JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

No. 1

MINISTRY OF HEALTH
THE REPUBLIC OF THE SUDAN

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR THE SUPPLY OF MEDICAL EQUIPMENT AND MATERIALS FOR SUDAN EMERGENCY FLOOD RECONSTRUCTION PROGRAMME IN THE REPUBLIC OF THE SUDAN

(THE PROJECT FOR SUPPLY OF BASIC MEDICAL EQUIPMENT AND MATERIALS)

MAY 1992

BINKO LTD.

JICA
BASIC DESIGN STUDY REPORT ON THE PROJECT FOR THE SUPPLY OF MEDICAL EQUIPMENT AND MATERIALS FOR SUDAN EMERGENCY FLOOD RECONSTRUCTION PROGRAMME IN THE REPUBLIC OF THE SUDAN
MAY 1992
415
92.8
GRF
G R F
92-075

JICA LIBRARY

1100184[9]

24147

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF HEALTH
THE REPUBLIC OF THE SUDAN

BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
THE SUPPLY OF MEDICAL EQUIPMENT AND MATERIALS
FOR
SUDAN EMERGENCY FLOOD RECONSTRUCTION PROGRAMME
IN
THE REPUBLIC OF THE SUDAN

(THE PROJECT FOR SUPPLY OF
BASIC MEDICAL EQUIPMENT AND MATERIALS)

MAY 1992

BINKO LTD.

国際協力事業団
24147

PREFACE

In response to a request from the Government of the Republic of the Sudan, The Government of Japan decided to conduct a basic design study on the Project for the Supply of Medical Equipment and Materials for Sudan Emergency Flood Reconstruction Programme and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Sudan a study team headed by Dr. Takeki Shiina, Department of International Cooperation, National Medical Center Hospital, Ministry of Health and Welfare and constituted by members of Binko Ltd., from 9 November 1991 to 6 January 1992.

The team held discussions with the officials concerned of the Government of the Sudan, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to the Sudan in order to discuss a draft report and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of the Sudan for their close cooperation extended to the teams.

May 1992

Kensuke Yanagiya
President
Japan International Cooperation Agency

May 1992

Mr. Kensuke Yanagiya,
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Supply of Medical Equipment and Materials for Sudan Emergency Flood Reconstruction Programme in the Republic of the Sudan.

This study has been made by Binko Ltd., based on a contract with JICA, from 12 November 1991 to 29 May 1992. Throughout the study, we have taken into full consideration of the present situation in the Republic of the Sudan, and have planned the most appropriate project in the scheme of Japan's grant aid.

We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, the Ministry of Health and Welfare and Embassy of the Republic of the Sudan in Japan. We also wish to express our deep gratitude to the officials concerned of the Ministry of Health of the Sudan, JICA Office in the Sudan and Embassy of Japan in the Sudan for their close cooperation and assistance during our study.

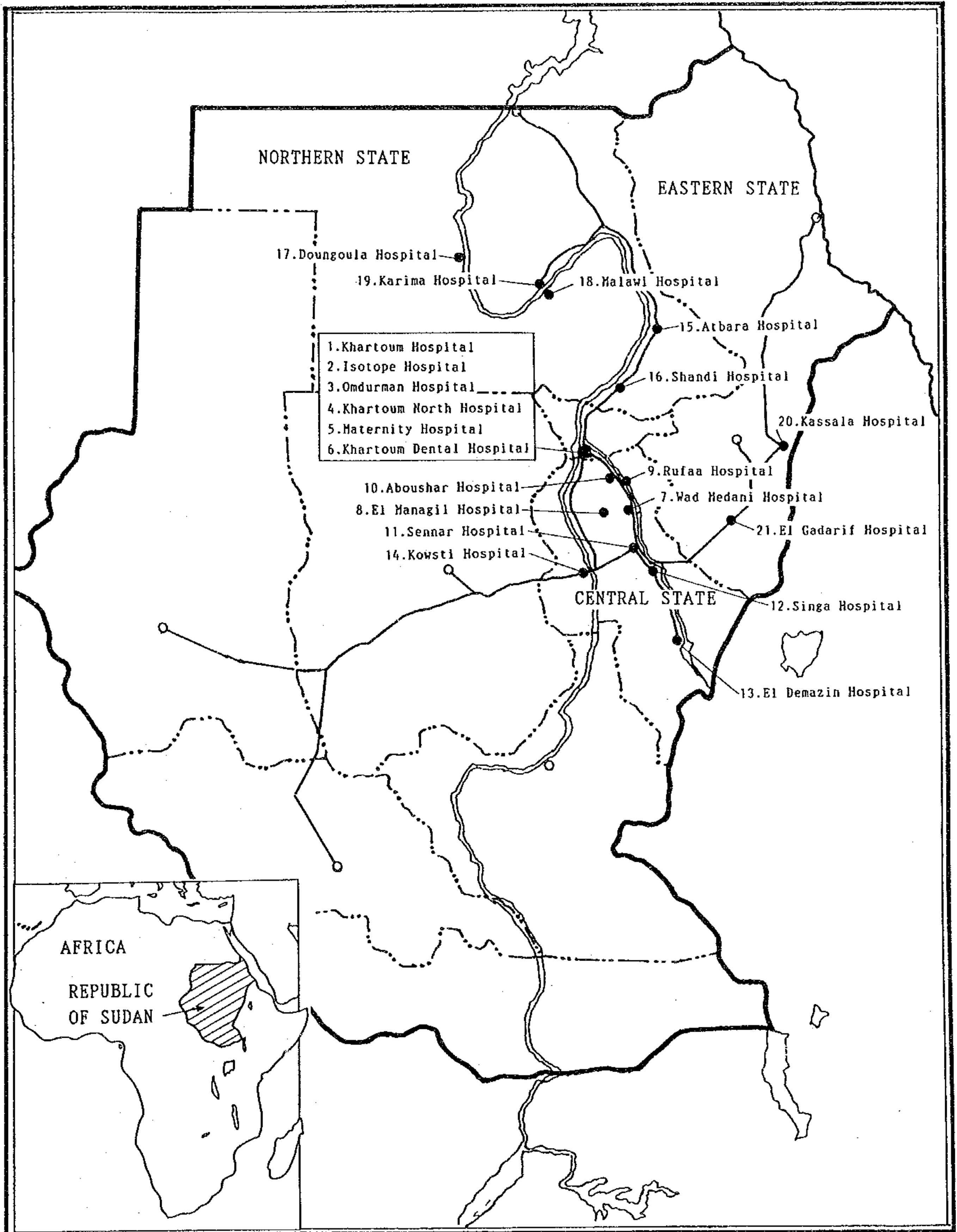
At last, we hope that this report will be effectively used for the promotion of the project.

Very truly yours,

Zenichi Ando
Team Leader
Basic design study team on the Project for the supply of Medical Equipment and Materials for Sudan Emergency Flood Reconstruction Programme

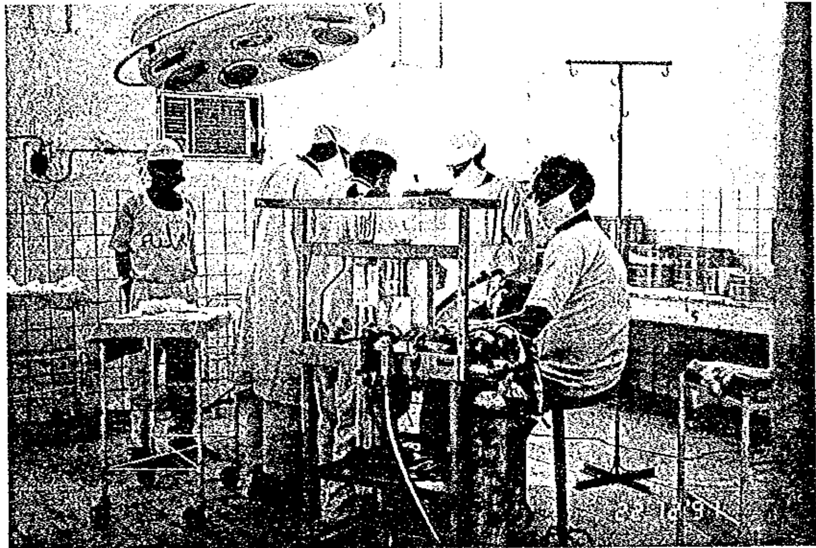
Binko Ltd.

