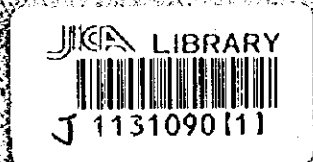


No. 1

Ministry of Health  
Republic of Uganda

**BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT  
FOR  
IMPROVEMENT OF  
THE MEDICAL EQUIPMENT  
IN MULAGO HOSPITAL  
IN  
THE REPUBLIC OF UGANDA**

JANUARY, 1996



JAPAN INTERNATIONAL COOPERATION AGENCY  
INTERNATIONAL TECHNO CENTER CO., LTD.

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BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF THE MEDICAL EQUIPMENT IN MULAGO HOSPITAL IN THE REPUBLIC OF UGANDA

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**Ministry of Health  
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## PREFACE

In response to a request from the Government of the Republic of Uganda the Government of Japan decided to conduct a basic design study on the Project for Improvement of the Medical Equipment in Mulago Hospital and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Uganda a study team from July 23 to August 18, 1995.

The team held discussions with the officials concerned of the Government of Uganda, 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 Uganda in order to discuss a draft basic design, and as this result, the present report was finalized.

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 Uganda for their close cooperation extended to the teams.

January, 1996



---

Kimio Fujita  
President

Japan International Cooperation Agency





January, 1996


**Letter of Transmittal**

We are pleased to submit to you the basic design study report on the Project for Improvement of the Medical Equipment in Mulago Hospital in the Republic of Uganda.

This study was conducted by International Techno Center Co., Ltd., under a contract to JICA, during the period from July 17, 1995 to January 16, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Uganda and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



Shigetaka Tojo

Project Manager,

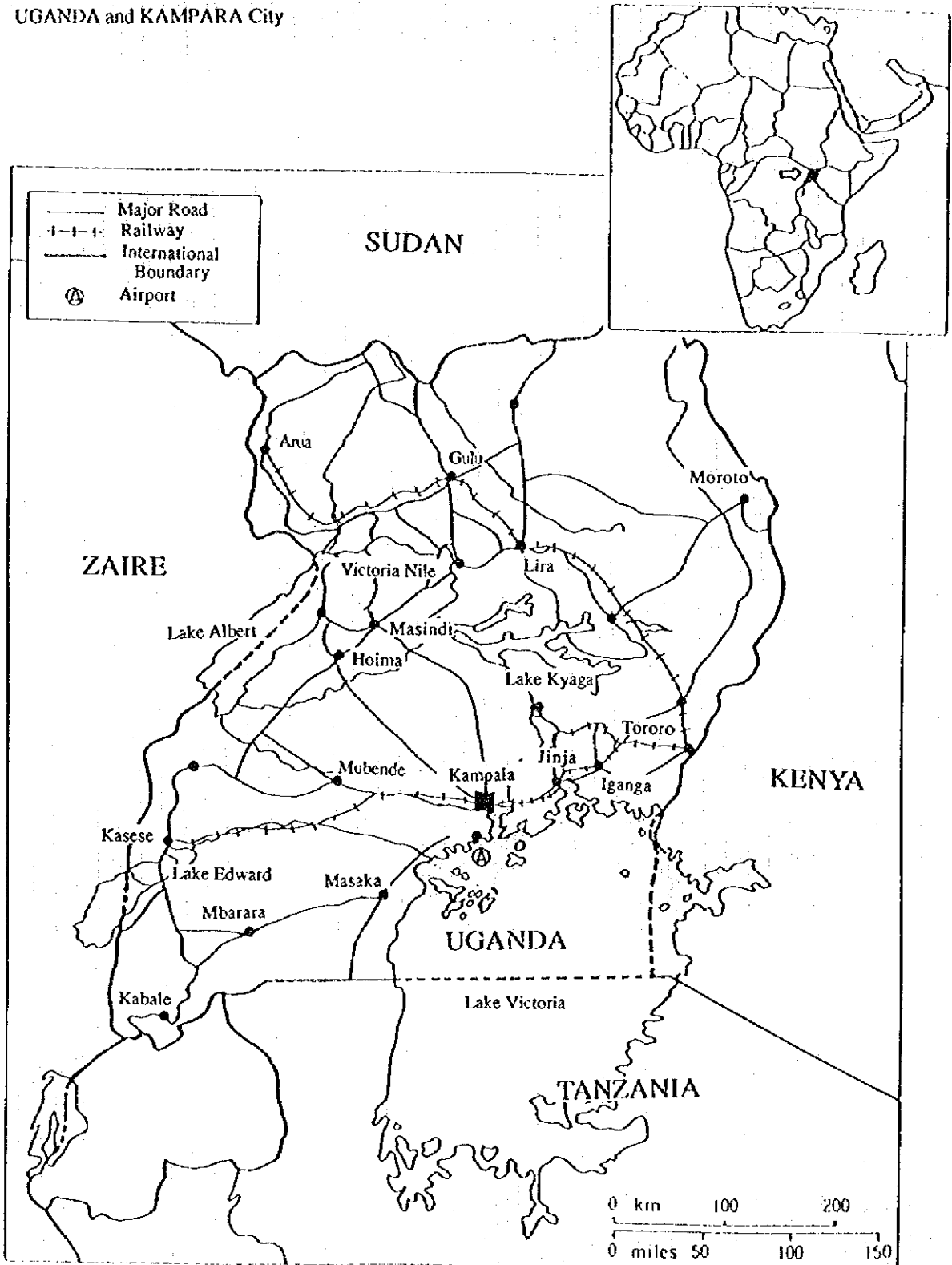
Basic design study team on

the Project for Improvement of the

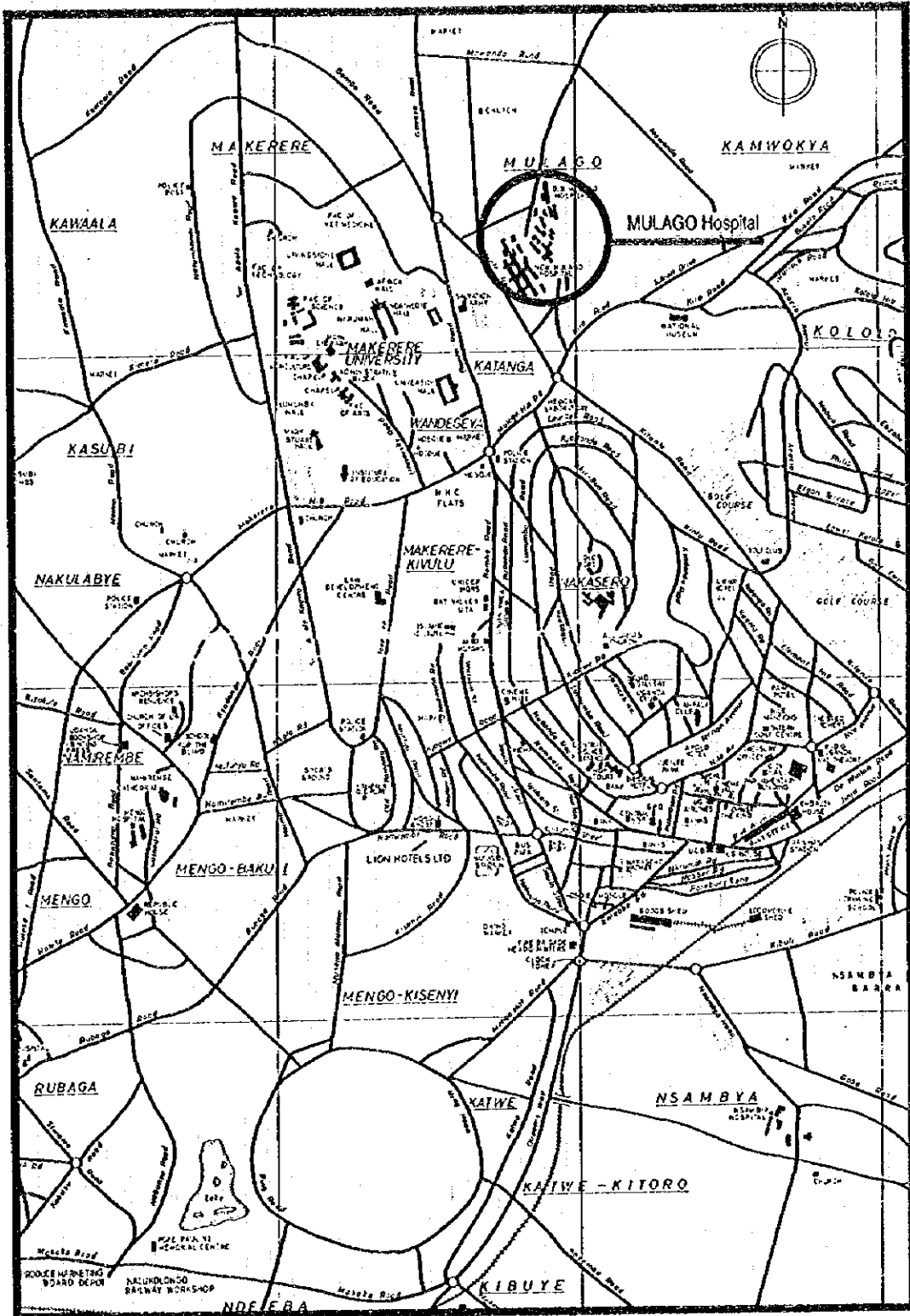
Medical Equipment in Mulago Hospital

International Techno Center Co., Ltd.

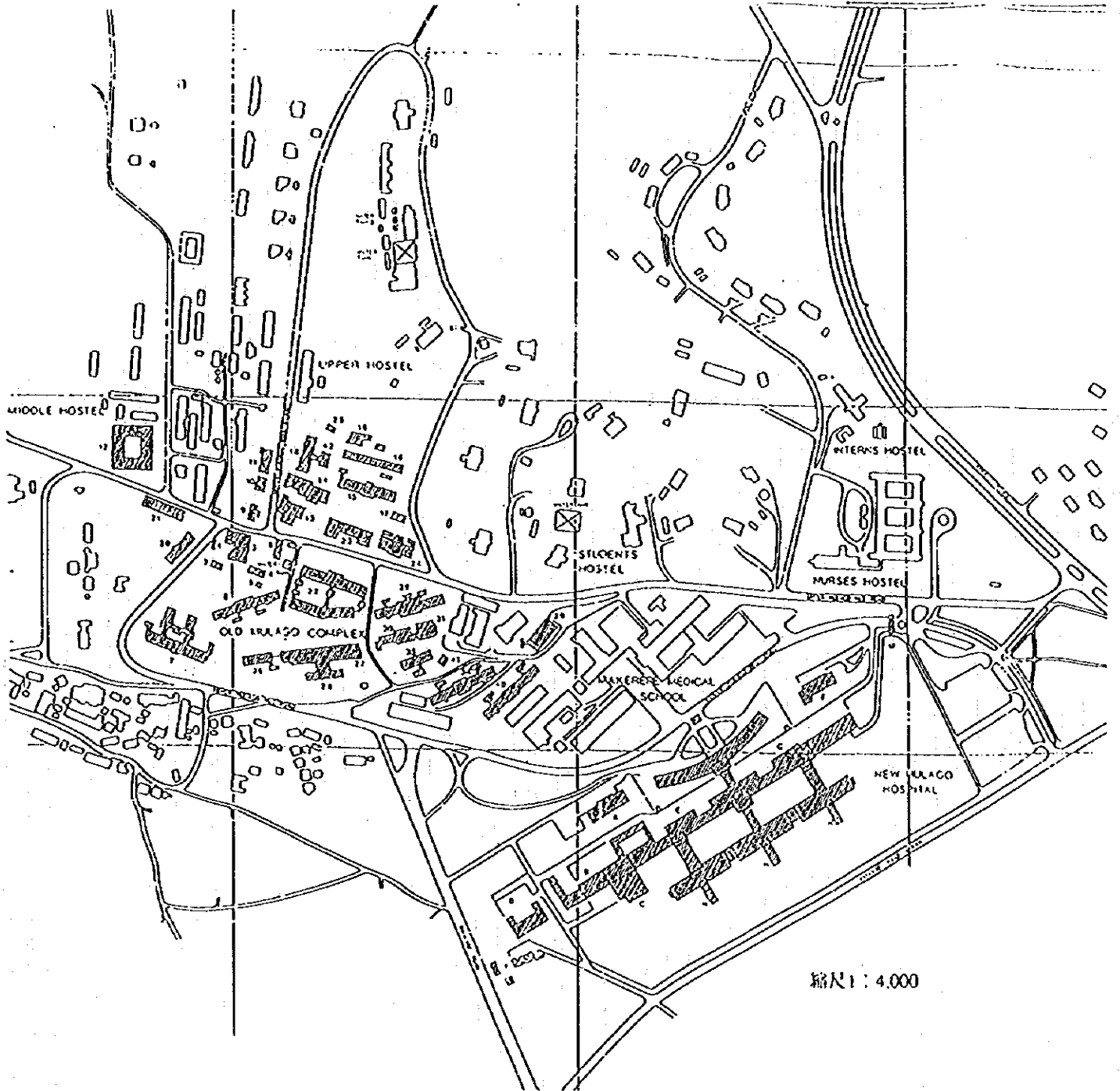
UGANDA and KAMPALA City



# KAMPALA city and MULAGO Hospital

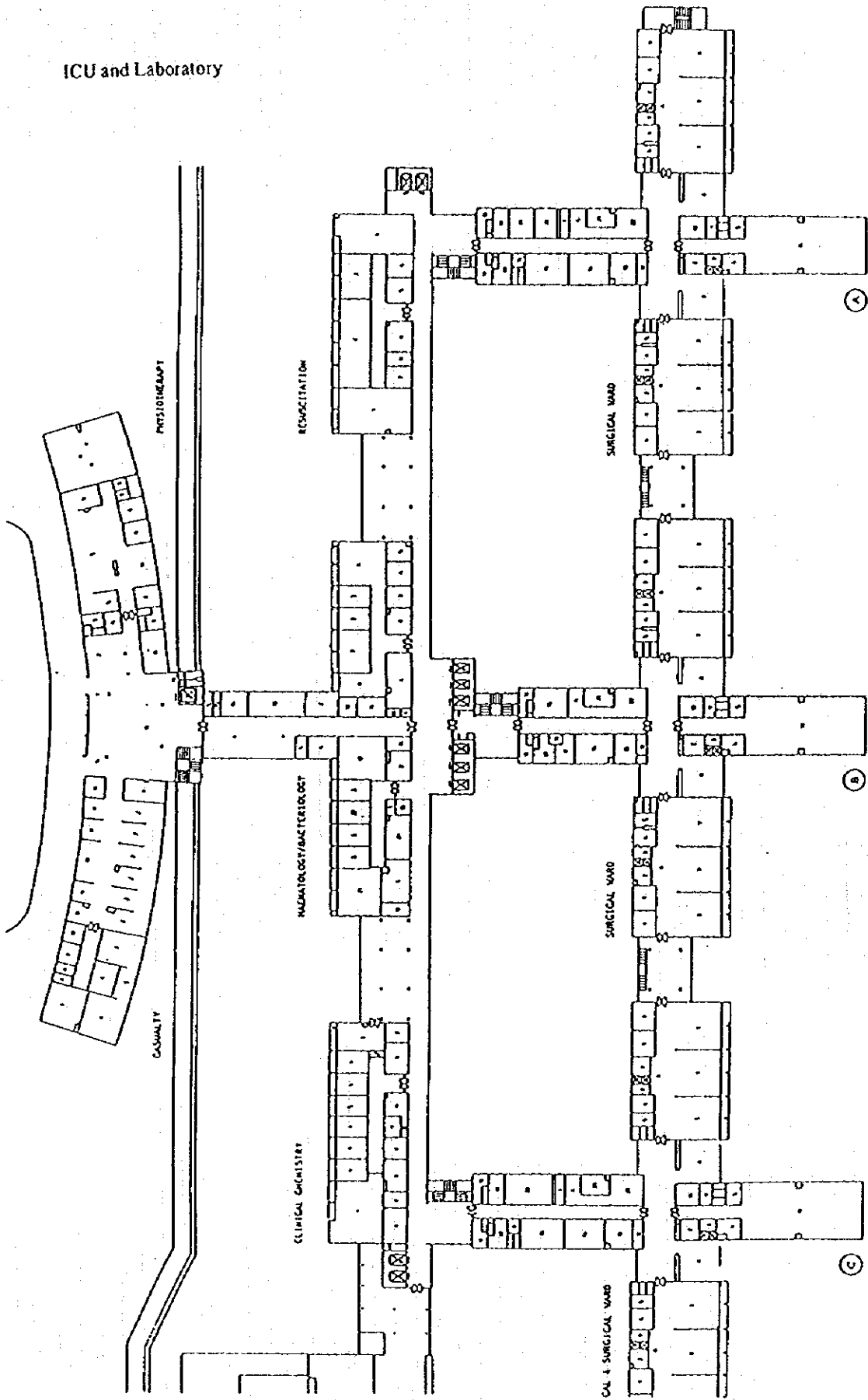


MULAGO Hospital



縮尺 1 : 4,000

ICU and Laboratory



## ABBREVIATIONS

A/P	Authorization to Pay
AfDB	African Development Bank
AfDF	African Development Fund
ARI	Acute Respiratory Infection
B/A	Banking Arrangement
CIDA	Canada International Development Agency
DANIDA	Danish International Development Agency
E/N	Exchange of Note
EC	European Community
FINNIDA	Finnish International Development Agency
GDP	Gross Domestic Product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HIV	Human Immunodeficiency Virus
ICU	Intensive Care Unit
IDA	International Development Association
IMF	International Money Fund
IMR	Infant Mortality Rate
LLDC	Least-Development Countries
NGO	Nongovernmental Organization
NRA	National Resistance Army
ODA	Official Development Assistance
PHC	Primary Health Care
SIDA	Swedish International Development Agency
TBA	Traditional Birth Attendant
UNICEF	United Nations Children's Fund
USAID	Agency for International Development, United States
WHO	World Health Organization

