had been a seventeen year north-south civil war centered around southern opposition to northern economic neglect and political hegemony.

During the past decade, there had been a process of decentralization, especially in the industrial and commercial sector. Trade relations and political links with the West have expanded and Sudan has invested heavily in large scale development projects funded by the World Bank and other western donors in addition to aid from Arab nations. These two links are both extremely important to Sudan's future development.

Internationally, Sudan has had problems with Egypt, Ethiopia, Uganda, Chad and Libya over border disputes, refugees and dissidents. As a member of the Arab League and the Organization of African Unity, Sudan has also played an active mediating role, as in Chad. Sudan's foreign policy has been moderate and generally pro-Western; a shift from Nimeiri's earlier Soviet stance to alignment with conservative countries such as Saudi Arabia, Kuweit and many Western powers.

2.3 CULTURAL SETTING

Sudan has been subjected to alien rule for considerable periods of time during its history as have a great majority of African countries. The existing boundaries, administrative institutions, and cultural outlook have been largely determined by colonial domination. Through its long history of close contact with other North African countries, Sudan was influenced by ancient Egyptian civilizations followed by the establishment of Christian kingdoms.

All those who have conquered Egypt tried to extend their influence, if not their power, south and into the lands of the Sudan. The Arab Muslims were the most successful, among all of the conquerors their culture and religion have the most lasting effect.

Arab and Islamic influence of the Sudan was not solely the result of military conquest. It was initially brought about through the immigration of Muslim Arabs coming from Arabia across the Red Sea, and from Egypt after the conquest of 641 AD from the Arabian troops. At a later stage, Muslim influence from the Maghreb gradually infiltrated the Christian kingdoms. By 1504, the first Islamic kingdom was established by Africanized Arabs. Islam continued to spread into the existing ethnic group structures and became the major religion in northern Sudan. The Southerners adhere to traditional beliefs and practices or followed various forms of Christianity.

The great majority of the Sudanese Muslims are Sunni followers of Sunnah based on the teachings of the prophet Muhammad. They are generally called "Orthodox." The Sunnah is based upon the Quran and the Books of Tradition which are organized into four Orthodox schools or rites of equal standing within the Orthodox fold. The Sudanese are followers of the school founded by Imam Malik of Medina (d. 795 AD) as do the Northern Nigerians and other North African Muslims.

Orthodox Sunni Islam is expressed in Shari'a law which is the fundamental Law of Islam: its "constitution". The Shari'a courts which judge cases of such issues as personal status, marriage and divorce, and the secular courts which have a wide jurisdiction based on Western codes of law in civil and criminal matters exist side by side in Sudan. Both sets of courts are authorized to give judgment, irrespective of the creed or race of the defendant. As Islam is as much a distinctive culture as it is a religion, its

influence is felt in many other aspects of Sudanese life.

Though in origin a Semitic Arabian faith, Sudanese Islamic adherents have also been influenced by the local and indigenous cultural systems that existed before the seventh century. Islam was superimposed on Sudan's existing subsistence rural economy where tribal leaders and their kinsfolk monopolized the means of production and controlled armed forces. The advent of Islam did not change matters in this respect, but rather Islam enhanced the power of tribal leaders during the Funji Kingdom and Turko-Egyptian rule. This was done by the introduction of a theory of obligation based on religion.

During this period, the activities of holy families, Sufi Tarigas, began to play a central role in forming the special Sudanese character of Islam. The Tarigas did not constitute religious "sects" like Catholicism or Protestantism in Christianity, nor did they represent such serious cleavages within Sudanese Islam as existed between Shi'ite and Sunni Muslims elsewhere. The activities of the Tarigas operate within the Islamic context but to varying degrees there is emphasis on communal worship of a Sufi or mystical type, promoted by the founding Sheikh. Tarigas associations have been popular, open and proselytizing, have cut across ethnic group boundaries, and have achieved a remarkable degree of unity by emphasizing and encouraging mutual sympathy and cooperation among their followers. The religious role of the Tarigas also led to a political and social role within Sudan. During the Mahdist rule the Mahdi fought the existing authority in tribal and sectarian structures in order to substitute a revolutionary theocracy based on Sunni Islam. The overthrow of the Mahdist state was followed by a revival of Sufism.

In the early decades of Anglo-Egyptian rule, all notions of Islam as a basis of political community, together with other traditional concepts of social organization and attitudes towards political authority were discouraged.

This was implemented through calculated policies to eliminate the growing spirit of Mahdism which was cultivating national aspirations. In their place a new pattern of a modern political and economic structures were forcefully established, although tribal leadership was used in the colonial administration. Economic change led to social change, which was further encouraged by Western education. The result was the formation of a modern society according to Western-style characteristics: an educated elite, a broad base of tenant farmers and artisans, and an industrial urban labor base.

By independence in 1956, the modern Sudanese state was more or less shaped and based on the urban sector and the rural traditional sectors of population. Their values and loyalty were based on tradition rather than on state imposed ideology although early political parties had a strong religious base. This is mainly true of both urban and rural sectors. A Sudanese society is emerging, based on the heritage of Islam and local traditional beliefs and practices. Religious biases have not been the basis for disunity, a fact which is reinforced by the national acceptance of a secular constitution. The cultural milieu in the Sudan is the product of their religious and political history and of the particular location and nature of the country.

2.4 GOVERNMENT AND PEOPLE

The Permanent Sudanese Constitution, the first since independence, was endorsed by the People's Assembly in April, 1973. The constitution provides for an executive branch consisting of a President, a Prime Minister, and a Secretary General of the Sudanese Socialist Union. The President is nominated by the Sudanese Socialist Union and approved by popular referendum, for a term of six years. He may appoint a Vice-President, a Prime Minister and Ministers who are responsible to him. The President is the Supreme Commander of the

Armed Forces, the Security Forces and Supreme Head of the Public Service. Legislative power is vested in a 250 member People's Assembly. Twenty-five are appointed by the President, 125 directly elected by geographic district, 70 selected by functional and occupational associations, and 30 are selected by Provincial People's Councils. Major legislative proposals are initiated by the President after approval by the Political Bureau of the Sudanese Socialist Union and referred to functional committees before consideration by the full Assembly.

The judiciary is an independent body, directly responsible to the President. A supreme court and civil, criminal and tribal courts make up the judicial system. The state is subject to the rule of law which is the basis of government under the constitution. It is a secular constitution which reflects the ethnic and religious complexity of the Sudanese society.

Under the constitution, there is (after the 1972 Addis Ababa Agreement) a southern regional government with its own regional assembly and regional executive at Juba. The executive branch is headed by a president who is also the Vice President of the whole Republic of Sudan. The regional executive is responsible for all matters except national defense and external affairs. The Sudanese Socialist Union is the sole political party, which includes a National Conference, a Central Committee, a Political Bureau, an Executive Bureau, and a Secretariat General. In every province, the Sudanese Socialist Union has a branch organization, with a network forming from the province capital to the other urban and rural areas.

Since the emergence of the State of Sudan since 1821, successive governments have found themselves to be increasingly centralized in the capital of Khartoum. With independence and the spread of education and communication, local indigenous groups began to express their dissatisfaction with the

development processes and programs in their areas. The Sudanese government has found it difficult to exercise control and authority from the center and ensure an equitable distribution of services and development projects; the current government has been encouraging policies and programs for decentralization.

The sheer size of the country is a problem complicated by the large number of languages spoken. Arabic, the official language, is spoken by about half the population. Most northern peoples speak Arabic and accept an Arabic cultural heritage. Nilotic, Nilo-Hamitic, Sudanic, Nubian, and Darfurian languages are also spoken but Arabic is often used as a lingua franca. In total, 115 languages are spoken in the Sudan. Ethnically the country is complex, comprising some 56 separate ethnic groups, subdivided into 597 groups.

To ensure effective administrative and effective political control of the country, the government has emphasized decentralization in all its development efforts. In 1971, the Sudanese government passed the People's Local Government Act as part of the decentralization process. Among the delegated functions in the Act are: education, public health, agriculture, community development, livestock raising, minor public works, housing and local welfare. Other important objectives were to create channels for mass participation in decision-making and to give local councils the right to prepare their own projects and plans to secure local financing for these projects. Under the People's Local Government Act, a number of new provinces were created and the number was increased from nine to eighteen in 1977 in an attempt to bring Government closer to the people (see Figure 2 on page 3). Recently, the Provincial Commissioners were given the power and authority of Cabinet Ministers.

All the Provincial Commissioners are appointed by the President and are responsible for planning, regional integration, and direction of public

services. In each province, the People's Executive Council is restrained by delegate powers over local social and economic services to a number of local councils. Table 8 on page 86 explains the relationship of the central and local government bodies. These local councils provide the links from the village to the province level and are encouraged to discuss development plans and to participate through their elected and appointed delegates. At the provincial level, the Commissioner is the Sudanese Socialist Union Secretary General who is assisted by a Provincial Committee. The hierarchy of the Sudanese Socialist Union structure extends down to the village, neighborhood and enterprise level. The basic units of the Sudanese Socialist Union in the rural and urban areas are elected by individuals with active membership. The parallel structures of the Sudanese Socialist Union and the government are intended to ensure close and continuous links between political activities and policies and administration. Most of Sudanese Socialist Union leaders in the rural areas are well represented in local government, which can provide popular support at various government levels and hence institutionalizes the present regime. The Sudanese Socialist Union leaders and members are expected to counteract the influence of traditional, sectarian, ethnic, and political groups, who are disinclined to support the political and administrative authorities of the state.

Despite political instability and subsequent setbacks and problems, many important developments have in fact occurred over the last decades in Sudan. The country has been building the needed infrastructures and has spent large amounts of money in potentially valuable resource development. Attempts are being made to alleviate Sudan's acute problems; it is hoped that these attempts will succeed with the right political leadership and an improved world economic climate.

2.5 ECONOMY

Although Sudan shares many of the economic characteristics of other low income countries, there are a substantial number of important differences, particularly in the area of foreign trade. Since the early part of the century, the export of cotton, particularly the higher quality long staple cotton, has dominated export earnings. Until recently, cotton has accounted for more than one half of Sudan's export earnings, but in response to fluctuations in world prices, the government has been diversifying. Production of medium staple and short staple cotton are being encouraged as they are better suited to the needs of the textile industries. While at one time British mills bought virtually all of the output, the market has now shifted in large part away from the West to the nations of Asia leading the list of customers. A variety of other agricultural products, primarily foodstuffs, such as groundnuts and sesame, comprise the rest of the export list. Manufactured goods are essentially absent from the export list, reflecting the small industrial sector. Future industrial growth is projected in sugar, textiles, vegetable oils and building materials.

As an Arabic speaking nation, Sudan has increased trade relations with the Arab oil producing countries. The volume of goods exported to these countries is twenty-eight percent of total exports in 1980, putting them third to Western and Eastern Europe on the list of export customers. The Arab oil countries' growth of wealth has made them an increasingly important market for Sudan. In 1978, the Arab Authority for Agricultural Investment and Development (AAAID) was established with the aim of investing in Sudan's agricultural potential for the Arab world's increasing needs of food supplies.

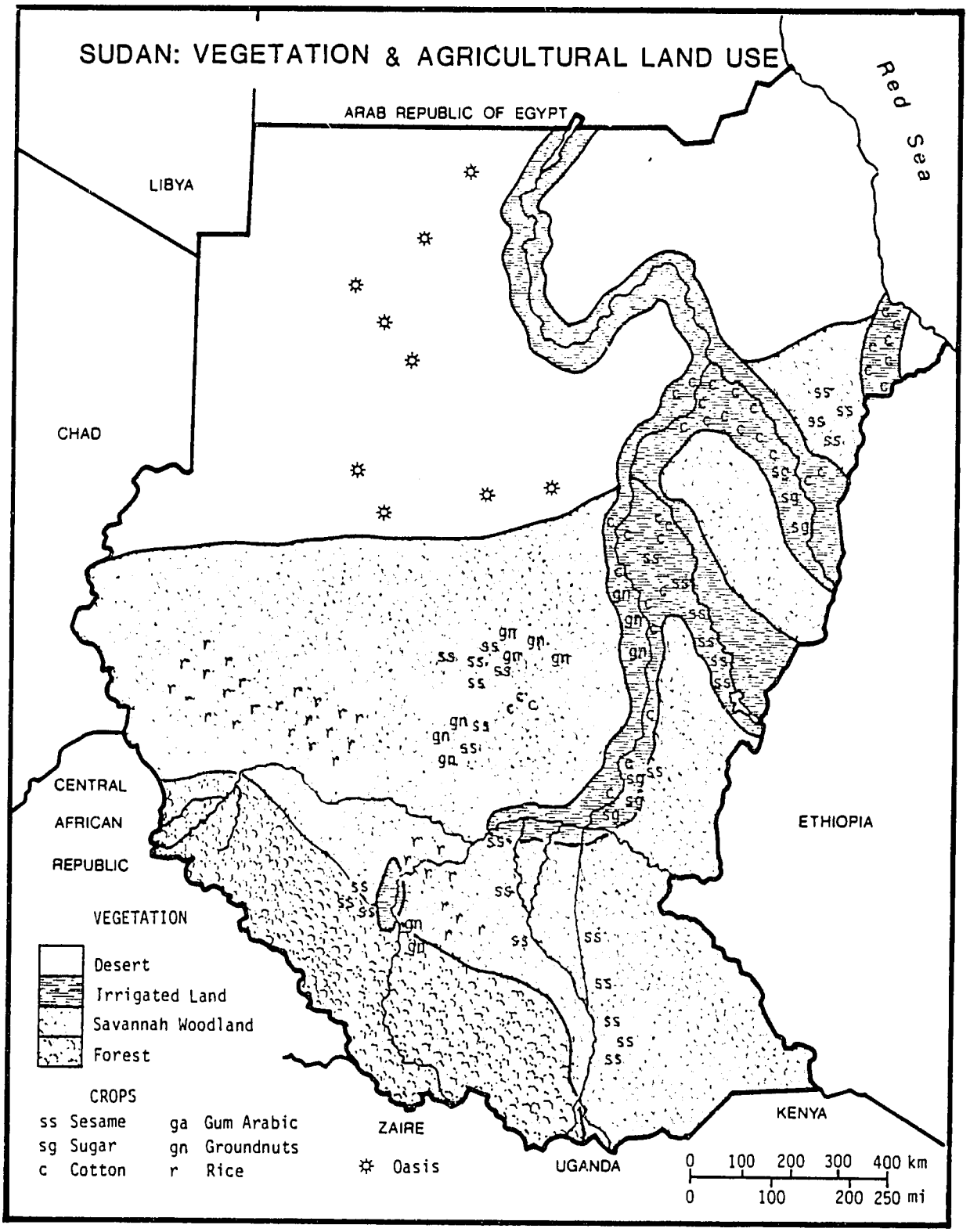
Another important Arab oil influence on the country, ranking with the

Arab role in providing a large amount of development aid, is the market provided for Arabic speaking Sudanese workers needed to meet labor shortages in some of the oil exporting countries especially Saudi Arabia and Libya. The external migration of Sudanese workers according to country is depicted in Table 2, page 35. The remittances of the Sudanese workers living abroad are already a major factor in helping offset a substantial excess of imports over exports. Nevertheless, the balance of payments problem has remained quite severe, seriously affected by the increasing cost of energy imports. During 1979/80, for example, nearly 20 percent of Sudan's export earnings were needed to pay for imported fuel, a figure up sharply from the 8 percent of 1960 (Sudan, Government of 1982b, 24). There is a substantial external debt of U.S. $2.5 billion, much of which has been rescheduled. Reserves of foreign exchange are often at extremely low levels. This situation has made it difficult for many areas of the economy to operate at capacity.

The government plays an important role in most areas of production. Irrigation schemes, non-highway transport, and most industrial firms are run by the state. In addition, the banking system is nationalized and has provided a large amount of funding for government expenditures. There has been considerable inflation which is clear even taking into account the uncertainty in ways of measuring inflation. Between 1972 and 1976 inflation has averaged 25 percent p.a. and has reached 25 to to 30 percent by 1977 (Sudan, Government of 1983 [?] 15). The rising cost of living is due in part to world inflation as well as local factors such as the imbalance between supply and demand, lack of transport infrastructures, speculation, etc.

Gross National Product per capita in U.S. dollars is estimated to be U.S. $375 in 1983 (S150) and $786 (S307) by 1995 (Sudan, Government of 1983

FIGURE 3



SOURCE: Murray 1982.

[?], 17). Agriculture provides employment for almost four out of every five workers with the remainder equally divided between industry and services as shown in Table 14, page 101. Even though the early years of independence saw an extremely low rate of growth, by the early 1970's Sudan experienced a growing rate of production, 5 percent per year. The GDP for Sudan over the past five years (1976/77 to 1981/82) has had an average growth rate of 3 percent a year. Specifically, the GDP for agriculture increased at an annual average rate of 3.2 percent and the manufacturing and industrial sector registered 1.2 percent average growth over the five year period (Sudan, Government of 1982a 27).

2.6 THE RESOURCE BASE

Sudan is described either in terms of great wealth and high potential or as a land of misused resources, hardship, and poverty. Either way, this country does have several natural resource assets as is evidenced by Figure 3. The first by far in the perception of most Sudanese is the Nile. The Nile and its tributaries move much needed water from the uplands of Ethiopia and from Uganda through the plainlands of the Sudan, which become increasingly arid to the north. The Nile has provided irrigation water for many pump schemes along its banks and for the major gravity irrigation projects now totalling over four million acres. In addition, the Nile provides some hydropower, serves as a communication link, and yields significant sources of protein.

Less understood is the importance of the unusual soil resources of the east-central Sudan, the clay plains. The clay plains are gently sloping in most places, an ideal circumstance for gravity irrigation. The soil type is quite well suited to irrigation and in many areas is so impermeable that canals do not need to be lined. South of the irrigated area, similar clay plains have

been utilized for rainfed mechanized agriculture. Soils here are of moderate fertility and suffer if fertilizers and/or crop rotation are not used.

Outside the clay plain areas, highly fertile soils are confined to smaller areas, parts of volcanic Jebel Marra, for example, and smaller river valleys. Higher rainfall in southern regions creates a higher crop potential there.

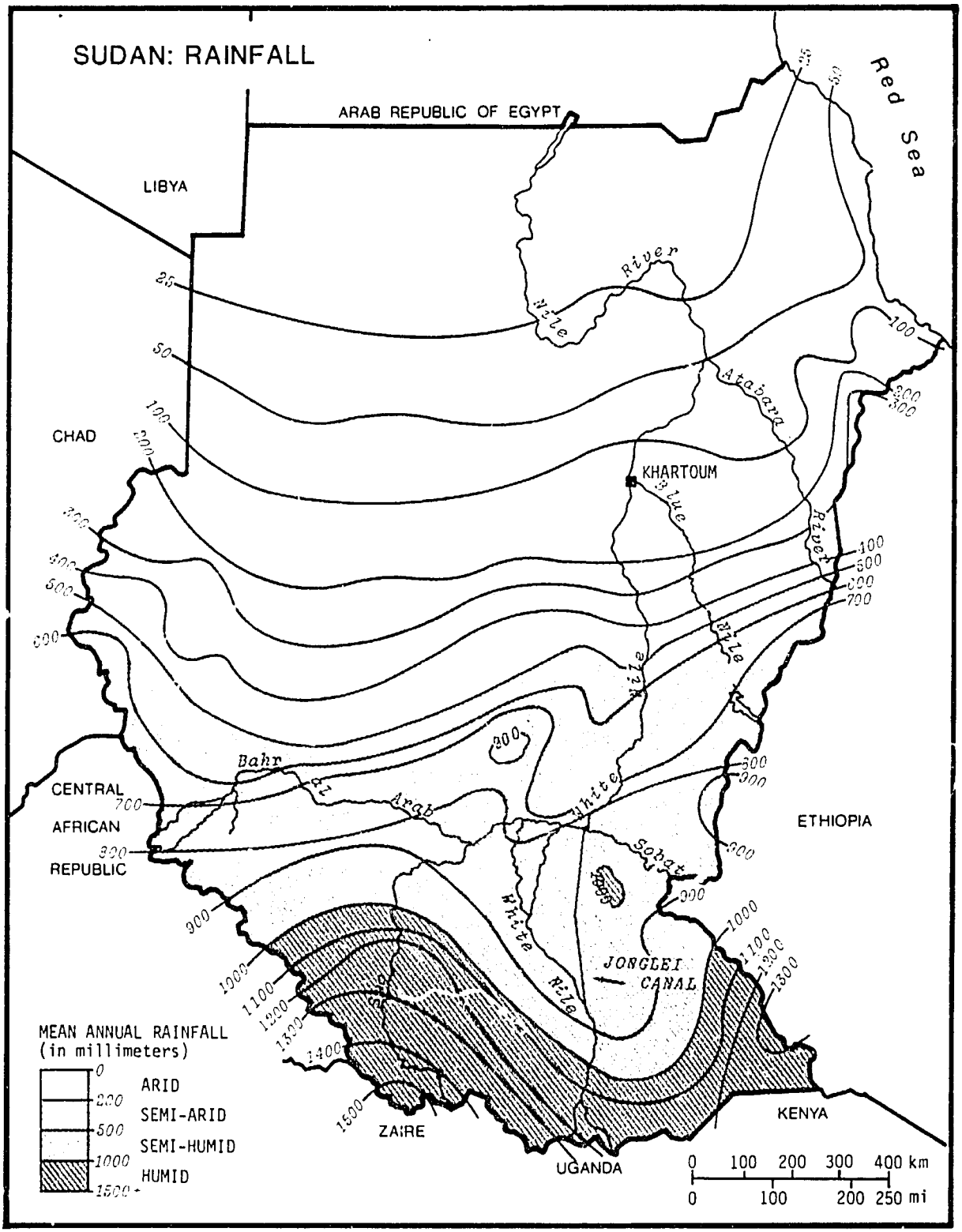
The annual mean rainfall is 72 inches, although as indicated in Figure 4, there is an extreme variance from the northern areas to the south. The months from July to September mark the rainy season; a slightly shorter period in the north as opposed to the lengthier season in the equatorial regions.