Locations of Proposed Hospitals for the Project

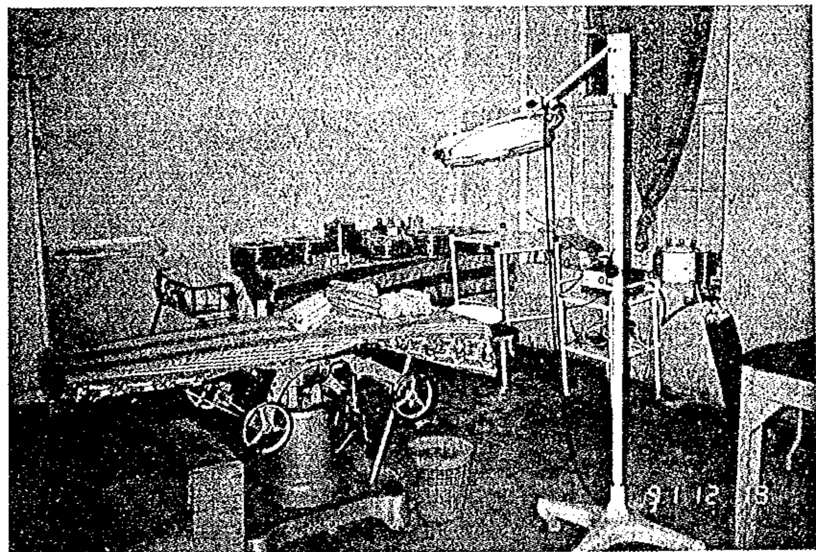


Status of Proposed Hospitals

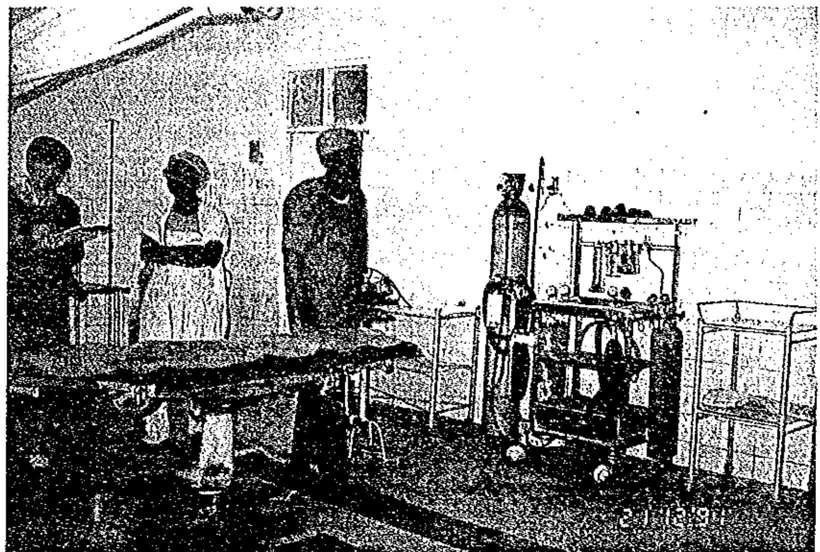
Khartoum Hospital,
Main Gate



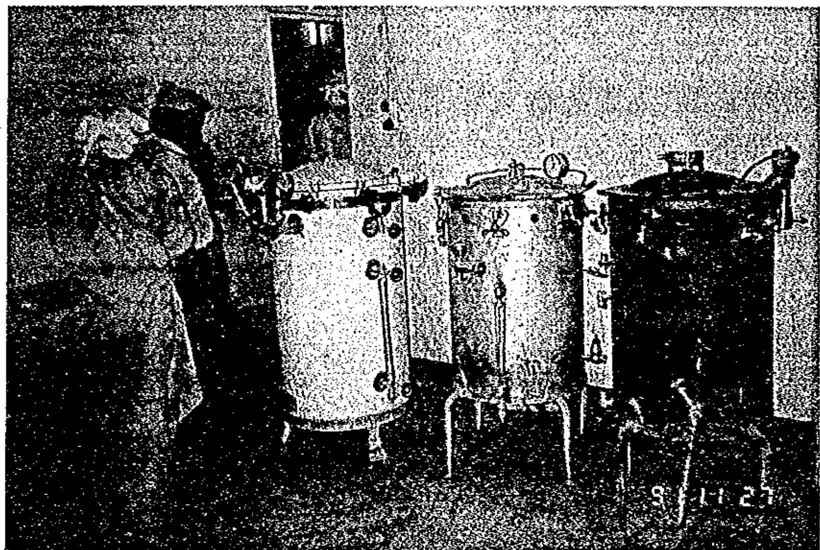
Kowsti Hospital,
Operation room



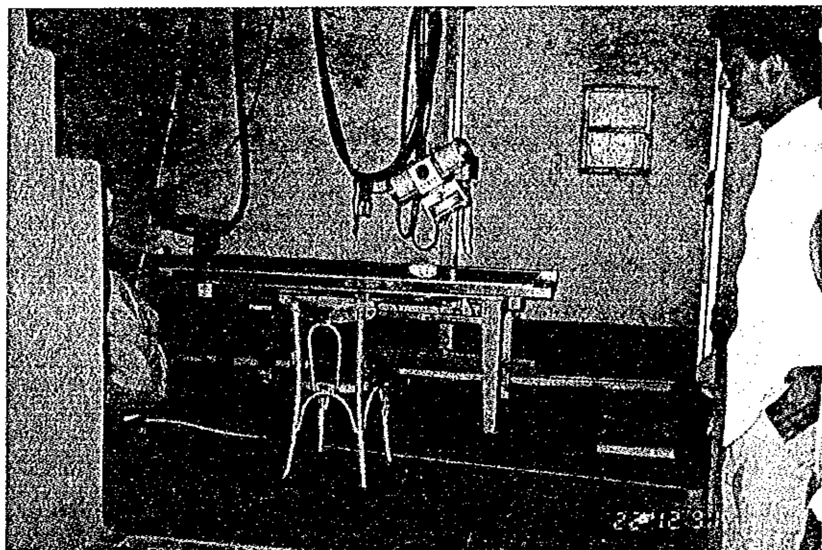
Sennar Hospital,
Minor Operation room



Ruffa Hospital,
Operation room



Atbara Hospital,
Sterilizing room



Kowsti Hospital
X-Ray room

SUMMARY

The Republic of the Sudan (hereinafter referred to as "the Sudan") is the largest country in Africa. Agricultural land accounts for 12% of its territory, forests account for 22%, and deserts account for the remainder. The population of the country was estimated at 25,000,000 in 1990. The official language is Arabic, and people in the northern part of the country are followers of Islam while people in the southern part are Christian or follow other religions. The adult literacy rate is said to be 35%.

In the Sudan, the national economy depends on agriculture, Major agricultural products include cotton, gum arabic, livestock and sesame seeds. These products are exported and oil and industrial manufactures (e.g., machines, transportation equipment and chemicals) are imported. Economic growth in the country, however, has been low over the past several years, with accelerating inflation due to budget deficits.

In June 1990, the Government of the Sudan adopted the Three-Year National Economy Salvation Plan (1990/1991～1992/1993) to wipe out the budget deficit, promote agricultural development and change its controlled economy to a free market economy. The 1990/91 national budget formed in accordance with the Plan was a remarkable austerity budget aimed at a deficit reduction of 91.2% from the level of the previous year.

The Government of the Sudan declared that good health underlay the fundamental human rights and was indispensable for national development, and that the Government was responsible for promotion of the people's health. In 1977, in order to attain this goal the Government formulated its first Health and Medical Service Plan. Through several changes, the Plan was established in 1990 as the Three-Year National Health Plan (1990/1991～1992/1993). The Plan has been the basis of activities pertaining to the people's health and medical services for the people. In the Plan, the Government intends to make the rural hospitals and the

district hospitals the nucleus of primary medical care which is to be supported by upper-ranking hospitals in charge of secondary and tertiary medical care.

In the Sudan, many people suffer from malaria, gastroenteritis, diarrhea, respiratory diseases or dysentery. The mortality rate of infants under 12 months is high, while the average life expectancy is only 51.7 years. Such being the case, it is urgently necessary to extend more preventive medical care as well as proper primary health care. It is also important to rehabilitate regional general hospitals which are in charge of secondary medical care, thereby supporting primary health care.

The Sudan was hit by unprecedented heavy rains and consequent flood in 1988. Most of the people were affected by these natural disasters. More than two million people lost their houses. Agricultural areas along the Nile River were devastated, and essential services such as health, education, and communications suffered. In response to the request of the Government of the Sudan, international assistance organizations dispatched a joint survey team to make a survey on the damage from the heavy rains and the consequent flood, and formulated the Emergency Flood Reconstruction Programme. The Government of the Sudan has been endeavoring to reconstruct, with the cooperation of these international assistance organizations and domestic volunteers as well as through bilateral assistance.

Also in the area of health and medical services, the Government has been promoting reconstruction of damaged facilities with the Ministry of Health as the nucleus and with the cooperation of state governments and the private sector based on the Emergency Flood Reconstruction Programme. The Government has also been promoting improvement of the environment by taking measures for malaria prevention, etc. The Government has formulated the Project for Supply of Medical Equipment and Materials for the Sudan Emergency Flood Reconstruction Programme, intending to restore medical services in hospitals whose equipment has become superannuated or damaged by the flood. However, the Project

implementation was impeded by financial constraints and difficulty in obtaining foreign currency. Under these circumstances, the Government of the Sudan requested grant aid assistance of Japan for the Project implementation.

In response to the request, the Government of Japan decided to conduct a basic design study. The Japan International Cooperation Agency dispatched a Basic Design Study Team to the Sudan from November 19, 1991 to January 6, 1992. The team made a survey of the 21 proposed hospitals for which the supply of equipment is requested and studied the background of the Project, its purpose, details, executing and management system and budgetary measures. Returning to Japan, the team analyzed the collected data and made a basic design. From the 11th to the 22nd of March 1992, the team gave an explanation of its draft final report in the Sudan.

Based on the field survey and data analysis in Japan the following items pertaining to the Project have been clarified.

1. The heavy rains and the consequent flood in 1988 caused considerable damage in the health and medical services sector. Facilities and medical equipment were damaged, the functioning of health and medical service systems was impeded, and quantities of medicines were lost.

2. The Government of the Sudan has been making every effort to restore its health and medical service systems, based on the Emergency Flood Reconstruction Programme. Repairs of hospital buildings have been making considerable progress, with the financial cooperation of the Ministry of Health, state governments and residents near these hospitals.

3. Many of equipment in these hospitals were damaged by the heavy rains and the consequent flood or are too superannuated to work properly. This prevents hospitals from providing sufficient medical services. In these circumstances, the Ministry of Health intends to replace

damaged or superannuated equipment, by formulating the Project for Supply of Medical Equipment and Materials for the Sudan Emergency Flood Reconstruction Programme. However, since medical equipment supplies mostly depend on imports from foreign countries, difficulty in obtaining foreign currency prevents the Project implementation.

4. The purpose of the Project is to replace basic equipment which has become superannuated or been damaged by flood in the 21 proposed hospitals and thereby to restore medical services in the country. These 21 proposed hospitals have been selected from among general and speciality hospitals in the National Capital region and general hospitals in main cities, based on the degree of the necessity of medical equipment renewals. Most of equipment to be provided under the Project are fundamental medical equipment necessary for secondary and partially tertiary medical services.

The analysis results have made it clear that it would be significant to promote the Project implementation with the grant aid cooperation of Japan. A basic design has been made based on this conclusion and prepared in accordance with the fundamental policies of the Project, as mentioned below.

1. Renewals shall be basically limited to those equipment which have been damaged by the flood or which cannot be repaired because of superannuation.

2. The selection of equipment shall be so made that it will not become a heavy burden to the Government of the Sudan regarding the procurement of consumables or maintenance and repair.

3. Equipment to be provided shall be limited to types which can be operated and maintained by the existing personnel who have sufficient experience.

The outline of the basic design made in accordance with the above-mentioned fundamental policies is described as follows.

1. Proposed hospitals

Khartoum State
- (1) Khartoum Hospital
- (2) Isotope Hospital
- (3) Omdurman Hospital
- (4) Khartoum North Hospital
- (5) Maternity Hospital
- (6) Khartoum Dental Hospital

Central State
- (7) Wad Medani Hospital
- (8) El Managil Hospital
- (9) Rufaa Hospital
- (10) Aboushar Hospital
- (11) Sennar Hospital
- (12) Singa Hospital
- (13) El Demazin Hospital
- (14) Kowsti Hospital

Northern State
- (15) Atbara Hospital
- (16) Shandi Hospital
- (17) Doungoula Hospital
- (18) Malawi Hospital
- (19) Karima Hospital

Eastern State
- (20) Kassala Hospital
- (21) El Gadarif Hospital

2. Equipment and materials to be provided

(1) Instrument for general operation
- Operating scissors
- Hemostatic forceps
- Hemostatic sutures
- Gastro - intestinal
- Surgical orthopedic
- Ophthalmic

(2) Anesthetic
- Anesthesia apparatus with ventilator
- Suction unit
- Automatic spygmomanometer
- Peripheal nerve stimulator
- Others

(3) I.C.U.
- Ventilator
- Bedside monitor
- ECG monitor, 3ch
- Suction unit

(4) Gynecology & Obstetric
- Obstetric forceps
- Doppler fetal heart detector
- Electric cautery
- Doyn's retractor
- Others

(5) Sterilization

- Hot air oven
- Instrument sterilizer
- Autoclave
- Others

(6) Treatment/Ward

- Diagnostic set
- Others

(7) Operating theatre

- Major operating table
- Standard operating table
- Operation lamp
- Electrosurgical unit
- Defibrillator
- Nebulizer
- Instrument cabinet
- Instrument table
- Others

(8) E.N.T.

- Diagnostic instruments set
- E.N.T. examination unit
- Caryngoscope
- Bronchoscope
- Esophagoscope
- Suction unit (Portable)
- Others

(9) Ambulance

- Ambulance

(10) X-ray unit

- Static X-ray unit
- Condenser discharge x-ray unit (Mobile type)

(11) Dental equipment

- Dental x-ray unit
- Oral surgical instruments set
- Instrument for laboratory
- Instrument set
- Others

On condition that the Project is implemented under the grant aid cooperation of Japan, the Ministry of Health is responsible for the Project implementation. The Project is to be managed by the Director General, Department of Curative Medicine of the Ministry of Health. After completion of the Project, persons in charge are to operate and maintain the equipment and materials in each of the proposed hospitals, under the control of the hospital director. Recurring expenses for

equipment and materials are to be covered by the budget of the Ministry of Health for the hospitals controlled by the Ministry, while these expenses are to be covered by the budgets of state governments for regional general hospitals. The Central Medical Supply, under the Ministry of Health, is to take charge of repairs of equipment as well as the supply of consumables. The C.M.S. has independent budgetary appropriations, and its Medical Equipment Maintenance Department takes charge of repairs of medical equipment in the hospitals. The Mechanical Transportation Department under the control of the Ministry of Transportation and Communications is responsible for repairs of ambulances, and such repairs are to be done at the repair shops of M.T.D. in nearby cities of the country.