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**CONTENTS**

Preface		
Letter of Transmittal		
Location Map		
Abbreviations		
Chapter 1	Background of the Project	.....1
1-1	Present State of Uganda	.....1
1-2	Background of the Project	.....8
1-3	Outline of Requets	.....10
Chapter 2	Contents of the Project	.....14
2-1	Objectives of the Project	.....14
2-2	Basic Concept of the Project	.....14
2-3	Basic Design	.....15
	2-3-1 Design Concept	.....15
	2-3-2 Basic Design	.....17
Chapter 3	Implementation Plan	.....31
3-1	Implementation Plan	.....31
	3-1-1 Implementation Concept	.....31
	3-1-2 Implementation Conditions	.....32
	3-1-3 Scope of Works	.....32
	3-1-4 Consultant Supervision	.....32
	3-1-5 Procurement Plan	.....33
	3-1-6 Implementation Schedule	.....34
	3-1-7 Obligations of Recipient Country	.....35
3-2	Operation and Maintenance Costs	.....36

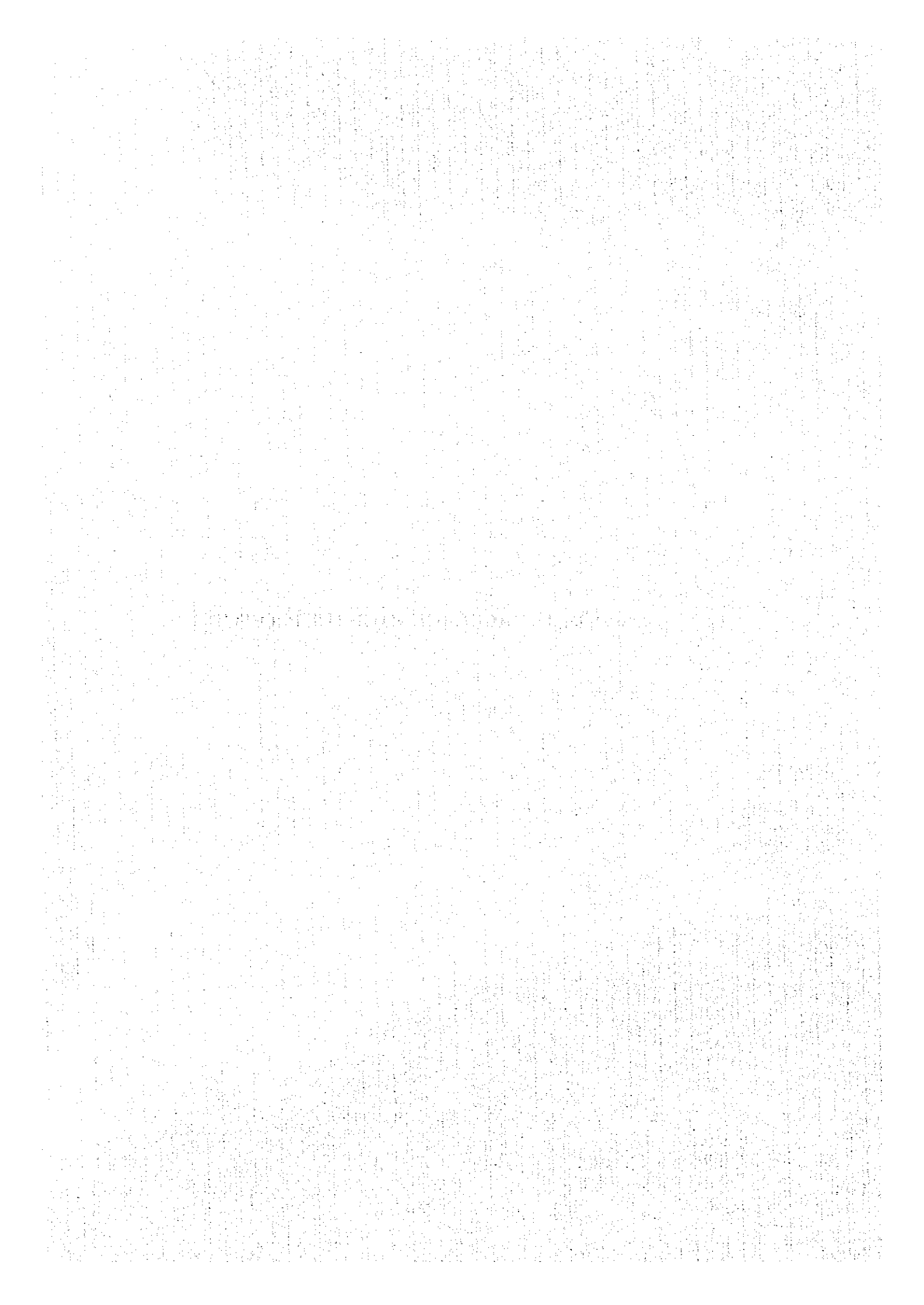
<b>Chapter 4</b>	<b>Project Evaluation And Recommendation</b>	<b>.....48</b>
4-1	Project Effect	.....48
4-2	Technical Cooperation and Collaboration with Other Donors	..... 50
4-3	Recommendation	.....50

#### **Appendices**

- 1. Member List of the Survey Team**
- 2. Survey Schedule**
- 3. List of Party Concerned in the Recipient Country**
- 4. Minutes of Discussions**
- 5. References**



## **Chapter I BACKGROUND OF THE PROJECT**



## Chapter 1 Background of the Project

### 1-1 Present State of Uganda

#### (1) General Conditions

The Republic of Uganda (hereinafter referred to as "Uganda") is a landlocked country located in East Africa, and it is blessed with a fertile land and affluent natural resources. Since 1890, Uganda had been a protectorate of the British government until it gained autonomy over domestic matters in 1961. Uganda finally became independent in 1962. In the early years of independence, Uganda had been a kingdom with a federal constitution bestowing the British queen as sovereign. In 1963, however, the country established a government ruled by presidency, and Musate II, king of Buganda, became the first president. In 1966, prime minister Obote led a military coup and became president himself. However, Obote was, in turn, overthrown in a military coup led by Amin in 1971. President Amin was dictatorial and did such excesses as expulsion of Asians from the country and mass murder of oppositions. Anti-Amin Ugandan soldiers supported by Tanzanian military ousted Amin from the country in April, 1979. After an unstable interim, during which many presidents were replaced, President Obote returned to office as victor in the election of 1980. However, Obote's government was wrecked by a military coup led by Lt.-Gen. Okello and a war with the National Resistance Movement (NRM). In January, 1986, ousting Okello's government, Chairman Yoweri Museveni of the NRM established the current government. Since then, President Yoweri Museveni has been successful in restoring social order almost all over the country by declaring amnesty, solving ethnic disputes, and respecting human rights.

Uganda is one of the Least Developed Countries (LDC). Agriculture is the core economic sector and produces 60% of the GDP, and most exports are agricultural produce. The country has a fertile land and a relatively reliable rainfall, so 73% of the land is suitable for cultivation. Economic development is likely for such countries. However, the economy of Uganda was crippled by the successive political upheavals that had occurred after the independence. The Museveni government, after taking control of the country, has been rehabilitating the economy. The Reconstruction and Development Plan was devised in May, 1987, for the purpose of solving severe economic problems with assistance from the World Bank and the International Monetary Fund (IMF). The plan has promoted production increases in the agricultural, mining and manufacturing industries and encouraged exports. As a result, the country has achieved an annual economic growth of 6 ~ 7%.

However, this economic development plan depends heavily on foreign aid since domestic resources are not countable or reliable. Personnel necessary for the execution of the plan is not fully available at present because many people fled from the country during the extended civil upheaval. Though a plan for promoting return of such people is

currently being considered by the World Bank, it is not possible to bring back so many people as to satisfy the need for workers in the execution of present development projects. As for infrastructure, networks of roadways and power-supply lines are now being built with credits from the World Bank, the African Development Bank (AfDB), and others.

## (2) Present State of Health Care

### Demography

The health care system of Uganda was one of the most advanced in East Africa. However, the civil war from 1970 to 1980 not only caused political and economic confusion but also left the health care system exhausted. Hospitals were left without improvement, repair and renewal of medical equipment including ambulances. As a result, the health care system became unable to provide sufficient medical care, morale of medical personnel declined, and shortages of medicine and medical equipment resulted in the low quality of services. On the other hand, such infections as malaria, diarrhea, and respiratory diseases are prevalent. Prevention and control of AIDS is also becoming a serious matter. All these diseases besides rapid a population growth are burdening the health care system. According to a census carried out in 1991, Uganda has a total population of 6.6 million, and the average annual population growth is 2.5% in the past ten years. Figure 1-1 shows the demography by gender.

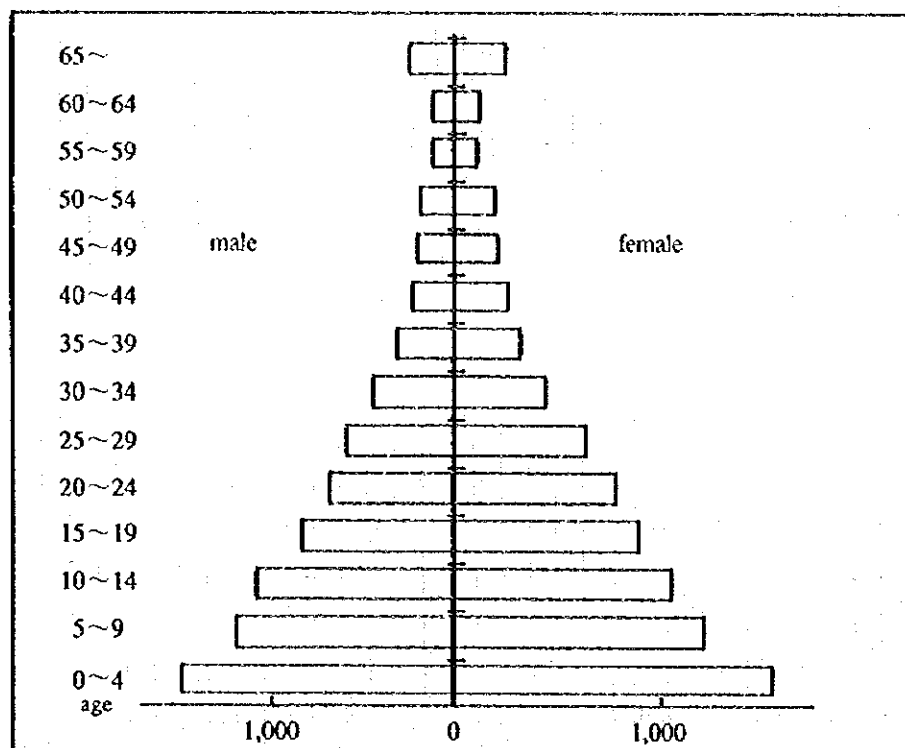


Figure 1-1 : Population Structure of Uganda by Age Group in Gender

The demography of Uganda shows that young age groups occupy a large part in the population structure. The children under the age of 15 share 47.3% of the total population, which is typical of most African countries. Children under the age of 15 are most likely to get diseases and require health care services. About 90% of the population live in the countryside, and the population is distributed unevenly in regions. It is concentrated in Kabale and Mbale, located around Lake Victoria, where agriculture is most productive because of fertile soil. On the other hand, regions in western and south western Uganda, Kabarole, Hoima, Mashindhy, part of Mbarara, Iganga are underpopulated even though the soil is relatively fertile. The reason is frequent droughts. In northern Uganda including Ruolo soil is barren with droughts, so the region is utilized as pasture land and least populated.

### Morbidity and Mortality

As seen in Table 1-1 malaria, diarrhea, upper respiratory diseases, anemia, nutritional deficiencies are the major diseases listed in the upper part of it. Every year, these rankings change in the table, but malaria is always at the top. This disease pattern is characterized by diseases that are preventable. At present, the Ministry of Health is actively promoting PHC for prevention. Cases of HIV/AIDS, which had not been seen before 1982, have increased recently. This has led the government to place a first priority on prevention and control of HIV/AIDS. In terms of reproductive health and health care for mothers and children, AIDS is a significant problem. 25 ~ 32% of the women between the ages of 15 and 21 who donated blood in 1990 were reported HIV positive. This high prevalence among young women is a serious problem, increasing the number of patients and deaths, and moreover infecting children while still in mother's womb.

**Table 1-1: Leading Causes of Morbidity of Outpatients**

Disease	1991			1990		1989		1988	
	Cases	%	Rank	%	Rank	%	Rank	%	Rank
Malaria	2,708,118	25.4	1	22.6	1	21.7	1	20.2	1
Upper Respiratory Disease	1,571,471	14.7	2	15.6	2	16.7	2	13.7	2
Intestinal Worms	1,005,006	9.4	3	7.7	4	7.5	5	7.6	5
Diarrhoeal Disease	896,066	8.4	4	7	5	8.7	4	9.1	4
Traum / Injuries	791,221	7.4	5	9.1	3	9.6	3	9.7	3
Lower Respiratory Disease	606,078	5.7	6	5.9	6	5.3	7	6.3	7
Skin Disease	600,943	5.6	7	5.6	7	7.4	6	6.7	6
Eye Infections	434,834	4.1	8	4.5	8	4.7	8	5.1	8
Anaemias	245,640	2.3	9	1.9	10	2.4	9	3.4	9
Ear Infections	207,795	1.9	10	2.1	9	2.3	10	-	-
Others	1,606,970	15.1		18		14.4		18.1	
Total	1,067,414	100.0		100.0		100.0		100.0	

As seen in Table 1-2, leading causes of death correspond with the above major diseases, which are preventable by vaccination.

**Table 1-2: Leading Causes of Mortality of Inpatients**

Disease	1991			1990		1989		1988	
	Cases	%	Rank	%	Rank	%	Rank	%	Rank
Malaria	1,015	16	1	14.2	1	8.4	3	9.6	2
Diarrhoeal Disease	618	9.7	2	8.7	3	11.1	1	10.4	1
AIDS	612	9.6	3	9.3	2	8.9	2	4.8	6
ARI/Pneumonia	405	6.4	4	7.9	4	7.7	4	8.1	4
Nutritional Deficiencies	352	5.5	5	5.4	7	6	6	8.8	3
Neisserial Meningitis	332	5.2	6	5.6	6	5.2	7	4.2	8
Anemia	326	5.1	7	7.3	5	7.4	5	7.5	5
Tuberculosis	313	4.9	8	4.5	8	4.6	8	3.9	9
Measles	250	3.9	9	-	-	-	-	4.4	7
Sepsis	183	2.9	10	-	-	-	-	-	-
Others	1,938	30.5		37.1		40.7		38.3	
Total	6,344	100.0		100.0		100.0		100.0	

### **Infant Mortality Rate (IMR)**

According to statistics of 1990, the infant mortality rate of Uganda is 99 per 1,000 live births. This rate is greater than those of Kenya and Zimbabwe, which are neighboring countries of Uganda. As seen in Table 1-3, the infant mortality rates of neighboring countries have been steadily decreasing since 1965, but the infant mortality of Uganda shows little of such tendency. This seems a result of improper and insufficient health care activities carried out for prevention and health education in the health care system and socioeconomic system, which were weakened during the political upheaval lasted after Amin's dictatorial government. Direct causes of infant mortality are listed as malaria, diarrhea, ARI, anemia, sepsis, and others.