Despite impressive achievements in irrigation and mechanized agriculture, most Sudanese wealth is in livestock holdings. Sudan's vast area is mostly used for grazing and supporting 18 million cattle, 30 million sheep and goats, and 2.5 million camels with an overall annual growth rate of 2 to 3 percent (Sudan, Government of 1983 [?], 31). Most of this is regarded as fixed rather than disposable wealth.

While agriculture remains the mainstay of the economy, minerals and mining will be playing a larger role in the future. Oil has been discovered in the southwest region and there are hopes that petroleum may be a potential foreign exchange earner. Other minerals such as chrome, copper, lead and zinc are being prospected. The surface geology of the country has made prospecting difficult, but there is cause for general optimism in the future of mineral development in Sudan, though this may have little impact in the next few years.

Woodland resources in the country have suffered from the growing demand for construction and fuel. The South has the greatest potential with a projected forestry surplus for at least the next decade. But this is not true for many of the other areas and higher priorities must be given to preservation and replanting of woodlands in most parts of the country.

FIGURE 4



SOURCE: World Bank 1982.

CHAPTER 3. KEY DEVELOPMENT ISSUES IN SUDAN

3.1 INTRODUCTION

Sudan became independent in 1956, earlier than most African countries. In twenty-seven years of independence, there have been several different patterns of economic growth. Balance of payment problems and slow growth characterized the first years of independence. The sixties saw major investments in extension of irrigation, some expansion of industry in Khartoum, and the beginning of mechanized agriculture in the Blue Nile regions. There was an active USAID program at this time. The end of the sixties and early seventies saw a change in direction of government and a lessening of ties with the West in favor of links with Eastern Europe and the Soviet Union. During the latter part of the 1970's there was a strong reorientation toward Western economic ties as well as a move to link the economy more closely with Middle Eastern OPEC countries.

For much of its independence, Sudan has had to deal with a persistent north-south split, including a bitter civil war. Although there was a peace accord between the north and south more than a decade ago, there has been an increasing hostility from the south. Much of the opposition results from a lack of economic development experienced by the south; the large influx of refugees from surrounding countries who add additional strain to the economy; as well as the conceived threat of Islamic political development in the north. The creation of a unified national infrastructure has therefore been difficult to attain, let alone maintain.

Sudan, particularly northern Sudan, has a long history of contact and interchange with surrounding countries and Europe. The quality of Sudanese professionals is well known in the Arabic speaking world. With the economic

expansion of OPEC nations, there has been a great demand for Sudanese at many levels of professional and technical expertise. Many Sudanese have taken positions in Saudi Arabia, Libya and other nearby nations. Thus, at a time when there is a new surge of Sudanese development activity and a resurging need for skilled personnel, the Sudan is also supplying OPEC countries with this scarce resource. The balance sheet on this problem is one of the issues discussed in this chapter.

The key development issues of the Sudan discussed below include some which are common among most least developed nations. They are:

- balance of payments;
- modernization of the livestock industry;
- imbalance between urban and rural economies;
- development of the traditional agricultural sector;
- energy.

In addition, the particular character of Sudan's regional location, culture, and environment has contributed to some unique problems and issues including:

- the role of irrigation and the use of the Nile water resource;
- conflicting possibilities for use of the central rangelands including mechanized agriculture and grazing;
- the role of in and out migration of labor;
- special development problems of the south;
- some aspects of Sudanese institutional problems.

Overlapping these two categories are a number of issues which are important to the region of Eastern Africa. These include:

- inadequate infrastructure;
- appropriate development of rangelands;

- institutional issues of centralization and decentralization;
- refugees;
- environmental degradation;
- problems of rural energy.

This profile is thus a compendium of issues common to the least developed, to the region, and to those issues unique to Sudan.

3.2 SUDAN BALANCE OF PAYMENTS

Issue: The balance of payments problem facing Sudan is a critical constraint on economic development. Export earnings depend heavily on a single crop, cotton, and are smaller by a factor of 2.4 than import spending. While various forms of external aid have prevented financial disaster, there remains serious structural problems.

Balance of payment problems are high on any list of chronic problems facing developing nations. However, in comparison with other countries, Sudan's difficulties are more serious. To quote the World Bank's 1982 Report for economic stabilization and structural change:

> Imports, particularly in recent years, have risen relative to GDP, while exports have fallen sharply, leaving a deficit on current account equal to around 12 percent of GDP. Public debt outstanding and disbursed has grown to over US $3 billion, or about four times export earnings, and the ratio of debt service owed to exports has risen to over 40 percent. In fact, the external debt burden is now one of the key economic constraints (p. 2) (see Table 1).

Added to this problem is Sudan's considerable dependence on cotton exports. World market prices have been volatile through 1981 for cotton and ground nuts which are important export items for Sudan. This, together with a decline in the export of cotton of over 50 percent of total exports in 1971/72 to 39 percent in 1980/81, has had an exacting impact on the balance of payments. The fluctuations of the world market have strained an already fragile financial situation; it becomes impossible to have good long range management planning where crop income is so impossible to predict. The diversification and promotion of other exports such as gum arabic, sesame seeds, oil seed cake, edible oil and dura provide some insulation against shifts in the world cotton market (World Bank 1982, 17).

Another dimension of the balance of payments problem is its interrelationship with development expenditures. Considerable donor and Government of

TABLE 1

SUMMARY OF MACRO INDICATORS IN SUDAN

ITEM	1970/71	1972/73	1977/78	1980/81
		-(LS millions)-		
GDP (current prices	761	897	2883	4435
		-(US$ millions)-		
Current Account Balance	-44	-11	-471	-719
External Public Debt (disbursed only)	300	370	1800	3100
Debt Service Ratio (%)	14	12	35	40
Cotton Exports (ths bales)	1500	1200	800	400
		-(percent of GDP)-		
Imports	18	17	16	21
Exports	16	17	8	9
Current Account Balance	-2	-	-8	-12
Current Revenues	22	20	16	17
Current Expenditures	18	18	15	20
Current Savings	4	2	1	-3
Development Expenditures	2	3	6	7
		-(growth rates)-		
	70/71-80/81	70/71-72/73	72/73-77/78	77/78-80/81
GDP (constant prices	2.6	-5.2	7.9	-0.7
Money Supply	27.9	22.3	28.6	30.6
GDP Deflator /a	16.3	14.5	17.0	16.3

/a Data for this indicator are very weak and are thought to considerably understate inflation, especially in recent years.

SOURCE: World Bank 1982, 2.

Sudan financed development activity is taking place in several sectors. This development action creates a large amount of spillover demand for foreign exchange. Even in cases where the donor has provided funds to offset the balance of payments impact, it is likely that cost overruns or infrastructural improvements will be required. The Kenana scheme is a recent case in point. The sugar producing complex was built with Arab capital and Western technology; the project was initially estimated at a cost of U.S. $250 million but has now exceeded over U.S. $500 million and is expected to reach U.S. $750 million before completion. A country with a stronger balance of payments situation could absorb such extra demands. Sudan doesn't have that capacity, however, and as a result may not fully exploit the potential of the development projects or must borrow further to deal with the problem. In addition, the projects' exchange requirements cannot avoid having an impact on import priorities, pushing aside some urgent alternative needs, particularly in the general area of infrastructural maintenance.

3.3 THE IMPACT OF THE OIL ECONOMIES ON TRADE AND AID

Issue: The Sudan, as an Arabic-speaking, partly Muslim country, is part of the Arab world. Although oil prices have decreased, increased consumption of petroleum products have created difficult problems for the Sudan in terms of expenditures. This may to some extent be offset by the benefits from trade and aid with oil producing Arab countries.

Higher oil prices have a direct and negative impact on the balance of payments. During 1979/80, petroleum imports represented nearly 20 percent of all import expenditures exceeding U.S. $400 million, and 43 percent of total export earnings. According to the World Bank, "transportation consumes fifty-five percent of petroleum products at present; the remainder is consumed by agriculture (eighteen percent), industry (sixteen percent), services (four percent) and electricity generation (six percent)" (World Bank 1982, 99). The effect of this drain on foreign exchange is greatly multiplied by the impact it has on the rest of the economy. The situation may worsen in the future unless recent oil discoveries in Sudan prove to be of commercial value. The Sudanese government is reasonably confident that commercially exploitable amounts of crude oil have been discovered in southern Sudan which could be expected to meet half of the nation's needs by the end of the eighties, and possibilities of a gross annual foreign exchange savings of $125 million on imports (Sudan, Government of 1982b, 24). The need for sound management practices would be critical to the success of oil exploitation.

On the other side of the equation, Sudan benefits from increased development aid from the Arab oil producers. The pattern of Arab aid will have a major impact on how effective and appropriate projects sponsored by other donors are. Aid given through national funds established by the oil-producing countries has been provided to Sudan in development projects mainly

established with the specific aim of developing the agricultural potential of countries. There have also been joint government-private business ventures where Sudanese government funds are joined with private Arab funds. While Arab aid has had an impact on the Sudanese economy, it nonetheless falls short of all its needs. As Arab aid is transitory in nature due to the price fluctuations of oil, the volume of aid to Sudan may stabilize or decrease. Other donors will have to fill the gap carefully and selectively.

The rise in the cost of oil may have a subtle impact on Sudan's cotton trade. The petrochemical base and high energy content of synthetic fibers makes it unusually sensitive to oil price changes. Cotton is a good substitute for synthetics and may help Sudan in the medium term future. Non-cotton trade is another issue. Although the Arab world was not a major market for Sudanese products in the 1970's, it is presently growing rapidly. Proposed projects are to lead to increased exports to the Arab world, but Sudan's agricultural strength is not an area where unlimited expansion can be anticipated in the near future. The exports of food and food-related crops to OPEC countries are limited by Arab populations which are somewhat less sensitive to the importing nation's income level.

3.4 THE IMPACT OF THE OIL ECONOMIES ON EXPORT OF SUDANESE LABOR

Issue: The rapid economic expansion of the Arab oil economies has provided Sudan, through its Arab ties, with development possibilities through the direct export of labor. Yet it is difficult to assess the costs and benefits to the Sudanese economy of this export.

Although related to the balance of payments problem, the question of the role Sudanese workers abroad should play in national development stands as a separate issue. The debate on whether or not overseas labor makes a positive or negative contribution continues. High demand among oil producing Arab countries for a wide range of skilled and semi-skilled labor has led to many Sudanese workers earning overseas wages of approximately twelve times their Sudanese wages. Such emigration is not a total loss to Sudan since some fraction of the overseas earnings will be transferred to family members still in Sudan or returned directly when the worker does. The Bank of Sudan and IBRD have estimated that the flow of emigrant funds were "equivalent to fifteen to twenty percent of Sudanese imports on average during the latter part of the seventies". Many of the imports were commodities, such as cars, which led to further foreign expenditures on fuel and spare parts (World Bank 1982, 120).

Given the precarious nature of Sudan's balance of payment situation, exploring use of Sudanese workers to increase hard currency inflow is attractive but uncontrolled under present government policies. Tables 2, 3 and 4 present information on the number of emigrants temporarily abroad, their educational background, and their level of skill. The Sudanese government has given considerable attention to government policies but has not yet arrived at a policy to maximize positive impact on the balance of payments. At the same time, there is concern over the "brain drain" impact on the Sudanese economy.

While the matter needs careful study, it appears that current labor shortages are not as great a constraint on development as the shortage of foreign exchange. It also appears that the direct export labor of Sudanese working abroad may be a considerably more efficient means of earning foreign exchange than the same labor employed in the production of export goods. At the very least, the economic role of Sudanese working abroad warrants further study. The experience of some of the lower income countries in the European Common Market may suggest possible policies and could well be tied into consideration of the feasibility of some sort of Arab common market.

The "market" for Sudanese working abroad also depends on oil revenues in Arab states flowing at a rate sufficient to maintain a large wage differential between Sudan and the oil producers. While one can reasonably expect employment in the Arab oil producing nations, it is much less clear to what extent, given the fluctuating price of oil which has been decreasing. It is quite likely that time will see the gradual replacement of Sudanese workers, particularly the more skilled, with OPEC nationals although some preference is being given to East and South Asians in semi-skilled labor. The continued demand for Sudanese workers has been projected to increase by 4 percent to 1985 by recent World Bank estimates. Any government policies or programs concerning Sudanese workers abroad should consider that Sudan's emigrant labor market to oil producing Arab countries may remain fairly constant although there is the risk of a decreased demand for semi-skilled labor. For example, the development of specialized training programs to provide exportable workers makes little sense if there is a five year horizon, but may be quite practical if the labor shortage will continue for decades.

TABLE 2

SUDANESE IMMIGRANTS TO ARAB AND OTHER COUNTRIES

1978

Country	Number of Temporary Immigrants	Percent of Total
Saudi Arabia[1]	140,550	60.8%
Egypt[2]	45,000	19.5%
Libya[1]	20,000	8.6%
United Arab Emirates[1]	12,000	5.2%
Kuwait	3,500	1.5%
Oman	1,800	.8%
Qatar	2,500	1.1%
United Kingdom	1,500	0.6%
Northern Yeman	800	0.3%
Nigeria	500	0.2%
Lebanon[2]	500	0.2%
Greece	300	0.1%
Jordan	300	0.1%
Bahrain	100	--
Other Countries	2,000	0.9%
TOTAL	231,350	99.9%

[1]It is likely that the number of immigrants to Saudi Arabia, Libya, and the United Arab Emirate has increased since 1978.

[2]Sudanese in the United Kingdom, Greece, Lebanon, and to some extent Egypt, are primarily students.

SOURCE: Gallal el Din 1978.

TABLE 3

SUDANESE WORKERS IN ARAB PETROLEUM PRODUCING COUNTRIES,

BY EDUCATION AND BY TECHNICAL LEVEL

(A Representative Sample)

Educational Level	Number	Percent
Basic Literacy	48	9.6%
Primary Education	151	30.6%
Intermediate Technical Education	20	4.0%
Technical and Vocational Trained	14	2.8%
Junior Secondary School	78	15.6%
Higher Secondary School	78	15.6%
Higher Technical Education	30	6.0%
Higher Agricultural Education	22	4.4%
University and Higher Education	59	11.8%
TOTAL	500	100.0%

SOURCE: Gallal el Din 1978.

TABLE 4

OCCUPATIONAL STRUCTURE OF IMMIGRANTS BEFORE LEAVING SUDAN

	Number	Percent
Administrators and Higher Technical	60	12.0%
Clerks and Accountants	48	9.6%
Artisans	103	20.6%
Technicians	110	22.0%
Skilled Workers	90	18.0%
Casual Workers	56	11.2%
Unemployed	33	6.6%
TOTAL	500	100.0%

SOURCE: Gallal el Din 1978.

3.5 IRRIGATION: SUCCESS OF THE PAST, KEY TO THE FUTURE

Issue: Irrigation has been the mainstay of Sudan's agricultural development. However, additional Nile water for expansion of irrigated land is limited and other water resources are not likely to be sufficient to meet most projected needs. The slowing of horizontal expansion of irrigation and the need for a major reappraisal of some aspects of existing projects creates a special set of issues in the Sudan irrigation sector.

Irrigation has long been practiced along the banks of the Nile in northern Sudan. In this area there has been a transition from small scale flood irrigation and the traditional shaduf or sagia water lifting to modern diesel pump watering. Although land is scarce along the riverine lands at the Northern and Nile Provinces because of the irrigation, cultivation is year-round and has a strong horticultural bias. Many small pump schemes have been surpassed in importance by government sponsored large projects usually over 50,000 acres. Pump irrigation now waters over 1.4 million acres.

The greatest transformation, however, began in the 1920's with the development of gravity irrigation projects in the Gezira. Four major projects now provide water to over 2.5 million acres. They are the Gezira at 1.2 million, Managil at 0.9 million, Rahad at 0.3 million and New Halfa at 0.4 million acres each. Gravity irrigation is seen both locally and internationally as a major development achievement and is an important model for other African countries. As irrigated land produces 90 percent of the nation's exports of cotton, groundnuts, wheat and sugar cane, and supports 50 percent of the paid labor force, it is obviously a vital part of the economy.

The best known of the irrigation projects is the Gezira scheme which is managed and controlled by the Sudan Gezira Board. The Gezira scheme "numbers 96,000 tenant farmers and produces seventy-five percent of Sudan's cotton,

twelve percent of its sorghum; sixty percent of its groundnuts and eighty-five percent of its wheat" (Sudan, Government of 1983 [?], 26). The crops grown consume some 7.5 billion cubic meters of water a year. An irrigation scheme of such magnitude has created environmental problems and conditions which should be examined when assessing the success of the Gezira scheme. Some of the problems and conditions include: the application of insecticides, fertilizers and other chemicals which affect human health and water quality; numerous irrigation canals provide breeding grounds for snails which host bilharzia vectors and malaria-carrying mosquitos. Crop intensification and over-irrigation have affected the physical and chemical qualities of the soil (University of Khartoum, Geography Department 1982, 22-24). The environmental impact of the Gezira scheme is of consequential importance both to the inhabitants and workers in the area as well as the area itself.

A number of important issues must be considered in assessing the pattern of future irrigation:

1) Water Availability

By 1985, available Nile Waters will be fully allocated between Egypt and Sudan. Some additional water may be supplied as a result of the Jonglei project, but water will remain a scarce resource limiting Sudan's future expansion of irrigation on the scale achieved in the 1960's and 1970's (a rate of approximately 100,000 new acres a year).

2) Ground Water

Additional water for irrigation may be available from ground water but adequate surveys of potential ground water resources are not yet available. It is likely that opportunities from this source will be localized.

3) Water Management

Improvements in water handling and use are becoming increasingly important. Already the Sennar Dam cannot supply all needed water to the Gezira because of new cropping patterns and

the design of the main canals. The new Rahad project uses a different method of irrigation (furrow) and tenants are charged directly for water used. It is politically difficult to introduce this procedure into the older projects even though it would improve efficiency.

4) Rehabilitation of Existing Schemes

Considerable investment is needed in the older projects to improve resource utilization. Land leveling to prevent waterlogging and salinity build up is particularly important. Transmission losses are a problem requiring attention and regular maintenance of canals has not always been alloted high enough priority.

5) Siltation

The Khashm el Girba project has major problems with siltation of the dam already consuming 40 percent of dam capacity. Silting is also a problem in Sennar and Rosaries dams with losses of 20 percent capacity.

6) Jurisdictional Concerns

Organization of irrigation in Sudan has traditionally been shared between the Ministry of Irrigation and the parastatal boards which run the projects. The Ministry of Agriculture is also involved in cropping and agricultural techniques. The smaller pump schemes have suffered the most from these conflicting lines of authority. Many aspects of irrigation organization are recognized as needing review and change but change will not come easily in the present government structure.

7) New Crop Research

The Sudan is currently experimenting with new crop mixes for the irrigated areas. The main thrust of previous research has been cotton. With a variety of crops being produced, a much broader support base including crop research, study of most efficient watering, and optimal inputs will be needed.

The output performance of irrigated agriculture has declined in the 1970's. This decline can be seen in Table 5 which shows a decrease in yields of cotton, wheat, groundnuts, sugar cane, sorghum and sesame. The World Bank has attributed the decrease in productivity and in yields of major export crops partially due to the following: weak management of the schemes; transport problems; the increasing cost of producing the crops; foreign exchange

TABLE 5

KEY INDICATORS OF AGRICULTURAL PERFORMANCE

(Major Crops 1970/71-1980/81)

Sub-sector		Area			Yield			Production		
		1970/71 1974/75 Ave.	1975/76 1979/80 Ave.	1980/81 Prov.	1970/71 1974/75 Ave.	1975/76 1979/80 Ave.	1980/81 Prov.	1970/71 1975/76 Ave.	1976/77 1980/81 Ave.	1980/81 Prov.
		'000 fd			mt/fd			'000mt		
Cotton LS	Irrig-M	1006	708	546	0.546	0.345	0.297	550	244	162
	Flood-M	--	3	61	--	0.154	0.225	--	--	9
Cotton MS	Irrig-M	154	262	245	0.510	0.538	0.351	79	141	86
	Flood-M	46	35	5	0.196	0.193	0.400	9	7	2
	Rfd-M	--	13	--	--	0.230	--	--	3	--
Cotton SS	Rfd-M	170	137	131	0.113	0.132	0.168	19	18	21
Cotton	Total	1,375	1,156	967	0.478	0.358	0.291	657	414	281
Wheat	Irrig-M	367	591	436	0.513	0.420	0.333	188	247	145
Sugar Cane	Irrig-M	34	52	103	30.4	27.5	27.7	1024	1420	2848
(sugar output)		--	--	--	--	--	--	(105)	(130)	(265)
Groundnut	Irrig-M	261	400	232	0.946	0.872	0.685	247	349	159
	Rfd-M	1,261	1,908	1,930	0.245	0.260	0.284	309	497	548
	Total	1,521	2,308	2,162	0.365	0.367	0.327	555	845	707
Sorghum	Irrig-M	445	467	427	0.522	0.462	0.424	232	216	181
	Flood-M	74	68	76	0.389	0.344	0.368	29	23	28
	Sub-total	519	535	503	0.514	0.447	0.416	261	239	209
	Rfd-M	NA	3,130	3,314	NA	0.318	0.366	NA	996	1,214
	Rfd-T	NA	2,898	3,020	NA	0.254	0.232	NA	737	700
	Sub-total	4,395	6,028	6,334	0.295	0.288	0.302	1,297	1,734	1,194
	Total	4,193	6,563	6,837	0.317	0.301	0.311	1,558	1,973	2,123
Sesame	Rfd-M	NA	485	490	NA	0.128	0.120	NA	62	59
	Rfd-T	NA	1,677	1,521	NA	0.098	0.100	NA	164	152
	Total	2,194	2,162	2,011	0.128	0.105	0.105	281	227	211
Millet	Rfd-T	2,321	2,764	2,604	0.164	0.158	0.189	381	438	492

Source: World Bank 1982, 293.