Expenses to be borne by the Government of the Sudan include only expenses to remove existing equipment which is to be replaced. Maintenance expenses after completion of the Project include power tariffs, expenses for water supply and drainage, the cost of medical gas, expenses for consumables such as x-ray films, and expenses for ambulance fuel. However, any additional increase in running expenses is expected to be small and may be covered by the current budget because most of equipment and materials to be provided are renewals.

Once the Exchange of Notes between the Japanese and Sudanese governments is concluded, it will take about 9 months for the Project to be completed after the procurement contract is signed.

Provided that the Project is implemented, equipment and materials damaged by the heavy rains and the consequent flood or not working satisfactorily because of superannuation will be replaced, and medical services will be improved in the 21 proposed hospitals. In addition, a system can be established to provide secondary and partially tertiary medical services for the citizens. Since six of the proposed hospitals which are general and speciality hospitals as well as national referral hospitals are located in the National Capital region (Khartoum State), people in the National Capital region and referral patients from other

states will be benefited by the realization of the Project. Thus about 18 million people including citizens in main cities will be able to receive improved medical services after completion of the Project.

CONTENTS

Preface

Letter of Transmittal

Map

Photographs

Summary

Chapter 1 Introduction 1

Chapter 2 Background of the Project 4

2-1 Outline of the Republic of the Sudan 4

2-2 Outline of Health and Medical Service Sector 17

2-3 Outline of Related Project 38

2-4 Particulars and Summary of the Request 46

2-5 Status of Proposed Hospitals for the Project 49

Chapter 3 Details of the Project 86

3-1 Purpose of the Project 86

3-2 Study and Examination of the Request 86

3-3 Outline of the Project 102

Chapter 4 Basic Design 106

4-1 Basic Design Policy 106

4-2 Basic Design Conditions 107

4-3 Study on Selection Conditions 109

4-4 Equipment Supply Plan 112

Chapter 5 Implementation Plan 126

5-1 Implementation Policy 126

5-2 Range of Undertaking 128

5-3 Execution Plan 129

5-4 Equipment Procurement Plan 132

5-5 Execution Process Plan 132

Chapter 6 Maintenance and Administration Plan 137
6-1 Maintenance and Administration Organization (System) 137
6-2 Maintenance and Administration Expenses 141

Chapter 7 Project Evaluation 146
7-1 Project Effect 146
7-2 Propriety of the Project 151

Chapter 8 Conclusion and Recommendations 153
8-1 Conclusion 153
8-2 Recommendations 153

APPENDIX
1. MEMBER LIST OF SURVEY TEAM 155
2. SURVEY SCHEDULE 157
3. LIST OF PRINCIPAL PERSONS CONCERNED 161
4. MINUTES OF DISCUSSIONS 168

Chapter 1 Introduction

Chapter 1 Introduction

The Republic of the Sudan, with an area of approximately 2.5 million square kilometers, is the largest country in Africa, with about 6.7 times the land area of Japan. The Sudanese population is estimated to be about 25 million, 20% of which is urban, concentrated in the capital area, while the remaining 80% dwells in rural regions. The Republic of the Sudan has been confronted with economic difficulties for many years.

Per capita national income and consumption levels have been declining, primarily because of large financial deficits. After agricultural crop production fell markedly, due to drought conditions which lasted three years during 1985 to 1987, two million people lost their homes in the unprecedented rainfall and cataclysmic floods of 1988. The floods seriously affected health care and the medical service system; not only were hospitals and medical equipment destroyed partially or totally, but medicine was also lost and the health care and medical services situation worsened. The proposals for the Emergency Flood Reconstruction Programme, made by a joint survey team composed of a number of international assistance organizations conducting a field survey immediately after the flood, have been taken into consideration by the Ministry of Health. The Ministry has been endeavoring to restore damages sustained by health care and medical service facilities, with the assistance of international assistance organizations such as WHO and UNICEF, as well as private organizations.

The restoration of hospital buildings, which could be financed by domestic funds, has made substantial progress at the individual hospital level. Although the Ministry of Health, with the Project for Supply of Medical Equipment and Materials for the Sudan Emergency Flood Reconstruction Programme, has made an attempt to renovate medical equipment which have severely deteriorated due to age, implementation of this Project has been hindered by financial difficulties and problems in securing foreign currency funds.

The Republic of the Sudan has therefore filed an official request for grant aid from Japan in order to implement the Project.

The Japanese Government decided to conduct a basic design study in response to this request and the Japan International Cooperation Agency dispatched a survey team, headed by Dr. Takeki Shiina, Department of International Cooperation, National Medical Center Hospital, Ministry of Health and Welfare, to the Republic of the Sudan for a 49-day period (from November 19, 1991 to January 6, 1992). The survey team confirmed the background and substance of the request, and confirmed which Ministry is responsible for the Project and which ministry department is in charge of the Project implementation. It also conducted a field survey of the 21 hospitals proposed in the request.

Findings of the survey team are summarized as follows, with the results of the field survey and analysis made after the return of the survey team to Japan.

The Project calls for aid to be given to general or speciality hospitals located in the national capital region, or to general hospitals playing important social roles in local main cities; it also calls for aid to be given to 21 hospitals which are given top priority in medical policies. The Project proposes the replacement in those general or speciality hospitals of medical equipment which were seriously damaged by the flood or which have deteriorated due to age.

Furthermore, it was also confirmed that the Project implementation would play an important role in promoting the Emergency Flood Reconstruction Programme, which is being promoted by the Sudanese government and would restore medical services and provide secondary and tertiary medical services of a high quality to many Sudanese people. Consequently, provision of grant aid by the Japanese Government for the implementation of the Project is considered very significant. Therefore, the Project basic design has been prepared in the survey report.

The field study schedule and the names of survey team members are found in the appendix attached hereto.

Chapter 2 Background of the Project

Chapter 2 Background of the Project

2-1 Outline of the Republic of the Sudan

2-1-1 General Profile

(1) Land area

The Republic of the Sudan, with an area of 2,505,812 km^2, is the largest of all African countries; its area is equal to approximately 6.7 times that of Japan. 12% of the land area is arable, while 22% is forest and the rest is desert. Arable land extends along the Nile (Blue and White) and irrigated farmland extends over an area of 40,000m^2.

(2) Climate

The Republic of the Sudan is situated in the northern latitudes from 4° to 22° and in the eastern longitudes from 22° to 38°. The northern part is desert and it is hot from May through October. Average temperature in a day is 31°～34°. From November to April, average temperature is 19°～27° which is comparatively cool. The moisture is low being 16%～32% all year round with little rainfall in July and August. The central part where Khartoum is located, it is hot from April through October and average temperature in a day is 30°～34° with the moisture of 12%～27%. Rainy season is from June to September and almost no rain in other months.

The southern part is mountainous. It is hot all year round with average temperature of 28°～32° and with high moisture of 50%～80%. Rainy season is from May to October.

(3) Language

The official language is Arabic, spoken by about 60% of the population, while English is partly used. There are also 115 tribal languages in the Southern State.

(4) Education

The literacy rate for adults is said to be 35%. Although education is not compulsory, there are 7,064 primary schools and 1977 secondary schools. Text books are distributed free of charge, and schooling is also free. The main universities are Khartoum University, Khartoum Annex of Cairo University, Gezira University and Islamic University. The total number of university students is estimated at approximately 44,000. The years of education are 3 years for the primary, 3 years for the secondary, 6 years for high school and 6 years for university (4 years for college).

(5) Political structure

The Sudanese political system is republican. The President is the head of state. There is a Prime Minister who is the head of government administration; under the Prime Minister are 21 ministers who form the cabinet.

1. Ministry of Foreign Affairs
2. Ministry of Justice
3. Ministry of the Interior
4. Ministry of Finance and Economic Planning
5. Ministry of Culture and Information
6. Ministry of Agriculture and Natural Resources
7. Ministry of National Guidance
8. Ministry of Autonomy
9. Ministry of Irrigation
10. Ministry of Health
11. Ministry of Energy and Mining
12. Ministry of Education
13. Ministry of Industry
14. Ministry of Housing and Construction
15. Ministry of Salvation and Internal Refugees
16. Ministry of Transport and Communication
17. Ministry of Welfare and Social Development
18. Ministry of Commerce and Supply

19. Ministry of Youth and Sports
20. Ministry of Defense
21. Ministry of Higher Education and Science

2-1-2 Demographic Trends

In 1956, when the first census was taken, the population was 10.3 million. The 1973 census gave a total of 14.822 million; this rose to 20.56 million in the census of 1983. Despite the war and natural disasters, the rate in population growth has averaged 3.1% a year, bringing the total to an estimated 25 million in 1990. In 1983 the average population density was 8.2 per km2, but there were substantial regional variations: one half of the population lives on just 15% of the land area around the Nile and regional unbalance of population is remarkable.

There has been considerable rural-urban migration: the urban population increasing ratio raised from 8.3% in 1956 to 17.6% in 1972. It is estimated that 2.5 million people, or around 10% of the population, may now live in the capital city's 'Three Towns'" of Khartoum, Omdurman and Khartoum North.

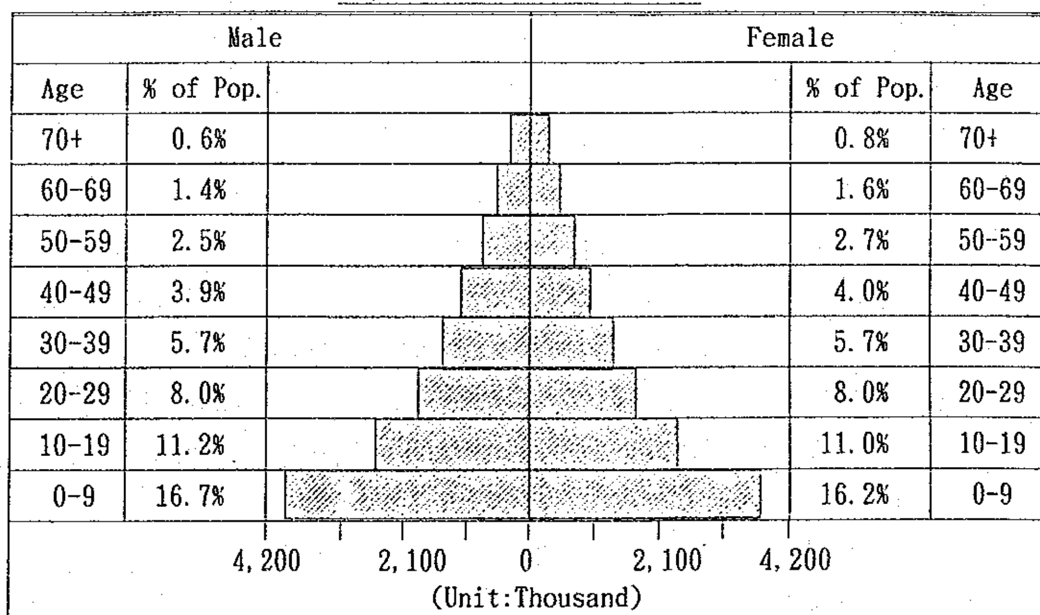
Over 2 million people are entirely nomadic. In addition, these herdsmen practiced transhumance, following the northward movement of the summer rains in search of new pastures. There also used to be about 500,000 seasonal workers who migrated within the major irrigated agricultural scheme network.