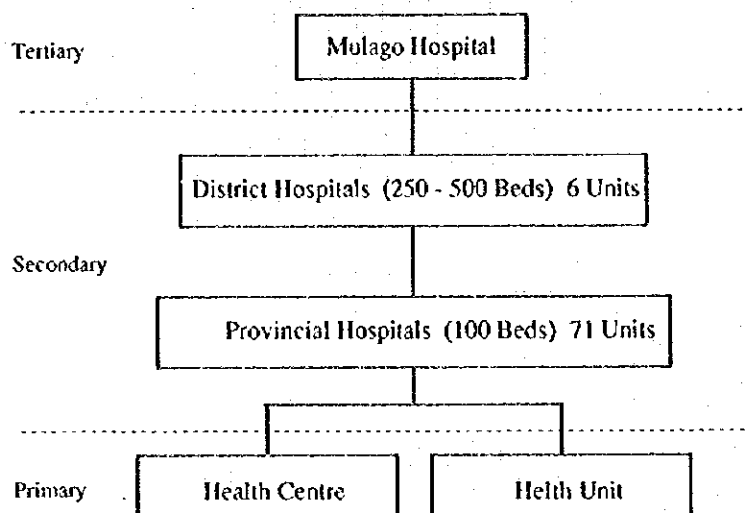
**Table 1-3: IMR of Uganda and Neighboring Countries**

Country	1965	1990	Decreasing
Uganda	119	99	17%
Kenya	112	67	40%
Zimbabwe	103	49	52%
Ghana	120	85	29%
Sub Saharan Countries	157	107	30%
Average of LDCs	124	69	42%

### (3) Present State of Medical Services

#### Referral System

The referral system is organized in the health care system as shown in Figure 1-2. Health facilities are grouped into three categories: center, district, and community; and they provide tertiary, secondary, and primary medical services. Mulago Hospital is listed as tertiary care provider. Secondary care providers are six district hospitals (Arua, Gulu, Mbale, Jinja, Fort Portal, and Masaka) and one regional hospital. Health centers and health posts, which are nested in communities, are providing primary care.



**Figure 1-2: Referral System**

#### Conditions of Health Facilities

Governmental health facilities account for 61% of the secondary and tertiary care hospitals, and 58% of the outpatients are visiting governmental hospitals. Though most health facilities are government owned, there are some NGO hospitals that play an important role in provision of medical services. Table 1-4 shows health facilities each with the number of hospital beds.

**Table 1-4: Health Facilities with Number of Beds**

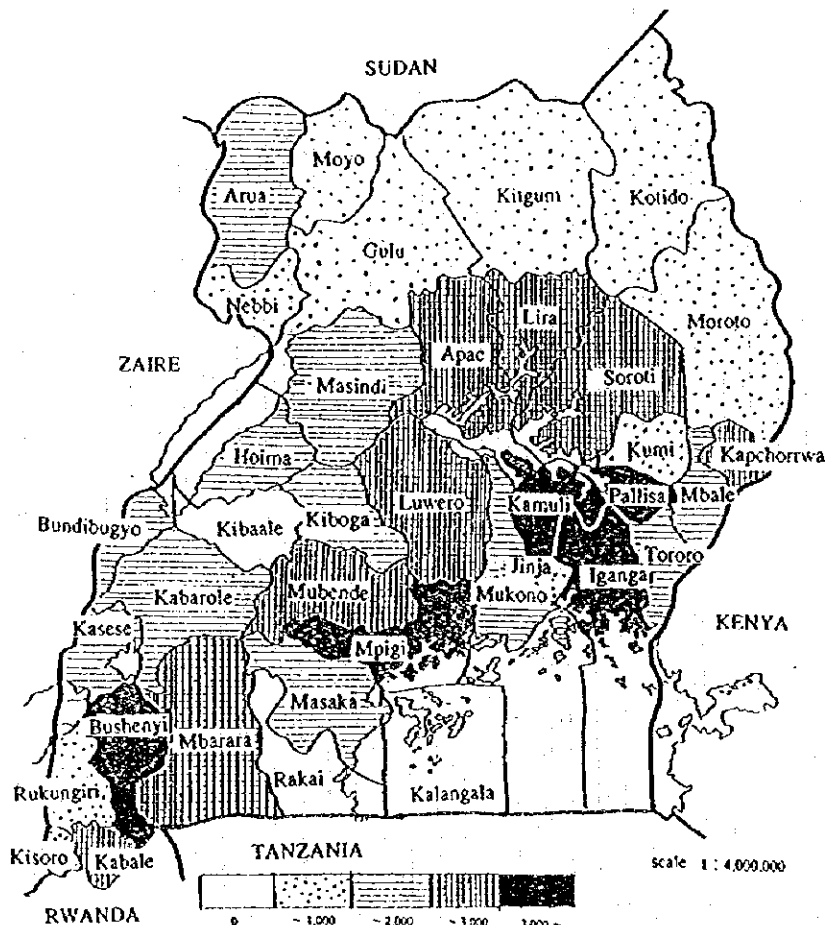
	Tertiary and Secondary Facilities		Primary Facilities
	Number	Beds	Number
Government	50	8,474	800
NGO	36	5,343	231
Private	0	0	326
Total	86	13,817	1,357

According to a study carried out by the Department of Planning of the Ministry of Health, 49% of the population live within a distance of 5 km from a nearest health center. This rate of coverage for providing PHC is relatively good among sub-Saharan countries.

Table 1-5 lists the number of health facilities by the level of care, together with the number of people cared per facility. As seen from the table, the number of people per facility is 10,000 ~ 14,000 in each area. However, if the number of beds and the patients treated are compared, then regional differences become clear as shown in Figure 1-3.

**Table 1-5: Number of Health Facilities and Number of people per Facility**

Area	Number of Units		Population per Unit
	Tertiary & Secondary	Primary	
Central	25	447	10,265
Eastern	17	365	10,759
Northern	23	250	11,461
Western	21	297	14,201
Total	86	1,357	11,491



**Figure 1-3 Numbers of Patients per Bed**



## Medical Personnel

**Doctors** More than 1,500 doctors had fled from Uganda during the 15 years since the beginning of the civil war. According to the National Health Personnel Study conducted in 1991, only 611 doctors are working at health facilities under administration of the Ministry of Health. The numbers of doctors by the district are as follows: 284 doctors work in Kampala, capital city; 45 doctors in Jinja district, which has a second largest city; 42 doctors in Mupigi District, which is located next to Kampala; and 27 doctors in Mbale District, which has a good road network and a customs office at the border with Kenya. There are no doctors in Kalangala District, which includes many islands in Lake Victoria; Kasese District, which is near the border with Zaire and mountainous; and Kibale District, where traffic is inconvenient.

**Nurses** The total number of nurses working at health facilities under administration of the Ministry of Health is 1,118. The numbers of nurses by the district are as follows: 329 nurses work in Kampala, 98 nurses in Jinja, 57 nurses in Mupigi, and 54 nurses in Mbale. Nurses are not stationed in the above mentioned three districts that have no doctors: Kalangala, Kasese, and Kibale.

**Midwives** The total number of midwives working at health facilities under administration of the Ministry of Health is 211. The numbers of midwives by the district are as follows: 23 midwives work in Mbale and 16 midwives in Arua. Midwives are not available in the other 28 districts, but in stead of midwives, there are many traditional birth assistants (TBAs), who help homie labor.

There is a serious problem of emigration by medical personnel. The Ministry of Health is trying to supplement personnel shortage by developing new medical personnel. As the ministry is specially active in improving the provision of PHC, it is employing and training assistant medical workers to station at newly built health centers. The ministry is also training and educating TBAs and other personnel for the purpose of promoting community-participated health care activities.

However, the execution of this training and education is hindered by shortages of doctors and specialists because many intellectuals fled the country during the civil war. Also, there are shortages of educational facilities and materials. As the educational system for developing medical personnel has not been fully recuperated yet, the quality of medical services as a whole is still low. Furthermore, medical personnel tend to

concentrate in urban areas. The reasons are that, in the countryside, salaries are low, security is not certain, and life is not comfortable. Graduates of medical schools are also likely to avoid assignment to provincial hospitals. As a result, there is a serious problem of lacking medical personnel in the countryside.

Other problems are the conditions of district's health facilities and their equipment, which are badly damaged in confusions after the civil war. Maintenance work has not progressed much, so most medical equipment is not in condition for use. This must be another reason leading to shortage of personnel and low quality of services.

## **1-2 Background of the Request**

After President Museveni established the current government in January, 1986, the government devised the Reconstruction and Development Plan in May, 1987. Since then, the government has been trying to reconstruct the governmental structures, which were dilapidated during the civil war, with assistance from World Bank and the IMF. However, persistent poverty is a severe problem which leads to other problems relating to health care. People's health is essential to economic recovery, so formulation of health care plans is important as the government promotes economic recovery to wipe out poverty.

Since the civil war damaged many health facilities, hospitals have been left deteriorating. Medical equipment and ambulances are also left without proper maintenance. Shortages of medical equipment and medicine and low salaries and delayed payment for medical personnel are other problems resulting from lack of funds experienced every year. These problems have caused the morale of medical personnel to dwindle and the quality of medical services to decline. This can be clearly seen especially in rural areas.

With these problems, the government, which is struggling with a severe shortage of funds, has formulated measures to stem the spread of preventable diseases such as AIDS and to recover people's health by providing especially mother and child health care. For execution of these measures, the government has reallocated funds to the rural areas, correcting the concentration of funds in big cities. In this way, the government has changed health care policies, stressing prevention rather than treatment.

Now, the government is rehabilitating existing health facilities and equipment, vitalizing medical services, and reconstructing the referral system with assistance from foreign countries. In addition, the government has devised Three Year Health Plan (1993-1995) that strengthens PHC activities to stem the spread of preventable diseases by effectively utilizing domestic resources.

According to Three Year Health Plan, the government of Uganda is implementing several projects. Among these projects, First Health Project assisted by the World Bank and Rehabilitation Project assisted by the African Development Bank (AfDB) and African

Development Fund (AFDF) are major projects which will renew existing health facilities and equipment.

Mulago Hospital is located in the capital city, Kampala, and it was established in 1913. Since then, a school for developing nurses is added to the hospital in 1930, and a school for developing medical technicians in 1950. In 1962, a six-story new building was donated by the British government as a commemorative of Ugandan independence. This new building is referred to as "New Mulago Hospital," and the whole buildings and facilities are referred to as "Mulago Hospital Complex." Whenever this report mentions "Mulago Hospital," it means "New Mulago Hospital." Mulago Hospital is a top referral hospital, and it is a teaching hospital for Makerere University.

Factors essential for provision of good medical services such as facilities, equipment, and personnel have deteriorated all over the country. As medical services are free, very little is charged for the services provided at any public hospital. As such, people can visit any hospital, public or private, without referral, or ignoring the referral system. This has led to a collapse of the referral system. Differences are not seen in the levels of medical services provided at the health facilities. Patients who should visit health centers or district hospitals around Kampala have concentrated to Mulago Hospital in the past few years. This condition is impairing Mulago Hospital to perform functions of tertiary care provider. According to a report, 75% of the patients who visit Mulago Hospital are ignoring the referral system, and more than 95% of the inpatients can be treated and cared in district hospitals, health centers, and sub-health centers.

As the concentration of patients continues, resources of the hospital such as funds and specialists' work time are spent on those who can be treated elsewhere. In order to correct this problem, the government is reconstructing the referral system. For reconstruction of the system, Mulago Hospital is currently being improved on Rehabilitation Project with assistance from international organizations and foreign governments.

On Rehabilitation Project, the roof, electric wiring, water supply line and drainage of the hospital are repaired; a cooking facility, a laundry facility, a maintenance workshop, an emergency power generation facility are newly constructed; and the roads inside the hospital site are paved. In addition, a store for medicine, a pediatric ward, and an outpatient ward are planned to be constructed together with procurement of some medical equipment.

The equipment to be procured on Rehabilitation Project will not satisfy the needs of the hospital, so the government has devised the Project for Improvement of the Medical Equipment of Mulago Hospital in addition to Rehabilitation Project. The Government of Uganda requested the Government of Japan for a grant for the execution of this project, which was originally planned to improve the medical equipment used in five departments of the hospital including the X-ray department. In response to this

request, the Japanese government dispatched a project formulation study team in health sector to Uganda in 1993 and carried out a study of the condition of Mulago Hospital and the present state of the health care system of Uganda. In this study, the project was found not clear of whether the items of the medical equipment requested for Japanese assistance overlapped the medical equipment procured by Rehabilitation Project and how these projects related to each other. The study team asked the Government of Uganda to adjust and arrange the two projects so that there would be no overlap or excess procurement of equipment. Upon making an adjustment, the Government of Uganda requested the Government of Japan, this time, for a grant to improve the medical equipment of only two departments, which are the ICU Department and the Central Laboratory.

### **1-3 Outline of Request**

#### **(1) Objects of Request**

In consideration of the relation with Rehabilitation Project, this project is to improve the medical equipment of the ICU Department and the Central Laboratory, and thereby contributes to the rehabilitation of Mulago Hospital so that the hospital can effectively function as top referral hospital. Through the strengthened referral system by an improved Mulago Hospital, the project can contribute to the improvement of the quality of medical services provided for patients who may be referred from all over the country.

#### **(2) Implementing Organization**

Ministry of Health

#### **(3) Facilities Included in Request**

Mulago Hospital: ICU Department and Central Laboratory

#### **(4) Items of Equipment Requested**

It has been three years since the original request was submitted. There has been reconsideration and some adjustment on the contents of the request. The number of departments to be improved on the project has been reduced from five to two. During this reconsideration and adjustment, several equipment lists were produced. These differing lists confused the work of basic design. Therefore, when the basic study team visited the hospital, the team made sure to confirm the medical equipment to be procured on the project. During this confirmation work, the team received a final equipment list. With reference to the contents of this list, the team had discussions with the hospital staff and studied conditions of the existing equipment and facilities of the hospital.

The final list of requested equipment is shown on the next page.

### Requested Equipment

<u>ICU</u>	<u>No.</u>	<u>Equipment</u>	<u>Q'ty</u>
	1	ECG Single Channel	5
	2	ECG Analyzer 3 Channel	3
	3	ECG-Long Term ECG Recorder	2
	4	Stress Testing System	2
	5	EEG	2
	6	Ultrasound Machine	1
	7	Bedside Monitor ECG, BP, Temp.	20
	8	Telemetry Monitor	3
	9	Pulse Oximeter	10
	10	Resuscitation Trolley with Defibrillator	5
	11	Portable Defibrillator	3
	12	Respiratory Gas Analyzer	5
	13	Pulmonary Function Testing System	3
	14	Spirometer Wrights	3
	15	Stethoscope	20
	16	Sphygmomanometer	20
	17	Ultrasonic Doppler	5
	18	Percussion Hammer	20
	19	Diagnostic Set	10
	20	Sphygmomanometer Electric	5
	21	Infusion Pump	10
	22	Blood Warmer	10
	23	Respirator	10
	24	Endotracheal Sets	20
	25	Anaesthesia Table	5
	26	Revolving chair	10
	27	Oxygen Cylinder Trolley	10
	28	Instrument Trolley	10
	29	Patient Trolley	10
	30	Haemodialysis Unit	2
	31	Peritoneal Dialysis Set	10

Central Laboratory	No.	Equipment	Q'ty
	A1	Centrifuge	6
	A2	Colorimeter	5
	A3	Refrigerator, type A	4
	A4	Refrigerator, type B	5
	A5	Microscope Binocular	6
	A6	Hot Air Oven	4
	A7	Autoclave	5
	A8	Water bath	4
	A9	Mechanical Shaker	2
	A10	Blood Differential Counter	7
	A11	Flame Photometer	1
	A12	pH Meter	2
	A13	Interval Timer	10
	A14	Spectrophotometer	1
	A15	Computer system	1
	A16	Personal Computer and software	3
	A17	Software	-
	A18	Voltage Stabilizer	1
	A19	UPS	1
	A20	Dot Matrix Printer	1
	A21	Laser Printer	1
	A22	Diskettes 3 1/2"	10
	A23	Diskettes Box for 3 1/2" Diskettes	1
	A24	Data Switch	1
	A25	Jars	3
	A26	Stop Watch Timers	8
	A27	Deep Freezer	4
	A28	Balance Analytical	2
	A29	Analytical Balance	2
	A30	Water Distiller	4
	A31	Hot Plate	3
	A32	Autoclave	3
	A33	Background Condenser	2
	A34	Tally Blood counter	8
	A35	Slide Drier	3
	A36	Drying Cabinet	3
	A37	Autoanalyser	1
	A38	De-Ionizer Unit	3

A39	Loop Holder	
A40	Haematology Analyzer	1
A41	Fibrinometer Coagulation System	1
A42	Electric Kettle	6
A43	Blood Bank Refrigerator	2
A44	Microtome	4
A45	Microtome Knife	10
A46	Duplicating Machine	2
A47	Overhead Projector	1
A48	Projector Screen	1
A49	Slide Projector	1
A50	Microscope Objectives	1
A51	Micro Pipette	1
A52	Office Table	4
A53	Office Chair with Arm Rest	6
A54	Office Chair without Arm Rest	12
A55	Filing Cabinet	4
A56	Steel Cupboard	8
A57	Pedal Bins	12
A58	Dispenser Trolley	8
A59	Laboratory Stools	20
A60	High Performance Liquid Chromatography	1
A61	Scientific Calculator	10
A62	Electrical Typewriter	1
A63	Manual Typewriter	1
A64	Glassware Washing Machine	4
B1	Bactimeter	1
B2	VIDAS Complete System	1
B3	Automatic Media Dispenser	1
B4	Personal Computer and Software	1
B5	Software	
B6	Voltage Stabilizer	1
B7	UPS	1
B8	Dot Matrix Printer	1
B9	Laser Printer	1
B10	Diskettes 3 1/2"	10
B11	Diskette Box for 3 1/2" Diskettes	1
B12	Data Switch	1

## **Chapter II CONTENTS OF THE PROJECT**



## Chapter 2 Contents of the Project

### 2-1 Objectives of the Project

The government of Uganda is strengthening the existing health care system in Three Year Health Plan, especially emphasizing rehabilitation of facilities and equipment. Pursuant to this policy, the Ministry of Health is promoting Rehabilitation Project supported by the AfDB and AfDF. However, Rehabilitation Project alone is not enough to rehabilitate the facilities and equipment of Mulago Hospital, so the Government of Uganda officially requested the Government of Japan for a grant to execute another project which will also improve the medical equipment of Mulago Hospital.