1 feddan (fd)=0.42 hectares
LS-Long Staple
MS-Medium Staple
SS-Short Staple
M-Modern
T-Traditional

shortages and inadequate producer prices due largely as a result of the cost recovery mechanism on the schemes (World Bank 1982, 58; 59). Other reasons cited were "the size of schemes which makes completely centralized, public control of all operations impractical; declining maintenance of facilities; poor water programming as well as the ever-worsening relations with the schemes' tenants, have led to declining factor productivity" (Development Alternatives, Inc. and Research Triangle Institute 1982, 8). Policies and structural reforms are being considered to alleviate many of the incurred problems and to increase the productivity of the irrigated areas.

3.6 LARGE SCALE MECHANIZED AGRICULTURE

Issue: Mechanized agriculture, now using over five million acres is still expanding rapidly. While increasing total national grain production, this sector is increasingly invading land which the traditional sector uses for crop and animal husbandry. Mechanized cropping practices result in lowered productivity and sometimes abandonment of land. The future expansion of this sector and the pattern of resource utilization is an important issue for the Sudanese government.

The officially allocated areas of mechanical farming under the Mechanical Farming Corporation are concentrated in Kassala and Blue Nile provinces where over four million acres are allocated. Expansion to Upper Nile, White Nile and South Kordofan, and South Darfur provinces is a more recent phenomenon, and more expansion is planned for these areas. The extension in South Darfur uses lighter sandy soils whereas all other rainfed cultivation of this type has been on the clay plain soils. In 1976, the World Bank estimated that mechanized farming produced almost one million tons of sorghum, 50,000 tons of sesame and 5,000 tons of short staple cotton yielding a combined value of U.S. $150 million (World Bank 1979, 174). The net financial return to the farms is estimated to average U.S. $20 per farmed acre for the private sector and a loss of U.S. $22 per farmed acre for state farms. It is estimated that an average farmer could earn between U.S. $7,500 to U.S. $12,500 per year which is far above income levels in irrigation or in the traditional sector.

However, since the mid 1970's there has been a strong declining trend in crop yields of cotton and a less severe decline in wheat, sesame, millet and sorghum. The World Bank lists some of the contributing factors which have led to production declines: government strategies; decreasing performances of agricultural corporations; insufficient information services for producers; consumer subsidies; and labor shortages (World Bank 1982, 62-66).

The major problems of mechanized farming are:

1) Declining soil fertility due to mono-cropping of sorghum and a lack of an effective extension system to advise farmers on rotation needs.

2) Seasonal farming with minimum investment in the land. Lack of dry season potable water and road communications contribute to the continuation of this system.

3) Farm machinery is not appropriate to the conditions and is only used for tilling, resulting in large labor demands for other parts of the cropping cycle.

4) Poor farm layout with no assessment of land potential and rationalization of land use.

5) Increasingly critical competition for labor, especially in Kassala and Blue Nile provinces.

6) While land allocated to mechanized agriculture has been thought to be unused, it did represent a major grazing resource. Even more important land allocated to mechanized agriculture in the future will surely be a reallocation from some existing use.

To quote the World Bank in its 1979 Report:

> No one has systematically surveyed and collated what knowledge has been derived from experience over the past twenty years and tried to relate it to different rainfall patterns or different soil conditions. Farmers and the MFC know more about what they should not do than about what they should do; the farming system has developed on a trial and error basis. Many errors have been identified and the MFC is now looking for corrective measures. The economics of varying farm practices has received even less investigation. Almost nothing has been done on the optimal timing of farming operations to suit the micro-climatic conditions in various mechanized farming regions; the same applies to crop selection and improvement. The availability of factors of production is often uncertain because of weaknesses in the marketing system, and of servicing facilities. The suitability of the technology being used is presently questioned (World Bank, Vol. 2 1979, 168).

Priority continues to be given to expansion of mechanized farming, even though many observers suggest that the best long run gains will come from consolidation of achievements in areas already under cultivation and through development of an appropriate research, extension, and marketing system in

these areas. The whole question of developing a better combination of crops and of crops and livestock is vital.

To quote an article in Sudanow:

> We cannot afford the unbalanced agricultural development that has been practiced so far, with mechanized farming expanding at the expense of forestry, pasture, and wildlife (Turner 1979, 35).

3.7 DEVELOPMENT IN THE TRADITIONAL SECTOR

Issue: Traditional agriculture in Sudan has received little development attention until the last few years. Some experimental projects are now underway but many questions remain, ranging from what is the most effective general strategy for development in this sector to particular local marketing and extension issues.

Two wide zones of the country have suffered because of the lack of development interest in traditional agriculture: the west (Kordofan and Darfur) and the south.

The West

The western region has a limited resource base with annual variations in rainfall which have been declining in the past years. Traditional dry farming is a major economic activity; the importance of farming has gained significance with the expansion of groundnut cultivation. In the northern area of the region, crop failures are frequent. To ensure some success, farmers prepare more than one field for cultivation. Collection of gum arabic is also significant to the economy.

Two divergent views about strategies for the traditional sector are posed by the International Labour Organisation's 1976 Report, Growth, employment and equity: A comprehensive strategy for Sudan; and a communication by professionals experiences in Sudan, Which way Sudan agriculture? (Berkoff and Adams 1979).

The ILO Report and subsequent project and sector studies argue that on grounds of equity, past neglect of traditional agriculture should be redressed. The ILO team also recommended that the "remarkable increases in the production of groundnuts, food and vegetables from traditional agriculture"

could be greatly expanded with some support to the sector (International Labour Organisation 1976, xxi). According to the World Bank, "the growth of groundnut production...has been one of the most significant successes...during the 1970's and has contributed to change in an otherwise stagnant portion of the economy" (World Bank 1982, 67).

Berkoff and Adams agree with the priority to redress equity, but they cite the extension of the railroad to Nyala as the rationale for success of commercial agriculture in the West. They present a much less hopeful prognosis for growth in productivity in the traditional sector. Quoting from their study:

> Traditional agriculture has been neglected but not simply because of the government's determination to promote modern agriculture. It has been neglected because of the inherent difficulties of doing something effective.... Finance is unlikely to be the limiting factor. Far more important will be the implementation capacity, the difficulty of identifying real opportunities for development, and the absorption capacity of areas dominated by traditional agriculture (Berkoff and Adams 1976, 196).

These cautions, though well taken, do not undermine the ILO premise that assistance to the traditional sector is timely. Although responses may be slow, it is clear that the Sudanese government is now firmly committed to investment in the traditional sector.

Decisions to invest in the traditional sector imply questions of what kind of development investment will be most productive. Many in the government and among donors still view mechanization of grain production, modern ranch projects, and large scale agricultural cooperatives to be the best means.

In contrast, the World Bank and USAID, among other donors, are providing support to a strategy more in keeping with the ILO recommendations. For example, they are supporting a project in southern Darfur which calls for

integrated rural development through a gradual approach to change in land use. The project includes modifying both cropping and animal husbandry and is based on one of the detailed resource surveys which have been prevalent in Sudan in recent years. A US/World Bank initiative in northern Kordofan and Darfur starts with a research program in agriculture and plans to build a viable agricultural future from the results of the detailed research program.

Whatever the argument about the details of these projects, the general philosophy they follow is a key issue. The need to arrest further decline in the traditional sector is a major rationale, as well as the notion that development in this sector is a process of experimentation. Projects, therefore, need to be set in an experimental mode with medium to long term viewpoints.

An important ingredient missing from many of current activities is an up-to-date assessment of how the rural system operates. Some parts of the country have excellent resource surveys along with reasonable accounts of the complex economic systems which currently use them. Other areas lack data on both the resources and how they are used. Based on what is known, three major issues are essential to any investment strategy in the traditional sector: the lack of transport as an institutional constraint; the integration of livestock and cropping; local, national, and international marketing; and the institutional framework. These issues are dealt with in further chapters.

Soil erosion by wind or water action, overcultivation, overgrazing and overcutting of trees and an increase in human and animal populations and soil impoverishments are but some of the environmental pressures experienced in this region. "These environmental consequences have intensified further the pressures of the local population, who, because of extenuating social conditions and the mismanagement of a precarious environmental balance set the cycle in motion" (University of Khartoum, Geography Department 1982, 34).

The dynamics of the environment, population, and current resource use systems appear to be an essential information base upon which to build both rural development programs and agricultural experimentation.

The South

The traditional sector in the southern Sudan has a different matrix of problems. War disrupted all parts of the rural administration and has still not been completely corrected. There are few available agricultural statistics for production in the south. However, a few visiting teams have indicated the generally dispersed pattern of agricultural production and the mainly localized marketing facilities.

The majority of traditional farmers in the southern region produce little or no crop surplus for the market and generally suffer from low animal productivity. The inadequate transportation and communications network impedes incoming and outgoing deliveries of any surplus production to the traditional farmer in the south. This also means low prices for agricultural output and higher prices for what is bought. Also contributing to low prices is the lack of storage facilities for surplus production. The combination of inadequate or lacking the means of transportation and storage facilities has led to an almost non-existant market for the southern farmer. Thus there is no incentive for the farmer to produce a marketable surplus.

On the positive side, the south has more reliable rainfall than other parts of the country. Recent environmental degradation has not been nearly as severe as in the north, but the rain falls on soils of variable fertility. Long range planning, then, must introduce greater diversity in crops and other agricultural inputs if there are to be substantial increases in productivity.

The challenge is to strengthen agricultural services which can support the style of development and promote the growth of local and regional markets. Over the next decade, marketing promises to be a major issue in this area. Development in the south will necessarily also include interventions in the infrastructure for health, education and transportation.

3.8 ENVIRONMENT AND DEVELOPMENT: ACHIEVING A BALANCE IN SUDAN

Issue: To what extent have current resource use patterns seriously depleted the productivity of agriculture and forestry in Sudan? Can destructive trends be arrested and reversed?

There is a curious dichotomy in reports on the Sudan. There is a clear separation between plans and accounts that discuss in optimistic terms the extension of irrigation and mechanization projects for development, and others which express concern about the rapid degradation of the natural resource base. Sudanese government and World Bank documents have presented both viewpoints in separate parts of the same report (Sudan, Government of 1977b and World Bank 1979).

A report compiled by the Institute of Environmental Studies at the University of Khartoum and Clark University, entitled Environmental Context of Development in Sudan has directed attention to the environmental impacts of various projects engaged in the last few years in Sudan. The report indicates that the "environmental impacts of these development projects have become apparent in the form of resource degradation, devegetation, and signs of desertification. Thus there is great need for careful planning and monitoring of the environmental impacts of development, and the incorporation of environmental considerations into project planning" (University of Khartoum, Geography Department 1982, 1).

Environmental problems can have considerable effects on the development process in Sudan. To assist in the productivity of development projects, especially on a long-term basis, the Environmental Context of Development in Sudan report has "attempted to provide some rating of the intensity of environmental problems" in the various regions of Sudan (University of Khartoum, Geography Department 1982, 1-4).

The following is a summary statement taken directly from the above cited report as well as the key to the map taken from the mapsheet (see Table 6). It is included as a strong expression of the Sudanese concern for the environment as well as providing guidelines for policy action concerning development projects in the Sudan. The map itself is included as Figure 5.

For the purpose of this map the environment is seen as a set of physical, biological, and social factors which influence a particular area or community. The interaction between these factors make for a complex environmental system that needs careful analysis and monitoring. Development activities in the country can upset the delicate balance between these factors, and can present conflicts between satisfying social or economic goals and preserving a fragile physical environment. The most pressing environmental problems are those associated with declines in agricultural and livestock productivity such as vegetation cover removal which results from overcultivation or overgrazing, desertification, soil degradation, crop pests, animal disease and the general productivity declines associated with human morbidity and mortality.

The map is designed to present expected environmental trends at the regional level, and therefore, to alert planners and policy makers to environmental problems which can be considered either directly or as part of an integrated development programme. Thus, it is important that the map:

a. Show the present intensity of environmental problems at the district level,

b. Identify the kinds of environmental problems that are interacting in each district,

c. Show the possible environmental impacts of development projects at present and in the future.

In so doing, it is anticipated that the environmental map will create some awareness of environmental problems and their interactions at the district, regional, and national level so that environmental factors are taken into consideration in project planning.

Explanation of Map

Six categories of environmental problems were identified by members of the Geography departments of University of Khartoum and Clark University. For each of these categories data was collected at the smallest administrative unit, the census district. The data for each district was ranked and rated on a scale of 1 to 4 with 4 indicating more severe problems. The "total intensity rating" was the combination of the individual ratings for the six problem categories and was used to classify each district on the map. The total intensity rating is considered to show the degree of environmental pressure in that district.

The six problem categories used in this classification are:

1. Problems of Human Disease:

   This category includes the types of diseases present, as well as their incidence and prevalence. The incidence of particular diseases varies from district to district, so we considered the six major diseases associated with a given district.

2. Problems Arising from Livestock Diseases and Plant Pests:

   The category includes all diseases that affect domestic animals and was of special concern in areas with a concentration of lifestock. Likewise, the presence and density of crop pests in agricultural areas were assessed and rated.

3. Land Related Problems:

   This category includes those problems related to land productivity. We included problems of soil fertility, problems of salinity, soil erosion and land characteristics which preclude cultivation. Each one of these problems was assessed separately.

4. Problems Related to Development Activity:

   This category includes problems related to the development process which includes urbanisation, industry and mining, and major agricultural projects, as well as the consequences of the lack of infrastructure and of isolation. For example, problems related to the development of agriculture included the impacts of irrigation on semi-arid environments and the consequences of the use of herbicides and pesticides.

5. Water Related Problems:

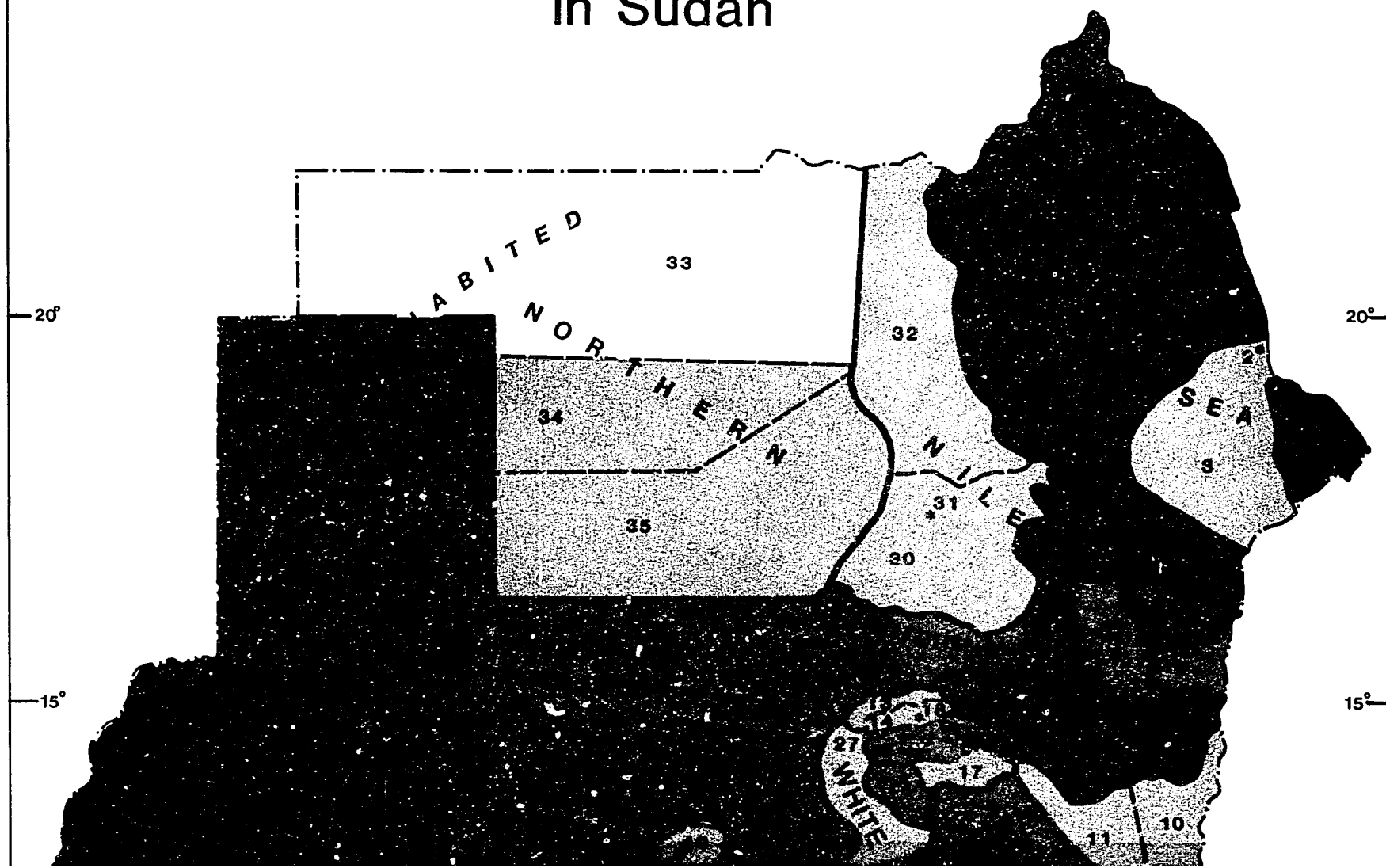
   This category includes water quantity and availability, domestic water quality, and problems related to periodic hazards such as floods and droughts. The numerical ratings for water quality represented a range from "very good" to "poor" while for flood and drought hazards the ratings denoted a scale from "light to "severe".

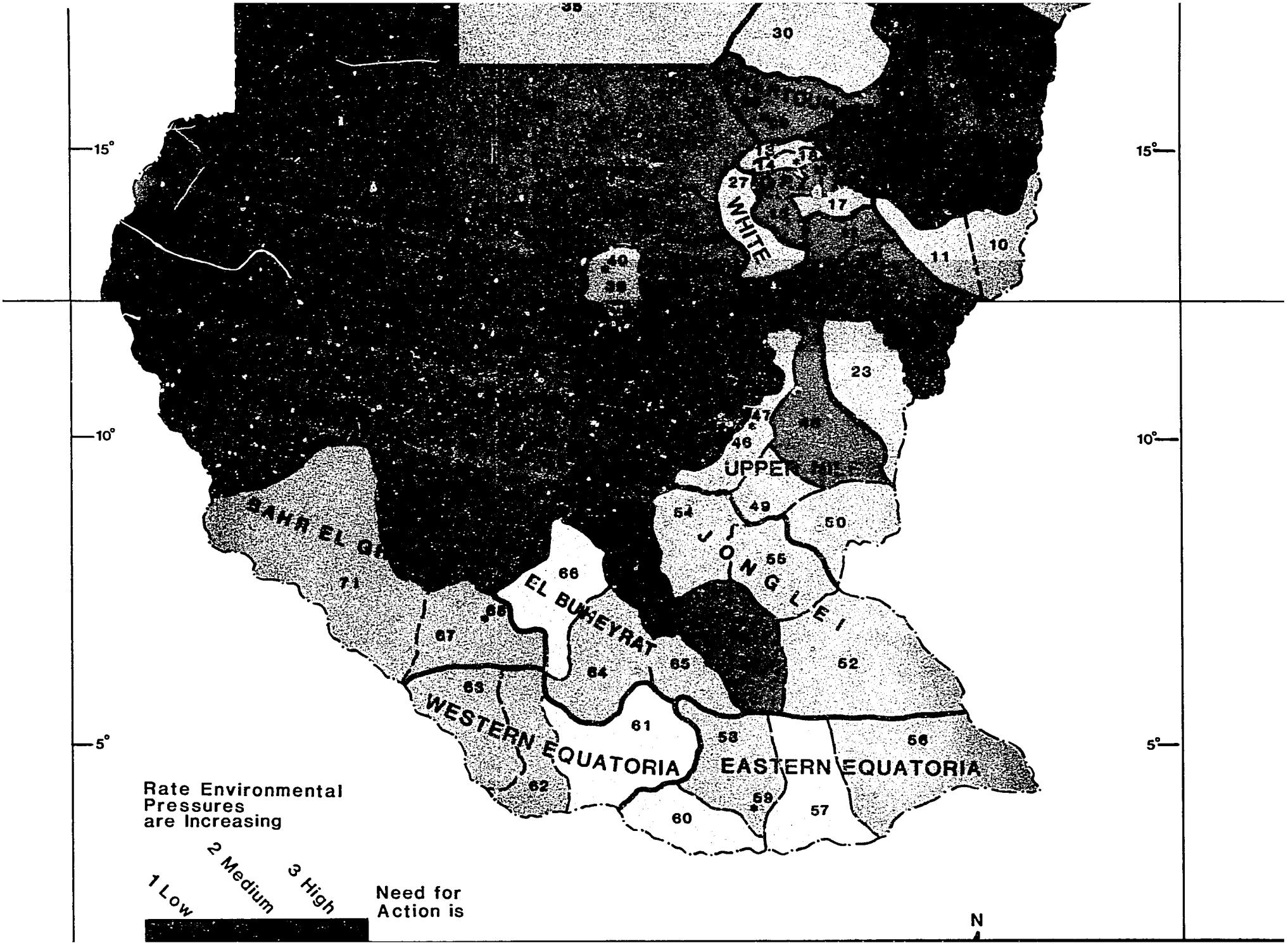
6. People Related Problems:

   This category includes the social factors related to resource use and access to the environment. We included land tenure problems such as fragmentation and open grazing. Other problems considered included land-use conflicts, deforestation as a result of overcultivation or overgrazing, and soil erosion as a reuslt of human use of the land.

In producing the map, care was taken to simplify these complex problems in order to achieve a clear graphic expression of the environmental context of development in Sudan.