Population composition by age in the Sudan is presented hereunder.

Although it is rather difficult to correctly understand demographic trends in the Sudan, it may easily be inferred that the status of health care and medical services in the Sudan is unsatisfactory considering that average life

expectancy at birth is said to be no greater than 52 years.

Fig. 2-1 Age Distribution



Male		Female	
Age	% of Pop.	% of Pop.	Age
70+	0.6%	0.8%	70+
60-69	1.4%	1.6%	60-69
50-59	2.5%	2.7%	50-59
40-49	3.9%	4.0%	40-49
30-39	5.7%	5.7%	30-39
20-29	8.0%	8.0%	20-29
10-19	11.2%	11.0%	10-19
0-9	16.7%	16.2%	0-9

Source: IMF

2-1-3 Economy

(1) Overview of the Economy

Sudan's economy is dependent on agriculture; cotton is the principal crop. As recently as 1979 cotton accounted for 65% of export revenue. By 1989 crop diversification had reduced its contribution to 45%, while gum arabic and sesame accounted for another 21%.

The country has made some progress towards diversifying its economy. Industry has been hampered by the lack of spare parts and shortages of power supplies, due in turn to a lack of foreign exchange.

Overseas aid has been mainly directed at specific development projects, whereas Sudan's most urgent need has been for budgetary support and program loans to pay for imports and the running of projects already started. The pull of employment opportunities in the oil-rich Gulf

countries since the mid-1970s has severely depleted Sudan's own supply of skilled workers, although this trend is certain to be reversed as the result of the 1991 Gulf War. The external debt has soared and civil war in the south has blocked the exploitation of its oil and water resources.

(2) Cost of Living Trends

Inflation has been fueled by persistent deficit financing and by the chronic transportation bottlenecks that have plagued the Sudan for so long. Devaluation of the Sudanese pound and the gradual removal of food subsidies in accordance with conditions attached to IMF credits have also contributed to inflation.

The following Table 2 - 1 shows the consumer price index.

Table 2-1 Trends of Consumer Price

(Price index "1985=100")

	1984	1985	1986	1987	1988	1989
Consumer price index	68.8	100.0	124.5	....	247.1	403.9

Source: IMF, Bank of Sudan, Annual Report

In June 1990 the current regime adapted" the National Economy Salvation Programme 1990 - 1993". An outline of this latest programme is given below.

Principal Goals of the New Economic Policies

(a) Deficit financing shall be solved within three years, starting in fiscal year 1990/91.
(b) Prices of consumer goods shall be gradually liberalized.
(c) Government employee excesses shall be curbed.
(d) The taxation system shall be reformed.
(e) The exchange rate shall be stabilized in near future.
(f) Credit policy shall be set with development needs.

(g) Financial and Insurance Corporations shall be Islamized.

Main Specific Policies

(a) Top priority shall be given to agricultural development.

(b) Government control of the private sector shall be removed as much as possible (except oil exploration).

(c) Public corporations with deficit shall be sold to the private sector, or participation of the private sector will be sought. In the latter case the government shall not necessarily hold the majority of capital, and the government shall guarantee the investments involved, provide tax preferences, and allow the overseas remittance of profits.

(d) For the export promotion of agricultural products, the licensing system shall be abolished, and export prices shall be liberalized (except for cotton and gum arabic for the 1990 - 1991 fiscal year).

(e) To encourage agriculture, credits for agricultural development shall be increased.

(f) The exchange rate shall be reviewed at a reasonable period of time in the future, and stabilized at a practical rate.

2-1-5 National Finance

The national budget of the Sudan is divided into the ordinary expense budget and the development expense budget. The budget for fiscal 1990/91 is as shown in Table 2 - 1. Of note is that while total revenue is to increase by 81.2% from the previous year, total expenditure is reduced by 2.1% from the previous year, in order to attain a balance in revenue and expenditure, with deficit financing decreasing by an epoch-making -92.1% from the previous year.

Also, while the government intends to increase direct tax revenue by 52.2%, it also intends to increase service revenue (various fees, public service charges, etc.) by an unprecedented 535.1% from the previous year. The current regime's decision

seems to represent an unusual determination, although many difficulties are foreseen for the implementation of the proposed reform.

With regard to the development expense budget, emphasis is placed on agricultural development (as shown in Table 2 - 3), by appropriating 33.8% for agricultural development. Furthermore, the first annual budget of the "Three Year National Economic Salvation Programme" is highly oriented towards reducing deficit financing. On the other hand, 4.3 billion Sudanese pounds are appropriated for defense, with a 19.1% increase from the previous year.

Table 2-2 Central Government Current Expenditure Budget (1990/91)

(Unit: SL.million)

Item	Amount	Change
Total Revenue Budget	15,457.8	(+ 81.2 %)
Taxes	8,750.0	(+ 32.2 %)
Direct taxes	2,500.0	(+ 52.5 %)
Import taxes	3,750.0	(+ 20.5 %)
Indirect taxes	2,500.0	(+ 33.6 %)
Non tax revenue	6,707.8	(+ 338.1 %)
Office services fee	2,413.5	(+ 535.1 %)
Profit of public service corporation	4,294.3	(+ 273.1 %)
Total Expenditure Budget	16,163.7	(- 2.1 %)
Personnel expenses	1,091.4	(- 2.2 %)
Social services	2,005.3	(−)
Debt services	6,692.0	(−)
Defence & security	4,300.0	(−)
States government	1,910.0	(- 0.4 %)
Maintenance of Gov. Facilities	165.0	(0.0 %)
Balance	-705.9	(91.2 %)

Source: IMF

Note : Value of % means comparison to last years figure

Table 2-3 Development Budget (1990/91)

(Unit: SL. Million)

Total Amount	5,255.0	100%
Agriculture	1,711.8	32.6
Industry	340.0	6.5
Energy	347.7	6.6
Water	446.4	8.5
Transportation & Communication	641.3	12.2
Services	718.5	13.7
States Development	684.3	13.0
Private Sector	365.0	6.9
Source of Fund	5,255.0	100
External cash & Marchandise Assistance	645.0	12.3
External Project Assistance	1,845.0	35.1
Gov. Budget	2,400.0	45.7
Private Sector	365.0	6.9

Source: Ministry of Finance & Economic Planning

2-1-6 Trends in International Payment Balances

(1) Export Trends

The Sudan's foreign trade pattern shows exports of agricultural products (primarily cotton) and imports of oil, industrial products (machinery, transport equipment, chemicals, etc.). In fiscal 1990/91 cotton exports remained satisfactory, while the export of gum arabic and peanuts declined. As a consequence, total export revenue declined to about 465 million US dollars. The Sudan's export trade partners during fiscal 1990/91 were: first, Saudi Arabia (15%), second, Japan (11%), third, the United Kingdom (6.6%), fourth, Yugoslavia (5.3%), and fifth, the People's Republic of China (5.1%).

Table 2-4 Export Trend of Sudan

(FOB Value, Unit: US$ million)

Year	1985/86	1986/87	1987/88	1988/89	1989/90 *
Cotton	136.0	176.4	161.1	245.4	240.0
Peanut	6.7	5.0	26.4	25.2	16.3
Sesame	35.1	28.3	42.6	70.5	37.4
Sorghum	0.5	31.3	53.4	33.4	10.8
Gum arabic	27.3	100.0	59.9	49.7	55.2
Livestock	237.5	73.6	69.5	76.6	50.8
Others	54.3	67.0	73.0	47.3	54.0
Total	497.2	481.6	485.9	548.1	464.5

Source: IMF * = assumption

(2) Import Trends

Oil imports steadily occupy more than 1/5 of total imports. A significant number of passenger cars and small trucks were brought into Sudan by expatriate Sudanese, although they do not appear in import statistics. During fiscal 1989/90, imports of chemicals, machinery and equipment showed a decrease of 45% from the previous year, reflecting a decline in capital investment. This was a direct consequence of the credit squeeze and a severe shortage of foreign exchange, as a result of imports of oil, food, and pharmaceutical and agricultural products. Major import trade partners during fiscal 1988/89 were: first, the Arab countries (28.9%), second, the United Kingdom (8.7%), third, West Germany (7.5%), fourth, the United States of America (6.3%), and fifth, Japan (5.2%).

Table 2-5 Import Trend of Sudan

(CIF Value, Unit: US$ Million)

Year	1985/86	1986/87	1987/88	1988/89	1989/90*
Food(Others)	190.5	135.4	165.3	232.8	141.1
Wheat	97.3	85.1	98.2	140.3	69.4
Drink/Tobacco	4.6	4.4	7.0	12.4	8.5
Petroleum & Products	273.2	190.6	248.8	210.9	276.6
Medicine & Chemicals	199.4	151.9	210.0	160.7	78.3
Manufactured Goods	163.9	145.5	247.0	282.5	140.1
Machinery & Equipment	108.1	85.6	177.0	169.0	117.4
Transport & Equipment	100.1	101.6	144.0	129.8	168.8
Textiles	15.2	17.3	24.0	25.5	53.0
Total	1,152.3	917.4	1,321.3	1,363.9	1,053.2

Source: IMF "*" = estimated amounts

2-1-7 Overseas Aid Trends

The flow of overseas aid to the Republic of the Sudan fluctuates significantly from year to year, reflecting political and economic changes. Some aid by the Organization for Economic Cooperation and Development (OECD) is tied to specific projects. Bilateral aid levels have had their ups and downs as projects have been started and completed.

The World Bank's affiliate, the International Development Agency (IDA), as well as the European Community (EC), have been among the major multi-lateral donors. Aid from Arab countries reached a peak of 450.2 million US dollars in 1983, but fell thereafter to only 37.3 million dollars in 1989. Table 2 - 6 hereunder shows official development assistance.

Table 2-6 Development Assistance of International Organization and Bilateral Countries

(Unit: US$ Million)

	1984	1985	1986	1987	1988	1989
U.S.A.	122.0	347.0	149.0	103.0	110.0	111.0
Germany	53.2	71.4	59.0	47.4	52.1	48.3
Italy	11.3	66.8	93.3	79.5	75.7	49.0
U.K.	36.4	54.8	38.1	33.1	46.0	51.6
Japan	28.8	25.8	32.7	77.7	59.6	41.8
Netherlands	28.0	27.8	52.5	58.9	67.0	57.3
Arab countries	122.7	215.3	227.2	232.9	120.9	37.3
Total of Bilateral	402.4	808.9	651.8	632.5	531.3	396.3
UNHCR	47.3	99.1	58.1	42.4	37.0	29.2
EC	28.6	62.1	87.1	56.2	57.6	73.3
IDA	80.8	38.1	67.2	61.7	123.0	84.0
WFP	17.1	40.3	19.9	23.5	42.6	21.4
Unicef	6.2	7.6	12.9	14.2	12.6	26.0
Total of Int's Organization	180.0	247.2	245.2	198.0	272.8	233.9
Grand Total	635.7	1,136.0	1,028.3	938.5	967.0	797.7
Total of Grant Aid	485.2	978.9	833.6	712.2	669.8	599.0

Source: OECD, Geographical Distribution of Financial Flows to Developing Countries.