The original project requesting for a grant was to improve five departments of the hospital including the X-ray Department. In 1993, the Government of Japan dispatched a project formulation study team to study the project. However, it was not clear to the study team whether the items of medical equipment requested for Japanese assistance overlapped the equipment procured by Rehabilitation Project and how these projects related with each other. The Government of Uganda, making some adjustment in the contents of the original project in accordance with advice given by the study team, requested the Government of Japan again for a grant, this time, however, to improve the medical equipment of only two departments, which are the Intensive Care Unit (ICU) and the Central Laboratory.

Therefore, the objectives of this project are to improve the medical equipment used in the ICU Department and the Central Laboratory in consideration of the relation with Rehabilitation Project, and thereby to improve the quality of services provided by the hospital as a whole, thus restrengthening the referral system.

### 2-2 Basic Concept

The goal of this project is to improve the functions of the Central Laboratory and the ICU Department through procurement of medical equipment. Therefore, the scope of assistance, i.e., the medical equipment to be procured on the project, is determined in consideration of such factors as necessity, urgency, priority, and cost-effectiveness, and is limited to those items which can be utilized and maintained self-supportively by the Ugandan staff respectively to the following administrative and technical aspects.

#### Administrative aspect:

1. Financial propriety in consideration of funds coming from fees charged for services and from national budget; and
2. Appropriateness of budgetary plan for maintenance, repair, and renewal of the equipment.

### **Technical aspect:**

1. Selection of equipment suitable for functions and levels of the departments,
2. Selection of equipment in consideration of relation with the existing equipment,
3. Selection of equipment in consideration of appropriateness for technical levels of the medical personnel,
4. Decision on the sophistication of the analyzing equipment to be procured, based on the number of specimens examined daily,
5. Determination of the quantity of the equipment so as to avoid over-procurement; and
6. Selection of equipment so that it will not overlap the equipment procured by other aid organizations.

## **2-3 Basic Design**

### **2-3-1 Design Concept**

#### **(1) Natural Conditions**

The average temperature and humidity in Kampala are stable throughout the year, at around 22 deg. C and 75 ~ 80% respectively. The average rainfall is about 1,000 mm, which is one of the most wettest countries in East Africa. With this temperature and humidity, the equipment procured on this project is fully suitable if it meets the standards of JIS, BS, DIN, etc.

#### **(2) Social Conditions**

As the referral system was seriously damaged during the civil war, Mulago Hospital, which is a top referral hospital, was made to provide primary and secondary health care besides providing tertiary care. The health care policy of the government is to reconstruct and strengthen the referral system by improving the functions of primary and secondary health care facilities, so that Mulago Hospital can concentrate on provision of tertiary care as top referral hospital and as teaching hospital.

With respect to the above policy, the object of this project is to improve the functions of Mulago Hospital and thereby to contribute to the reconstruction of the referral system. As such, the project shall be designed for technical and financial sustainability in consideration of the funds allocated to health care, and proposes a cost sharing scheme for the purpose of maintaining the equipment.

#### **(3) Local Agents**

There are no medical equipment manufacturers in Uganda. However, there are local agents of foreign manufacturers who are about to start business in Uganda. Most of

them are sales agents representing European and American manufacturers. There are no representatives of Japanese manufacturers. Therefore, any equipment requiring spare parts, consumables, and maintenance services should be preferably a product of a European or American manufacturer who has a local representative in Uganda or Kenya.

#### **(4) Maintenance Capability**

In consideration of maintenance after the completion of the project, the medical and maintenance staff of Mulago Hospital should be trained during the installation period so that they will be capable of operating the equipment and performing daily maintenance work satisfactorily. Technical data, operation manuals, and lists of manufacturers and agents are to be provided for the purpose of maintaining the equipment. As some sophisticated equipment requires periodical maintenance services provided by specialists, the hospital should sign a maintenance agreement with the manufacturer who supplies such equipment. Therefore, priority is given to manufacturers who have representatives in Uganda or Kenya when selections of equipment are made.

#### **(5) Equipment**

Since the equipment to be procured will be used for diagnosis and treatment in the ICU and Central Laboratory of Mulago Hospital, such factors as easy maintenance and compatibility with the existing equipment shall be taken into consideration. Highly sophisticated equipment will be excluded from the procurement. As it takes about six months for the hospital to procure spare parts and consumables, spare parts and consumables required for the first six months and for test operation should be provided with the equipment as components.

Power failure occurs three times a month. When it occurs, an emergency power generator is manually operated. It takes about ten minutes for starting power generation. To prevent any damage from surge currents, the blood gas analyzer, autoanalyzer, and respirators to be procured on the project should be provided with certain peripheral devices such as automatic voltage stabilizers as components.

#### **(6) Implementation Schedule**

The installation process is so designed that interruptions to the normal operation of the hospital will be minimized. The delivery and installation work shall be carried out as efficiently and as quickly as possible after having good communications with the manufacturers who need to perform installation work.

## **2-3-2 Basic Design**

### **(I) Overall Plan: ICU**

During the field study, the basic study team found that few patients were treated in the ICU because there was a serious shortage of medical equipment, and that the quantities of the equipment requested in the list were without any reflection of the size of the ICU of 14 hospital beds. The hospital didn't have any staffing or financing plan or any specific concept for improving the ICU.

Therefore, the study team proposed and discussed an equipment plan with the hospital with respect to the list submitted by the hospital in consideration of the following points, and both sides agreed on the plan. The items of equipment agreed for the project are listed in the minutes of meeting.

**Items Excluded:** Holter ECG, Stress test system, Respiratory gas analyzer, Pulmonary function test system, Pen size ultrasonic doppler, Electric Sphygmomanometer, Revolving chair, etc.

**Items Replaced:** 1 ch. ECG and 3 ch. ECG with analyzer are replaced with 3 ch. ECG; Defibrillator and Portable defibrillator are replaced with Defibrillator; Respiratory gas analyzer is replaced with Blood gas analyzer; and Percussion hammer, Diagnostic set and Endotracheal set are replaced with Diagnostic set.

**Items Added:** ICU bed, Over-bed table, X-ray film viewer, Patient lift, Mobile X-ray apparatus, Ultrasonic nebulizer, Personal computer with printer, etc.

It is necessary to decide the size of the ICU before determining the quantities of the medical equipment. Analyzing the data collected in the field study, the appropriate size of the ICU is determined, and then the equipment to be procured is determined.

### **Determination of Staff Size**

In the ICU department, there are 15 nurses. However, they give general treatments which do not differ from the treatments given in any general ward. The reason why intensive care is not given in the ICU at present is that it is impossible to provide intensive care with the existing medical equipment. However, there is a little doubt whether the nurses are prepared for providing intensive care.

In Japan, one nurse is placed for two patients as standard for deciding the size of a staff assigned to ICU. Data presented by the hospital on the numbers of patients and nurses are analyzed for determining an appropriate size of the ICU in accordance with

this Japanese standard. Calculation is made for each year from the numbers of patients cared in the ICU in the last three years, and the results are listed as follows.

If the number of nurses needed are calculated from the values of 1994 on the basis of three work shifts and one shift for rest, then  $4 \times 9 = 36$  nurses. This result tells that the current number of nurses assigned to the ICU department is short for providing effective intensive care.

The hospital executes a plan for developing new ICU staffers after the completion of the this project. However, this new staff developing plan will be only effective after the existing staff are fully accustomed to the medical equipment procured on this project. If the ICU is started immediately with 14 beds, in a way as the hospital wishes, with the staff who are not familiar with providing intensive care, then the operation of the ICU will be very difficult due to the lack of personnel, technical know-how, and skillful administration. Thus, there is concern that the equipment procured on the project may not be utilized effectively. Therefore, it is appropriate to plan the improvement of the ICU in such a way that after the existing nurses are well trained to operate the equipment, new personnel will be trained for increasing the staff size. In this way, the size of the ICU will be gradually increased so that intensive care can be provided to 14 patients at the same time.

On the other hand, if the appropriate number of patients are calculated with respect to the current number of nurses, then  $15 \text{ nurses} \div 4 \text{ shifts} = \text{about } 3.7$ , thus requiring 3 ~ 4 nurses per shift. If the above standard, i.e., one nurse to two patients, is applied, then  $3 \sim 4 \text{ nurses per shift} \times 2 = 6 \sim 8$  patients. Under the current size of the staff, it is appropriate to limit the size of the ICU to 6 ~ 8 beds.

#### Determination of Equipment Requested

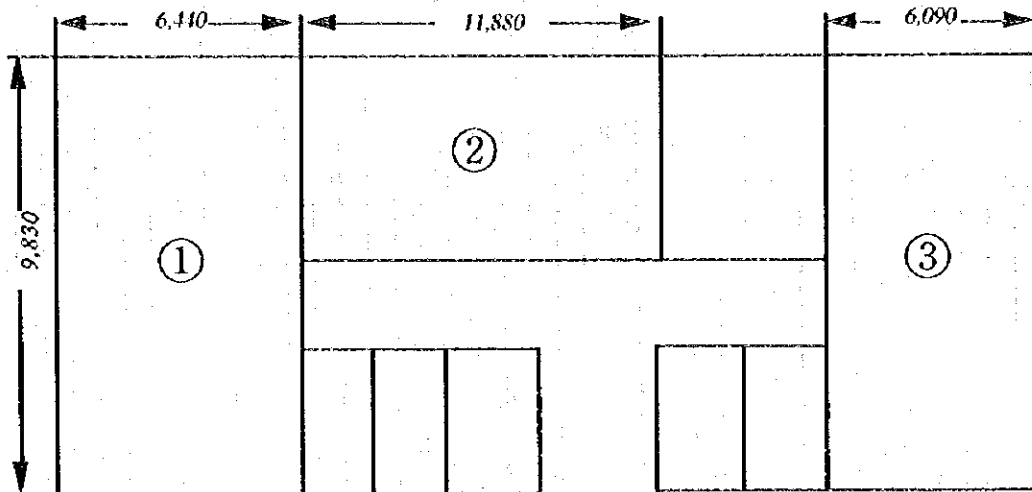
Artificial dialysis apparatus and peritoneum perfusion apparatus are requested for treating patients with acute or chronic renal insufficiency. The medical equipment to be procured on this project is analyzed and determined in consideration of the room arrangement as well as the needs of patients, the appropriation plan of staffing and running cost, and the technical level of the staff.

Water supply and drainage are required for dialysis treatment, and dialysis apparatus, which needs pretreatment of water, requires space. Therefore, it is preferable that the existing right or left room be used for dialysis treatment and the two remaining rooms for intensive care.

#### Determination on Facility Size

In Japan,  $15 \text{ m}^2$  are required for each bed in ICU, and the room must be biologically clean as principle.

The three rooms of the ICU Department have each (1) 9,830 mm x 6,440 mm = 63.3 m<sup>2</sup>; (2) 4,280 mm x 11,880 mm = 50.85 m<sup>2</sup>; and (3) 9,830 mm x 6,090 mm = 59.86 m<sup>2</sup> (refer to the drawing).



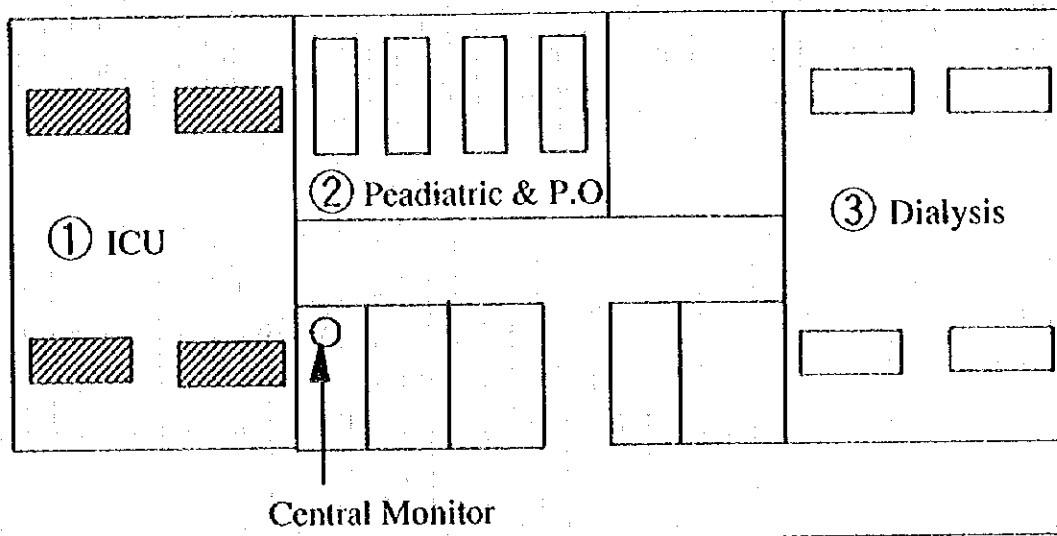
These rooms have no air-conditioner, and windows are covered with blinds. As such, it is difficult to keep cleanliness. If the number of beds are calculated for each room by applying the above Japanese standard, then (1)  $63.3 \text{ m}^2 / 15 = 4.22 \Rightarrow 4$  beds; (2)  $50.85 \text{ m}^2 / 15 = 3.39 \Rightarrow 3$  beds; and (3)  $59.86 / 15 = 3.99 \Rightarrow 4$  beds. One room must be prepared for dialysis treatment, accommodating two dialysis apparatus requested for the project, and the other two rooms are used for intensive care. As Room (3) has a water supply line and a drain, Room (3) is appropriated for dialysis treatment, and Room (1) and (2) are appropriated for intensive care. Therefore, it is appropriate to limit the size of the ICU to a maximum of 6 beds.

The medical equipment for the ICU is analyzed and determined after deciding the size of the ICU to 6 beds in consideration of the room arrangement, the needs of patients, the staff appropriation plan, and the technical level of the staff.

### Discussion with the Hospital

The hospital requested two things for the project. One is to establish a fully equipped 14 beds ICU, and the other is to set up a dialysis unit. The hospital is prepared to have a urologist and a nurse and a medical engineer experienced in dialysis treatment. The hospital is also prepared to sign a maintenance agreement with a manufacturer and to charge the patients in order to keep the dialysis unit operating.

After the analysis and determination, the basic design team consulted the hospital staff, and a decision has been reached. The existing ICU be arranged to have a size of 12 beds, comprising a room of 4 beds for intensive care, a room of 4 beds for pediatric care and post-operational recovery care, and a room of 4 beds for the dialysis unit.



**Fig. 3-1; ICU Layout figure**

**Medical Equipment**

According to the above arrangement of the rooms, the equipment to be procured is decided.

**ICU Room**

ICU beds, Bedside monitor, Pulse oximeter, Respirator, Infusion pump, Blood warmer, Syringe pump, and Ultrasonic nebulizer.

\* A central monitor is planned to be placed in the room next to the ICU room, and this central monitor will be used for the purpose of training for students and nurses.

**Pediatric Care and Post-operational Recovery Care Room**

4 ICU beds, and

Bedside monitors, Pulse oximeters, Infusion pumps, Blood warmers, Syringe pumps, and Ultrasonic nebulizers, which are for two ICU beds.

\* The other two beds are not equipped with these items because they are procured for the purpose of expanding the ICU in the future.