Environmental Context of Development in Sudan




30
15°
WHITE
27
17
11
10
23
10°
46
UPPER
49
50
JONGLEI
55
66
EL BUHEYRAT
65
52
64
63
WESTERN EQUATORIA
61
58
56
EASTERN EQUATORIA
62
60
57
5°
Rate Environmental Pressures are Increasing
1 Low
2 Medium
3 High
Need for Action is
N

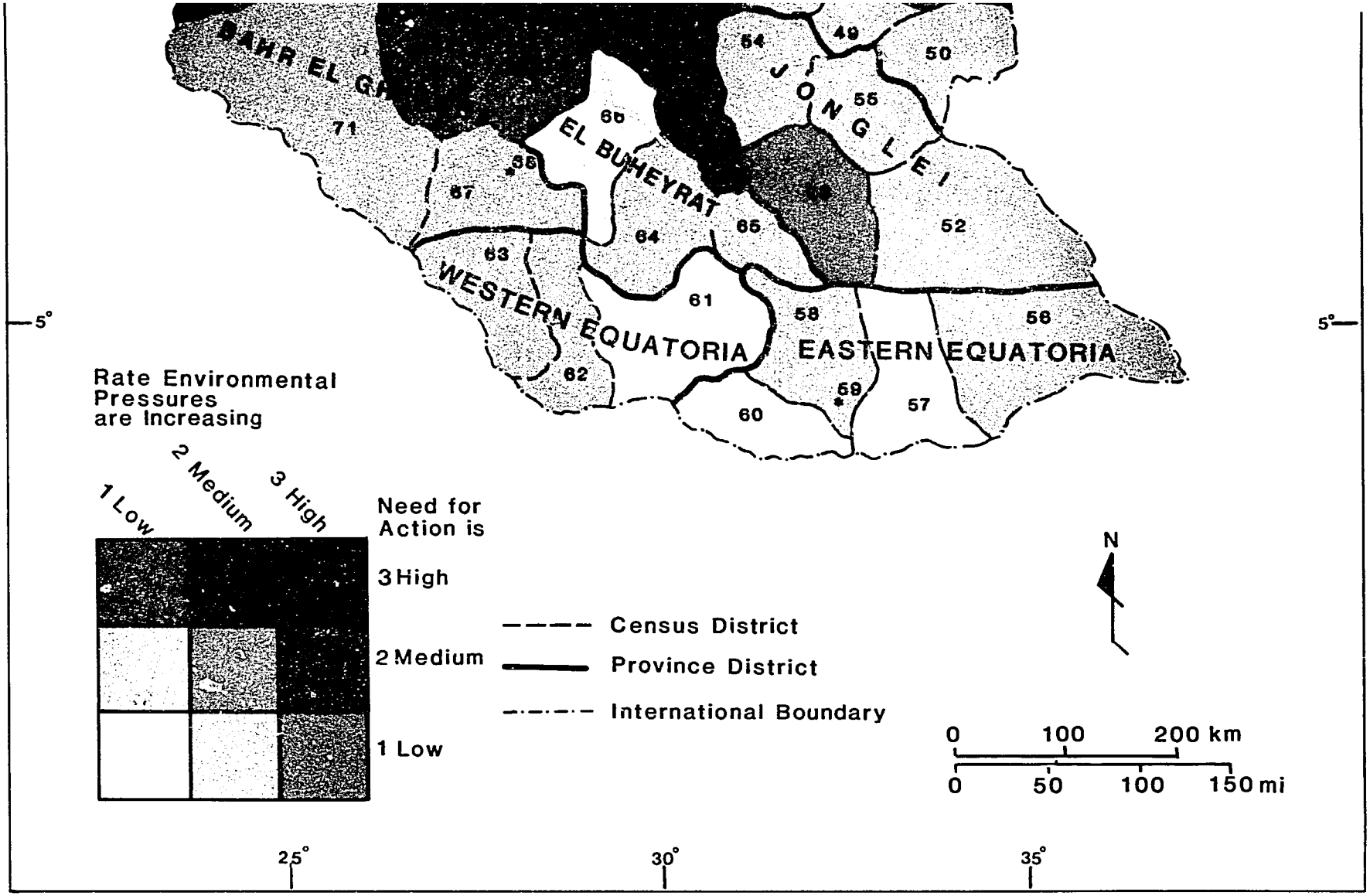

BAHR EL GA
71
66
EL BUHEYRAT
54
49
50
JONGLEI
55
56
57
52
64
65
63
WESTERN EQUATORIA
61
58
58
EASTERN EQUATORIA
62
59
60
57
5°
5°
Rate Environmental Pressures are Increasing
1 Low
2 Medium
3 High
Need for Action is
3 High
2 Medium
1 Low
Census District
Province District
International Boundary
N
0 100 200 km
0 50 100 150 mi
25°
30°
35°

TABLE 6

ENVIRONMENTAL CONTEXT OF DEVELOPMENT IN SUDAN: KEY TO MAP

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
RED SEA				
1. Amrar & Bisharin	3	3	Development Activity/ Water Related/ Human Disease	Isolated, Lack of Infrastructure, Scarcity of Water, Drought, Malnutrition
2. Port Sudan*	3	3	Development/Water Related/Human Disease	Urbanization, Industrial Development
3. Sinkat	2	2	Development Activity/ Water Related/ Human Disease	Isolated, Lack of Infrastructure, Scarcity of Water, Drought, Malnutrition
4. Tokar	3	3	Development Activity/ Waste/Human Disease	Isolated, Lack of Infrastructure, Water Scarcity, Drought, Malnutrition
KASSALA				
5. Aroma	3	3	Human Disease/Water/ People Related	Scarcity of Water, Drought, Migration Dynamics, Land Tenure, Deforestation
6. Kassala	2	3	Livestock Diseases & Plant Pests/Development Activity/ People Related	Plant Pests, Impact of Modernized Agriculture, Migration Dynamics
7. New Halfa	2	3	Livestock Diseases & Plant Pests/Development Activity/ People Related	Plant Pests, Impact of Modernized Agriculture, Migration Dynamics
8. Gedaref North	3	3	Water/People Related	Water Scarcity, Water Quality, Land-Use Conflicts, Deforestation
9. Gedaref Town*	3	3	Developmental	Urbanization, Human Diseases, Refugees
10. Gedaref South	2	2	People Related/Water/ Human Disease	Land-Use Conflicts, Migration Dynamics, Water Scarcity, Water Quality, Malaria

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
11. Qala en Nahl	2	2	People Related/Water/ Human Disease	Land-Use Conflicts, Deforestation, Water Scarcity, Water Quality, Malaria
GEZIRA				
12. Rufaa	3	2	Human Disease/Water/ People Related	Malaria, Schistosomiasis, Land-Use Conflicts, Deforestation, Soil Erosion, Water Quality, Droughts
13. El Mielig	1	3	Human Disease/ Development Activity	Malaria, Schistosomiasis, Impact of Modernized Agriculture
14. El Mehiriba	1	3	Human Disease/ Development Activity	Malaria, Schistosomiasis, Impact of Modernized Agriculture
15. El Hasaheisa	2	3	Human Disease/ Development Activity	Malaria, Schistosomiasis, Impact of Modernized Agriculture
16. El Managil	2	3	Human Disease/ Development Activity	Malaria, Schistosomiasis, Impact of Modernized Agriculture
17. El Hosh	1	3	Human Disease/ Development Activity	Malaria, Schistosomiasis, Impact of Modernized Agriculture
18. Wad Medani Town*	2	2	Development Activity	Urbanization, Industrialization
BLUE NILE				
19. Sennar	2	3	Human Disease/ People Related	Malaria, Deforestation
20. Singa	2	3	Human Disease/ People Related/Water	Malaria, Land-Use Conflicts, Deforestation, Water Quality
21. Rufaa Shariq	2	3	Development Activity/ Human Disease/Live-stock Diseases & Plant Pests	Isolation, Lack of Infra-structure, Malaria, Animal Disease
22. Er Roseires	3	3	Human Disease/Live-stock Disease & Plant Pests/Development Activity	Malaria, Lack of Infra-structure, Isolation

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
23. El Kurmuk	2	2	Development Activity/ Human Diseases/Live-stock Diseases & Plant Pests	Isolation, Lack of Infrastructure, Malaria
24. Abu Higar	3	3	Development Activity/ Human Diseases/Live-stock Diseases & Plant Pests	Isolation, Lack of Infrastructure, Malaria
WHITE NILE				
25. Kosti	3	3	Livestock Diseases & Plant Pests/People Related	Land-Use Conflicts, Deforestation
26. Kosti Town*	3	3	Development Activity	Urbanization, Industrialization
27. Ed Dueim	2	2	Livestock Diseases & Plant Pests/People Related	Animal Diseases, Deforestation
KHARTOUM				
28. Khartoum	2	3	Development Activity	Urbanization, Industrial and Mining
29. Three Towns*	3	3	Development Activity	Urbanization, Industrial and Mining
NILE				
30. Shendi	2	2	People Related/ Development Activity/ Land Related	Land Tenure, Migration Dynamics, Lack of Infra-structure, Land Charac-teristics Preclude Cultivation
31. Atbara* Town	2	2	Development Activity	Urbanization
32. Berber	2	2	People Related/ Land Related	Land Tenure, Migration Dynamics, Land Character-istics Preclude Cultivation

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
NORTHERN				
33. Sukkot & Mehas	1	1	Development Activity	Urbanization
34. Dongola	2	2	People Related/ Development Activity/ Land Related	Land Tenure, Migration Dynamics, Isolation, Lack of Infrastructure, Land Characteristics Preclude Cultivation
35. Merowea	2	2	People Related/ Development Activity/ Land Related	Land Tenure, Migration Dynamics, Isolation, Lack of Infrastructure, Land Characteristics Preclude Cultivation
NORTHERN KORDOFAN				
36. Kababish	2	3	Water/Development Activity/People Related	Water Scarcity, Water Quality, Drought, Lack of Infrastructure, Isolation, Deforestation, Soil Erosion
37. Dar Hamid	2	3	Water/Development Activity/People Related	Water Scarcity, Water Quality, Drought, Lack of Infrastructure, Isolation, Deforestation, Soil Erosion
38. Eastern Kordofan	2	3	Water/People Related	Water Scarcity, Drought, Deforestation, Soil Erosion
39. Bedeiriya	2	2	Water/Development Activity/People Related	Water Scarcity, Drought, Lack of Infrastructure, Deforestation
40. El Obeid*	3	3	Water/Development Activity	Water Related Diseases, Urbanization
41. En Nahud	2	3	Water/Development Activity	Water Scarcity, Water Quality, Drought, Isolation, Lack of Infrastructure

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
SOUTHERN KORDOFAN				
42. Mesiriya	2	3	Development Activity/ Water/Livestock Diseases & Plant Pests	Isolation, Lack of Infrastructure, Water Scarcity, Water Quality, Livestock Diseases
43. Northern Jebels	3	3	Human Disease/ Development Activity/ Water	Isolation, Lack of Infrastructure, Water Scarcity, Water Quality
44. Southern Jebels	3	2	Human Disease/ Development Activity/ Water	Isolation, Lack of Infrastructure, Water Scarcity, Water Quality
45. Tegale	3	2	Human Disease/ Development Activity	Isolation, Lack of Infrastructure
UPPER NILE				
46. Shulluk	2	2	Human Disease/Animal Disease & Plant Pests/ Development Activity	Isolation, Lack of Infrastructure, Malaria
47. Malakal Town*	2	2	Development Activity/ Human Diseases	Urbanization, Lack of Infrastructure
48. Renk	2	3	Human Disease/Livestock Diseases & Plant Pests/ Development Activity	Malaria, Isolation, Lack of Infrastructure
49. Sobat	2	2	Livestock Diseases & Plant Pests/Development Activity/Human Diseases	Isolation, Lack of Infrastructure, Malaria
50. El Nasir	2	2	Livestock Diseases & Plant Pests/Development Activity/Human Diseases	Isolation, Lack of Infrastructure, Malaria
51. Bantiu	3	3	Water/Development Activity/Plant Pests & Animal Diseases	Water Quality, Floods, Isolation, Lack of Infrastructure
JONGELI				
52. Bibor	2	2	Plant Pests & Animal Diseases/Development Activity/Human Disease	Lack of Infrastructure, Isolation, Malaria

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
53. Bor	2	3	Development Activity/ Plant Pests & Animal Diseases/Human Disease	Isolation, Lack of Infrastructure, Malaria, Venereal Disease
54. Zaraf	2	2	Water/Development Activity/Plant Pests & Animal Diseases	Water Quality, Floods, Isolation, Lack of Infrastructure
55. Lau Nuer	2	2	Livestock Diseases & Plant Pests/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
EASTERN EQUATORIA				
56. Eastern Equatoria	2	2	Plant Pests & Animal Diseases/Development Activity	Lack of Infrastructure, Isolation
57. Torit	1	2	Human Disease/Development Activity/Plant Pests & Animal Disease	Malaria, Isolation, Lack of Infrastructure
58. Juba	2	2	Human Disease/Development Activity/Plant Pests & Animal Disease	Malaria, Isolation, Lack of Infrastructure, Urbanization
59. Juba Town	3	3	Development Activity	Isolation, Lack of Infrastructure, Urbanization
60. Yei	1	2	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
WESTERN EQUATORIA				
61. Maridi	2	1	Plant Pests & Animal Disease/Development Activity	Lack of Infrastructure, Isolation
62. Zande East	2	2	Plant Pests & Animal Disease/Development Activity	Isolation, Lack of Infrastructure
63. Zande West	2	2	Plant Pests & Animal Disease/Development Activity	Isolation, Lack of Infrastructure

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
EL BUHEYRAT				
64. Rumbek	2	2	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
65. Yirol	2	2	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
66. Thiet	1	2	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
BAHR EL GHAZAL				
67. Wau	2	2	Human Disease/Plant Pests & Animal Disease/ Development Activity	Malaria, Onchocerciases, Isolation, Lack of Infrastructure
68. Wau Town*	3	3	Development Activity	Urbanization, Lack of Infrastructure, Isolation
69. Gogrial	2	3	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
70. Aweil	2	3	Plant Pests & Animal Disease/Development Activity/Human Disease	Malaria, Onchocerciasis, Isolation, Lack of Infrastructure
71. Raja	2	2	Plant Pests & Animal Disease/Development Activity/Human Disease	Isolation, Lack of Infrastructure, Malaria
SOUTHERN DARFUR				
72. Southern Darfur	2	3	Development Activity/ Livestock Disease & Plant Pests/Water	Isolation, Lack of Infrastructure, Livestock Disease, Water Quality
73. Western Darfur	3	3	Development Activity/ People Related/Land Related	Isolation, Lack of Infrastructure, Land Tenure, Land-Use Conflicts, Migration Dynamics, Soil Erosion, Land Characteristics Preclude Cultivation

Province/ District	Action	Pressure	Category of Problem(s)	Specific Problems
NORTHERN DARFUR				
74. El Fasher	3	2	Water/People Related/ Development Activity	Water Scarcity, Water Quality, Drought, Deforestation, Soil Erosion, Isolation, Lack of Infrastructure
75. El Fasher Town*	3	3	Development Activity	Urbanization, Lack of Infrastructure, Isolation
76. Eastern Darfur	2	3	Water/Development Activity/People Related	Water Scarcity, Drought, Isolation, Lack of Infrastructure, Deforestation
77. Dar Masalit	3	3	Development Activity/ Human Diseases/Water	Isolation, Lack of Infrastructure, Water Scarcity
78. Northern Darfur	3	2	Water/Development Activity/People Related	Water Scarcity, Water Quality, Drought, Isolation, Lack of Infrastructure, Soil Erosion, Migration Dynamics

SOURCE: University of Khartoum, Geography Department 1982.

Each of these issues has been recognized as important in Sudanese government publications, but it is not clear whether priorities have been established by the government or donors for dealing with these impediments to development. Desertification is generally recognized as a major problem, characterized by degradation of pasture around settlements and watering points, sand encroachments, and destructive overgrazing, especially near pump schemes.

> Along the Nile banks in Northern Province, the land resources are continuously subjected to lateral erosion by the Nile during flood season, especially on the outer parts of the riverbed...In addition the outer limits of the agricultural land are being encroached upon by sand and mobile dunes, causing the removal of thousands of acres from productive use (17-18).

> In the Nile Province, some of the pump schemes have been affected by creeping sands. As a response to the creeping sands limited scale aforestation programmes have been started in the Province (9)

> The Red Sea Province is in the desert and semi-desert region of Sudan. The past few years, the Baraka scheme (agricultural development project) has been subjected to a continuous process of sand creep and dune encroachment. The western delta has been submerged by sands and therefore lost to agricultural production. This process continues and threatens the whole of the scheme. The area is known for its wind storms, locally known as Hababi, which...only increases the process of erosion... (31-32).

> The two provinces of Northern Kordofan and Northern Darfur Provinces "have been badly affected by desertification processes...As a result, particularly in barren areas, soils have become more susceptible to wind erosion. Massive sand dune movement is typical of this zone" (34).

In parts of northern Kordofan and Darfur, wood and charcoal are becoming quite scarce. Concern has been expressed over the increase in charcoal consumption which has shifted the area of charcoal production southwards by a yearly average of fifteen to twenty kilometers a year. Much of the area previously under forestation is now under mechanized cultivation; this loss of dryland forest means not only a loss of growing stock but of increasing soil erosion (Sudan, Government of 1983 [?], 52). The problem of charcoal and

fuelwood is further discussed in section 3.9, "Sudan's Energy Crisis". These areas are important grazing lands which are becoming impoverished. Some people have already moved out of traditional areas. Emigration usually extends farther south where new land usage conflicts with already established residents or to the Butana where many have settled around the Khashm el Girba irrigation project.

The rehabilitation of the affected areas is important for future livestock production. Equally important is the problem of preventing such deterioration in vulnerable areas of south and central Kordofan, Darfur and the Butana.

Irrigation is another environmental issue. The nature and importance of environmental side effects from irrigation has varied from place to place, with health problems and soil erosion being the most pervasive.

Irrigated agriculture in the Nile Province and Northern Province must deal with problems of land fragmentation and hadem, lateral erosion. The many problems of Gezira's large irrigation scheme was pointed out in section 5, "Irrigation". Many irrigation schemes in the Blue Nile Province have suffered the problems of declining soil fertility. Large scale irrigation development with surface drainage and poor water management is creating disease problems similar to those found in the Gezira scheme. Irrigated agriculture in Kassala Province which has developed parts of the Atbara, the Gash and the Rahad Rivers are also experiencing many of Gezira's problems.

The following chart summarizes some side effects:

Project	Environmental Impacts
Older Gezira	Major health issues: bilharzia and malaria. Weed problems: mainly in canals. Waterlogging and salinity: a problem but extent not clear.
Managil Extensions	As above.
Khashm el Girba	Rapid siltation of reservoir. Malaria Some salinity.
Pump schemes	Blocking of pumps by water hyacinth, salinity and waterlogging in places.
Jonglei Canal	Cultural impact on people of Sudd. Blockage of human and animal migration. Reduced fish supply. Decrease in grazing lands.

The development of mechanized farming on the dry plains east of the Blue Nile has been an effective means of bringing several million acres of grassland into crop production, but much of the farming has been of an exploitative nature with relatively little return to the land.

> Away from the Blue Nile, good soils and sufficient rainfall have attracted mechanised dry farming which is either government sponsored or the result of unplanned, i.e., unauthorised private development. In both types of development minimal or no soil analysis is done, rotations are not strictly followed, and minimal inputs if any are added to preserve the soils. Moreover, whether the development is authorized or not, vegetation is cleared and no wind shelters are provided. These factors, in addition to the absence of conservation attitudes among farmers, have led to widespread soil degradation and erosion. Many dry farming schemes have been abandoned because of weed infestation and poor productivity. At present, mechanised farming is shifting toward more humid areas both in the Province and the country as a whole, but under present day managerial practices resource destruction is inevitable (University of Khartoum, Geography Department 1982, 25).

Health conditions in rural areas in Sudan are partly related to the poverty of rural living conditions and partly to the side effects of modernization. Malaria and bilharzia are examples of two diseases which are now more

widespread. The southern Sudan is an area of particularly poor environmental health conditions.

Rural energy generally means wood and charcoal; another component of resource degradation has resulted from a rural energy crisis. Greater consumption of wood and charcoal has been a contributing factor in the acceleration of deforestation especially in the provinces of the Blue Nile and southern Kassala. Increasing use of kerosene has been slowed and in some areas reversed by price increases and supply difficulties. Woody vegetation is being used much faster than it is being replaced, at least in the central third of the country.

Finally, the rapid growth of the Khartoum complex consisting of Khartoum, Omdurman and Khartoum North, has placed a great strain on services and the local environment. Greater Khartoum has a population of nearly 1.5 million inhabitants: 75 percent of the total population of the province lives in the Khartoum complex and over 35 percent of the total urban population of Sudan (University of Khartoum, Geography Department 1982, 20).

The growth of industry and trade in greater Khartoum has attracted many to the area, creating a rapidly growing population. The growing population has created demands for urban housing, infrastructure and services. Problems such as congestion, the development of shanty towns, poor communication and transportation linkages, insufficient water and utility supplies, and inadequate waste disposal are common. These overloaded conditions have resulted in the dumping of wastes in streets and drains, standing contaminated water and contamination of drinking water supplies. These conditions are unhealthy and provide breeding grounds for mosquitos, flies and other pests which increase the chances of malaria, typhoid and cholera outbreaks (University of Khartoum, Geography Department 1982, 20-21).

3.9 SUDAN'S ENERGY CRISIS

Issue: There are two overlapping energy consumption systems in Sudan: imported fossil fuels and wood and charcoal. Both sectors have supply and pricing problems which have caused stress in both rural and urban areas of Sudan.

> Since 1973 Sudan, like most developing countries, has faced a growing "energy crisis." The impact of the crisis varies by sector and type of energy. Most apparent to farmers are the shortages of essential petroleum fuels that affect their irrigation, their land preparation or the transport of their products to markets. Most apparent to many industrialists are seasonal shortages of power supplies to their industries. Housewives feel the effects of Sudan's energy crisis in the unavailability of kerosene to light their homes, the rapidly increasing prices of charcoal (a ten-fold increase in charcoal prices since 1976) or in the distance they must travel each day to collect firewood for cooking their families' food. In other words everyone is affected by growing energy problems, and these problems are very real (Sudan, Government of 1982b, 1).