Note : Totals may not add due to rounding.

2-1-8 Emergency Flood Reconstruction Programme

The Republic of the Sudan suffered from an unprecedented flood disaster in 1988. The majority of the population suffered either from heavy rainfall or flooding. The capital region and the Northern State located along the Nile River were the most hard hit. About 200,000 houses were destroyed either partially or completely, and more than two million people lost their homes. Production (particularly agricultural production) and public services (health medical services, education and telecommunications), all undergone flood damage. To cope with this damage, in the latter part of August, 1988 the Sudanese Prime Minister made a request to the World Bank, asking that a survey of the damage be made and that measures be planned to deal with the situation. In response to this request, a joint survey team of international assistance organizations was

organized to survey the rainfall and flood damage, and to plan measures to cope with the situation. Results of the survey were summarized in the team's "Emergency Flood Reconstruction Programme ". The Sudanese government is following this Programme, and is being assisted by international assistance organizations and by developed countries in its attempt to recover from the damage.

The "Emergency Flood Reconstruction Programme" sets forth its objectives as follows.

(1) An assessment is to be made of losses in the Sudan's productivity and social capital caused by rain and flood damage; measures are to be planned to restore them to their level prior to the disaster.

(2) For those areas sustaining water damage, where conditions are judged to have been unacceptably deficient even prior to the disaster, measures are to be planned to make improvements to a minimum required level.

(3) Measures are to be decided upon in order to attain the above-mentioned objectives (1) and (2). First, a two year plan shall be established for the most urgent measures to be taken for the relief of disaster victims, for which the required aid funding is to be obtained from the government and from international assistance organizations. In addition, projects such as public works, completion of which would take considerable time, are to be postponed for more than 3 years, even though they may be important.

On the basis of the objectives set forth as above-mentioned, the total cost of the restoration programme was estimated to be 407.5 million US dollars, comprising 122.2 million US dollars of domestic funds (30% of the total) and 285.4

million US dollars of foreign exchange funds (70% of the total). The restoration plan covers agriculture, water supply, education, health care and medical service, construction of industry, energy, telecommunications, transport, urban construction, project management and measures to prevent flood damages and other vital areas.

In line with the Emergency Flood Reconstruction Programme recommended by the joint survey team, the Sudanese government organized a Headquarters of Emergency Flood Reconstructoion Programme, which under the jurisdiction of the Ministry of Finance supervises the implementation of the programme and paves the way for accepting aid from international assistance organizations.

According to the information provided by the headquarters, the total amount of funds disbursed for the implementation of the program was 158.1 US dollars as of the end of September, 1991. Similarly, funds which were made available and committed by international assistance organizations and developed nations as of the end of June, 1991 were 294.5 million US dollars. Table 2 - 7 hereunder shows an outline of the funds.

Table 2-7 Assistance of International Organization and Bilateral Countries for Emergency Flood Reconstruction Programme (at June, 1991)

(Unit : US$ million)

SECTOR	TOTAL	IDA	AFDB	JAPAN	U.K.	F.R.G.	NETHER LANDS	E.E.C.	ARAB	DENMARK	SWISS	ISLAMIC	UNDP
AGRICULTURE	93.9	33.0	18.8	24.3	--	--	--	11.0	2.0	2.4	2.4	--	--
RURAL WATER	19.2	--	--	14.2	--	--	--	--	--	5.0	--	--	--
EDUCATION	28.9	13.0	3.9	4.0	--	--	--	--	--	--	--	8.0	--
HEALTH	21.1	4.3	5.8	5.7	--	5.0	--	--	0.3	--	--	--	--
INDUSTRY	--	--	--	--	--	--	--	--	--	--	--	--	--
POWER	16.3	--	--	--	0.8	--	4.7	--	10.8	--	--	--	--
TELECOM-MUNICATION	43.4	12.0	--	17.6	--	--	2.5	9.0	2.3	--	--	--	--
TRANSPORT	17.9	2.5	5.2	--	--	--	1.8	8.4	--	--	--	--	--
URBAN	49.7	18.2	--	29.5	--	--	--	--	2.0	--	--	--	--
FOOD PREVEN-TION STUDY	0.7	0.7	--	--	--	--	--	--	--	--	--	--	--
PROGRAMME COORDINATION	2.6	2.1	--	--	--	--	--	--	--	--	--	--	0.5
UNPROGRAMMED	0.8	0.8	--	--	--	--	--	--	--	--	--	--	--
TOTAL	276.6	84.1	28.5	95.3	0.8	5.0	7.2	20.0	17.4	7.4	2.4	8.0	0.5

Source : Emergency Flood Reconstruction Programme Unit

2-2 Outline of Health and Medical Service Sector

Modern health and medical service in the Sudan was initiated when hospitals were built in major cities such as Khartoum, Atbara and Doungoula at the turn of the century under the joint administration of United Kingdom and Egypt. Smaller hospitals were built during the first half of the century in various cities by the funds donated by benefactors of the pertinent regions.

After the independence of the country in 1956, the Sudanese government made efforts to establish health and medical service system and built new hospitals in regional main cities and expanded existing facilities. During the 1970s, the Sudanese Government promoted the establishment of health centers to encourage dissemination of primary medical service being aided by the

cooperation of WHO. As a result, the number of hospitals, the number of beds available and the number of medical doctors were respectively 205 hospitals, 19,200 beds and 2,593 medical doctors as of 1989. The Sudanese Government continues to implement the Three-Year National Health Plan (1990/1991～1992/1993) in order to reinforce primary medical service as well as secondary medical service to back-up primary medical service. However, extremely severe damage inflicted by flood disasters upon the medical service sector is considered likely to significantly obstruct the attainment of the target of the Three-Year National Health Plan (1990/1991～1992/1993).

Contagious diseases such as malaria, gastroenteritis, and diarrhoea are still ranking high in the Sudan. Diseases like pneumonia or tuberculosis are significant and needs for expansion of primary and secondary medical service are high.

Although private clinics are increasing in number, however they are yet scant and of small scale. Consequently, the majority of the population depends heavily on the medical services provided by public hospitals and public health centers.

2-2-1 Status of Diseases

(1) Health care and hygiene indicators

The birth rate in the Sudan is 43.2/1,000, while the mortality rate is 14.1/1,000. Infant mortality rate is as high as 100/1,000. Consequently the average life expectancy is 51.7 years, which is rather short compared with other north African nations. The degree of malnutrition may differ from region to region and malnutrition is frequently found in two-year-old and three-year-old infants. Health care and hygiene indicators of the Sudan as of 1990 are compared with the equivalent of African nations hereunder.

Health care and hygiene indicators (1990)

Population growth rate	: 3.77% (Average of 1983 -1990 period)
Total population	: 25,993,797 (As of 1990)
Average life expectancy at birth	: 51.7 years
Gross birth rate	: 43.2/1,000
Gross mortality rate	: 14.1/1,000
Infant mortality rate	: 100/1,000
Mortality rate of pregnant women	: 20/1,000

Source: Department of Planning & Development, Ministry of Health

Table 2-8 Comparative Table of Health Statistics for African Countries

Country	Population (million)	Birth Rate (per 1,000)	Death Rate (per 1,000)	Life expectancy at birth (years)
Whole Africa	642.1	43	13	50
Algeria	25.0	35	7	66
Egypt	52.4	31	9	62
Sudan	25.9	43	14	52
Morocco	25.1	33	8	63
Tunisia	8.2	27	6	68

Source: UNDP, Annual Report (1991)

(2) Trend of diseases

1) Trend of diseases of patients admitted to hospitals

Those suffering from such contagious diseases as malaria, gastroenteritis and diarrhoea, respiratory contagious diseases, viral hepatitis, typhoid fever and so on comprise a high percentage of the patients admitted to hospitals due to a deficiency of public hygiene standards as well as lack of knowledge of health care and hygiene on the part of the population. The number of accidents and circulatory diseases has steadily increased in recent years. Table 2 - 9 hereunder shows the most prevalent ten diseases of patients admitted to hospitals as of 1990.

Table 2-9 Most Prevalent Ten Diseases in Hospitals (1990)

Diseases	No. of Hospital visits admission	Rate / 1,000 Population
1. Malaria	6,403,133	343
2. G.E. & Dirrhoeal Diseases	4,111,179	220
3. Diseases of Respiratory System	4,041,503	216
4. Bacillary Dysentary & Amobiasis	3,761,091	201
5. Diseases of Digestive System	1,609,375	86
6. Acute Tonsellitis	1,139,569	61
7. Nutritional Marasmus	1,078,626	58
8. Anaemia	1,058,583	57
9. Peneumonia	526,703	28
10. Abnormal Deliveries & Diseases of Obstetrics	24,168	13

Source: Department of Planning & Development, Ministry of Health
Note : Data for Southern 3 States is not included, calculation of "Rate/1,000 population" made with reduction of estimated population for these 3 States (about 7.4 million)

2) Trend of mortal diseases of patients admitted to hospitals

Top four of mortal diseases are the diseases that result from contagious infection and 51.4% of the total mortality of patients admitted to hospitals are due to diseases of this nature. The fact that anemia or malnutrition due to poverty and eating habits is ranking high is an indicator of the status of health and medical services available in the Sudan. Table 2 - 10 hereunder shows the top ten fatal diseases of patients admitted to hospitals.

Table 2-10 Top Ten Fatal Diseases in Hospitals

Diseases	Inpatient	No. of Deaths	Rate/1000 Inpatients	Rate of Deaths
1. Malaria	123,319	1,948	15.8	19.0%
2. Pneumonia	53,026	1,078	20.3	11.0%
3. G.E. & Diarrhoeal Diseases	19,758	962	48.7	9.4%
4. Cerebro Spinal Spiral Meningitis	7,193	703	97.4	6.8%
5. Heart Failure	7,560	561	74.2	5.4%
6. Anaemia	7,446	354	47.5	3.4%
7. Nutritional Marasmus	1,031	350	339.0	3.4%
8. Diseases of Respiratory System	5,985	320	53.4	3.1%
9. Malignant Neoplasm	1,041	257	246.9	2.4%
10. T.B.	3,098	208	67.1	2.1%

Source : Ministry of Health

3) Trend of infant mortal diseases

Similarly to the trend of adult diseases, it is evident that contagious diseases are ranking high for infant diseases of zero to fifteen-year-old infants. Among the top ten infant mortality diseases, the top eight, excepting malnutrition and heart diseases, are due to contagion. Among those, the mortality rate by gastroenteritis and diarrhea of up to one year old infants is markedly high with 508 mortality out of 4,057 patients, viz., 125 mortality per 1,000 patients. Other than contagious diseases, mortality due to heart diseases is ranking markedly high with 661.7 mortality per 1,000 patients, viz., greater than 66% mortality rate.