**Commonly used in above Two Rooms**

ECG, EEG, Defibrillator, Spirometer, Mobile X-ray apparatus, X-ray film viewer, Patient lift, Anaesthesia table, Resuscitation trolley, and Cupboard.

## **Dialysis Room**

4 ICU beds and 2 Haemodialysis units

\* Two ICU beds are procured for future expansion.

Patients with renal insufficiency are forced to go to the neighboring country Kenya to receive dialysis treatment as the treatment is not available in Uganda. Considering that the hospital is going to arrange a staff who will operate dialysis treatment effectively, it is appropriate to supply dialysis apparatus since the hospital is a top referral hospital. With provision of dialysis apparatus, the project will greatly contribute to the improvement of medical services in Uganda.

However, peritoneal dialysis apparatus, which has a similar function as hemodialysis apparatus, was deleted from the equipment list.

## **Items Used Commonly in All Rooms**

Stethoscope, Sphygmomanometer, diagnostic set, and oxygen cylinder trolley.

\*A personal computer was requested, but its use was not clear, so it was deleted from the list.

A blood gas analyzer is planned to be installed in the Emergency Laboratory, which is located between the ICU and the Central Laboratory so that both the ICU and the Central Laboratory can have access to the equipment. The Emergency Laboratory is equipped with a centrifuge, a water bath, microscopes and spectrophotometers for treating emergency patients. The existing blood gas analyzer was granted by an aid organization years ago, so it is not repairable any more. There are two local representatives of a European and American manufacturers of blood gas analyzers. Therefore, the blood gas analyzer for the project will be selected from the manufacturers who have local representatives in Uganda or Kenya to secure necessary maintenance.

## **(2) Overall Plan : Central Laboratory**

Most of the existing laboratory equipment is outdated or scrapped. The equipment still usable is quite old, experiencing frequent break downs, and daily examination work is often interrupted by equipment trouble. However, the existing electricity, water, and drainage lines are being renovated by First Health Project and Rehabilitation Project.

The equipment for the Central Laboratory was discussed with hospital based on the list which was submitted during the field study. Considering the following points, both sides agreed on the equipment to be procured. The items of the equipment are then listed in the minutes of meeting.



**Items Excluded:** Condenser, Electrical kettle, Photocopier, Office table, Office chair with arm rest, Office chair without arm rest, Filing cabinet, Steel cupboard, Pedal bins, Dispenser trolley, Laboratory stool, Scientific calculator, Electric typewriter, Mechanical typewriter, Diskettes, Diskettes box, and a Data switch

**Items Replaced:** Type A refrigerator and Type B refrigerator are replaced with Refrigerator of one type; Bench-type autoclave and High pressure steam sterilizer are replaced with Steam sterilizer of one type; Microtome knife is included in Microtome as a component; Objective lenses are included in Microscope as components; UPS and Stabilizer are included in the equipment as components so they are deleted from the list; Computer-related items are included in Computer with printer; and VIDAS system is a product name, so it is renamed in the list as Immunoanalyzer.

**Items Added:** Knife sharpener, Refrigerated microtome, Paraffin dispenser, pipette washer, Stirrer, Haemoglobinometer, Hematocrit centrifuge, CO2 incubator, Cytocentrifuge, Slide warmer, and Paraffin bath.

### **Clinical Chemistry**

Auto-analyzer, Centrifuge, Water bath, Flame photometer, PH meter, etc.

At present, the dispensing unit of the existing autoanalyzer is out of order, and it is not repairable because spare parts are not available any more due to it being an old model. Necessary reagents are manually dispensed for a large number of specimens. In addition, other basic equipment including centrifuges, a water bath, a flame photometer, a PH meter, etc. is also dilapidating. Therefore, these items also need renewal.

A high-performance liquid chromatography was requested. This item is not commonly used in hospital laboratories and also deemed difficult to maintain. Therefore, it is deleted from the equipment list.

### **Haematology**

Haematoanalyzer, Microscope, Centrifuge, Blood bank refrigerator, etc.

The existing haematoanalyzer is out of order and not repairable due to it being an old model. Microscopes, centrifuges, blood bank refrigerators are also old. Therefore, these items also need replacement.

Fibrinometer with coagulation system and Immunoanalyzer were listed in the request, but these items are deleted from the equipment list. The reasons are that they are sophisticated equipment and difficult to maintain and that the number of specimens is small.

### **Microbiology**

Centrifuge, CO2 incubator, Microscope, Deep freezer, etc.

### **Pathology**

Microtome, Refrigerated microtome, Slide warmer, Cytocentrifuge, Paraffin bath, etc.

There are microtomes, a refrigerated microtome, a slide warmer, a cytocentrifuge, a paraffin bath in the pathology section, but they are very old almost to the point of being scrapped. Therefore, they need to be replaced.

The hospital is computerizing data management. The Central Laboratory, which is improved with Japanese assistance, is excluded from the improvement carried out by other projects. Computer is useful to clinical data management, so one set of personal computer is planned to be placed in the office of microbiology for data management of all examinations performed in the Central Laboratory.

Pedal bin, Scientific calculator, and Typewriter were listed in the request, but they can be purchased locally by the hospital. Therefore, these items are deleted from the equipment list.

### **(3) Equipment plan**

The equipment is carefully selected, based on the project's policy, which is mentioned previously. The items selected for the project are listed as follows.

ICU	No. <u>Equipment</u>	<u>Q'ty</u>
	1 ECG	3
	2 EEG	1
	3 Ultrasound Diagnosis apparatus	1
	4 Bedside Monitor	6
	5 Central Monitor	1
	6 Pulse Oxymeter	6
	7 Defibrillator	1
	8 Resuscitation Trolley	1
	9 Spirometer	3

10	Stethoscope	20
11	Sphygmomanometer	20
12	Diagnostic Set	10
13	Infusion Pump	12
14	Syringe Pump	8
15	Blood Warmer	6
16	Respirator	4
17	Anaesthesia Table	2
18	Oxygen Cylinder Trolley	10
19	Instrument Trolley	6
20	Stretcher(Patient Trolley)	2
21	ICU Bed with Mattress	12
22	Over Bed Table	12
23	Haemodialysis Unit	2
24	Lift of Patient	1
25	Mobile X-ray Apparatus	1
26	X-Ray Film Viewer	1
27	Ultrasound Nebulizer	6
28	Blood Gas Analyzer	1
29	Suction Unit	6
30	Cabinet for ICU	1

**Central Laboratory**

<u>No.</u>	<u>Equipment</u>	<u>Q'ty</u>
1	Centrifuge	6
2	Colorimeter	5
3	Refrigerator	8
4	Binocular Microscope	6
5	Hot Air Oven	4
6	Vertical Autoclave	5
7	Waterbath	4
8	Mechanical Shaker	1
9	Blood Differential Counter	7
10	Flame Photometer	1
11	pH meter	2
12	Interval Timer	10
13	Spectrophotometer	1
14	Computer with Printer	1
15	Anaerobic Jar	3
16	Deep Freezer	4

17	Analytical Balance	4
18	Water Distiller	4
19	Hot Plate	3
20	Tally Blood Counter	8
21	Slide Drier	1
22	Drying Cabinet	3
23	Autoanalyzer	1
24	De-Ionizer Unit	3
25	Haematology Analyzer	1
26	Blood Bank Refrigerator	4
27	Overhead Projector	1
28	Projector Screen	1
29	Slide Projector	1
30	Micro Pipette Set	1
31	Glassware Washing Machine	2
32	Microtome	1
33	Microtome Knife Sharpener	1
34	Freezing Microtome	1
35	Tissue Processor	1
36	Pipette Washer	1
37	Stirrer	2
38	Hemoglobin Meter	1
39	Haematocrit Centrifuge	1
40	CO2 incubator	1
41	Loop Holder	5
42	Balance	1
43	Cystocentrifuge	1
44	Paraffin Dispenser	1
45	Slide Warmer	1
46	Stirrer with Hotplate	1
47	Paraffin Bath	1

**Table 2-1 : Specifications for Main Items**

Name of Equipment	Principal Specifications	Applications & Propriety
EEG	1) Number of channels: 10 2) With a memory for measuring programs 3) With a photic stimulator	This equipment measures electric potential differences generated over the surface of the head by the brain function. Thus, it is used for diagnosing diseases whose causes may be traced to the brain function. This equipment requires only most basic specifications. It should have 10 channels for electroencephalography, which number of channels are enough for general examination, and it should be capable of memorizing a measuring program and of automatically carrying out the measurement. It should include a photic stimulator, which is often applied for stimulating the brain function through eyes for encephalography. The hospital has an examining room which is electromagnetically shield especially for having electroencephalography.
Ultrasound Diagnosis Apparatus	1) Imaging mode: B mode, M mode and B/M mode 2) Probe model: Convex and linear 3) Display: 9 inch CRT	This equipment transmits ultrasound waves into the human body and catches reflective waves. Then, it analyzes the reflection and gives images showing respective body organs. By detecting and analyzing ultrasound reflection, various diagnoses can be determined, imaging the diseased condition or characteristic figure of a respective organ and tissues. A 9-inch display and two probes are selected for this equipment, so that the examiner will carry out observation of various organs easily. This equipment requires only basic specifications.
Bedside monitor	1) Items monitored: Electrocardiography, pulse wave, body temperature 2) Capable of detecting arrhythmia 3) Monitor: Non-fade 5.5-inch CRT 4) Capable of measuring blood pressure uninvassively	Generally, patients cared in ICU are monitored in observing electrocardiogram, blood pressure waves, respiration waves, heart rate, body temperature, respiration rate, etc. The ICU of the hospital considered on this project has been developed from a recovery room, where patients after operation were treated in the past. The current ICU is a general ICU, and it is used for caring patients with respiratory disease as well as for treating neonates as NICU. Therefore, the equipment should include functions for monitoring electrocardiograph, pulse-waves, body-temperature, and blood pressure. The need of consumables should be also considered for this equipment.
Respirator	1) Method: Volume-controlled / Pressure controlled 2) Drive mode: SIMV, IMV, ASSIST, PEEP, CPAP 3) Tidal volume: 50~ (1200-3500) ml 4) Maximum flow: 20~50 lit./min. 5) Attachments: Humidifier, nebulizer, compressor, oxygen cylinder	This equipment is used for assisting a patient with respiratory insufficiency and for controlling the respiration of a patient after operation. This equipment should have functions for both volume-controlled respiration and pressure-controlled respiration, which are most required in treatment, and also include functions of SIMV, IMV, ASSIST, PEEP and CPAP. This equipment should be applicable for adult as well as for child with a body weight of 10 kgs or more. The equipment should include a humidifier and a nebulizer, which attachments are necessary for treating a patient with a respirator. It should also include patient circuits which are reusable after sterilization. Since the hospital does not have a centrally controlled system for supplying pressurized air and oxygen, this respirator should come with a compressor and oxygen cylinders. These specifications are basic for an ordinary respirator.

Name of Equipment	Principal Specifications	Applications & Propriety
Haemodialysis unit	1) Dialyzing method: Single-pulse method 2) Supply flow of dialyzing fluid: 500ml/min. 3) Temperature control: 34-40 degree C 4) Blood-circulation pump: 40-500ml/min. flow rate adjustable 5) With a bubble detector	<p>This equipment is used for treating patients with chronic or acute renal insufficiency or patients experiencing intoxication. The equipment procured on this project will be applied for treating a group of patients who are rich enough to pay for the service. Charging fees for the treatment is meaningful in consideration of benefits contributed to the project. At present, most patients who need artificial dialysis go abroad for the treatment. By charging such patients who are dialyzed with the equipment procurement, other departments of the hospital can be financially helped. Mulago Hospital says they can retain a capable operator for this equipment.</p> <p>Therefore, it is considered that if the equipment procured on this project is of the same basic type as popularly used in Kenya, then the operation and maintenance of the equipment can be carried out without much trouble in the hospital. A representative for a manufacturer of this equipment is present in Kenya, so a system for procuring consumables and maintaining the equipment can be established in Uganda.</p>
Mobile X-ray apparatus	1) Mode: Capacitor-charging method 2) Tube voltage: (40-50)~125 kV 3) mAs: 0.5~(125-320) mAs 4) X-ray tube: 140~270 kIII 5) Transfer method: Battery powered 6) Power source: Rechargeable battery	<p>This equipment is used to radiograph a patient who is too weak to move from his bed to an X-ray examining room. All the body parts can be X-rayed in simple radiography with this equipment. As level of performance, this equipment should have a capacity of 125kV with 100mAs for various radiographic conditions. This equipment, which utilizes a capacitor for charging high voltage, does not experience much trouble in operation, so it will be easily maintained. This equipment will be moved around in the hospital, pushed by only one radiologist. Therefore, this equipment should be of a type which is equipped with a battery-powered drive, because a mobile X-ray apparatus which depends on human power for its transfer is too heavy to be pushed or lifted up even over a little step, which will be encountered in the corridors of the hospital. Since some rooms of the hospital are not provided with a power outlet, the equipment should be battery-powered so that it will be used for radiography in any room. Nevertheless, this equipment does not require special features, but only basic specifications.</p>
Blood Gas Analyzer	Number of items measured: pH, PO <sub>2</sub> , PCO <sub>2</sub>	<p>Blood gas analysis is a daily routine testing in clinical laboratories, and this equipment is most significant to monitor patients in ICU. Decisions of treatment and care is made based on the testing result with this equipment. A representative for a manufacturer of this equipment is present in Kenya, so a system for procuring consumables and maintaining the equipment can be established in Uganda.</p>

Name of Equipment	Principal Specifications	Applications & Propriety
Autoanalyzer	1) Number of items measured: 22~32 items 2) Measuring method: Photometer-transfer direct photometry 3) Reaction time: 12~15 min. 4) Number of specimens tested: 300 samples/hour 5) With a water purifier Flow rate: 100 lit./hour	<p>At present, Hospital carries out biochemical analysis by using two spectrophotometers. This condition presents a limit to the number of specimens tested per day, affecting daily routine testing severely. These spectrophotometers are more than ten years old, and procurement for spare parts is becoming difficult year by year. The autoanalyzer planned on this project will ensure daily routine testing for Hospital, so these existing spectrophotometers will be set as standby for emergency use in case that the autoanalyzer experiences trouble. The model for this equipment will be considered on whether the manufacturer has a representative in Uganda, so that a system for procuring reagents and consumables and for maintaining the equipment will be established for Hospital.</p>
Haematology Analyzer	1) Number of items measured: WBC, RBC, MCV, MCH, CHC, Hct, etc. 2) Number of specimens tested: 60 testing /hour	<p>This equipment measures the number of RBCs and WBCs in whole blood, so that it is most significant equipment in haematologic testing. The haematology analyzer planned on this project will ensure improvement of protocol and capacity of the testing which has been carried out by manual method in Hospital. The model for this equipment will be considered on whether the manufacturer has a representative in Uganda, so that a system for procuring reagents and consumables and for maintaining the equipment will be established for Hospital.</p>

The following list shows the equipment to be procured on the project. The items are selected through a determination process of discussions and analyses on the equipment list of the minutes of meetings. The items which are considered to have one of the following factors listed below are deleted from the equipment plan.

- a. It does not contribute to basic medical services.
- b. It is not suitable for the level and the function of the target department.
- c. It would not be utilized fully as its usage rate is low.
- d. It can be procured locally by the hospital.
- e. Maintenance is deemed difficult from financial and technical standpoints.
- f. It belongs to the category of consumables and reagents.
- g. Similar equipment is already requested in the proposal.
- h. It is included as a component of another equipment requested or has the same function as that of another equipment.
- i. It is no longer needed as the same type of equipment has been procured or a budget appropriation has been already made for the procurement of the equipment after the submission of the request.
- j. It has been substituted with less advanced and easier-to-operate equipment that does not require high precision.
- k. There are no or hardly any agent within the country that can supply consumables and spare parts.
- l. No appropriate equipment can be found to suit the need.
- m. It has been substituted with up-to-date equipment that is commonly used today.