A clear dual economy exists in Sudan's energy sector: (1) the needs of the modern, mechanized irrigated agricultural system, urban consumption, and a small industrial sector; and (2) the needs of traditional rural areas. In international terms, energy consumption is not high. Fossil fuel consumption per capita is estimated at 38 percent of total use. It rose from 150 kilos to 170 kilos in oil equivalent between 1972 and 1978. According to the Ministry of Mining and Energy, in 1980, Sudan consumed energy equal to slightly less than seven million tons of oil equivalent (TOE) (Sudan, Government of 1982b, 28).

There are problems in both traditional and modern energy sectors. Difficulties of financing oil imports are almost equalled by the difficulties of maintaining an adequate resource base for wood and charcoal production.

In the Sudan, currently utilized energy resources include firewood (including charcoal), some fossil fuels, thermal energy, and hydroelectric power.

Resources with development potential include solar energy (under research and development), energy from agricultural residues, exploration of fossil fuels (currently underway), and expansion of hydroelectric generation from the Nile (planned).

Table 7 shows the contribution of existing resources to consumption in 1980:

TABLE 7

FUEL CONSUMPTION

(1) Wood, charcoal and other biomass		85%
- Households consumed 93% of all biomass energy, primarily for cooking and water boiling		
(2) Petroleum products		
Total Petroleum Consumption:		14%
- Transport sector	58%	
- Industry	15%	
- Agriculture	10%	
- Power generation	8%	
(3) Hydropower		1%
Accounted for 79% of total electricity generation		
- Households and industry each represented one third of total electricity sales, with 11% used by agricultural pumps		

SOURCE: Sudan, Government of 1982b, 28.

Firewood and charcoal are mainly consumed in the rural areas, with the latter being consumed also in the urban areas. The household per capita consumption of charcoal rose from an estimated 0.07 mt (metric ton) in 1962 to 0.13 mt with the total household consumption of charcoal from approximately 690,000 mt in 1962 to over 2.4 million mt at present. Over 40 percent of all

charcoal manufactured is destined for the urban area whose population constitutes 25 percent of the entire country (Sudan, Government of 1982b, 36).

The total amount of firewood used is 7,830 million tons per year which is roughly one-fifth of the total forest regeneration in Sudan. However, only forests close to human settlements can be used effectively for firewood, thus eliminating about half of the national forest from potential use. The Ministry of Mining and Energy has noted that the area of charcoal production has shifted south due to the rising charcoal consumption. There is an average of fifteen to twenty kilometers per annum shift south. In 1960 the bulk of charcoal consumption in Khartoum was from the northern Blue Nile Province and the area around Gedaref in Kassala Province. Some of the charcoal reaching Khartoum comes from over four hundred kilometers away. Many of the areas which were previously under forests are now under mechanized cultivation and an average of 8,750 square kilometers of dryland forest are being cut annually. Little of this cleared wood is converted to charcoal or used for domestic fuelwood (Sudan, Government of 1982b, 53).

It is important to remember that forest products are used also for home construction and furniture making, thus creating a tight supply/demand situation for wood in Sudan. In some localities, especially in the semi-arid north and along the Nile, there is an acute shortage of firewood and charcoal which results in high prices and increasing destruction of the remaining woodlands. The demand is increasing because of population growth and escalating prices of other alternative energy sources. The woodlands around Khartoum, are now completely denuded and wood for charcoal is sought at distances up to 400 kilometers (Sudan, Government of 1982b). The dramatic rise in charcoal consumption and the expansion of mechanized rainfed agriculture in Sudan have combined to make the situation an important issue in the development process.

Oil and other petroleum products are consumed primarily by the economy's modern sectors. Oil is used in the transport system, in agriculture and industry, and partially in the generation of electricity. Table 8 indicates that the imports of petroleum has increased steadily:

TABLE 8

IMPORT OF PETROLEUM 1975-1980
(Millions of U.S. Dollars)

	1975/76	1976/77	1977/78	1978/79	1979/80
Petroleum	89.4	110.8	117.6	177.6	254.0
(Volume in mt)*	(1,103,999)	(1,077,586)	(1,060,332)	(1,012,662)	(921,449)
Total Imports	1061.6	985.6	1188.0	1137.9	1339.9

*Calendar years 1975, 1976, 1977, 1978, and 1979 respectively. Excludes changes in refinery stocks.

SOURCE: Sudan, Government of 1982b, 24.

Sudan's oil requirements will rise by more than 10 percent a year over the next decade. This is clearly a much higher figure than the estimated rise in gross national product or value of exports. It is estimated that the demand for oil will reach about 3 million mt a year by 1985. The Ministry of Energy estimates that the oil import bill will exceed U.S. $400 million, or over two-thirds the value of exports. Total external debt, currently in excess of U.S. $ 7 billion will increase substantially (Sudan, Government of 1982b, 24).

It is increasingly urgent for the Sudanese government to initiate policies to level off the demand for oil energy and to insure an equitable distribution to the priority sectors within the country. The agricultural sector is also concerned about the fuel shortage, as there are difficulties in delivering

fuel at the right time for planting crops or to transport the harvest to the exporting point. Within the country such shortages are leading to declining yields, leading farmers to produce more non-export crops. Politically and economically, energy has become a central issue.

Electricity which is generated both from oil and from hydropower is mainly consumed in urban areas. The Blue Nile grid system (Blue Nile, Gezira, and Khartoum Provinces) generates and distributes 84 percent of local power in the Sudan. Southern and Western Sudan have much lower levels of per capita electricity consumption than do other areas. Consumption in the Khartoum area--due to much higher levels of household electric power consumption and industrial activity--far exceeds other areas. According to the Ministry of Mining and Energy, "1980 per capita electricity consumption was 234 KWh in Khartoum province, 49 KWh for all of Sudan excepting the Southern Region, 2.7 KWh in Darfur, and only 1 KWh per capita for the Southern Region as a whole (with twenty-two percent of the country's total population)" (Sudan, Government of 1982b, 34).

Hydroelectric generation accounts for over 63 percent of power generated by public systems. Development plans call for more intensive use of the Nile River potential. Out of a total hydroelectric potential of more than 2,700 megawatts from the Nile, only 8 percent is currently being used. To develop such potential, major capital and time investments are required. The demand for electric power in the Sudan is associated with the (1) agricultural irrigation schemes in Khartoum and Blue Nile Provinces, where all the pump schemes are operated by electricity; (2) increasing urbanization; and (3) development of manufacturing industry. Consumption of electricity in 1980 on the Blue Nile Grid, the major supplier and distribution system was accounted to the following: residential 37 percent; industrial 39 percent; large agricultural cus-

tomers (large electricity-power irrigation pumps) 12 percent; and commercial and other customers comprised some 9 percent (Sudan, Government of 1982b, 48).

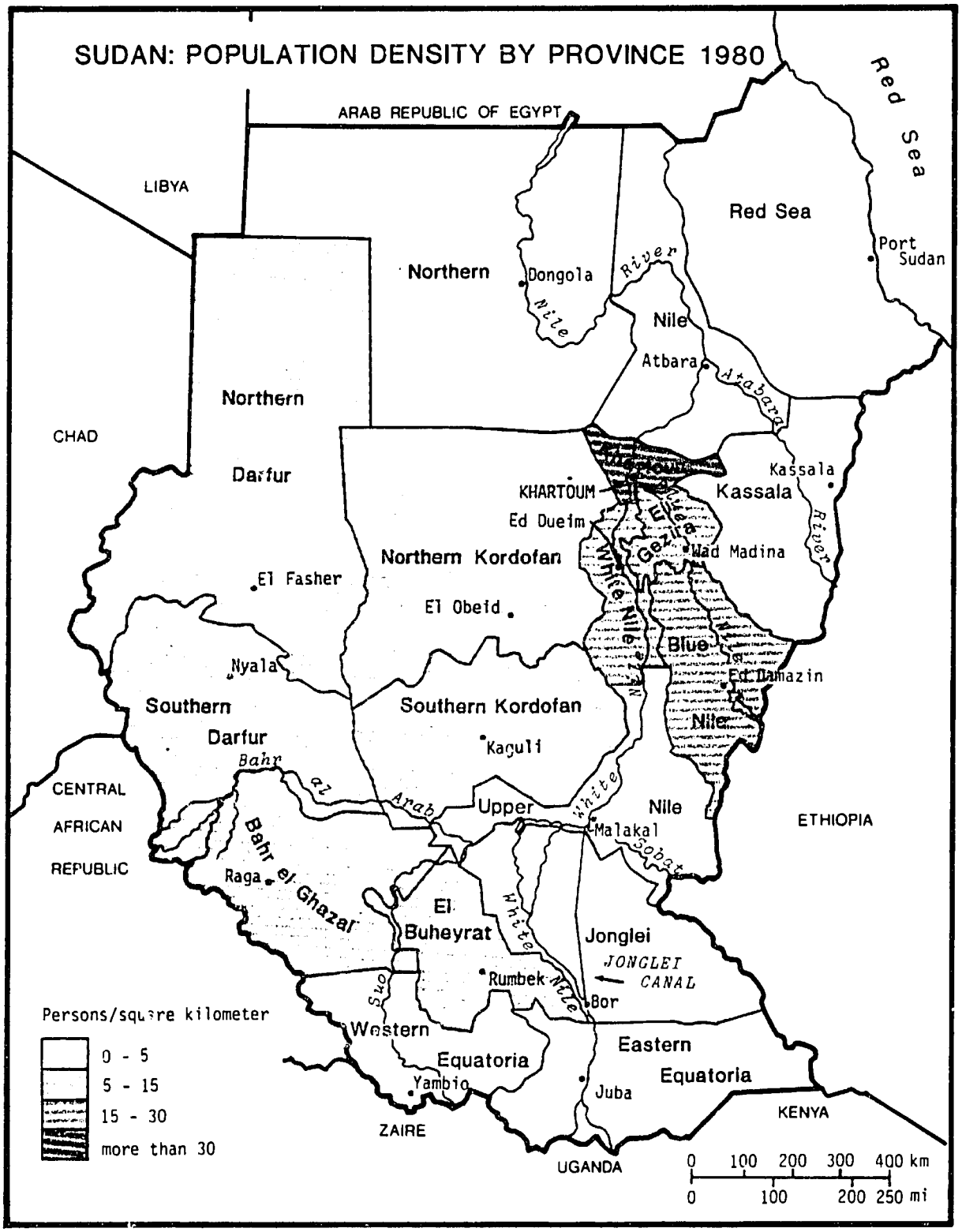
Again, within this energy sector, industrial as well as domestic concerns are frustrated by continuous cuts and shortages. This occurs, especially during the peak demand, by fuel shortage for the thermal generating plants or because of low water head at the hydro generating sites. Such a situation is leading many industrial developers to install expensive generators for use during the periodic cuts. The Sudanese government has formulated very ambitious plans to increase electricity generating capacity from thermal as well as hydroelectic sites. An overall capital of US $500 million will be spent in the coming decade to meet the increasing demands. It is also installing small generating plants in provincial as well as urban centers. Rural electrification has been introduced in the Gezira and New Halfa scheme villages.

3.10 RURAL/URBAN DISPARITY

Issue: As in many developing countries, urban growth in Sudan averages 8 to 10 percent a year. Urban living standards are much higher than those in the countryside, promoting continual unbalanced growth as people move to cities which increasingly are unable to provide services for them.

Data on income, employment, health, and other indicators of well being are available only in aggregate form. Yet it is clear that there are major differences in levels of well being between Greater Khartoum in particular and rural areas in general. The growth rate of towns is higher in comparison with general growth rates. Between 1973 and 1980 population grew by an estimated 22.7 percent, an average of 2.96 percent per year; stated in annual terms, the demographic growth of the nation may be put at about 2.6 percent, while the country's total urban population grew at approximately 7.7 percent per year. The geographic urban growth rate is as follows: Khartoum Province 6.8 percent; Blue Nile Province 10.4 percent; White Nile Province 9.0 percent; Eastern Equatorial Province 11.7 percent; and Western Equatorial Province 11.7 percent. The average annual population growth rates per year among regions and provinces are as follows: Khartoum Province 5.4 percent; Red Sea Province 4.0 percent; Gezira 3.4 percent; Darfur 2.9 percent; Southern Region 1.7 percent; Kordofan 1.5 percent; and Northern Province 1.0 percent. Figure 6 illustrates the population density by province. Sudan's estimated total population in 1980 of 18.7 million of which: 4.4 million (roughly 25 percent) was urban; 14 million (roughly 75 percent) was rural; 1.6 million (8.6 percent) in Khartoum Province; 4.2 million (22.5 percent) in the Southern Province; and 2.4 million (12.8 percent) and 2.6 million (13.9 percent) are in Kordofan and Darfur Regions respectively (Sudan, Government of 1982b, 24; 25).

FIGURE 6



SOURCE: World Bank 1982, 170.

There are many reasons for such disparities including a great influx of rural migrants and refugees into many Sudanese towns. Not only do many rural emigrants and refugees come to urban areas in search of work, they arrive with diverse educational and occupational experience and from a wide variety of ethnic backgrounds. Thus, migrants, refugees and the urbanites have unequal access to goods, services and employment.

The discrepancies between levels of living in the main urban areas, in smaller towns, and in the countryside is considerable. Eighty-two percent of rural households have an income of below S 200 compared with 28 percent of urban households: only 2 percent of rural households have incomes above S 400 compared with 25 percent of urban households. On a regional basis, higher rural incomes are mostly concentrated in Gezira and in the mechanized farming areas. Outside these areas, household income averages below S 100 in Darfur and perhaps less than half of that in the south (International Labour Organisation 1976). A household budget survey was conducted in 1979/80 and is due to be published. The previous survey from which these statistics were taken was conducted in 1967/68 and published in 1969.

An analysis of educational data provides another indicator of rural/urban differences. Rural areas show a school attendance rate of less than 20 percent at primary level and only 2.5 percent at the secondary level compared with 64.2 percent and 41.8 percent respectively in urban areas. The secondary level data for urban areas may be misleading as many of the schools are boarding schools and, while located in urban areas, may include large numbers of rural students in their roster. The primary school data more nearly reflects reality, a reality which provides one-third the percentage opportunity for rural children's education (International Labour Organisation 1976).

The provision of health care facilities shows at least the same level of discrepancy between rural and urban areas. Figure 8, page 108 shows this discrepancy. A major cause of migration to urban areas is to gain access to medical care which is concentrated in large hospitals in urban centers.

In all the aspects of well being for which we have data, as well as in the perception of most Sudanese, there are major differences in the level of living between Greater Khartoum, the next tier of towns including Port Sudan, Atbara, Kassala, Gedaref, Kosti, El Obeid, Malakal, and Juba, and then the rural areas. The Gezira and other irrigated areas are partial exceptions. There is obviously poverty in urban areas, but rural/urban discrepancies are significant.

A main thrust of the Government of Sudan's development plan is to institute improved regional distribution of development expenditures as well as investment in traditional agriculture. In the allocation of investment in health, education, and economic development, the problem of rural/urban disparity is also an important consideration for Sudanese planners.

A particular dilemma results from the fact that urban problems in Greater Khartoum are particularly visible to policy makers. The rapid growth of the three towns has created immense strain on every part of the service sector including health and education. Balancing the visible needs of Khartoum with the less visible but equally important needs of the rural areas is needed.

3.11 DEVELOPMENT AND THE SOUTH

Issue: For a complex set of historical, locational, and cultural reasons, southern Sudan has lagged in the process of development and change. A special focus on the South is necessary in any analysis of development issues in Sudan.

Southern Sudan lies south of latitude 10°N and extends as far as Nimuli on the Uganda border. It consists of three provinces, Upper Nile, Bahr El Ghazal, and Equatoria which have recently been divided into the six provinces of Eastern Equatoria, Western Equatoria, Bahr El Ghazal, El Buhaiyrat, Jonglei and Upper Nile. The South covers an area of about 250,000 square miles, just over one-fourth of Sudan's total area. Unlike the north, the South lies within the wet tropics with a mean annual rainfall which varies between 400 mm in the Upper Nile Province to about 1600 mm in the Nile-Congo River divide. The South's two main regions are the flood and equatoria regions. The flood region is either open grassland or swamps and the equatoria region is dominated by forest and woodlands.

The southern Sudan has good agricultural potential. Shifting cultivation is widely practiced as well as hunting and fishing activities. Although the southern Sudan is an economically viable area, its wealth has not been developed. The cash economy has been retarded by long distances from potential markets, lack of good transport, capital and credit, disease and insects, and other environmental and climatic factors. Exports from the area include primary products such as groundnuts, sesame, timber, skins, and hides. Imports consist of grain, salt, foodstuffs, textiles, building material, and fuel.

The South's 4.2 million people (22.5% of total population) have hardly moved out of the subsistence economy and lag far behind development stages in

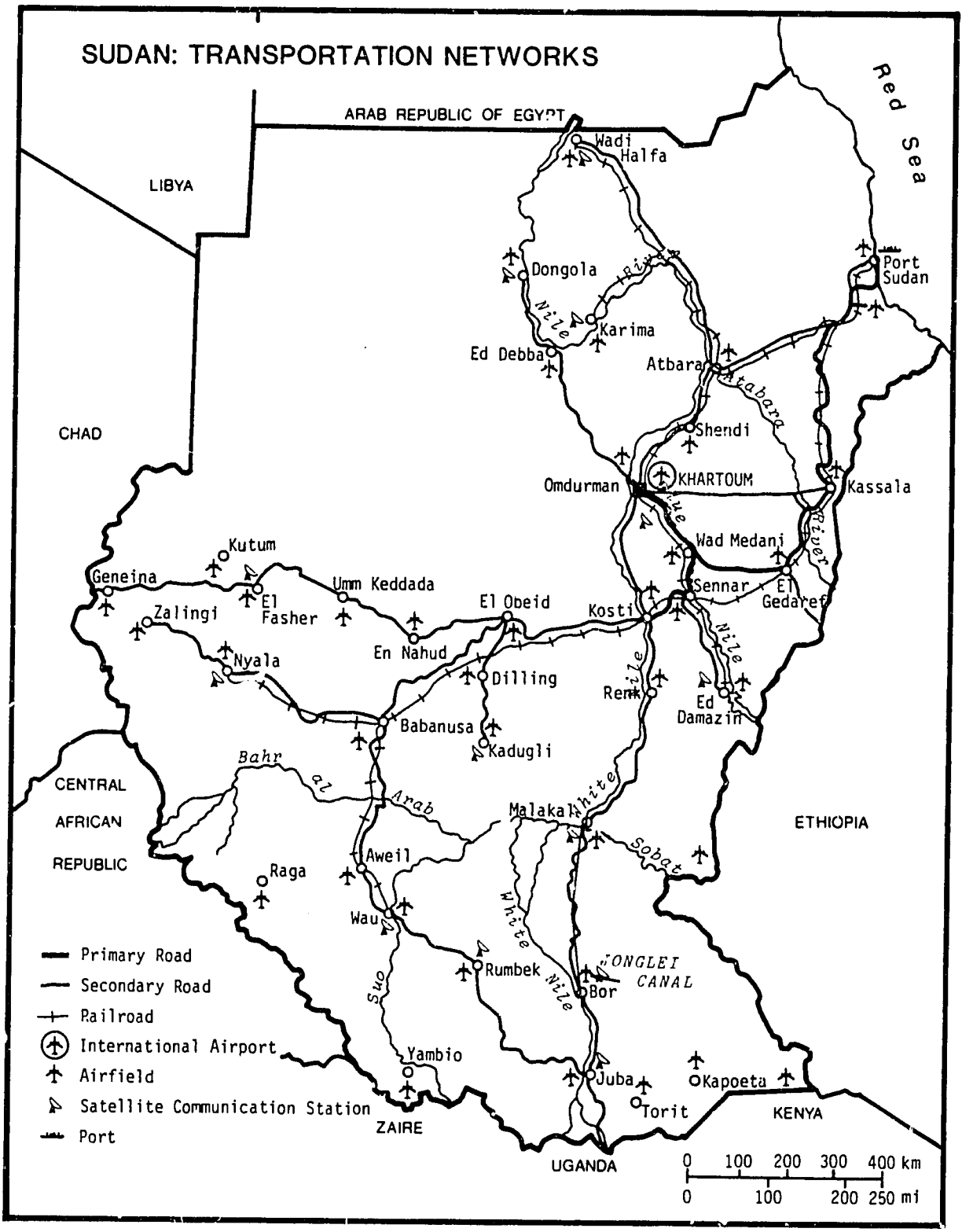
the North. No economic development was initiated during the Anglo-Egyptian rule and even after independence in 1956 little progress was made. The more modern agriculture and manufacturing found in Equatoria Province has had little influence on the region as a whole. Per capita income in the south remains half that of the national average.

By the end of the civil war in 1972, most of the rudimentary infrastructure that had been developed was destroyed. The Addis Ababa Agreement united the three former provinces into a single autonomous region. A framework for a southern regional government with its own elected regional assembly and executive committee was devised.

The regional government had begun to assess priorities for development and to build a political and administrative framework to control the region. The south clearly lacks trained manpower and skills to do this effectively at the center and lacks services in the rural areas. It is too poor a region to be able to contribute large amounts for the development of its own resources. A decision to accelerate development in the south means a substantial budgetary support from Central Government in Khartoum. The scale of such transfers is likely to increase as development gets underway. At present what can be spent on development is limited by a number of physical constraints, as well as deficiencies in administrative capabilities.

One major area that needs immediate improvement is the transport and communication system. While the country as a whole suffers from inefficient railway and river transport and seasonal rudimentary roads which is apparent in Figure 7, the south is completely isolated from the rest of the country during the wet season. Improvements in road and river transport will enhance the process of national integration, development of agriculture and animal

FIGURE 7



SOURCE: Central Intelligence Agency 1971; Oxford Map of Sudan 1980; World Bank 1982.

husbandry, development of markets, and effective government decision making and administration. Transport links with East Africa are felt to be no substitute for improved internal communication.