Table 2-11 Children's Morbidity / Death Rate, Top 10 Cases

Diseases	New born ~ Age 1		Age 1 ~ 5		Age 5 ~ 14		Total Numbers		Death/ 1000 cases
	Cases	Death	Cases	Death	Cases	Death	Cases	Death	
1. G. E. &Dirrhoeal	4,057	508	6,075	235	4,002	97	14,134	840	59.4
2. Malaria	7,333	67	16,439	300	18,465	176	42,237	543	12.8
3. Pnemonia	13,116	279	18,078	190	9,763	65	40,957	534	13.0
4. Nutritional Marasmus	1,102	134	1,568	165	535	23	3,205	322	100.4
5. Cerebro Spinal Meningitis	315	67	813	90	1,066	75	2,194	232	105.7
6. Diseases of Respiratory System	806	70	1,025	34	960	13	2,791	117	41.9
7. Heart Failure	46	38	34	23	56	29	136	90	661.7
8. Chormic Rheumatic Heart Dise.	71	37	69	25	153	27	293	89	303.8
9. Tetanus	93	34	70	11	102	18	265	63	237.7
10. T. B.	30	4	235	22	406	25	671	51	76.0
Total :	26,969	1,238	44,406	1,095	35,508	548	106,883	2,881	26.9

Source: Ministry of Health

2-2-2 Health Administration

(1) General Administration

The country is administratively divided into eight autonomous States in addition to Khartoum (capital region). States in turn are divided into 19 provinces, each divided into districts which are 65 in number. Each district consists of a number of rural and urban councils with populations of 10,000 - 65,000. Each State is administered by a Governor. States are autonomous in budgeting, programming and control within the policy set by central authorities.

(2) Health Administration

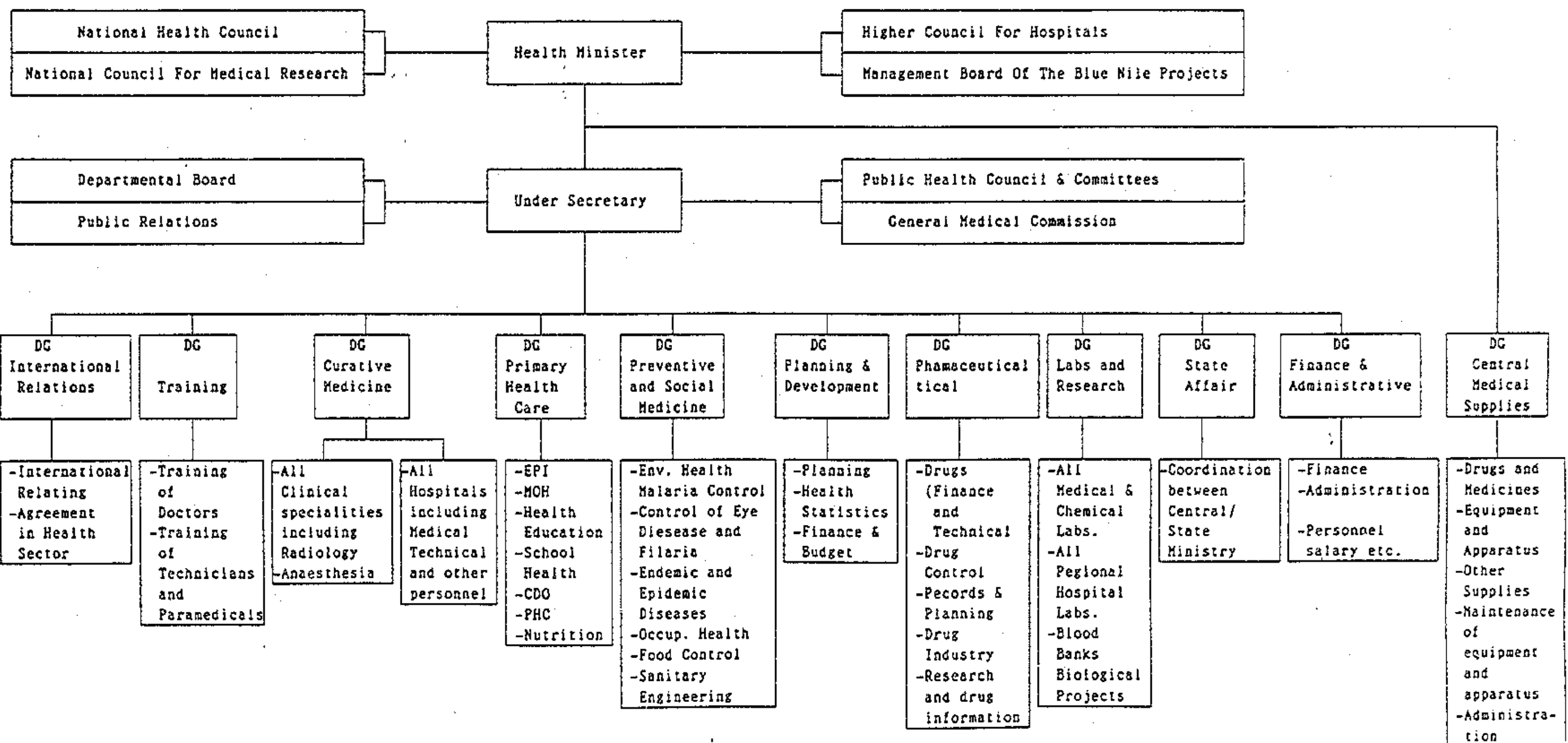
Health services in the Sudan are provided by both public and

private sectors. The public sector consists of the Ministry of Health (MOH), Army Medical Service and Police Medical Services. It is estimated that 80%-85% of health services in the country is provided by MOH. The Minister of Health is assisted by an Under-Secretary of Health and supported by different advisory bodies namely, National Health Council, National Council for Medical Research, High Council for Teaching Hospitals and Management Board of the Blue Nile Health project. Under the Under-Secretary there are 10 Directorates General dealing with number of subjects. Each Director General has a number of Directors under him dealing with various health activities. See the organization chart of the Ministry of Health hereunder. The Central Medical Supply is a public institution supervised by the Ministry of Health.

Since the Government Act of 1980 came into force, the Ministry of Health is responsible only for over-all health policy development, health legislation and management of national referral and teaching hospitals. State government is responsible not only to execute the management of hospitals and health centres under the jurisdiction of the state government but also to carry out health activities such as malaria control and immunizations.

The state government has its own Department of Health and the Governor of the state supervise the Director of the Department.

ORGANIZATION CHART OF MINISTRY OF HEALTH - SUDAN



(3) Health and Medical Service

In 1987, number of hospitals was 200 with 18,816 beds in the Sudan as a whole and it is a little increased to 205 hospitals with 19,200 of beds during 2 years up to 1989. Referral services are provided at rural and district hospitals, at provincial level and general and speciality hospitals in main cities.

Primary health care services are mainly the responsibility of rural and urban health centers, dispensaries, PHC units and dressing stations. Dressing stations, however, are gradually being replaced by PHC units. The number of these health facilities in 1989 is as follows:

Health Centers	399
Dispensaries	1,224
Dressing stations	1,259
Primary Health Care Units	3,211

Services provided by Health Centers, Dispensaries and Primary Health Care Units and Dressing Stations are basically primary medical service, while rural hospitals, district hospitals provide both primary medical service and secondary medical service. Inter-hospital patient referral system consists of referral from lower rural hospitals or district hospitals to provincial hospitals or State hospitals, and further to general hospitals and speciality hospitals of capital region.

Table 2 - 3 hereunder shows positioning of each medical service facilities while Table 2 - 12 shows outline of medical service facilities.

1) General hospitals and speciality hospitals of capital region

There are Khartoum Hospital which provides general medical services as the central hospital of the Sudan to be referred to by all hospitals of the country, Khartoum North Hospital

and Omdurman Hospital as general hospitals of capital region, and Isotope Hospital, Khartoum Dental Hospital and Maternity Hospital as speciality hospitals of capital region. 17 hospitals in capital region are under the jurisdiction of the Ministry of Health each of which employs general and specialized medical doctors to provide secondary and tertiary medical services of the highest quality of the country not only to the population in capital region but also to all population of the country.

2) State hospitals and provincial hospitals

State hospitals and provincial hospitals which are general hospitals located in major regional cities provide secondary and partially tertiary medical services as the referral hospital of at state level. Land areas of states except capital region are large and can not be fully covered by state hospitals located in state capitals as the referral hospital of the states as a whole. Consequently, provincial hospitals which are located in cities remote from state capitals are staffed with speciality medical doctors to play the role of referral center of the region.

3) District hospitals and rural hospitals

District hospitals in general are located in urban areas to provide primary and secondary medical services and are staffed with general medical doctors. Number of beds per district hospital is no greater than 100. Rural hospitals are located in small rural towns to provide primary and secondary medical services with average number of beds, between 40-60. Scale of rural hospitals is considerably smaller than the scale of district hospitals.

4) Health centers

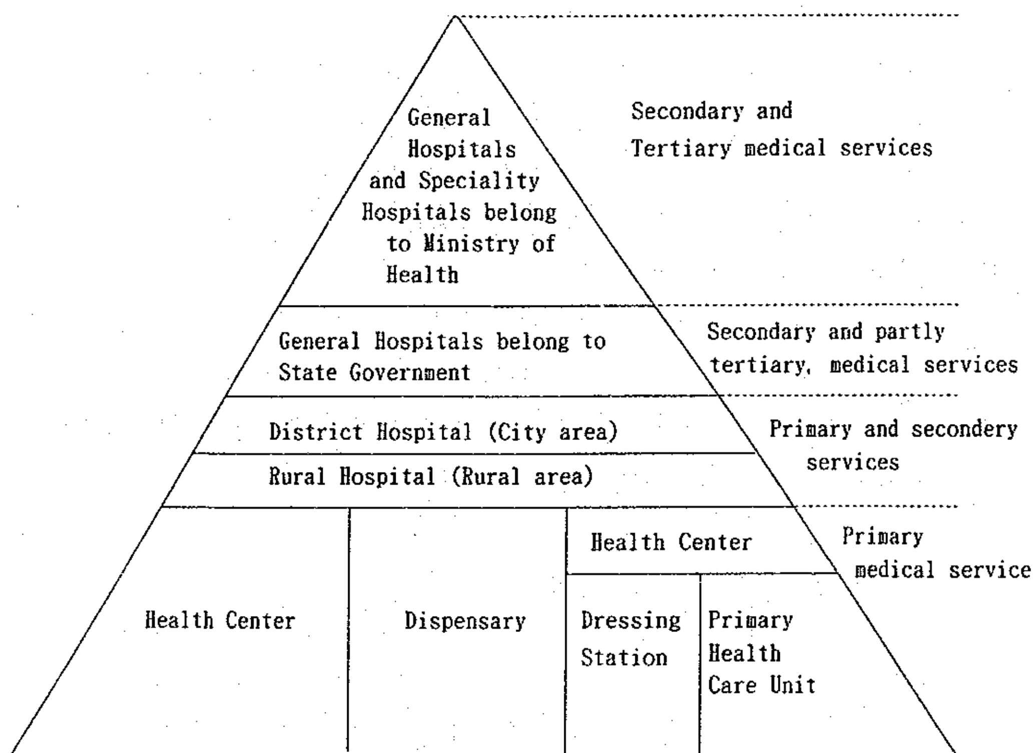
Health centers in general are located in urban areas as well as in rural areas to provide primary medical services as well

as preventive medical services and health care education.

5) Dispensaries, Dressing Stations and
Primary Health Care Units

Those are health and medical service facilities of even smaller scale which provide preventive injection and health care education to local population and provide medical prescription and simple medical services. They are staffed by medical assistants, nurses and community workers.