**Table 2-2 : Check List for Equipment Determination (ICU)**

No	Name of Equipment	Minutes Priority	Req Qty	Planned Qty	Final Qty	Selection Criteria													
						a	b	c	d	e	f	g	h	i	j	k	l	m	
1	ECG	A	3	3	3														
2	EEG	B	2	1	1														
3	Ultrasound Diagnosis apparatus	A	1	1	1														
4	Bedside Monitor	A	20	6	6														
5	Central Monitor	C	3	0	1														
6	Pulse Oxymeter	A	10	3	6														
7	Defibrillator	A	5	1	1														
8	Resuscitation Trolley	A	5	1	1														
9	Spirometer	A	3	3	3														
10	Stethoscope	A	20	20	20														
11	Sphygmomanometer	A	20	20	20														
12	Ultrasonic Doppler Pen Size	C	5	0	0	x	x	x											
13	Percussion Hammer	A																	
14	Diagnostic Set	A	10	10	10														
15	Infusion Pump	A	20	12	12														
16	Syringe Pump	A	10	6	8														
17	Blood Warmer	A	10	6	6														
18	Respirator	A	10	6	4														
19	Anaesthesia Table	A	5	2	2														
20	Oxygen Cylinder Trolley	A	10	10	10														
21	Instrument Trolley	A	10	6	6														
22	Stretcher(Patient Trolley)	A	10	2	2														
23	ICU Bed with Mattress	A	14	14	12														
24	Over Bed Table	A	14	14	12														
25	Haemodialysis Unit	B	2	2	2														
26	Peritoneal Dialysis Set	B	10	0	0														
27	Lift of Patient	A	1	1	1														
28	Mobile X-ray Apparatus	A	1	1	1														
29	X-Ray Film Viewer	A	1	1	1														
30	Ultrasound Nebulizer	A	5	6	6														
31	Computer with Printer	C	1	0	0	x	x	x											
32	Blood Gas Analyzer	B	1	1	1														
33	Suction Unit	-		6	6														
34	Cabinet for ICU	-		1	1														



**Table 2-2 : Check List for Equipment Determination (Central Laboratory)**

No.	Name of Equipment	Minutes Priority	Req Qty	Planned Qty	Final Qty	Selection Criteria												
						a	b	c	d	e	f	g	h	i	j	k	l	m
1	Centrifuge	A	6	6	6													
2	Colorimeter	A	5	5	5													
3	Refrigerator	A	4	8	8													
4	Microscope Binocular	A	6	6	6													
5	Hot Air Oven	A	4	4	4													
6	Autoclave (Vertical)	A	5	4	5													
7	Waterbath	A	4	4	4													
8	Mechanical Shaker	A	2	1	1													
9	Blood Differential Counter	A	7	0	7													
10	Flame Photometer	A	1	1	1													
11	pH meter	A	2	2	2													
12	Interval Timer	A	10	5	10													
13	Spectrophotometer	A	1	1	1													
14	Computer with Printer	C	1	0	1													
15	Anaerobic Jar	A	3	3	3													
16	Timer	A	8	0	8													
17	Deep Freezer	A	4	3	4													
18	Analytical Balance	A	2	4	4													
19	Water Distiller	A	4	4	4													
20	Hot Plate	A	3	3	3													
21	Tally Blood Counter	A	8	6	8													
22	Slide Drier	A	3	1	1													
23	Drying Cabinet	A	3	1	3													
24	Autoanalyzer	B	1	1	1													
25	De-ionizer Unit	A	3	2	3													
26	Haematology Analyzer	B	1	1	1													
27	Fibrinometer Coagulation System	B	1	0	0	x	x	x										
28	Blood Bank Refrigerator	A	2	4	4													
29	Overhead Projector	A	1	1	1													
30	Projector Screen	A	1	1	1													
31	Slide Projector	A	1	1	1													
32	Micro Pipette (Set)	A	1	1	1													
33	Pedal Bins	C	12	0	0	x	x		x									
34	High Performance Liquid Chromatography	C	1	0	0	x	x	x		x								
35	Scientific Calculator	C	10	0	0	x	x		x									
36	Electrical Typewriter	C	1	0	0	x	x		x									
37	Manual Typewriter	C	1	0	0	x	x		x									
38	Glassware Washing Machine	A	4	1	2													
39	Bactometer	B	1	0	0	x	x	x										
40	Immunoanalyzer	C	1	0	0	x				x								
41	Automatic Media Dispenser	A	1	0	0	x	x	x										
42	Microtome	A	1	1	1													
43	Microtome Knife Sharpener	A	1	0	1													
44	Freezing Microtome	B	1	0	1													
45	Tissue Processor	A	1	1	1													
46	Vacuum Impregnator	B	1	0	0											x		x
47	Pipette Washer	-	0	1	1													
48	Stirrer	-	0	2	2													
49	Hemoglobin Meter	-	0	1	1													
50	Haematocrit Centrifuge	-	0	1	1													
51	CO2 incubator	-	0	1	1													
52	Loop Holder	-	0	5	5													
53	Balance	-	0	1	1													
54	Cystocentrifuge	-	0	1	1													
55	Paraffin Dispenser	-	0	1	1													
56	Slide Warmer	-	0	1	1													
57	Stirrer with Hotplate	-	0	1	1													
58	Paraffin Bath	-	0	1	1													

## **Chapter III IMPREMENTATION PLAN**

## Chapter 3 IMPLEMENTATION PLAN

### 3-1 Implementation Plan

#### 3-1-1 Implementation Policy

This project will be implemented in accordance with the grant aid assistance system of the Government of Japan. The grant for the project will be commenced formally after approval and signing of an Exchange of Notes (E/N) by the Governments of Uganda and Japan.

After the signing, a Japanese consultant firm will enter into a consultant service agreement with the Ministry of Health of Uganda in accordance with the grant aid assistance system. In compliance with the agreement, which becomes effective upon verification by the Government of Japan, the consultant firm will provide consultancy services in designing the project in detail, planning and opening a bidding, and monitoring the implementation of the project.

The procurement and installation of the equipment will be carried out by a Japanese supplier who wins the bidding as supplier on the project and signs a supply agreement with the Ministry of Health of Uganda. This supply agreement becomes effective also after verification by the Government of Japan. The supplier will procure, deliver, and install the equipment, and will provide technical training on operation and maintenance. In addition, he will also provide manuals and technical data necessary for maintenance as well as lists of manufacturers and representatives.

The implementing agencies of Uganda are organized as follows.

#### Ministry of Health

The Permanent Secretary (PS) of the Ministry of Health is the person to sign the above agreements. He is the department chief of the Medical Service Department, which is an executing body of medical engineering.

#### Mulago Hospital

Mulago Hospital is in charge of the project on the site, and it is organized for the execution of works as follows.

General Management	: Executive Director of Mulago Hospital
Detailed planning	: Director of Surgical Service of Mulago Hospital Director of ICU, Director of Central Laboratory
Maintenance	: Maintenance Department of Mulago Hospital
Consumables	: General Department of Mulago Hospital

### **3-1-2 Cautions in Implementation**

It is necessary to be careful about restraining noise and keeping hygiene so that the installation work carried out in the hospital will not disturb outpatients as well as inpatients. Especially, safety measures shall be taken when the equipment is delivered into the hospital.

### **3-1-3 Scope of Works**

The works carried out on the project are shared by both countries as follows.

#### **(1) Government of Japan**

1. Procurement cost of the equipment on the project;
2. Both marine and inland transportation cost of the equipment to the hospital;
3. Installation cost of the equipment; and
4. Cost for providing technical instructions on the inspections, test runs, operation, and maintenance on the equipment.

#### **(2) Government of Uganda**

1. Presenting information and data necessary for the installation of the equipment;
2. Providing office space inside the hospital for the project;
3. Providing peripheral and auxiliary work such as laying out lines of electricity, water, and drainage, which might be necessary for installing the equipment;
4. Vacating the places which are planned for the installation space of the equipment; and
5. Providing storage for the equipment upon arrival until the installation.

### **3-1-4 Consultant's Supervision Plan**

After selecting a Japanese supplier which undertakes the procurement and installation of the equipment, the Japanese consultant firm will provide supervisory work on the project. The objectives of the supervision are to verify whether or not the equipment procurement is carried out in accordance with the design documents and the supply agreement. The consultant will provide guidance, advice, and coordination to the supplier for the purpose of improving the quality of the work carried out by the supplier throughout the project implementation. Before the equipment is transported, the consultant will inspect the packaging for securing proper protection against moisture and high temperature, which are expected during ocean and inland transportation. At the installation stage, the consultant will supervise the installation work and report the progress of it to the authorities concerned of both countries, and will give necessary guidance to the implementing agencies of Uganda and the supplier. After the installation, the consultant will inspect the equipment through test operation and confirm the good

condition of the equipment. Staff members who are responsible for providing health care, maintenance, and engineering, need to have some basic knowledge of operation and maintenance regarding some equipment, so they should be provided with some training during the installation. The consultant shall give guidance and advice to the Ugandan agency and to the supplier for holding training sessions. The consultant shall consist of three members including a project manager, an equipment planner, and a facility planner.

### **3-1-5 Procurement Plan**

The followings should be considered for procuring the equipment.

#### **(1) Local supply**

It is difficult to purchase any item of the medical equipment locally in Uganda because the market for medical equipment is small. If maintenance and purchase of consumables are considered, then it is better to procure the equipment outside the country, preferably from Europe. However, a personal computer with a printer can be procured locally in consideration of compatibility with existing computer systems, which have been provided and maintained by local agents.

#### **(2) Procurement from Third Countries**

Few Japanese products of medical equipment are available in Uganda, and maintenance systems for Japanese medical equipment are not well established. Judging from this condition, the following items of equipment are better to be procured from third countries, e.g., European countries.

\* Haemodialysis unit, Blood gas analyzer, Autoanalyzer, and Haematology analyzer.

When procuring products manufactured in countries other than Japan, it is decided on the basis of satisfying the need of maintenance in consideration of such matters as access to services provided by specialists and purchasability of consumables and spare parts. Therefore, the above items shall be procured from manufacturers who have local representatives in Uganda or Kenya.

#### **(3) Transportation Period**

Transportation of the equipment will take about six to seven weeks. Four weeks are spent for marine transportation from Japan. If the equipment is procured from third countries, e.g., from Europe, then it will take two to four weeks. Then, one week will be spent for customs clearance, and three to four days for inland transportation. The unloading port is Mombasa in Kenya, so the shipping schedule shall be carefully planned so that there will be no delay in the overall implementation of the project.

### 3-1-6 Implementation Schedule

#### (1) Detailed Design Work

The consultant will start detailed design work immediately after an agreement of consulting service signed with the Ministry of Health of Uganda is verified by the Government of Japan. He will compile a set of tender documents including detailed design drawings, technical specifications, and tender instructions. This tender documents shall be approved by the Ugandan side through discussions on the detailed equipment plan. This detailed design work will require about 3 months.

#### (2) Tender-related Work

The supplier for the project will be selected through a bidding. This bidding will be carried out in the following order: publicizing the bidding, accepting applicants for participating in the bidding, distributing tender documents, receiving tenders, evaluating the tenders, nominating a supplier, and signing an equipment supply contract. This process will take about 2 months.

#### (3) Equipment Procurement and Installation Work

After an equipment supply contract is signed between the Ministry of Health of Uganda and the supplier, it needs verification by the Government of Japan. Upon the verification, the procurement work will start. In consideration of the size and contents of the project and the local condition, this work will require about 7 months until the completion of the installation.

Fig. 3-1 shows the project implementation schedule. The implementation of the project starts from the signing of Exchange of Notes and ends at the completion of the project.

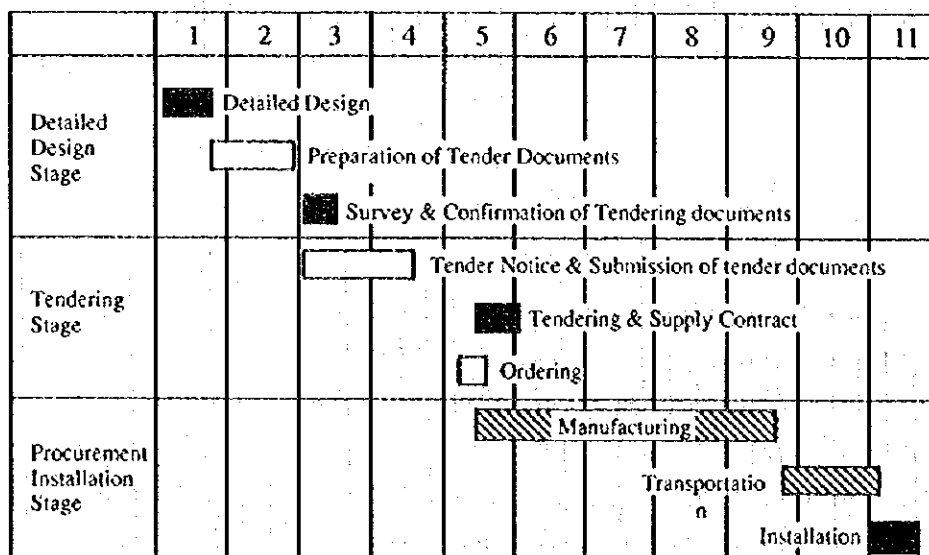


Fig. 3-1 Implementation Schedule

### **3.1-7 Obligations of Recipient Country**

The matters to be implemented for this project by the Ugandan side are as follows.

1. Presenting information and data necessary for the implementation of the project;
2. Arranging smooth unloading, customs clearance and inland transportation of the equipment in Kenya;
3. Exempting persons concerned with procurement of the equipment and related services from customs duties and various taxes;
4. Providing convenience to Japanese nationals who may bring in some equipment to carry out work and services on the project and taking security measures for them;
5. Bearing costs and expenses for Banking Arrangement (B/A) and Authorization to Pay (A/P) procedures;
6. Assigning personnel and appropriating funds for effective implementation of the project (to meet operation and maintenance cost of the equipment);
7. Providing technical training for the staff to handle the equipment effectively;
8. Submitting an operation plan of the equipment;
9. Maintaining the equipment properly and effectively, and bearing the costs and expenses arising therefrom;
10. Granting permission, licenses and other certificates required for implementation of the project;
11. Bearing costs and expenses involved in the above duty and tax exemption;
12. Collecting data to report how the equipment is being used after the completion of the project; and.
13. Bearing costs and expenses which may arise while implementing the project and which have not been specified in this report.

### 3-2 Operation and Maintenance Cost

#### (I) Maintenance System and Method

The government has constructed a new building for workshops next to the room for a boiler generator on Rehabilitation Project in order to strengthen the maintenance system so that the hospital will be able to take care of facilities and medical equipment. This new building has workshops and offices which are occupied by the mechanical division, the electric division, and the electronic division. These divisions are equipped with tools and measuring instruments.

As for medical equipment, the electronics division is responsible. There is an engineer who has been trained in the United States. He is conducting daily repair and inspection work. Each equipment has been registered on a computer. If any trouble occurs, cause and replacement parts are recorded in a data base so that history of the medical equipment used in the hospital is kept for effective maintenance. However, the data accumulated is small at present. Table 3-1 shows the staff of the Maintenance department which consists of 54 engineers and technicians including clerks.

**Table 3-1: Staff of the Maintenance Workshop**

Maintenance Staff	Number
Electronic engineer	1
Electric engineer	2
Mechanic engineer	2
Electronic technician	4
Electric technician	10
Mechanic technician	5
Other worker	20
Office worker	10
Total	54

As for the haemodialysis units, the blood gas analyzers, and the autoanalyzer, the hospital will sign maintenance-service contracts with the manufacturers so that precision of the equipment will be kept.

The present system works as follows. When malfunctions are found by operators of the equipment, the workshop receives a report concerning the problems. Engineers from the workshop examine the condition and carries out repair work in the workshop. If the trouble is beyond their ability, the workshop requests repair work to a representative of the manufacturer. The equipment procured on this project can be also fully taken care of by the existing system.

There is a request from patients that the environment for providing medical services be improved because a cost sharing scheme is being introduced. In response, the hospital has established a policy to secure effective use of the equipment. The



manufacturer should secure the reliability of the equipment so that the responsibility for maintenance will be clarified and idling of the equipment will be reduced. Also for the high-technology equipment, the policy is to conclude service contracts with the manufacturer or his representative so that the manufacturer or his specialist will perform periodic inspections, maintenance, and adjustments if necessary. So far, the hospital has concluded a service contract for a CT scanner. This project also requires such service contracts to ensure effective use of the equipment after the implementation.

## **(2) Supply System for Spare Parts and Consumables**

As for spare parts and consumables necessary for the maintenance of the equipment, the hospital shall estimate the cost based on prices of these items and take a budgetary appropriation. The respective manufacturers shall guarantee the supply of such parts on the basis of costs paid by the hospital at least for the first five years.

## **(3) Technical Data Preparation**

The supplier shall submit operation manuals, maintenance manuals, parts list, drawings, manufacturers list and agents list as follows.

### **1. Operation manual**

Each equipment shall be accompanied with an operation manual, and 1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

### **2. Maintenance manual**

1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

### **3. Parts list**

1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

### **4. Drawing**

1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

#### 5. Manufacturers list

1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

#### 6. Agents list

1 set of all manuals shall be provided in files classified by the item numbers for the workshop and another 1 set for the administration of the hospital.

The supplier shall dispatch engineers who can give the staff in charge of operating the equipment some training on operation, daily inspection, and trouble shooting during installation.