Another major project for the regional government is to rehabilitate and develop the agricultural potential of the south. Cash crops such as tea, coffee and tobacco can be grown in addition to food crops such as sorghum, millet, maize and groundnuts. There is a large market for animal products and its development is vital for the Nilotic cattle owners. As a result of the hostilities of the civil war, the indigenous production systems were disrupted and the region came to be increasingly dependent on the north for grains and foodstuffs. Self sufficiency in foodstuffs and grains is a major development need for rural areas.

Agricultural development is frustrated by the absence of agricultural infrastructure, technologies, extension, supply of inputs, storage facilities, and markets. Intensive training of local people, development of local agricultural tools, and an overall rural development strategy should be encouraged. Emphasis on developing this important sector should be the core of the development assistance for this region, as it is in fact central to USAID concerns in the area.

Health and education are also two issues for concern in the south. Education and training currently underway will help to provide the regional government in Juba with some urgently needed personnel to deal effectively with problems in the rural areas. Also the government's hopes to raise productivity in the traditional sector are based on encouraging mass education and training. The number of individuals with trained skills is insufficient in the South. Jobs entailing technical and special skills in agriculture and other sectors

are vacant in many ministries. It will take a concerted effort to provide a proper education process under these conditions, but a school system based on local resources could help. In Juba, the University of Juba's facilities could be utilized in training teachers and higher technical and administrative personnel, and to some extent this process is beginning. Vocational training and skill upgrading centers for graduates and non-graduates are also vital considerations in the creation of skilled labor supply.

The South's health problems are worse than in the rest of the country. Sanitation, malnutrition, the shortage of basic health services coupled with geographic and climatic environmental conditions are the main causes of poor health. Large investment in health provision is necessary to establish a primary health care system. Again, implementation of such a system is frustrated by the lack of trained personnel at all levels rather than availability of financial resources.

Although the south has much to do to catch up with the north, the region is slowly getting the development process underway by the efforts of regional and central government as well as the International Relief Organization and donors. To satisfy basic human needs will be a challenge for the south as well as the north. Policy changes can make it possible to increase the rate of development. For the south to achieve the growth rate prevailing in the north, it is necessary to set out clearly what is to be accomplished and to allocate resources to achieve these objectives and goals.

3.12 CENTRALIZATION AND DECENTRALIZATION: A MEANS TO INSTITUTIONAL CHANGE

Issue: The Government of Sudan has had a highly centralized structure since independence. In the past several years, there has been a growing trend towards decentralization and government policy is to transfer a significant part of decision making to the provinces. This policy could be a major force in creating better coordination between different branches of government, but much remains to be done before the policy can become fully operational.

The structure of government in Sudan, as inherited from preindependence, emphasized strong central control from Khartoum, especially in the technical fields. After independence, this structure was basically retained though the division of responsibilities between various ministries has fluctuated considerably.

Since the civil war's end, Khartoum has encouraged decentralized decision making through a restructuring of the government's power system. The need for decentralization in Sudan is due to the large size of the country; an underdeveloped infrastructure; need for autonomy among the various ethnic groups; uneven social and economic regional development; and lack of coordination between various ministries in the Central Government. The diffusion of central authority is complicated by the existence of parastatal bodies such as the Gezira Board or the Mechanical Farming Corporation. These parastatals have responsibility and jurisdiction over particular areas and/or sectors.

The process of decentralization began over ten years ago by uniting the three former southern provinces into the Southern Region to promote territorial autonomy. The Southern region has its own elected regional assembly and executive committee although Khartoum remains the national central government authority. In 1981, the Sudanese government created five new regional governments in the north: Northern Region, Central Region, Kordofan Region,

Eastern Region and Darfur Region. Each region has responsibility for regional development in the areas of health, education, welfare, and for the provision of public social services.

As a continuation of the decentralization plan, greater regional devolution in the Southern Region is also being considered. There is a proposal to end the special autonomous status of the south and redivide it into three separate regions to parallel the regional layers of government in the north. This has become an explosive issue in the south. Some southerners advocate a subdivision of the region into three areas to avoid domination of the Regional Government by one ethnic group, the Dinka. Dinka leaders and other southerners have challenged this view. Many southerners fear that the creation of three southern regional administrations will weaken their collective position in relation to the north.

The process of decentralization is addressed in the Six-Year Plan (1976/77-1982/83): it emphasizes the importance of regional development as an aid for reducing economic and social disparities between regions. The absence of such planning has had "great negative effects" (Sudan, Government of 1977b, 145). As part of the decentralization process, the Six-Year Plan envisions a transfer of the planning mechanisms to each region and greater participation of local institutions and individuals in the decision making process.

The provincial commissioners have been given ministerial status in the following areas: education, interior, religious affairs, youth and sports, co-operation, social affairs, and commerce and supply. The ministries have been asked to expedite the posting of technical experts to the provincial headquarters in order to prepare and study development plans. Greater coordination of activities between ministries and departments will hopefully facilitate political integration. Several major problems stand in the way of

a smooth transition to a decentralized administration. These problems include:

- continuing shortage of regional planning and coordination expertise in the regions;
- lack of an information system or data gathering processes in the regions;
- a history of non-coordination, not only between ministries, but between departments within the ministries;
- reluctance of high status manpower to be stationed outside Khartoum or the Gezira;
- and lack of financial control at the regional level.

Despite these problems, the government's plan for decentralized authority may prove to be a viable arrangement in dealing with national and regional conflict. Regionalization and decentralization are possible institutional solutions to problems of national unity, the development of human and natural resources and the provision of stability and security for Sudan.

3.13 INSTITUTIONAL DEVELOPMENT

Issue: Four sets of institutions deal directly with development questions. They are (1) ministries within the government, especially agriculture, finance, and irrigation; (2) parastatal organizations responsible for production (Gezira Board), transportation, (river transport), industry (Sudanese Industrial Development Corporation), banking (Sudan Bank), etc; (3) marketing boards, and (4) private institutions such as local savings or investment banks. Strengthening these institutions is critical to the success of development efforts.

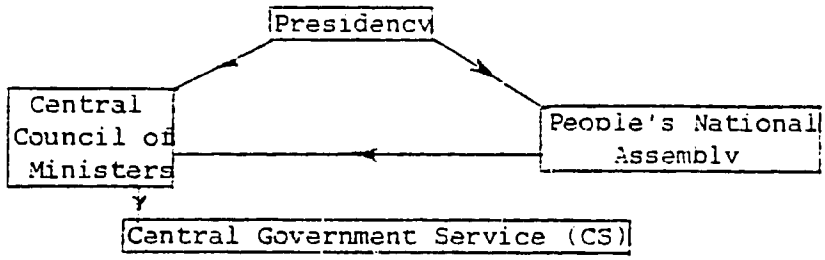
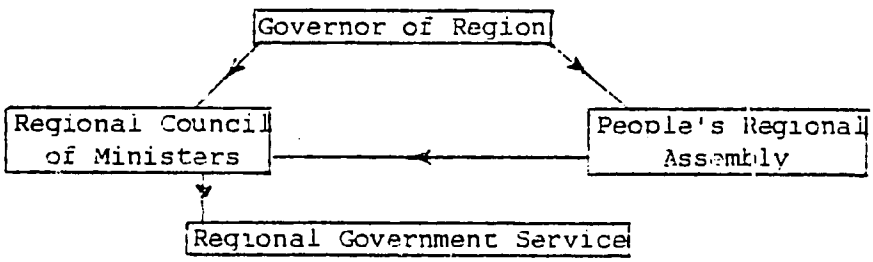
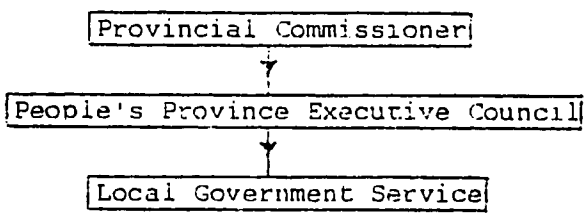
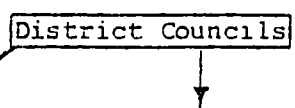
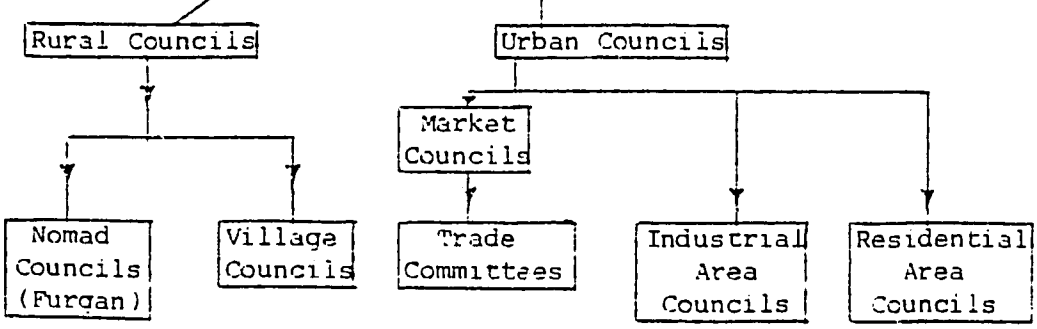
As agriculture is the basis of Sudan's economy, a brief overview of agriculture related institutions will be discussed as an example of the kinds of institutional strengths and possibilities which exist within the country.

Various field and action branches of the Ministry of Agriculture influence the agricultural production and export earnings of Sudan. Some of the Ministry's efforts have had positive impacts on the economy: the livestock research group, veterinary office and animal production research unit have worked effectively for many years in the increased production of livestock. Likewise, the Gezira Board's cotton research efforts and plant protection activities have enabled cotton exports to maintain consistent quality despite potential and existing problems.

Support for local food efforts and agricultural extension is not as developed. For example, funds to develop new forms of dura crop to help small farmers improve yields of local food products are often not available. USAID development assistance to increase productivity is directed towards "strengthening agricultural policy analysis and formulation and restoring and expanding the supporting infrastructure" (United States Agency for International Development 1982, 25). These efforts are an important part of the process toward increasing local food production as well as increasing domestic income and foreign exchange earnings.

TABLE 9

DECENTRALIZATION PLAN OF SUDANESE GOVERNMENT

Level	Structure of Government
Central Government	
Regional Government	
Provincial Government	
District	
Local	

SOURCE: Allen, et al. 1982, B107.

Another area of need for examination is the Public Agricultural Production Corporation. Originally patterned after the Gezira Board, the PAPC has not worked smoothly. Problems of distance between projects, communication, and efficiency have hampered operations. In 1976, PAPC underwent substantial decentralization: individual projects became more autonomous and emerged with their own board. Such decentralization is consistent with guidelines in the current Six Year Plan although it does increase the need for more skilled personnel in rural areas.

Related to food production are projects sponsored by the Sudanese Development Corporation (SDC). Backed by loans from Saudi Arabia and other oil producing nations, the corporation administers loans sponsored by the Arab aid funds. Subsidiary to SDC, is the Rural Development Corporation which finances small rural projects, including small scale rural industries.

Another source of agricultural credit is the parastatal Agricultural Bank of Sudan (ABS). Coodinated by the Sudan Bank (in parallel fashion to the Industrial Bank) the ABS has worked for the most part with large scale efforts such as importing tractors and farm machinery. Recent reforms suggest that the ABS may be working closer with smallholder credit.

Marketing boards are another important aspect of development policy. Although independent in particular jurisdictions, the marketing boards work within guidelines established by the Ministries of Finance and of Agriculture. Cotton, gum arabic, oil seed, and livestock and their current sales are carefully regulated by the corporations in an effort to provide maximum benefit both to farmers and the national economy.

Another dimension of agriculture is the mechanized farming projects. The Mechanized Farming Corporation (MFC) was originally established to supervise land clearing, provide technical assistance, organize credit, and help market

crops. As mechanized agriculture has greatly expanded its operations, the MFC now collects rent, runs state farms, undertakes land surveys, and introduces machinery.

On the research side, the Agricultural Research Corporation, the National Council for Research, the University of Khartoum, and the Animal Production Research Administration are responsible for developing new techniques and materials to increase productivity.

There are dozens of other institutions which contribute to development planning and implementation, including a roughly parallel set of organizations based in Juba which are responsible for development in the Southern Region. The ability to carry out responsibilities in the institutions is uneven, however. This is because of overlapping jurisdictions, poor communications, and insufficient numbers of skilled personnel.

Tables 10 and 11 suggest areas where personnel needs are greatest. A Central Manpower Planning body was proposed by the Six Year Plan to study the existing and future size of the labor force, as well as its distribution and distinguishing features. An area for examination will be on the training policies and on the lack of training centers in main agricultural projects. The presence of training centers could help to meet the current shortages in skilled labor, not only in agricultural projects but in institutions of other sectors as well.

TABLE 10

PROJECTIONS OF PROFESSIONALS BY SPECIALIZATIONS
DURING THE 1977/78-1982/83 PLAN PERIOD

PROFESSION OR OCCUPATION	DEMAND	SUPPLY	DIFFERENCE
Agriculturists	5000	2660	-2340
Veterinary Doctors	2200	1000	-1200
General Practitioners	2405	2380	-25
Dentists	105	105	0
Pharmacologists	500	360	-140
Engineers (Mechanical, Electrical, Chemical)	2800	1830	-970
Engineers (Civil, Transport, Construction)	1600	410	-1190
Science and Mathematics	2000	2900	+900
Lawyers	495	1740	+1245
Accountants and Financiers	3000	4700	+1700
Economics and Social Sciences	1500	2690	+1190
High Secondary School Teachers	1700	1640	-60
Other	200	3585	+3385
TOTAL	23505	26000	2495

SOURCE: Sudan, Government of 1977b, 105.

TABLE 11

PROJECTIONS OF SUPPLY AND DEMAND FOR TECHNICIANS
DURING THE 1977/78-1982/83 PLAN PERIOD

PROFESSION OR OCCUPATION	DEMAND	SUPPLY	DIFFERENCE
Agriculture and Forestry	5000	2150	-2850
Veterinary	2000	580	-1420
Medical Assistants	2400	1370	-1030
Mechanic and Electrical	3500	580	-2920
Technical and Construction Engineering	2200	550	-1650
Survey and Communication	3450	3335	-115
Clerical Engineering	2100	1600	-500
Accounting, Financial and Banking	1600	1600	0
Administration	500	500	0
Education (Secondary School Teachers)	900	900	0
Others	300	530	+230
	23950	13695	-10255

SOURCE: Sudan, Government of 1977b, 105.

3:14 REFUGEES

Issue: More than half a million refugees currently live in Sudan. The political, social, and economic problems of dealing with this group are an important issue.

Sudan has a common frontier with eight countries: Egypt, Ethiopia, Kenya, Uganda, Zaire, Central African Republic, Chad and Libya. At one time or another, Sudan has been host to political refugees from most of these nations. It is estimated that of the 500,000 current refugees, the largest group is Eritrean in origin, though Ethiopians from outside Eritrea also constitute a large group. Both of these groups are mainly located in the north, living in and around Khartoum with the remainder living around Kassala town. Kassala town has grown substantially in the past ten years partially due to the influx of refugees.

Another large group of refugees, concentrated in Darfur, come from Chad as a result of internal conflict. A third component is the considerable number of Ugandans who have emigrated from northern Uganda into southern Sudan. The numbers of these refugees have been more difficult to estimate. Table 12 shows the distribution of refugees by nationality and regional placement in Sudan.

The Government of Sudan has been particularly concerned with the impact of refugees on social and other services of the large towns where most have settled. Khartoum, Kassala and the south have been most affected; the situation in Khartoum has received the most government attention. Current policy is to move large numbers of refugees from the main towns into camps. There has been a particular push to transfer some of the Eritreans from Khartoum into Kassala Province. In addition, some 20,000 refugees are to be moved out

TABLE 12

ORIGIN AND DISTRIBUTION OF REFUGEES IN THE SUDAN 1980

Country of Origin		Distribution	
Eritrea	360,000	Red Sea Province (including Port Sudan)	55,000
Ethiopia	30,000	Kassala Province	250,000
Uganda	39,000	Blue Nile Province	15,000
Zaire	5,000	Khartoum Province	40,000
Chad	7,000	Other Cities in the North	30,000
		South	44,000
		Darfur	7,000
TOTAL	441,000		441,000

SOURCE: Smock 1982, 454.

of Kassala town into nearby camps and an unknown number moved from Gedaref, where there are 35,000 refugees in similar camps (Smock 1982, 453).

If government plans are carried through, nearly 100,000 people will be relocated in camps in the eastern part of Kassala province. This is in addition to those already there. In labor short Sudan, many of the refugees have found productive employment but their uncertain status is a problem. A greater problem is the burden on both urban and rural systems which must support refugees who need to be fed, housed, and provided with health care and schooling. In spite of international assistance, the Sudanese government is ultimately responsible for the refugees.

Although the large numbers of refugees have placed great stress on Sudan's infrastructures, they have contributions to make which have yet to be realized. Many of the refugees are highly skilled and educated, thus representing a potentially productive labor force. The challenge for the Sudanese government is how to best integrate the refugee community into its economy.

CHAPTER 4. DEFINITIONS AND DISTRIBUTION OF POVERTY

4.1 BACKGROUND

Absolute definitions of poverty are not possible, as many different criteria have been applied to measure it. Conventionally, per capita GNP has been used to establish standards of poverty by identifying only economic indicators, a measure considered unsatisfactory by some. Assuming that there are certain universal, human, biological needs which can be specified, the Physical Quality of Life Index (PQLI) was introduced in 1977 by the Overseas Development Council (ODC). The PQLI consists of three basic components: literacy, which measures the percentage of population over fifteen years of age able to read; infant mortality, which measures the number of deaths per thousand live births; and life expectancy, which measures age from year one (Overseas Development Council 1980, 154).

Indicators used in either the per capita GNP method or the PQLI determine the condition of poverty in terms of absoluteness or relativity. Adequate nutrition, shelter, potable water, access to health care, land ownership, education, and participation in the process of decision making are all indicators which may suggest measures of absolute poverty. As world poverty is more complex and there are real differences in material standards within a population, measures of relative poverty are also more realistic. For example, in western Sudan, poverty must be considered relative to the ownership of livestock; in the north, poverty can be measured relative to use of or access to the land.

Poverty should also be seen as a series of relationships that change over time. When modernization is occurring at rapid rates such a dynamic measure is especially well-founded. Where a traditional sector is vulnerable to

change, whether from modernization or other factors, measures of poverty must be especially sensitive.

Poverty is also often viewed only in quantifiable terms apart from the purely economic: how many bore holes per unit/area, how many hospital beds per capita, and so forth. However, non-quantifiable aspects of poverty should not be overlooked. Non-quantifiable measures may include perceptions of choices available, ability to deal with stress, willingness to take risks, or the skills required to plan for the future.

Of all the indicators available, income, employment, health status, and educational access have been defined as the most significant. Though partial, they are reflections of the general quality of life in any country. Income and employment show general tendencies in access to resources and to the means of production. Health and disease mirror an individual's ability to function on a day-to-day basis. Educational opportunities and capabilities are future oriented and important as measures of means to move out of a poverty situation. It is important to realize that whatever definitions and indicators of poverty are used, that the poor in Sudan are relatively, as well as absolutely, poor.

4.2 POVERTY AND WEALTH: A REGIONAL VIEW

A broad regional view of poverty and wealth in Sudan include a general discussion of conditions in the north, south, east, and west and the impact of this prevalent poverty in the country.

The North suffers from a limited resource base. Most of the population lives along the banks of the Nile and relies upon its water to irrigate small amounts of farmland. High seasonal temperatures, sparse rainfall, and lack of arable soils impede most agricultural development. Instead, a nomadic

sub-culture has adapted itself to these severe environmental conditions. Northerners have traditionally been involved in commerce and livestock trading. Perhaps the greatest asset of the North is its high level of education among the population. The enrollment in primary and secondary schools, as well as Koranic and private schools is the highest in the country. The distribution of educational attainment and participation among the settled agriculturalists is especially observable. This is evident in Figures 10, 11 and 12.

The perceived and experienced seclusion of southern Sudan stems from several factors and conditions. An inadequate infrastructure of roads and communication systems increases its distance from the rest of the country. The rainy season from July to September severely hinders any road travel and communication lines can go down during this time. The seventeen year civil war was a critical factor in southern Sudan's sequestration. Not only was there a disruption of health and educational services but there was much destruction of property and fixed capital assets such as roads and river transport.

In contrast to the northern region of Sudan, the southern area has had a history of minimal trade and commerce with outside areas. Presently, little surplus of commodities is produced, thus little is traded. One of the area's assets is its forestry resources. Southern Darfur and Southern Kordofan contain more forested area than a combination of the ten northern provinces (Sudan, Government of 1982b, 49), although much of this forest reserve is not used. The south's comparative lag in development accentuates its remoteness.

The east central part of the country is the most economically developed area in Sudan. The infrastructure of roads, railway extensions, irrigation

systems, wells, schools and health units is the best in the country. The area is not without its problems, however. Its population is the fastest growing in the country which causes severe stress on the existing infrastructure and social system. See Figure 6, page 74, for comparison of population density by province.

In eastern Sudan, including the Red Sea Hills and Kassala province nomadic herding in a harsh environment provides only a marginal livelihood. Many people have left the rural areas to work around Port Sudan and in Kassala town. Port Sudan, as the nation's only port, is a center of comparative wealth in this predominantly poor area.

A fragile environment characterizes the western region with poor soils and unreliable rainfall. Spreading desertification and increasing human and animal population has put tremendous pressure on already marginal grazing lands. Like the south, the west suffers from its inaccessibility to markets and the coast. Much of the population migrates to the modern agricultural sector in search of seasonal employment to supplement traditional forms of income. The area does produce gum arabic which accounted for 8 percent of total Sudanese exports, 1971-1981 (Speece 1982, 184), and provides further cash income to area residents.