Chart 2 − 3 Medical Facilities Linkage



Source : Ministry of Health

Table 2-12 Summary of Medical Facilities

Facilities	Status / Activties	Main Personnel	Numbers
General Hospital and Speciality Hospital in National Capital region	Servicing as General or Speciality Hospitals. Providing secondary & tertiary medical service as national referral hospitals	General doctors and Specialists.	17
State Hospital and Provincial Hospital	Providing secondary and partly tertiary medical services at main cities in states	General Doctors and Specialists	
District Hospital and Rural Hospital	Providing primary and secondary medical services at district level and small cities in rural area. Bed strangth of District Hospital is under 100 beds while it is between 40 - 60 beds for Rural Hospital.	General doctors	188
Health Center	Providing primary medical service and preventive health service	General doctor charge in city areas while medical assistant in charge in rural area	399
Dispensary	Being rural area and providing primary medical service	Medical assistants	1,224
Dressing Station	-ditto-	Nurse	1,259
Primary Health Care Unit	Preventive health service - 70% Curative (primary medicel service) - 30%	Community health workers	3,211

(4) International comparison of the number of hospitals and beds

Table 2 - 13 hereunder shows comparison of the number of hospitals and beds in the Sudan with the same in other African countries. Though Sudan is found a little better than neighboring Ethiopia, number of population per bed in the Sudan is ranked the worst.

Table 2-13 Comparative Table of Numbers of Hospitals

Country	Year	Hospitals	No.of Beds	Population per bed
Algeria	1979	367	47,116	406
Uganda	1981	485	19,782	689
Egypt	1982	1,521	87,685	509
Ethiopia	1980	86	11,147	2,787
Kenya	1978	65	24,708	601
Zaire	1979	942	29,244	322
Sudan	1989	205	19,200	1,375
Tanzania	1977	2,407	33,714	464
Nigeria	1980	2,270	61,628	1,251
Madagascar	1978	749	16,401	505
Morocco	1982	141	24,913	859

Source : UNDP Annual Report (1979/80 ~ 83/84)
Ministry of Health, Sudan (1989)

(5) Status of medical service staff

1) Number of medical doctors

Total number of medical doctors in the Sudan was 2,593 as of 1989 as shown in the Table hereunder, out of which 1,428 equal to approximately 55% of the total are concentrated in Khartoum State. Number of medical doctors per 100,000 population is 58 in Khartoum State indicating their concentration in capital region.

Table 2-14 Numbers of Doctor and Statewise Distribution

(Unit: Person)

State	Population of State	Doctor	Number of people per Doctor
Khartoum	2,442,383	1,428	1,710
Central	4,299,138	471	9,127
Northern	1,198,289	159	7,536
Eastern	2,793,691	288	9,700
Kordofan	3,911,481	103	37,975
Darfar	3,982,566	62	64,234
Equatoria	2,112,461	46	45,923
Bhar El Gazal	3,148,674	22	143,121
Upper Nile	2,502,247	14	178,731
Total	26,390,930	2,593	10,177

Source: Ministry of Health

Note : Population of States are estimated base

2) Number of paramedical staff

Table 2 - 15 hereunder shows total number and distribution in various States of nurses, medical technicians and medical assistants as of 1989. It is clearly shown that they are concentrated in Khartoum State similarly to medical doctors.

Table 2-15 Numbers of Paramedicals and Statewise Distribution

(Unit: Person)

State	Nurses (incl. student)	Technicians	Medical Assistants
Khartoum	3,696	1,077	1,315
Central	4,419	195	1,137
Northern	1,687	86	527
Eastern	1,561	66	562
Kordofan	1,829	67	611
Darfar	791	36	449
Equatoria	1,247	68	65
Bhar El Gazal	1,013	27	249
Upper Nile	711	18	21
Total	16,954	1,640	4,937

Source: Ministry of Health(1989)

3) International comparison of number of medical service staff

Table 2 - 16 hereunder shows international comparison of number of medical service staff. Current situation in the Sudan is no comparison with neighboring Egypt but is better than neighboring Ethiopia. In terms of the number, Sudan is found similar to the situation in Kenya.

Table 2-16 Comparative Table of Numbers of Medical Service Staff

(Unit: Person)

Countries	Year	Doctor	Population per doctor	Nurses
Algeria	1979	6,881	2,780	17,989
Uganda	1981	611	22,291	6,778
Egypt	1982	58,761	760	28,113
Ethiopia	1980	428	72,582	7,547
Kenya	1978	1,466	10,136	14,296
Zaire	1979	1,900	13,452	14,661
Sudan	1989	2,593	10,177	16,954
Tanzania	1977	960	16,282	5,658
Nigeria	1980	8,037	9,591	37,370
Madagascar	1981	901	9,939	3,779
Morocco	1982	1,308	16,355	22,147

Source: UNDP Annual Report(1979/80 ~ 83/84)
Ministry of Health(1989)

(6) Education of medical service staff

Education of medical doctors in the Sudan is conducted by the faculty of medicine of three universities including Khartoum University. Education of nurses and other medical technicians is provided by various colleges and schools in the country.

1) Education of medical doctors

Qualification required for the entry into the faculty of medicine of Sudanese universities is given by graduating twelve years education (Primary, middle and high schools). Number of years of education by the faculty of medicine is six years. By passing graduation examinations, graduates are given one year intern practice as intern students so called housemanship for internal medicine, surgery, obstetrics and gynecology, and pediatrics by teaching hospitals.

Qualification as general medical doctor is awarded by completing intern practice.

There after, the general doctor work in different parts of the country including two years in rural area. After three years of service, the doctor qualifies to sit for selection examination in any speciality he choose. After passing the examination, he becomes a registrar and confined his studies for a Master degree. After getting his Master degree the doctor becomes a specialist.

Three Sudanese universities having faculty of medicine are Khartoum University, Gezira University and Juba University out of which about 500 students graduate every year.

2) Nurses and medical assistants etc.

High nursing colleges provide education for nurses. After having completed four years study, students are awarded qualification for sistership. In addition, there are about 130 nurse schools which are attached to relatively large hospitals. Students are admitted after having completed courses of general education. They are given three years training as trainee nurses. After completing three years training they are awarded qualification of general nurse. After having completed five years of practice thereafter, they are qualified for the examination for the assistant ward sister. After having completed three years practice thereafter, they are qualified for examination for the ward sister. After having completed three years practice thereafter, they are qualified for status promotion examination for the medical assistant.

3) Education of medical technicians

Education of medical technicians who are to work in hospital laboratories is provided by one each of public and private

schools. In addition, one school provides education for X-ray unit technicians with four years course. Furthermore, there are a special college for hospital management staff with three years course and colleges for public hygiene technicians with four years course. Education of medical technicians is not sufficient in terms of both quantity and quality.

(7) Budgeting for health care and medical service sector

Budgeting for health care and medical service sector is composed of current expenditure budget and development expense budget. The budgets are met by the Ministry of Health and of each state government.

The budgets are first studied by the Ministry of Health before applied to the Ministry of Finance and Economic Planning for its approval.

1) Current expenditure budget for health and medical service sector

Current expenditure budget consists of personnel expenses of staff and other expenses of services. Table 2 - 17 hereunder shows outline of current expenditure budget for health and medical service sector of the country.

Table 2-17 Current Expenditure Budget for National and Health Sector

(Unit: S.L. million)

Year		1987/88	1988/89	1989/90	1990/91
National		2,843.0	4,901.1	10,202.0	16,163.7
Health Sector		162.8	246.0	373.1	411.0
	M.O.H.	300.1	210.0	327.9	349.8
	State Governments	32.7	36.0	45.2	61.2

Source: Ministry of Finance & Economic Planning

The ratio of current expenditure budget for health and medical sector to total current expenditure budget was 5.7% in fiscal year 1987/1988, but fell to about 2.5% in fiscal year 1990/1991. Also, share taken by each state in the current expenditure budget for health and medical service was 20% in fiscal year 1987/1988 and was about 15% in fiscal year 1990/1991.

a) Personnel expense of staff

The ratio of personnel expense to running expense budget for fiscal 1990/1991 of 349.8 million Sudanese pounds (hereinafter abbreviated as "pounds") of the Ministry of Health was about 39%. Principal items were personnel expenses and allowances for personnel of the Ministry of Health as well as medical doctors and other staff employed by hospitals under the jurisdiction of the Ministry of Health.

Personnel expense of the budget of each state was personnel expenses and allowances for the staff of medical service facilities such as state hospitals and health centers under the jurisdiction of state government.

b) Operating expenses

Operating expenses of the Ministry of Health for fiscal 1990/1991 were 208.2 million pounds and the share in the current expenditure budget was about 61%. Principal items are current expenditure and operating expenses of the Ministry of Health, Central Medical Supply and hospitals under the jurisdiction of the Ministry of Health. Principal items of operating expenses are promotion of primary medical service, countermeasures against malaria, promotion and dissemination of preventive injection, education and guidance of hygiene, health care programme, and supply of pharmaceutical to nation-wide medical service facilities conducted by Central Medicine Supply, and repair programme for medical appliances.

Operating expenses at state government level are for medical services to be administered by the Departments of Health of state governments operating expenses of medical service facilities under the jurisdiction of state governments.

2) Development expense budget for health care and medical service sector

Development expense budget is for the development projects of health care and medical service sector. Table 2 - 18 hereunder shows development expense budget of the country and the same for health care and medical service sector. Also, development expense budget is divided into the one for the Ministry of Health and the one for each state government.

Table 2-18 Development Budget for National and Health Sector

(Unit: L.S. million)

Year		1987/88	1988/89	1989/90	1990/91
National		1,553.3	2,580.9	3,630.3	5,255.0
Health Sector		36.0	59.0	139.6	198.6
	M.O.H.	20.3	24.4	77.4	95.9
	State Governments	15.7	34.6	62.2	102.7

Source: Ministry of Finance & Economic Planning

The ratio of health and medical service sector among the development expense budget for the country is about 3.8% in fiscal 1990/1991. Furthermore, development expenses of each state government are greater than the same of the Ministry of Health in that fiscal year.

Also, project for which development budget is allocated are as follows.

Principal development projects of the Ministry of Health

- Reinforcement plan for primary medical services
- Malaria control programme
- Promotion plan for mother and child health care
- Expanded programme on immunization(EPI)
- Blue Nile health care project
- Tuberculosis control project
- Re-training programme of health and medical service staff
- Miscellaneous

Principal development projects of each state government

- Reinforcement plan for health centers (Central State)
- Reinforcement plan for Kowsti first aid facilities (Central State)
- Reinforcement plan for health centers (Khartoum State)
- Construction plan for new health centers (Khartoum State)
- Construction plan for new hospitals (Northern State)

- Construction plan for new dormitory for medical service staff (Northern State)
- Support plan for rural hospitals (Eastern State)
- Reinforcement plan for general hospitals (Eastern State)

3) Implementation of chargeable medical examination system and fund assistance by the population

Establishment of hospital facilities and medical service system in the Sudan have been delayed for many years due to the lack of operating funds. Flood disaster in 1988 aggravated the situation even further. Although efforts are being made by Sudanese government to improve the situation, budget allocation for health care and medical service sector is insufficient as mentioned earlier. Consequently, Sudanese government approved implementation of partially chargeable medical service by hospitals. In response to the approval, number of hospitals which implement system of chargeable outpatient diagnosis, chargeable prescription and chargeable bed and so on is increasing. A part of the funds so secured by chargeable medical service system is paid to the Ministry of Health while majority of the funds is allocated to the hospital operating expenses to pave the way for medical services.

On the other hand, Hospital Salvation Committee is being organized in many hospitals supported by the cooperation of regional population. The committee is to accelerate establishment of hospital facilities, construction of new wards and improvement of medical services which have been delayed due to the lack of funds through fund raising campaign by regional population. In many hospitals, establishment of hospital facilities and construction of new wards are in progress supported by the funds donated by regional influential people and benefactors.