#### (4) Maintenance Cost Estimation

Annual operation and maintenance costs for main ten items of the equipment (those requiring high operation and maintenance costs) is estimated at about 8,650,000 yen (about 88,381,000 Ush.) for the ICU and about 8,046,000 yen (about 82,209,000 Ush.) for the Central Laboratory, reaching a total of 16,695,000 yen (about 170,590,000 Ush.) in total.

**Table 3-2 Estimated Annual Maintenance Costs of Principal Equipment**

Name of Equipment	Annual Costs (Yen)	Qty	Total Costs (Yen)	Total Costs (Ush)
Electrocardiograph	253,000	3	759,000	7,755,000
Bedside Monitor	275,000	6	1,650,000	16,859,696
Mobile A-Ray Apparatus	2,900,000	1	2,900,000	29,630,435
Ultrasound Diagnosis Apparatus	1,493,000	1	1,493,000	15,254,565
Respirator	462,000	4	1,848,000	18,881,739
Autoanalyzer	2,762,000	1	2,762,000	28,220,435
Blood Gas Analyzer	1,098,000	1	1,098,000	11,218,696
Spectrophotometer	548,000	1	548,000	5,599,130
Haematology Analyzer	1,038,000	1	1,038,000	10,605,652
Haemodialysis Unit	1,300,000	2	2,600,000	26,565,217
Total			16,695,000	170,590,565

Estimation of Maintenance Cost

No.	Equipment	Maintenance			Repairs parts			Consumable			Sub total ,000 Yen	cost/patient	Depreciation		Note
		Amount	parts	price Qty amount ,000 Yen	price Qty amount ,000 Yen	Item	price Qty amount ,000 Yen	,000 Yen	Yen	Yen					
1	ECG Jch 250 days operation 20 test/day	80.00													recording paper:25mx10 pcs. 1personx0.5m x 5000 times #250m electricity not included
2	bedside monitor 160 days operation 1 patient/day	80.00	Amount												recording paper:30mx10 pcs. electricity not included
3	Mobile X-ray unit 250 days operation 10 patients/day 2 films/patient	80.00	Amount 150.00 X-ray tube 1 change (for 2 yrs)	1,000 0.5 500.00	0.5	500.00	film developer/fixing liqu	0.45 5,000 0.01 5,000	2,250.00 50.00	275.764	Yen/day	309.6	584		electricity not included
4	ultrasound apparatus 250 days operation 15 patients/day	150.00	Amount 150.00 probe A 1 change (for 2 yrs)	1,000 0.5 500.00	0.5	500.00	Recording paper	3.00 50 3.50 55	150.00 192.50	2,950	580yen/pc	630.6	3,580		gel 250 daysx20personx15ml #75000ml -> 75kg recording paper 250daysx20personx3D6cs #15,000pcs
5	Respirator 250 days operation 1 patients/day	90.00	Amount 90.00	1,000.00		1,000.00	Amount humidifier chamber flow sensor oxygen sensor tubing kit	1.50 24 2.80 26 6.00 6 39.00 1 52.00 2	347.50 36.00 100.80 36.00 39.00 104.00	1,493.98	Yen/patient	1,481.6	2,674		electricity not included
		Amount	90.00	Amount		90.00	Amount	9.90	19.80	476.7	700 Yen/day	416.7	842		
		Sub Total	560.00	Sub Total		1,500.00	Sub Total		3,345.90	5,397		3,293	8,180		

Estimate of Maintenance Cost

No.	Equipment	Maintenance		Repair part			Consumable				Sup Total amount ,000 Yen	cost/patient Yen	Depreciation		Note
		Amount ,000 Yen	Parts	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty			Q'ty	Q'ty	
6	Autoanalyzer 250 days operation sample not refer to parts, technical fee included	150.00	Kit	695	1	685.00	(reagent)	9.70	8	77.60					electricity not included
			Valve A	50	1	50.00	ALBUMIN	8.00	10	80.00					ALBUMIN (20/day)
			Valve B	45	1	44.60	R ALP	8.00	10	80.00					R ALP (15/day)
			beist	2	2	4.69	R ALT(GPT)	8.00	10	80.00					R ALT(GPT) (15/day)
							R AST(GOT)	10.40	5	52.00					R AST(GOT) (10/day)
							CALCIUM kit	15.80	5	79.00					CALCIUM (10/day)
							CHOLESTEROL kit	12.20	9	109.80					CHOLESTEROL (10/day)
							R BUN	11.60	21	243.60					R BUN (20/day)
							R GLUCOSE kit	10.20	7	71.40					R GLUCOSE (50/day)
							R LDH-L	19.60	11	215.60					R LDH-L (10/day)
							X T BILIRUBIN kit	5.70	9	51.30					X T BILIRUBIN (25/day)
							R URIC ACID kit	18.60	13	241.80					R URIC ACID (30/day)
							sampling cup set	8.80	2	17.60					T PROTEIN (20/day)
							cleaning solution	7.40	7	51.80					R URIC ACID (30/day)
							recording paper(1250S)	9.40	2	18.80					Total 60,000cost/yr
							Other	350.00	1	350.00					
							Amount	1,828.30		1,828.30					
7	Blood gas analyzer 250 days operation 30 samples/day	80.00	Parts	150	1	150.00	Cal. solution (pH7.4)	4.50	8	36.00					
			PO2 electrode	150	1	150.00	Cal. solution (pH6.8)	4.50	5	22.50					
			pH electrode	130	1	130.00	time solution	2.30	50.0	115.00					
			Ref. electrode	130	1	130.00	salt-bridge solution	3.80	9	34.20					
							cleaning solution	1.40	2	2.80					
							recording paper	3.90	6	23.40					
							gas	56.00	4	224.00					
							Amount	560.00		560.00					
8	Spectrophotometer 250 days operation 20 samples/day	80.00	Parts				recording paper(2000/)	10.00	4	40.00					
							ribbon	4.00	10	40.00					
							lump	95.00	2.0	190.00					
							lump cyanogen	6.00	5	30.00					
							cell	17.00	5	85.00					
							cell holder	83.00	1	83.00					
							Amount	468.00		468.00					
9	Hematology analyzer 250 days operation 50 samples/day	150.00	Parts				reagent kit	15.50	50	775.00					
							recording paper	5.50	15	82.50					
							cleaner	22.50	8.0	180.00					
							Amount	1,037.50		1,037.50					
10	Remodialysis unit 250 days operation 6 treatments/week	100.00	Parts				dialyzer	3.00	200	600.00					
							patient tubekit	0.90	200	180.00					
							needle	0.10	200	20.00					
							DI card	1.40	200	280.00					
							solution(6l)	0.60	200	120.00					
							Amount	1,200.00		1,200.00					
							Sub Total	560.00		560.00					
							Sub Total	1,348.20		1,348.20					
							Grand Total	110.00		110.00					
							Grand Total	12,294.00		12,294.00					

### O/M cost estimation

Nine months are included in the calculation of the annual operation and maintenance cost for the first fiscal year after the installation of the equipment because consumables for the first three months after the delivery shall be included, annual inflation rate of 7% is taken into the calculation, as follows.

First year :      Maintenance costs + cost for spare parts + cost for consumables x 9/12) x 1.07<sup>3</sup>  
= ( 0 yen + 0 yen + 11,868,000 yen x 9/12) x (1.07)<sup>3</sup> = 14,904,000 yen =  
about 111,410,000 Ush.

After 2nd year :      Maintenance costs + cost for spare parts + cost for consumables) x 1.07<sup>4</sup>  
= (1,990,000 yen + 2,844,000 yen + 11,868,000 yen ) x (1.07)<sup>4</sup>  
= 21,893,000 yen = about 223,689,000 Ush.

In the fiscal 1997, approximately 10,000,000 yen ( 100,000,000 Ush.) is required, and approximately 20,000,000 yen ( about 200,000,000 Ush.) is required for the following year.

### **(5) Appropriation Plan for Running Cost**

The maintenance costs required after implementing AfDB's Rehabilitation Project is estimated at 120 million Ush, according to page 146 of the AfDB's appraisal report. This is about US\$ 320,000. when converted at the exchange rate of 374 Ush. to the dollar. This amount is about 30 million yen at 92 yen to the dollar. Therefore, when this amount is added to the above cost required for the second year, the amount becomes about 500,470,000 Ush. (about 50 million yen). Funds necessary for the maintenance will be appropriated as follows.

### Allocated from Government Budgets

Supposing that the government expenditure for Mulago Hospital increase by 5% annually, the annual maintenance cost, which is about 50,000,000 yen (about 500,000,000 Ush.), occupied 4.5%, 6%, 6.1%, and 6.2% in fiscal 1996 to 1999, respectively. This indicates that the maintenance cost can be fully covered with allocations from the government budget.

### Appropriation Made by Eliminating Overseas Treatment Cost

According to Rehabilitation Project, when Uganda withdraws the foreign currency spent for treatment of patients overseas and uses this money for the maintenance cost, there will be no problem for maintaining the equipment.

Table 3-3 shows the overseas treatment cost paid by the government during the period from 1991 to 1995.

**Table 3-3: Overseas Treatment Cost Paid by Ministry of Health**

Year	Overseas Treatment costs
1991	200,000,000
1992	1,139,490,000
1993	535,000,000
1994	210,600,000
1995	210,600,000

The Ministry of Health is paying approximately 20,000,000 yen for overseas treatments annually. This amount can be reduced to a certain extent when the hospital starts functioning as top referral hospital after being improved by Rehabilitation Project and this project. Therefore, funds can be reallocated for maintenance.

#### **Direct Appropriation from Revenues**

Fees collected from patients amounted at 506,403,000 Ush. in fiscal 1994. This amount accounts for 80% of the cost estimated for maintenance after the implementation of the project. Thus, if the hospital formulates an appropriate measure for collection of fees from the patients, funds will be available for the maintenance even though labor cost is not sufficed.

**Table 3-4 : Hospital Revenues**

	1990	1991	1992	1993	1994
Government	2,981,652	3,435,896	4,854,854	6,039,962	6,917,192
Patients	67,577	75,955	248,566	408,504	506,403
Others	153,210	583,286	367,219	127,394	148,119
Total	3,202,439	4,095,137	5,470,639	6,575,860	7,571,714

#### **(6) Possibility of Collecting Fees**

If an appropriate measure for collecting fees is applied for the services provided at the ICU and the Central Laboratory, funds will be easily available for maintenance. Possibility for collecting fees at both departments are as follows.

## ICU

The followings are fees charged by the hospital for services provided at the ICU.

Hospitalization fee (charged for VIP use)	:	50,000	Ush. / day
Hospitalization fee (a room for individual)	:	25,000	Ush./ day
Hospitalization fee (general)	:	7,500	Ush./ day
Radiography (with diagnosis by specialist)	:	15,000	Ush./ film
Ultrasound diagnosis	:	6,000	Ush./ diagnosis
Electrocardiograph	:	5,000	Ush./ examination

The following items of equipment are planned on this project: Respirator, Electrocardiograph, Bedside monitor, Mobile X-ray apparatus, Ultrasound diagnosis apparatus, Haemodialysis unit, Peritoneal dialysis set, etc.

Roughly estimated annual cost for maintenance agreements, spare parts and consumables is divided by an estimated number of examinations which will be carried out annually. The result shows an appropriate fee for each service.

	yen / service	Ush./ service
Respirator	: 1,700	about 16,300
Electrocardiograph	: 50	about 480
Bedside monitor	: 764	about 7,300
Mobile X-ray apparatus	: 584	about 230
Ultrasound diagnosis apparatus	: 398	about 3,800

Fees for dialysis treatment are not set up yet because such equipment is not available in the hospital at present. The hospital will be financially viable in maintaining the equipment if at least the above fees are collected for hospitalization, examinations, and treatments.

	yen / service	Ush./ service
Haemodialysis unit	: 6,500	about 62,300

## Central Laboratory

The followings are items of examination which will be available by major laboratory equipment after the completion of the project.

\* Autoanalyzer for biochemical examination

- Liver function : g-GPT, bilirubin, protein, lactic dehydrogenase (LDH), transaminase, and alkaline phosphatase (ALP).

- Metabolic function : cholesterol, neutral fat, blood sugar, creatinine, urea, and uric acid.

\* Spectrophotometer for biochemical examination

- Liver function : g-GPT, bilirubin, protein, lactic dehydrogenase (LDH), transaminase, and alkaline phosphatase (ALP).

- Metabolic function : cholesterol, neutral fat, sugar load test, blood sugar, creatinine, urea, uric acid, calcium, acid phosphatase (ACP), and albumin-globulin ratio (A/G ratio).

\* Blood cell counter

- Blood examination: WBC count, RBC count, platelet count, haemoglobin value, haematocrit value, mean corpuscular volume (MCV), and mean corpuscular haemoglobin (MCH).

\* Blood gas analyzer

- Blood gas analysis: PO<sub>2</sub> value, PCO<sub>2</sub> value, and pH value.

The followings are fees charged by the hospital for services provided at the Central Laboratory.

Pathological examination	:	8,000	Ush.
Biochemical examination	:	5,000	Ush.
Microbiological examination (without culture test)	:	3,000	Ush.
Microbiological examination (with culture test)	:	5,000	Ush.

Roughly estimated annual cost for maintenance agreements, spare parts and consumables for the above laboratory equipment is divided by an estimated number of examinations which will be carried out annually. The result shows an appropriate fee for each service. (The depreciation of the equipment is not considered.)

	yen / service	Ush. / service
Autoanalyzer	: 46	about 440
Spectrophotometer	: 110	about 1,050
Blood cell counter	: 83	about 800
Blood gas analyzer	: 146	about 1,400

The following table lists fees charged by the hospital, each fee being converted into Japanese yen.



**Table 3-5: Fare Table**

Testing		Ush	Yen
1. Haemogram Test	Hb	5,000	521
	WBC		
	Reticulocyte Count		
2. For Single Test	Hb	1,500	156
	Hct	3,000	313
	RBC	3,000	313
	WBC	3,000	313
	Reticulocyte Count	3,000	313
	Malaria Parasites	1,000	104
	Platelets Count	3,000	313
	Mean Corpuscular Volume	3,000	313
3. Electrophoresis Test	Haemoglobin Electrophoresis	5,000	521
4. Coagulation Screening	Bleeding and Clotting Time	2,000	209
	PT	2,500	261
	APTT	5,000	521
	Fibrinogen	5,000	521
5. Urin Analysis	Protein, Sugar, Microscopy	3,000	313
6. Urin Culture & Sensitivity Test		5,000	521
7. Cram Stair & Zn Stain on Sputum, pus etc.		3,000	313
8. Stool Ova or Systs		1,000	104
9. VDRL		3,000	313
10. Pregnancy Test		3,000	313
11. Blood Culture & Organisms Study		5,000	521
12. Liver Function Test	gamma-GPT	2,000	209
	Bilirubin	2,000	209
	Protein	2,000	209
	Lactate Dehydrogenase	2,000	209
	Transaminase	4,000	417
	Alkaline Phosphatase	4,000	417
13. Metabolic Substances	Electrolytes in Serum	3,000	313
	Glucose Tolerance	2,000	209
	Glucose in Blood	2,000	209
	Creatinine	2,000	209
	Urea	2,000	209
	Uric Acid	2,000	209
	Calcium	2,000	209
	Acid Phosphatase	2,000	209
	Albumin - Globlin Index	3,000	313
	Cholesterol	4,000	417
	Neutral Fat	2,000	209
	14. Blood Gas Analyzing	PO <sub>2</sub>	15,000
PCO <sub>2</sub>		15,000	1,564
pH		15,000	1,564

## Future Prospects

In consideration the present condition of the government, which is suffering from repayment of foreign debts; it is only natural for hospitals to participate actively in the promotion of cost sharing scheme.

However, it is difficult for Mulago Hospital or any other hospital to collect fees from patients for the purpose of meeting actual cost all of a sudden. The cost-sharing scheme should be promoted gradually so that patients will feel paying for medical services reasonable. Then, the scheme should be practiced widely reflecting actual cost in order to increase revenues.

The hospital collected fees from patients through the cost-sharing scheme in fiscal 1994, and it amounted at 506,403 Ush., which is about 7.3% of the total revenues. It is essential for the hospital to increase fees in a convincing way by improving medical services, strengthening the referral system, and then revising the fee table reflecting quality of service.

### **(7) Depreciation and Renewal**

The depreciating period for each equipment is roughly set at six to seven years, and the amount of depreciation is calculated by the following equation.

$$\text{Depreciation cost} = (\text{equipment price} \times 90\%) \div \text{depreciation period} \\ \text{(duration of equipment in years).}$$

Example:

If the equipment price is 150,000,000 yen, then the amount of depreciation is calculated at about 20,000,000 yen according to the above equation.

$$\begin{aligned} & (150,000,000 \text{ yen} \times 90\%) \div 7 \text{ years} \\ & = 19,285,714 = \text{about 20 million yen.} \end{aligned}$$

Initial cost for the equipment is covered by a grant from the Government of Japan. However, since consideration of depreciation is not reflected on the above fees to be collected from patients, the hospital should secure funds necessary for renewal of the equipment in the future in consideration of the depreciation of the equipment besides the above mentioned maintenance cost.