Another region in Sudan is the urban concentration, especially the three cities of Omdurman and the two Khartoums. Discussion of the urban area is included in Section 3.10 and will not be repeated here other than to stress the comparative wealth of Sudan's urban region in contrast to the rural areas.

4.3 LIVELIHOOD SYSTEMS

A consideration of various livelihood systems illustrates different facets of poverty and wealth. Each system has particular characteristics, heightened by the cultural, economic, and physical milieu.

Livestock is the primary means of support for the nomads of northern Sudan. The nomads have worked out patterns of seasonal migration that assure grazing lands in the south during the dry months. During the wet months, the livestock is brought back to the north to prevent tsetse infection. The nomads have been forced to travel further distances in search of pasture every year. An expanding human population, increases in the total number of livestock, and the encroachment of the desert on traditional grazing pasture all necessitate extended travel. In response to the increased risk resulting from extra travel, the nomads have increased their herd size which in turn puts more pressure on an already strained ecosystem.

Farmers in the northern region find cattle an excellent domestic investment, especially as the large export markets are not easily accessible. For example, when there is a surplus harvest of dura, which cannot be stored, it can be converted into feed for the cattle. As the animals grow, they increase in value at minimal cost to the investor. A return of 10 percent is common and, depending on market conditions, may run much higher.

Sudanese nomads, as prudent investors, do not always sell when the beasts reach optimum size. First, there are few alternative places to put one's money. Second, cattle are an excellent protection against future adversity, be it drought or an energy crisis. Livestock are also a relatively easy commodity to hide from the tax collector. Fourth, livestock can be moved on their own power, without need for expensive investments in transportation systems. Finally, nomads gain status from the accumulation of large herds.

All evidence points to total numbers of animals as well as the number of Sudanese who own animals increasing. Total herd size is over 47 million (in 1976/77) with an annual growth rate of 2 to 3 percent (Sudan, Government of 1983 [?], 31).

Irrigated agriculture is another major livelihood system. It exists in three basic types: pump schemes (nationalized in 1968), pump schemes along the Nile north of Khartoum, and large pump schemes. The northern pump schemes are run by the Northern Province Agricultural Corporation and produces for local consumption. The pump schemes along the Blue Nile and White Nile are run by the Agrarian Reform Corporation. These schemes are usually small, run by diesel pumps with old and badly maintained equipment. The large schemes are managed by government related bodies such as the Gezira Board and are cultivated by tenants with the help of migrant labor. The large schemes represent the major portion of the irrigated subsector.

These large irrigation schemes such as Gezira, New Halfa, and Rahad, have expended large amounts of government funds. A well developed infrastructure has been one of the results of the irrigation schemes. They have created a class of middle income earners involved in a relatively low risk enterprise where results from inputs are shown in five to eight years. However, there is a low net exchange, due to heavy expenses of operation including machines, fuel, fertilizers, insecticides, and large external loans. This has been a great expense to the rest of the country as uneven development is fostered by concentrating development in these areas.

Although the tenants may be better off than other areas of the country, they are not without problems. There is an increase in the rates of disease: the incidences of bilharzia have almost doubled while the rate for malaria has almost tripled in eight years (Ahmed, H.A. n.d., 15). Declining yields have

partially resulted from soil salinity and insufficient water at peak periods. There is also a dependence upon the world market for the price of cotton on which a complex loan-payment system for tenants is based (World Bank 1982, 64-65).

Mechanized rainfed agriculture, as a livelihood system, is an option for small numbers of the population due to the high outset costs. Land, machinery and materials require a large capital outlay. The rate of return is usually good and comes within one year although the risk factor is unusually high due to fragile soils, changeable weather, pests, and crop disease. Mechanized agriculture produces a small number of high income earners. Land is leased in large units, one thousand feddans or more, for a small fee. There is no incentive to rotate crops or let the land lie fallow to insure long term productivity. Soil erosion has been a frequent result of the use of a grid pattern without regard for natural drainage patterns. These schemes have created a need for foreign exchange and machinery imports without developing a proper maintenance system for this equipment. There is a reliance on migrant laborers as the schemes are not totally mechanized, although the trend is toward an increasing use of machines at the expense of displacing the laborer in a time of increasing unemployment. The social cost must somehow be incorporated into the general cost of mechanization.

The traditional livelihood sector combines animal husbandry and sedentary agriculture. This livelihood system, along with the nomadic, is the most vulnerable. There is a great risk due to the severe stress on the carrying capacity of the land caused by both human and animal activities. The entire sector suffers from a low agriculture yield due to little or no modern input, such as fertilizers, as well as an overall failure to control weeds or pests. Plant types are selected on their hardiness rather than yield, which is a

logical adaptation due to the uncertainty of rainfall. Hand tools are used rather than machines which also tend to cause a low yield.

The animal husbandry and sedentary agriculture livelihood system suffers greatly from a lack of infrastructure. Improved markets, transportation, and communication are keys to stimulating general development in the area. The traditional sector has responded to change and innovations; although, due to the subsistence level of economic activity, the risk taking capacity is limited.

A related yet separate part of the traditional sector are the Nilotic peoples in the south. Cattle are central to this society's livelihood although subsistence agriculture is also pursued. The Nilotes are physically isolated from markets so there is minimal participation in commercial ventures or any type of export production. Infrastructure is limited with transportation and communication barely above a rudimentary level. By any definition, the Nilotes are poor, vulnerable to uncertainties of climate, animal disease, crop pests and human disease.

4.4 INCOME AND EMPLOYMENT

Income and employment are basic measures of poverty. There are three basic classifications of income found in Sudan: income from work for money wages or money earned by the sale of products; income earned by bartering of a family's goods or work; and incomes consisting of goods and work for a family's own needs.

In urban areas such as Khartoum and Omdurman, irrigated farming schemes, and mechanized agricultural areas, income is mainly in cash or wages and can be easily measured. Whereas wage incomes in the rural areas may or may not be related to cash; production and collection for barter, wages in kind and pro-

duction for a family use play a greater role than in the urban areas. Thus, the money income is lower than the total income for many Sudanese individuals or families. Women's income or production of goods used in the household and of domestic work are not included in the labor force statistics. This results in certain areas appearing poorer than in reality. Four groups of economically active persons with conforming wage and income patterns as determined by F.A. Lees and H.C. Brooks appears on Table 13. This is complimented by Table 16 which shows average income of household distribution by province.

There is limited data on the size and composition of the labor force and as indicated the World Bank estimated the size for 1980 as 5.7 million (see Table 14). The agricultural sector (farming, forestry, hunting and fishing) employs the majority of the population and represented 65.8 percent of the GDP in 1980/81 (World Bank 1982, iv). Industry (manufacturing, construction, mining, electricity, water and gas) in Sudan is of fairly recent date and suffers from a scarcity of personnel with adequate managerial and technical skills. The most recent estimate of employment in agriculture is 65.8 percent of the population while industry and mining employ only 3.5 percent according to Table 15.

TABLE 13

FOUR PATTERNS OF INCOME IN THE SUDAN

(annual income in S)

Labor force sector	Basic range	Midpoint income
Urban-Modern	300-700	500
Urban-Informal	85-310	200
Agricultural-Modern		
Owners or tenants	500-4000	2000
Workers	100-150	125
Agricultural-Traditional	20-120	70

SOURCE: Lees and Brooks 1977, 23.

TABLE 14

ESTIMATES OF POPULATION, LABOR FORCE AND EMPLOYMENT

	1973	1975	1976/77	1979/80	Growth Rates 1976/77-1979/80
Total Population - million	14.4	16.5	16.9	18.3	2.8
Working Age Population - million	9.0	11.2	11.9	12.4	1.4
Labor Force - million	4.9	5.2	5.3	5.7	2.4
Labor Force Participation Rate	34.0	31.5	31.3	31.1	-
Employment - million	4.6	4.9	5.0	5.2	1.4
Unemployment - million	0.3	0.3	0.3	0.3	-
Estimated Sudanese Working Abroad - million	n.a.	n.a.	n.a.	0.2	n.a.

SOURCE: World Bank 1982, 112.

TABLE 15

DISTRIBUTION OF ECONOMICALLY ACTIVE PERSONS BY SECTOR
1976/77-1979/80
(in thousands)

	1976/77		1979/80 IBRD Staff Estimate		Percentage Change 1976/77-1979/80
	No.	Share	No.	Share	
Agriculture	3,435.3	68.5	3,432.6	65.8	-2.7
Industry and Mining	185.1	4.46	183.3	3.5	-1.8
Utilities	45.6	0.91	59.2	1.1	13.6
Construction	92.3	1.84	107.6	2.1	15.3
Commerce and Finance	245.7	4.9	220.8	4.2	-24.9
Transport and Communication	169.0	3.37	198.8	3.8	29.8
Services	521.6	10.4	679.8	13.0	158.2
Unallocated	320.5	5.12	340.5	6.5	20.0
TOTAL	5,015.0	100.0	5,222.6	100.0	207.5

SOURCE: World Bank 1982, 173.

It is not possible to establish a precise measure of employment in Sudan, partly because of the subjective nature of drawing the line between "main" and subsidiary activities as well as trying to distinguish between unemployment and underemployment. For example, according to the World Bank the female

labor force is poorly represented: 10.7% of the total labor was estimated as female between 1976 and 1979 (World Bank 1982, 168).

Unemployment has been approximated in the different provinces. The male unemployment rate in the urban south is roughly three times greater than in urban north. The southern rural male fares even worse, as indicated in the figures in Table 17.

TABLE 16

AVERAGE INCOME OF HOUSEHOLD BY PROVINCE
(Northern Provinces only)

Province	Average Annual Income (S)
Northern	124
Khartoum	236
Kassala and Red Sea	186
Blue Nile	180
Kordofan	153
Darfur	98

SOURCE: International Labour Organization 1976.

TABLE 17

PERCENTAGE OF UNEMPLOYMENT BY PROVINCES ACCORDING TO SEX (1973)

	Urban		Rural	
Provinces	Male	Female	Male	Female
Blue Nile	5.4%	1.1%	5.8%	0.9%
Northern	5.5	2.0	3.4	4.3
Kassala	3.6	1.3	2.7	2.3
Red Sea	4.6	2.2	6.4	1.8
Kordofan	5.1	1.1	3.9	0.6
Darfur	6.3	0.6	3.5	0.1
Khartoum	5.3	1.7	5.4	6.9
Northern Region	5.0	1.3	4.4	0.5
Upper Nile	19.9	4.0	18.0	3.4
Equatoria	10.8	3.2	10.3	1.3
Bahl el Ghazal	16.8	4.6	22.3	2.5
Southern Region	14.4	4.6	18.4	2.6

SOURCE: Sudan, Government of 1977b, 90.

Seasonal work in agriculture is substantial. In 1973/74, the Gezira Board alone employed 545,000 people for cotton picking, 340,000 of whom were seasonal migrants from other provinces. Despite low wages paid to seasonal labor, such labor shortages have been decreasing in recent years as Table 18 demonstrates.

TABLE 18

SHORTAGES OF SEASONAL LABOR ON THE GEZIRA

Year	67/68	68/69	69/70	70/71	71/72	72/73	73/74
Shortage as % of required labor	3.8	4.3	2.2	3.7	1.4	.05	.4

SOURCE: International Labour Organization 1976, 101.

Mechanized agriculture also employs seasonal labor, mainly for weeding and harvesting. Kordofan projects hire 70,000 workers annually while projects in Kassala Province hire roughly 100,000 season workers each year (International Labour Organisation 1976, 90). Difficulty in attracting a proper amount of seasonal labor at the right time is often cited as a reason for increased mechanization. It is not clear whether increased machinery is economically beneficial, given the costs of unemployment or underemployment in terms of development in Sudan.

Another employment issue is the drain of skilled labor to Arab oil producing countries. Section 3.4, dealt with the question in some detail. There are growing labor shortages among semi-skilled, skilled, and professional Sudanese. There are several steps that Sudan could take in the next years to decrease the labor shortages, including emphasis on increased technical training and encouragement for a broader participation, especially among women. According to the Ministry of National Planning in 1976/77, female labor

represented 12.8 percent of the total female population in comparison to 49.1 percent of the corresponding percentage for men (Sudan, Government of 1983 [?], 13).

4.5 HEALTH

Ill health and premature death arise in large part from poverty; infectious diseases and malnutrition are related to both urban and rural poverty in Sudan. Sudan's major diseases fall into two basic categories, those directly associated with malnutrition and with infectious diseases.

Although malnutrition can be a primary cause of death, it more often tends to produce chronic ill health and debility. It also lowers resistance to infectious diseases and can increase their severity once they have been contracted. Malnutrition in Sudan, especially the south, is often increased by parasitic diseases. These diseases can damage the intestinal walls enough to prevent absorbtion of the little food consumed.

Specific dietary deficiencies cause a great deal of chronic disease in Sudan. Protein deficiencies are common in the south, partially resulting from the scarcity of livestock due to the high incidence of cattle diseases. In Kordofan and Darfur provinces, although meat is available, vegetables are not. This results in widespread deficiencies of vitamin C. Inadequate distribution of food resulting from the lack of storage and transportation facilities also contributes to nutritional deficiencies in the western and southern regions.

The other major category of diseases found in Sudan can broadly be described as infectious. As malnutrition is related to the social and economic environment, so are many diseases. In the urban sectors (except in the comparatively modern parts), poor sewerage collection and treatment cause diseases which are direct consequences of unsanitary conditions and contamin-

ated water. In the rural sector, access to clean water supply is often limited because multi-purpose use of water frequently pollutes it. Lack of proper sanitation techniques and facilities give rise to such diseases as schistosomiasis and oncylostomiasis which require part of the vector's cycle to be passed through human wastes. Adequate waste collection and the availability of a sanitary water supply are essential in combatting diseases such as these.

Occupations or life styles can increase vulnerability to various diseases. Herders have health problems such as intestinal diseases related to lack of potable water and diseases such as tuberculosis, ringworm and rabies, contacted from sick animals. For workers in the chemical, ginning and textile industries, diseases of the respiratory system are common. Agriculturalists, especially in the irrigated sectors, suffer from water related diseases such as malaria and bilharzia.

Contrary to common belief, many diseases found in Sudan are not necessarily bound up with tropical conditions in the geographic or climatic sense. The resurgence and increase of malaria in urban areas and in the irrigation development project areas is a case in point. Malaria was a seasonal disease found throughout most of Sudan which was linked with the rainy and the flood seasons. It has now become a year round disease in the urban and irrigated project areas. Farmers and seasonal laborers contract malaria and bilharzia at alarming rates. In the past decade, malaria cases have more than tripled and bilharzia cases have almost doubled according to H.A. Ahmed (see Table 19). The highest incidences of malaria occur during the times of the year when land preparation, seeding, watering and harvesting take place. It has been estimated that an average of thirty-three working days are lost annually due to malaria.

TABLE 19

CASES OF MALARIA AND BILHARZIA: 1973-1981

	Malaria	Bilharzia
1973	818,225	90,576
1975	937,776	395,805
1976	399,762	1,452
1977	1,030,243	102,989
1978	104,584	562,546
1979	2,665,753	98,354
1980	2,830,931	98,143
1981	2,981,052	159,848

SOURCE: Ahmed n.d., 15.

Disease related to the physical environment can be illustrated by comparing the climates of the northern and southern regions. The south is hot, extremely humid, and thickly vegetated, encouraging the breeding of microorganisms, parasites, and various insects. The most serious types of tropical diseases occurring include malaria, bilharzia, ancylostomiasis (hook worm disease), leprosy, and trypanosomiasis (sleeping sickness). Swampy conditions exist about seven months out of the year and cut the area off from medical service and supplies.

There are interconnections between the environment and the health conditions. Livestock does poorly because of the tsetse fly, so people consume fish as an alternative source of protein. The river banks where the fish are caught are infested with the simulium fly which spreads onchocerciasis (river blindness). Another example is a human strain of sleeping sickness which is transmitted by a fly that cannot survive in direct sunlight. To combat sleeping sickness, medical authorities recommend removal of trees and brush along the river banks. Yet agricultural and water authorities oppose such removal recognizing the potential for increased soil erosion along the banks. The solution to one problem often creates others.

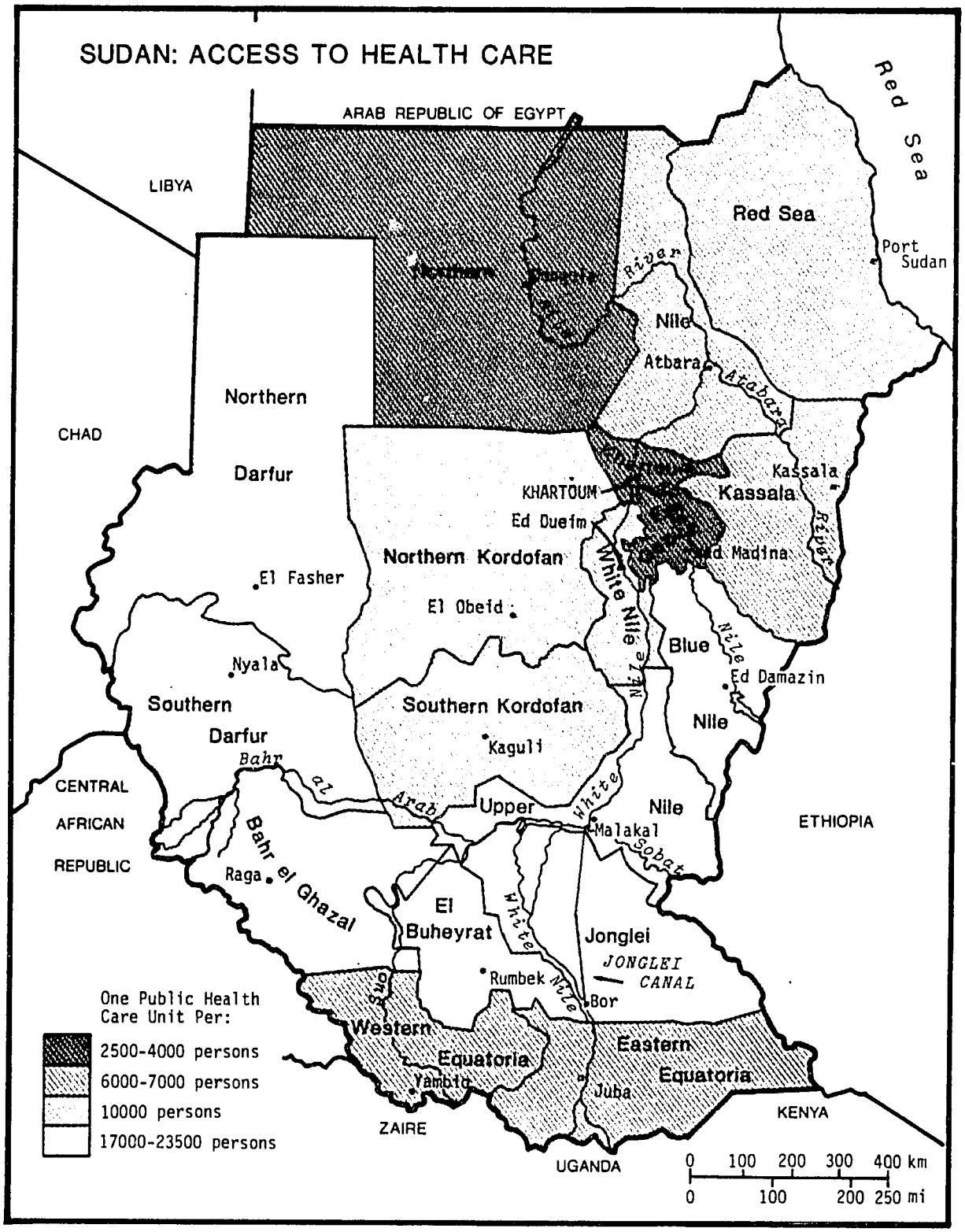
The North's climate is hot and dry with great variations in rainfall. Exceptionally high temperatures are related to such diseases as heat exhaustion, sun stroke, intestinal diseases and meningitis. In years of little rainfall, dust storms, haboobs, are common and the incidence of trachoma, an eye disease, increases. The lack of sufficient rainfall increases susceptibility to diseases. Due to the scarcity of water, the few watering points become overcrowded and overused. Depressions and small pools are used for both drinking and bathing by humans and animals alike. Such usage leads to the spread of diseases such as typhoid, schistosomiasis, and yellow fever.

The incidence of disease in the Sudan is also related to the high degree of population mobility. This mobility involves nomads moving with their animals in a seasonal pattern, rural-urban migration in search of employment and educational opportunities, an east-west movement connected with the holy pilgrimage to Mecca, seasonal migration from the rural sector to government or private schemes in search of agricultural wage earning opportunities, and lastly, immigration of refugees from other African nations. Increased mobility has numerous effects on health and health care. The spread of disease is perhaps the most obvious result, but providing health care services to a mobile population is also difficult. Immigration may result in the introduction of new diseases in addition to spreading ones already eradicated within the Sudan but perhaps brought back from bordering nations.

All of these issues complicate the delivery of an adequate health care system.

Sudan's infant mortality rate is high at 141 infant deaths per 1,000 live births while a low life expectancy at birth is 46. There is a wide difference in population mortality rate and infant mortality rate between the

FIGURE 8



SOURCE: International Labour Organisation 1976, 145.

north and south. This is partially attributed to malnutrition, lack of sanitation facilities and to the great variation in the population covered by primary health care units. Khartoum, Gezira and the northern provinces have the best health care facilities whereas Bahr el Ghazal, Darfur, and Upper Nile experience shortages of medical personnel and facilities as indicated by Figure 8. In spite of the many health problems in Sudan, the government has set an example for other developing nations by the high priority it has given to health care.

4.6 EDUCATION

This section will consider formal education only, and look at such measures as literacy rates in order to determine what educational standards exist in Sudan. Literacy for example is often used as an indicator for development as in the PQLI index which attempts to be a non-monetary concensus of well being.