2-3 Outline of Related Projects

2-3-1 National Health Plan

(1) Outline of National Health Plan

The Sudan adopted W.H.O. Alma-Ata Declaration which calls for Health for all by the year 2000. This has been a Political Commitment since 1977.

The Government through the Health Authorities undertook a large programme of Primary Health Care as the mainstay of achieving this goal. Thus in the National Health Plan (1977~1984) great attention was given to the establishment of Primary Health Care and most parts of the country was covered by such services. In 1985 New Plan of action was adopted with continuous emphasis on Primary Health Care. One of the most prominent successes of this plan was the resounding achievement of the extended programme of immunisation. The programme with the help of UNICEF could register more than 80% immunisation against the five diseases all over the Sudan. This programme was first in the World amongst similar programmes undertaken by UNICEF.

In this plan more work was done to improve the network of Health Centers and Rural Hospitals with the help of some donations from World Bank and other donors. In 1989 a Three Years Plan was set whose main direction was to rehabilitate as much as possible of the existing health facilities. In this Plan additional emphasis was given to improving the deteriorating situation in hospitals, budgets for this were reinforced by donation from the population and local organizations.

A start was made in making the patient pay partly for medical services. This went hand in hand with strengthening the core of Primary Health Care which still remains newcleus of the current and future programme.

Recently after the implementation of Federal Rule and division of the Country in 9 states and 61 districts a Ten Years Health Plan was drawn. This should start as from 1992～1993. Still the whole medical philosophy rests with Primary Health Care. But with proper delineation of districts and local councils the job is expected to become more easy to administer. Rural hospitals are to be developed or inititated wherever a population of 40,000 exists. There is great attention in the plan for promoting medical cares and increasing their number to much world figures by the end of the plan. The Plan is mainly financed by local resources but a margin is left for attracting donor to help.

(2) Content of National Health Plan (1990/1991～1992/1993)

The followings are the mainstays of National Health Plan (1990/1991～1992/1993) presently being promoted by the Sudan Government

1) Strategy of PHC

Development, strengthening and maintenance of Primary Health Care Units all over the country (dressing center, dispensary, health center and rural hospital etc.), continuation of training of the needed health personnel making rural hospital as a core of the promotion of PHC.

2) Malaria Control Programme

The programme plans to reduce the prevalence of malaria to 2% of total population by the year of 2000, spray insecticide, train the personnel engaged in malaria control, and increase community participation in the control of Malaria.

3) Mother and Child Health (MCH)

Maternal mortality in the Sudan is about 20 cases against 10,000 deliveries while infant mortality is about 120～140

cases against 1000 births. Long term goal of MCH is to reduce maternal and infant mortality to 50% of the present situation by the year of 2000.

4) Control of Diarrhoeal Diseases (CDD)
- Training
  - Evaluation of training programme
  - Middle level personnel training
  - Volunteers training
  - Workshops
- Promotion of Health Education
- Distribution of DRS
- Promotion of Expanded Programme on Immunization

5) Expanded Programme on Immunization (EPI)

The following are main goals
- Reach 80% coverage for all children under 12 months old
- Extend tetanus foxoid immunization to all women 15 to 44 years old
- Eradication of tetanus by 1995
- Reduce the prevalence of 6 immunizable diseases (diphtheria, pertussis, tetanus, measles, tuberculosis, poliomzelitic) to 50% of the present situation.

6) Epidemiology and Endemic Diseases
- Strengthening of the federal epidemiology administration
- Strengthening of information system at central and regional level and improvement of the feedback and communication system
- Strengthening of the epidemiology units in the states

7) Rehabilitation of Health Facilities

Within the plan period (1990/1991～1992/1993), the following health facilities are to be rehabilitated.

76 Hospitals

158 Health Centers
398 Dispensaries
2,275 Primary Health Care Units

8) Improvement of Medical Supply
   - Introduction of a new policy to supply, transport and deliver equipment materials and drugs
   - Maintenance of medical equipment
   - Control of drugs distribution, delivery and storing

9) Blue Nile Health Project (main parts are malaria control administration among long term overall development scheme and administration of health and sanitation education of community people in the Central State) and Administration of Tuberclosis Control.

2-3-2 International aid for health and medical service sector

International assistance is contributing significantly to the promotion of health and medical service programme in the Sudan. Cooperation of international organizations covers many areas of health and medical service programme either on project base or non-project base. Outline of cooperation rendered by major international organizations is as follows.

(1) Aid rendered by the consortium of international assistance organizations during the agreed upon period

The Ministry of Health is promoting health and medical service programme being supported by the funds and technical assistance of WHO and UNICEF. The assistance has been and will be rendered continuously over a long period of time. Principal items of the assistance are summarized as follows.

Table 2-19 Assistance of International Organization

Organization	Project Name	Amount (U.S.$ million)	Year
UNDP	Support for Ministry of Health(Technical Assistance)	0.7	1990
-ditto-	AIDS investigation (Technical Assistance)	0.3	1990
WHO	Primary health care	2.0	
-ditto-	Nutrition surveillance	0.1	
-ditto-	MCH activities	2.5	From 1980 up to present
-ditto-	Training of health and medical personnel and paramedical staff	1.4	
-ditto-	Malaria control	1.5	
-ditto-	Others		
UNICEF	Nutrition surveillance		
-ditto-	Control of diarrhoeal diseases (CDD)	about 30.0	For 5 years term
-ditto-	Primary health care (PHC)		
-ditto-	Expanded programme on immunization (EPI)		

Source : Ministry of Health
Ministry of Finance & planning

(2) Bilateral assistance

Japan and the Netherlands are continuing to provide bilateral assistance to health and medical service sector in recent years. The People's Republic of China is providing technical assistance to Aboushar hospital. Bilateral assistance so far known is summarized as follows.

Table 2-20 Assistance of Bilateral Countries (1)

Country	Name of Project	Amount (100 million yen)	Year
Japan	Malaria control project	6.5	1988
-ditto-	Khartoum Teaching Hospital (Technical assistance)	Equipment only 0.75 + 0.43	1985~91
-ditto-	Improvement of Teaching Hospital of Soba University	2.00	1982
-ditto-	Teaching Hospital of Khartoum University (Phase I)	15.80	1982
-ditto-	-ditto- (Phase II)	14.90	1983

Source: JICA, Annual Report 1990

Table 2-21 Assistance of Bilateral Countries (2)

Country	Name of Project	Amount (million US$)	Year	Summary
Nether-lands	Construction of central medical supply	1.8	1986	Construction of C.M.S. and technical assistance
-ditto-	Primary health care	2.7	1987	Technical assistance for P.H.C. activities
-ditto-	Construction of Central Medical Supply	1.7	1987	Construction of C.M.S. & technical assistance
-ditto-	Health training institute Wad Medani	0.45	1987	Techincal assistance
-ditto-	Essential drugs supply to Nile province	1.18	1991	Supply of essential drugs
-ditto-	Emergency medical supply	1.2	1991	Emergency drug supply
-ditto-	Medical aid	3.0	1991	Supply of drugs
Peoples Republic of China	Aboushar Hospital	—	1976~	Technical assistance for medical activities

Source: Ministry of Health,
Ministry of Finance & Economic Planning

2-3-3 Emergency Flood Reconstruction Programme for Health and Medical Sector

Reconstruction Programme of flood damage inflicted upon health and medical sector in 1988 has been implemented primarily by the Ministry of Health on the basis of Emergency Flood Reconstruction Programme which was drafted by the joint survey team of international assistance organizations as mentioned earlier in section 2-1 (8) Emergency Flood Reconstruction Programme.

(1) Outline of Emergency Flood Reconstruction Programme for Health and Medical Sector

The joint survey team of international assistance organizations reported flood damages inflicted upon health and medical sector as follows.

a) Buildings to be reconstructed or to be repaired	:		
Cost	:		10,650,000 US$
Design/supervision	:		1,600,000 "
Hospitals	:	45	
Health centers	:	117	
Dispensaries	:	228	
Primary health care units	:	81	
b) Furnishing of medical equipment etc.			9,404,000 "
c) Reinforcement of health and medical service environment			21,610,000 "
d) Replacement of medicine			6,202,000 "
Total			Approx. 49,500,000 US$

2) Measures implemented by the Ministry of Health

The Ministry of Health implemented various measures to salvage sufferers of flood disaster. Cooperation was rendered by Arab countries and developed nations by way of emergency supply of aid items and dispatch of relief teams. As the result, the worst scenario of the spread of malaria and epidemic was effectively stamped.

In addition, the Ministry of Health is endeavoring to restore hospital facilities damaged by the flood disaster. The restoration is supported primarily by the funds as mentioned earlier in section 2-2 (6) 2) Development budget for health and medical sector as well as by donations of regional

population and implemented by the Ministry of Health and each state government to restore so far most of the damages. Medical equipment however are hardly restored yet.

2-4 Particulars and Summary of the Request

The Ministry of Health has conducted its own resurvey primarily of the status of medical equipment of hospitals on the basis of Emergency Flood Reconstruction Programme for health and medical sector. As the result, 64 hospitals were found to require immediate renovation of medical equipment, out of which 21 hospitals that should be given top priority have been selected and established the Project for the Supply of Medical Equipment and Materials for Sudan Emergency Flood Reconstruction Programme which is aimed to the improvement of those damaged by the flood or those which had been already severely deteriorated by superannuation was drafted. Since most of medical equipment would have to be imported, it did not progressed smoothly because of problems such as difficulty in foreign currency acquisition. As the consequence, under the recommendation of WHO and the like, a request for grant aid was filed to the Government of Japan.

(1) Outline of the Project for Supply of Medical Equipment and Material for Emergency Flood Reconstruction Programme

1) Contents of medical equipment requested are as follows.

. Instruments for general operation
. Anesthetic equipment
. Intensive care equipment
. Obstetric and gynecologic equipment
. Sterilization equipment
. Treatment/ward appliances
. Surgical operation room appliances
. Otorhinolaryngology appliances
. Ambulances
. X-ray units

. Laundry equipment

. Dental hospital equipment

2) Proposed hospitals designated for the grant aid are as follows.

Khartoum State:

1) Khartoum Hospital
2) Isotope Hospital
3) Omdurman Hospital
4) Khartoum North Hospital
5) Maternity Hospital
6) Khartoum Dental Hospital

Central State:

7) Wad Medani Hospital
8) El Managil Hospital
9) Rufaa Hospital
10) Aboushar Hospital
11) Sennar Hospital
12) Singa Hospital
13) El Demazin Hospital
14) Kowsti Hospital

Northern State:

15) Atbara Hospital
16) Shandi Hospital
17) Doungoula Hospital
18) Marawi Hospital
19) Karima Hospital

Eastern State:

20) Kassala Hospital
21) El Gadarif Hospital

3) Agency in charge of the implementation of the Project is the Ministry of Health. Department of Curative Medicine of M.O.H. is in charge of the implementation of the Project. The preparation is made to receive the procured equipment at

the responsibility of the Directors of the proposed hospitals under the direction of Director General of Curative Medicine. The Medical Equipment Maintenance Dept., Central Medical Supply is in charge of the maintenance of the equipment recieved.

4) Objective of the Project is to restore hospital medical service functions through the renovation of medical equipment which were damaged or severely deteriorated due to superannuation. Implementation of the Project would contribute to Emergency Flood Reconstruction Programme which is positioned higher and would extensively provide fundamental medical services to local population.