When comparing enrollment ratios of rural and urban children at the primary and secondary levels, urban children's participation is far greater. In comparing regions or provinces, the largest numerical attendance is in Khartoum and Gezira provinces. The lowest rates are found in the Upper Nile, Red Sea, Bahr el Ghazal, and South Darfur at all levels (see Figures 10, 11 and 12).

When analyzing the internal make up of school children by sex, females make up a smaller part of the student body as education becomes more advanced. This is also true of females when studying literacy rates and age. Female enrollment at the primary level constituted 42 percent (out of 50 percent of the gross total of male and female enrollment of all ages at the primary level) compared to 52 percent for males. Secondary level enrollment decreases

for both sexes: females represent 11 percent, males 20 percent out of a total of 16 percent of the entire population (World Bank 1982, 168).

The provinces of Upper Nile, Bahr el Ghazal and Darfur have less than 5 percent of their total population in school. Northern Province and Khartoum, on the other hand, have over 20 percent of their total population in school. This is interesting when ones notes that 41 percent of the total Sudanese population is under the age of fourteen, as noted in the most recent estimates between 1976 and 1980 (World Bank 1982, 167) and depicted in Figure 9.

According to the most recent estimates, the literacy rate for Sudan averages 20 percent of the population between 1976-1979, an increase from 13 percent in 1960 (World Bank 1982, 168). The Ministry of Education estimates that in 1979/80, there were 1.4 million pupils in primary schools, or about 38 percent of the population between the ages of seven and twelve. Secondary enrollment was about 25 percent and the total number of full and part-time students at a higher educational level was about 27,000 students. (See Figures 10, 11 and 12 for regional distribution of enrolled students.)

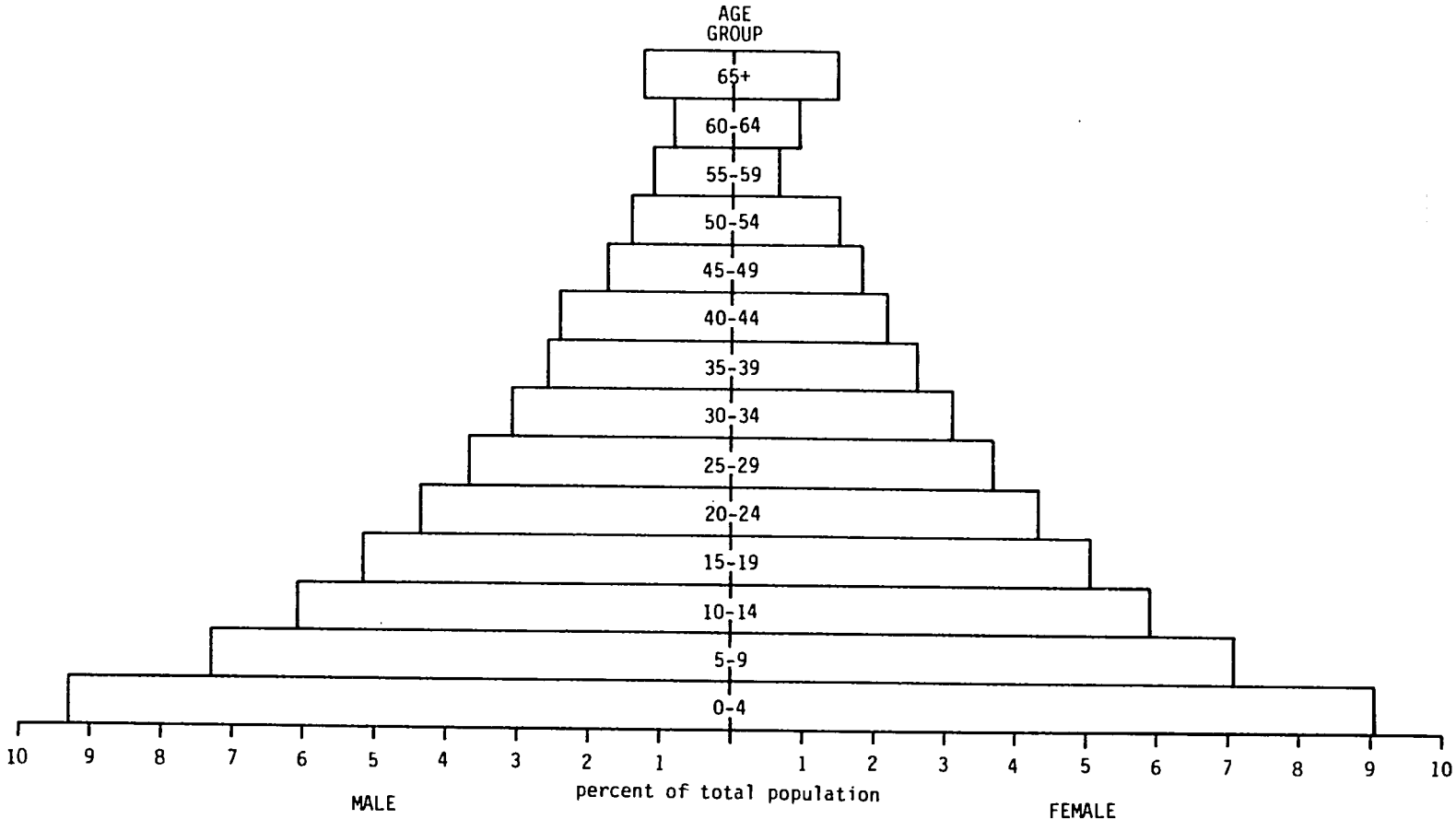
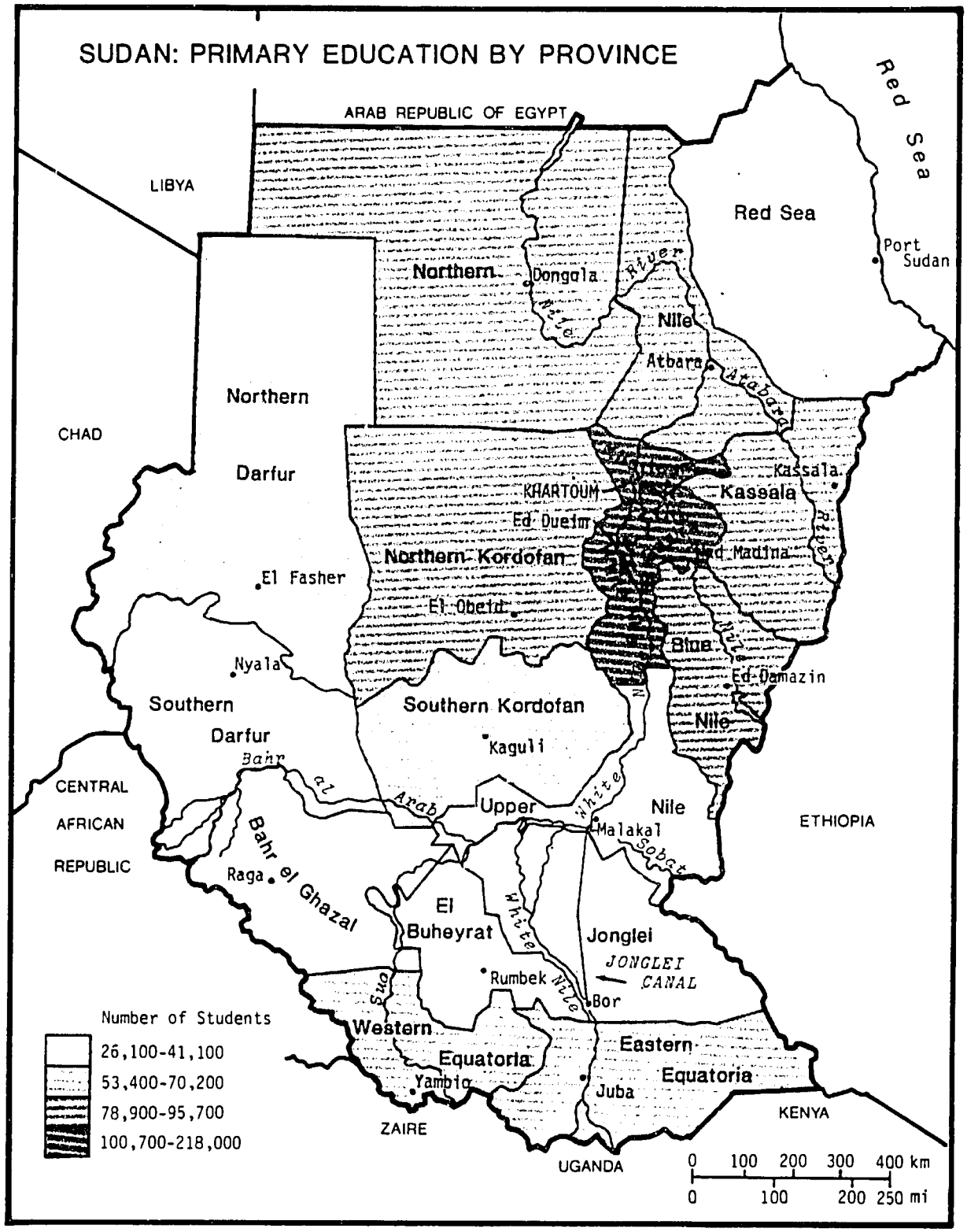


FIGURE 9

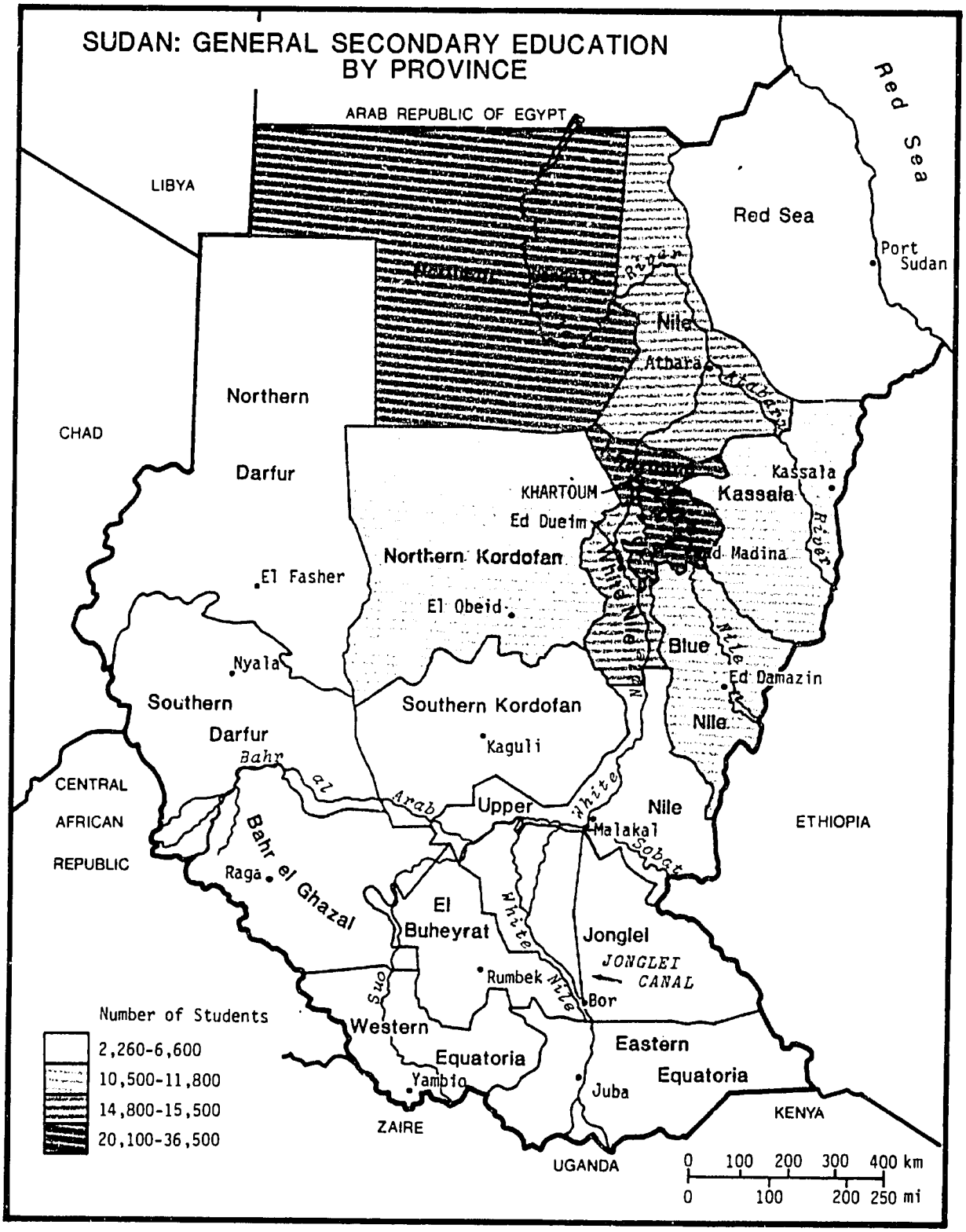
SOURCE: World Bank 1982, 172.

FIGURE 10



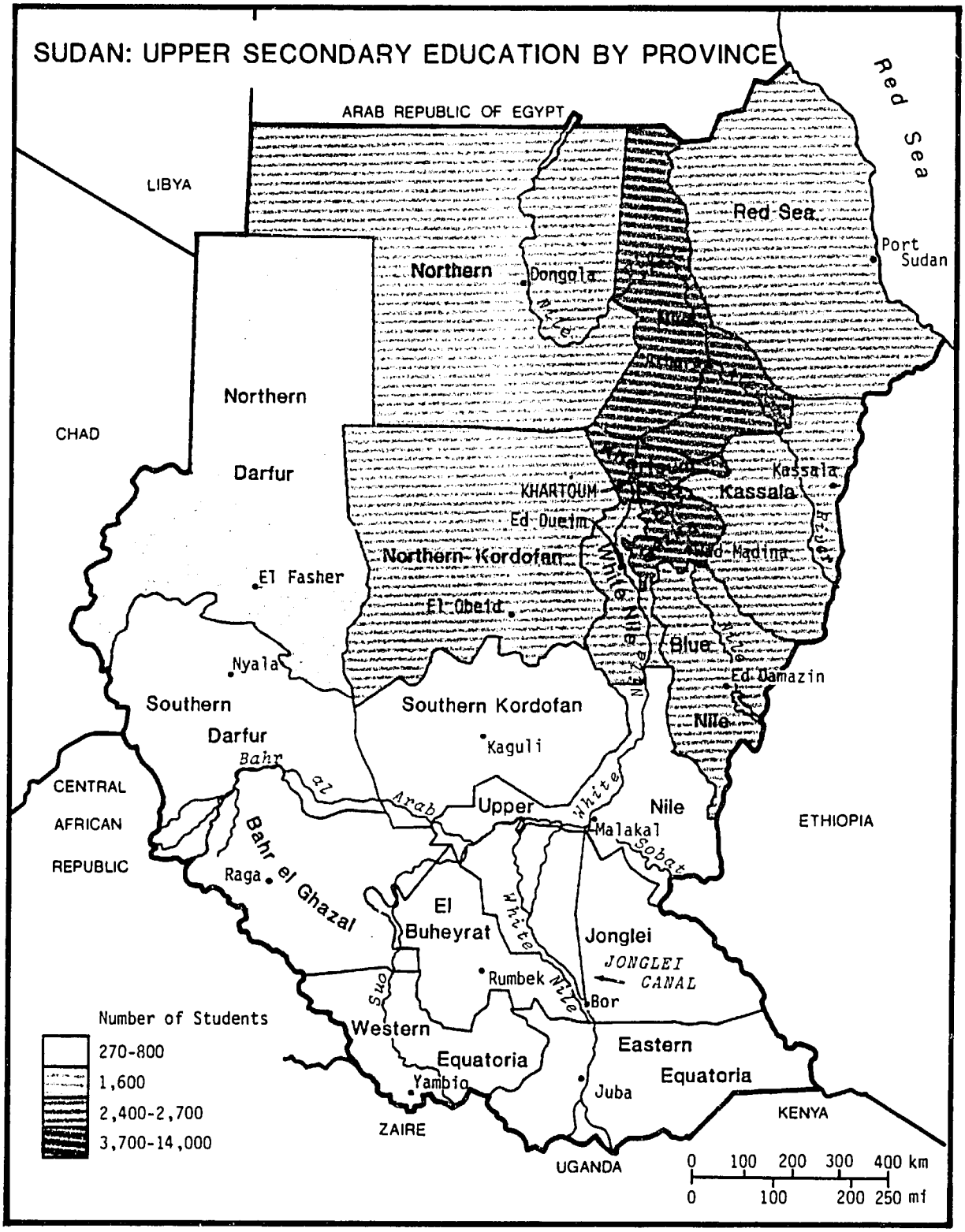
SOURCE: Sudan, Government of 1977, 130.

FIGURE 11



SOURCE: Sudan, Government of 1977, 130.

FIGURE 12



SOURCE: Sudan, Government of 1977, 130.

4.7 CONCLUSION

At the beginning of this section on poverty, the problem of obtaining localized statistical information on Sudan was emphasized. The considerable number of nomadic people present one kind of data gathering problem; the difficulty of communication in a huge country presents yet another. Despite the difficulties, there is consistent provincal level information on a number of important indicators of wealth and well-being. Livestock data, educational enrollments, and health are examples. Studies such as the 1968-69 Household Sample Survey also provide indications of income and expenditure.

These data, however, miss important information on poverty and well being. For example, educational data for formal institutions tell little of quality and nothing of the complementary role of informal educational systems. The health statistics describe disease, or more strictly, the number of patients identified. Income data traditionally have not included women's contributions to the economy.

Despite these caveats, the available information gives a clear message that well-being and wealth are seriously maldistributed in Sudan. In a regional perspective, the south stands out as a region of poverty in levels of income and employment, health services, and in access to education. Darfur and, to a lesser degree Kordofan, can also be identified as areas of relative deprivation. Income levels, health, and education are well below standard levels in other provinces although the region maintains middle to high levels of animal wealth. Parts of Kassala Province and the Red Sea Hills contain pockets of deep poverty, but these local situations are masked by the regional figures.

Within other areas of Sudan, some or all of our indicators show higher levels of well-being. The generalized regional data hide the wide variation

within local areas. In the irrigated and mechanized farming areas, seasonal workers gain employment but find many hardships in the off season and/or in seasonal migrations from place to place. Within urban areas there are peri-urban fringes of deep poverty, possibly worse than elsewhere in the country.

The Sudan is a least developed country, albeit one of significant potential. However, to achieve even a part of its potential, the human and physical resources of the whole country need to be carefully assessed, mobilized, and monitored.

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APPENDIX I

MAJOR EVENTS IN SUDAN 1821-1980

1821 The Turko-Egyptian Conquest of the Northern Sudan and the establishment of the Northern Sudan as an administrative unit.

1840 The successful penetration of the Sudd to establish a river route to equatorial Africa; and the beginning of the end of the isolation of the South.

1881 The beginning of the revolt against foreign rule led by Mohamed Ahmed El Mahdi.

1885 The Fall of Khartoum and the establishment of the Mahdist State with Omdurman as its capital.

1899 The Anglo-Egyptian Conquest of the Sudan and the initiation of colonial rule in the Sudan.

1924 Abortive uprising in Khartoum against colonial rule.

1930 The inauguration of the Southern Sudan Policy that led to separate administrative systems for northern and southern Sudan, and the restriction of northern influence in the south.

1938 The establishment of the Graduate Congress that signaled the rise of Modern Sudanese Nationalism.

1945 The creation of Sudanese political parties; some calling for union with Egypt, others demanding Independence.

1946 The reversal of Southern Policy that resulted in casting the lot of the South with the North after 16 years of separate administration.

1947 The convening of the Juba Conference attended by Northern, Southern and British representatives to discuss future north-south relation.

1948 Creation of a legislative assembly in Khartoum. Boycotted by some political parties.

1953 The Anglo-Egyptian agreement granting the Sudanese the right of self-determination.

1953 The first parliamentary elections in the Sudan were held. The alliance of the Unionist Parties led by Israeli El Azhari won the election and formed the transitional Sudanese government.

1954 Formation of the first southern political party, the Southern Liberal Party.

1955 Revolt of Southern troops stationed in the South against the government.

1955 The Sudanese government announced abandoning its policy of a link with Egypt.

1956 The Declaration of Sudanese Independence.

1958 Military Coup led by Lt. General Ibrahim Abboud. Banning of political parties, suspending of provisional constitution and the dismissal of parliament.

1960 Formation of a Southern Political Organization, Sudan African Closed Districts National Union (SACDNU) in exile.

1960 Vigorous implementation of the government's policy of Arabization and Islamization in the South.

1963 The birth of the Anya-Nya guerilla movement in the South to fight against perceived Northern domination.

1964 Expulsion of foreign missionaries from the South.

1964 A popular revolution precipitated the fall of the Abboud Military Regime in October and the return of parliamentary government and political parties.

1965 Convening of the Round Table Conference on the problem of Southern Sudan.

1969 A successful coup was staged by a young group of army officers led by Gaafar Mohamed Nimeiri. The establishment of a leftist government with communist participation.

1969 Declaration of Policy of Regional Autonomy for the Southern region.

1970 The quashing of an armed rebellion led by Imam Al Hadi Al Mahdi, leader of the Ansar sect.

1971 Abortive communist coup.

1971 General Gaafar Mohammed Nimeiri was elected President in a general plebiscite.

1972 The Addis Ababa Agreement granting autonomy to the Southern Sudan and ending the Civil War.

1973 Ratification of the permanent Constitution of the Democratic Republic of the Sudan.

1976 Opposition Forces of the National Front stationed in Libya staged an abortive coup.

1976 Joint Defence Accord between the Sudan and Egypt.

1977 National Reconciliation and the return of some of the opposition leaders from exile. (Sadig El Mhadi and Moslem Brothers leaders.)

1980 Implementation of regionalization by establishing five regions in addition to the Southern region.

SOURCE: Ahmed and Yousif 1981, 13-14.