**(8) Staffing Plans**

**ICU**

Request was initially for an intensive care unit of fourteen beds. However, when consideration is made on the current size, operation, and technical level of the ICU and the inclusion of dialysis apparatus; the ICU is outlined as follows.

**Planned size:**

One room for intensive care with four beds, one for pediatric intensive care with four beds, and one for dialysis with four beds.

Supposing that a 3-shift operation with holidays was applied in accordance with a Japanese standard of one nurse for two patients, at least the following numbers of staffers would be necessary.

**Staff assignment:**

Intensive care room	12 nurses
Pediatric intensive care room	12 nurses
Dialysis room	2 nurses and 1 engineer.

**Table 3-6 : Hospital's Staffing Plan**

Newly Qualified Nurses	15	Orientation being done now June - Nov., 1995
Student Nurses	6	Nurses are rotated on ICU all year round
Student Nurses	4	3 months duration on ICU, 3 shift a year 4 registered nurses out of whom 2 -3 will be deployed in Mulago Hosp.

**Central Laboratory**

As for the Central Laboratory, the equipment to be procured is primarily for the renewal of the existing equipment which is too old to be operated any more. The technical levels required for the equipment selected on the project are not special or far from the levels of the existing staff. Therefore, it is not necessary for the number of the present staff to be increased.

## **Chapter IV PROJECT EVALUATION AND RECOMMENDATION**

## Chapter 4 PROJECT EVALUATION AND RECOMMENDATION

### 4-1 Project Effects

#### (1) Propriety of the Project

This project is judged appropriate as a grant aid project on the basis of the following points.

Mulago Hospital is a top referral hospital and an educational institute for the School of Medicine of Makerere University. At present, the hospital is being improved on Rehabilitation Project, which was formulated in accordance with health care policies by the Government of Uganda and are now being supported by the African Development Bank (AfDB). Rehabilitation Project is improving quality and quantity of medical services, provision of Primary Health Care (PHC) and development of medical personnel. The goal of this project, which will be assisted by the Government of Japan, is to improve the functions of the Intensive Care Unit (ICU) and Central Laboratory of Mulago Hospital in cooperation with Rehabilitation Project. As such, this project will surely contribute to promotion of the health care policies of Uganda.

The ICU and the Central Laboratory are two departments most important for the hospital to properly function as a top referral hospital for providing tertiary care and as a teaching hospital for developing medical personnel. Therefore, this project is highly effective for strengthening the functions of the hospital since it improves the medical equipment of the two department.

Examination of the past budgetary allocations from the government to the hospital assures that there will be no difficulty for the hospital to acquire funds necessary for maintaining the equipment after the implementation of this project. The government is promoting a cost-sharing scheme in which patients share the cost of medical care with the government. Therefore, it will be easy for the government to maintain the hospital effectively. In addition, the hospital itself is planning to introduce this cost-sharing scheme and charge the patients. Besides this favorable financial condition, there will be no problem also in appropriating medical personnel since the hospital is a teaching hospital for Makerere University. Thus, this project is judged smoothly maintainable after the implementation in terms of finance, personnel, and technology.

In addition to the improvement of the hospital as a whole, this project can also contribute, on a more individual or personal basis, to the improvement of medical technique for examinations and treatments conducted by doctors and other medical personnel who can have access to the equipment procured on the project.

An AfDB project will supply to the hospital two incinerators, a waste disposal truck, and a dumper truck in consideration of protecting the environment. Improvement of hospital sewage disposal facilities will be also planned and be carried out. Solid waste and sewage generated on this project will be treated by these facilities and equipment, so there will be no harmful effect to the environment.

## **(2) Effects of the Project**

The following effects are expected after the completion of the project, with respect to the current problems and conditions of the hospital.

### **Improvement in Treatments**

At present, the ICU is not effectively operated because most items of equipment are more than 20 years old and are often out of order. There are no patient monitors, so only an electrocardiograph and sphygmomanometers are used for examining patients besides palpation by a doctor. Under such circumstance, patients are not monitored continuously for their vital signs. This project will provide patient monitors, respirators, plus oximeters, and infusion pumps and greatly improve the provision of intensive care.

### **Improvement in Diagnoses**

Over 130,000 specimens are examined annually in the Central Laboratory. However, there is a limit to the number of specimens to be tested because of a shortage of equipment and trouble of the existing equipment. An autoanalyzer, a spectrophotometer, a haematology analyzer, etc. are procured on this project. This renewal and replacement of some existing, troublesome equipment will provide satisfactory test results to doctors in terms of quantity and quality, so the project will surely improve diagnostic services.

### **Functional Recovery**

Mulago Hospital is a top referral institute, but 80 percent of the outpatients who are treated there are actually treatable in primary or secondary medical facilities. This situation of the hospital treating patients who can be treated elsewhere has resulted from functional degeneration of primary and secondary care facilities and collapse of the referral system. In order to solve this problem, the government devised Rehabilitation Project in cooperation with the AfDB. Recovering the functions of Mulago Hospital is one of the main goals of Rehabilitation Project, which is currently improving the facilities and equipment of the hospital. If this project, which is assisted by the Government of Japan, is implemented in cooperation with Rehabilitation Project, it will surely contribute to the functional recovery of the hospital as a top referral institute and thereby to the improvement of medical services in Uganda.

## **Beneficiaries**

Beneficiaries of this project will be people who live in and near Kampala, patients who are referred from all over the country and those who count on medical services overseas. The number of beneficiaries is estimated at about 400,000 annually, based on past data presented by the hospital.

### **4-2 Technical Cooperation with Other Donors**

#### **(1) Necessity of Technical Cooperation**

The government of Uganda devises and implements various projects and programs to restructure the health care system with assistance from international organizations and foreign donors. In addition to the improvement of facilities and equipment, the government also formulates educational programs to improve medical technology and to develop medical personnel. For this purpose, training programs are carried out internationally as well as domestically in cooperation with international organizations and foreign donors.

#### **(2) Cooperation and Collaboration with Other Donors**

Medical personnel of the hospital will attend at overseas training programs as well as domestic programs on Rehabilitation Project. Besides, the hospital itself plans and carries out trainings inside the hospital as well as overseas (such as in Kenya) for doctors and nurses. It seems that technical training is sufficiently carried out for the staff of the hospital. However, if it is possible for the Government of Japan to implement a short-term training course in Japan for medical personnel of the hospital or a technical cooperation by a long-term expert in medicine sent to the hospital, such technical cooperation will be all the more effective for improving medical technology of Uganda.

### **4-3 Recommendation**

The implementation of this project has great significance as the project will expectedly produce such effects as mentioned above and contribute to the improvement of medical services in Uganda. However, attention should be paid to the followings for successful completion of the project.

#### **(1) Maintaining Staff for ICU**

At the time of the field study, it was told that one doctor, two nurses, and one technician would be added to the staff assigned for the ICU Department. If personnel is added as planned, there will be no problem in manpower and in technical matter. However, in the long run, it is still necessary that attention be paid to this matter so that an effective number of staffers be always maintained in order to perform expected

functions. Therefore, it is important for the hospital to plan and carry out training sessions for developing personnel.

### **(2) Funds for Maintenance**

It is essential that an appropriate amount of funds be allocated for maintenance of the medical equipment procured on this project. This will not be a problem as the Government of Uganda understands this project and the need of maintenance. However, it is important for the hospital to make sure that a budgetary allocation be provided annually from the government for this purpose. As this project procures some high-technology equipment used at ICU and clinical laboratory, some highly trained staff members are required in addition to funds for purchasing reagents and consumables which are consumed by the equipment for testing specimens. These matters cost the hospital, so the hospital should launch a cost sharing scheme. For example, while consideration is made for protecting the poor, the hospital can charge the patients in accordance with a table listing fees for services provided in diagnosis and treatment.

### **(3) Maintenance Agreement**

The medical equipment to be procured on this project includes a blood gas analyzer, an automatic biochemical analyzer, an artificial dialysis apparatus, etc., which require maintenance work provided periodically by servicemen of the manufacturers. The hospital should allocate funds for signing maintenance agreements with such manufacturers or their representatives, so that such agreements can be signed promptly in connection with the project for the purpose of making effective use of the equipment.

### **(4) Reporting**

The medical equipment shall be operated and maintained properly by the Hospital after implementation of the Project. The Hospital should submit annual report which monitored following major equipments to Embassy of Japan in Kenya through the Ministry of Health of Uganda.

Equipment :

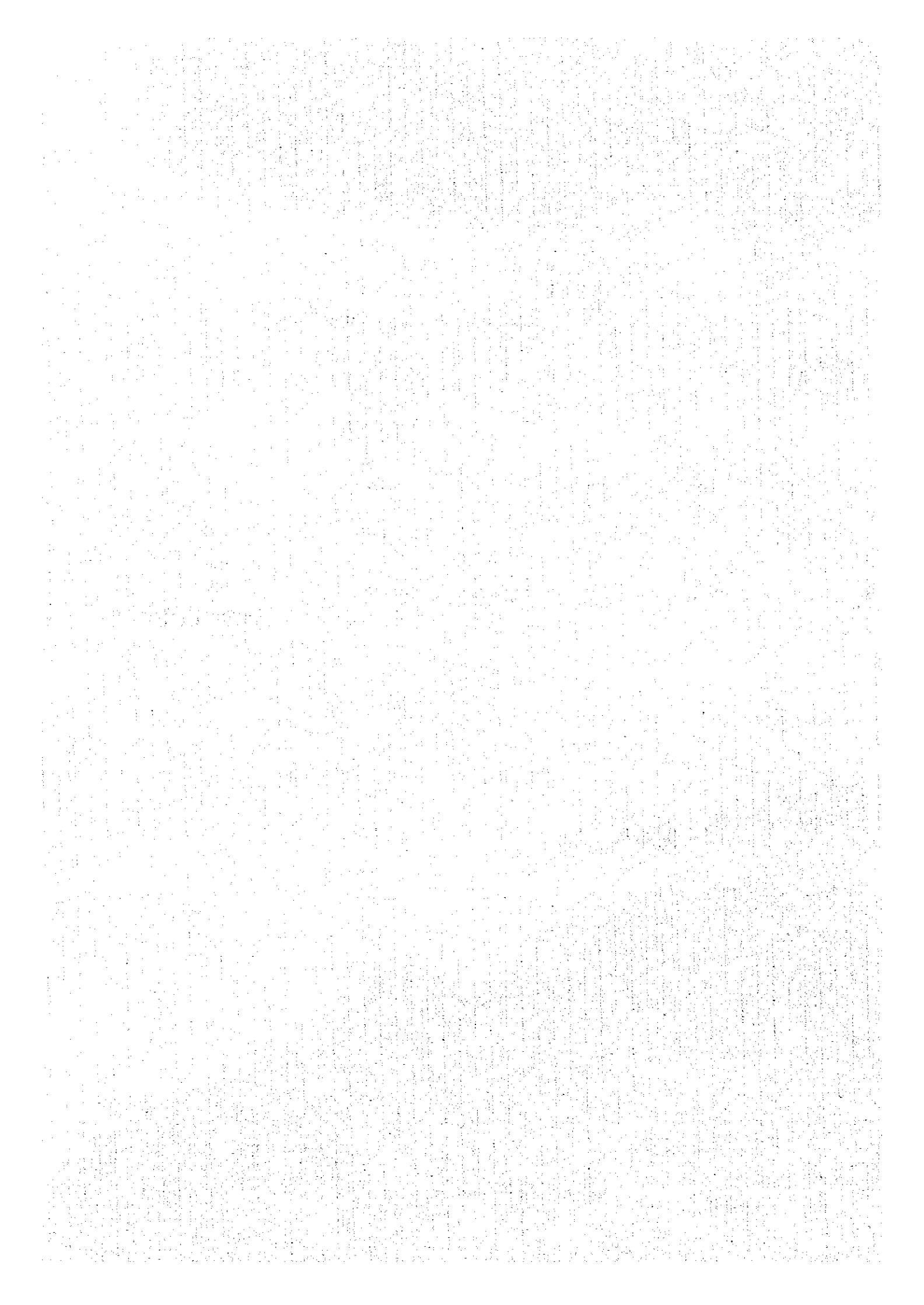
1. Haemodialysis unit
2. Haematology analyzer
3. Auto analyzer
4. Blood gas analyzer

Report Item :

1. Number of patients who treated or examined (weekly, monthly)
2. Annual consumption data of consumables and reagents
3. Annual maintenance cost
4. Amount of User fee



## APPENDICES



## **1. Member List of Survey Team**

### **Basic Design Study**

<b>Fujiko Yoshida</b>	<b>Team Leader</b>	<b>Grant Aid Division Economic Cooperation Bureau Ministry of Foreign Affairs Government of Japan</b>
<b>Yoichi Horikoshi</b>	<b>Technical Advisor</b>	<b>Bureau of International Cooperation International Medical Center of Japan Ministry of Health and Welfare Government of Japan</b>
<b>Yuko Hashiguchi</b>	<b>Grant Aid Planner</b>	<b>Public Relations Division General Affairs Department Japan International Cooperation Agency</b>
<b>Shigetaka Tojo</b>	<b>Project Manager</b>	<b>International Techno Center Co., Ltd.</b>
<b>Takashi Yoza</b>	<b>Medical Engineer</b>	<b>International Techno Center Co., Ltd.</b>
<b>Kenji Hiramatsu</b>	<b>Facility Engineer</b>	<b>Yachiyo Engineering Co., Ltd.</b>
<b>Tamotsu Nozaki</b>	<b>Cost Estimation</b>	<b>International Techno Center Co., Ltd.</b>

### **Draft Basic Design**

<b>Hidechika Akashi</b>	<b>Team Leader</b>	<b>Bureau of International Cooperation International Medical Center of Japan Ministry of Health and Welfare Government of Japan</b>
<b>Kazunori Miura</b>	<b>Grant Aid Planner</b>	<b>Second Project Management Division Grant Aid Project Management Department Japan International Cooperation Agency</b>
<b>Shigetaka Tojo</b>	<b>Project Manager</b>	<b>International Techno Center Co., Ltd.</b>
<b>Takashi Yoza</b>	<b>Medical Equipment</b>	<b>International Techno Center Co., Ltd.</b>

## 2. Survey Schedule Basic Design Study

No	Date	Team Leader	Official	P. Manager	Equipment	Facility	Estimation
1	7/23	Sun	Lv. Narita / Ar. London				
2	7/24	Mon	Lv. London				
3	7/25	Tue	Ar. Nairobi			Lv. Narita	
			Meeting at Embassy of Japan, JICA Office			Ar. London	
4	7/26	Wed	Lv. Nairobi / Ar. Entebe			Lv. London	
5	7/27	Thu	Meeting at MOF, MOFEP, MOH, Mulago Hospital			Ar. Entebe	
6	7/28	Fri	Survey at Mulago Hospital				
7	7/29	Sat	Survey at Mulago Hospital				
8	7/30	Sun	Team Meeting, Review the Collecting Data				Lv. Narita
9	7/31	Mon	Meeting at Mulago Hospital				Lv. London
10	8/1	Tue	Meeting at Mulago Hospital				Ar. Entebe
11	8/2	Wed	Signing of Minutes of Discussion at MOH				Survey
12	8/3	Thu	Discussion	Lv. Entebe		Survey of Mulago Hospital	Survey
13	8/4	Fri	Discussion	Lv. Nairobi		Survey of other Facilities	Survey
14	8/5	Sat	Lv. Entebe	Ar. Paris		Survey of Mulago Hospital	Survey
15	8/6	Sun	Ar. Nairobi	Lv. Paris		Team Meeting	
16	8/7	Mon	Lv. Paris	Ar. Narita		Survey of other projects	Lv. Entebe/Nairobi Ar. Paris Survey of agents
17	8/8	Tue				Meeting at Mulago Hospital	Ar. Narita Survey of agents
18	8/9	Wed	Ar. Narita			Survey of Mulago Hospital, Local Agents	Survey of agents
19	8/10	Thu				Survey of Mulago Hospital, Local Agents	Survey of agents
20	8/11	Fri				Survey, Courtesy Visit to Minister	Survey of agents
21	8/12	Sat				Reporting to MOH, JICA Lv. Entebe for Nairobi	Survey of agents
22	8/13	Sun				Team Meeting	Team Meeting
23	8/14	Mon				FDJ, JICA	Lv. Nairobi for London Ar. London
						Survey	
24	8/15	Tue				Survey	Survey
							Survey of agents
25	8/16	Wed				Lv. Nairobi, Ar. Lond Survey	Survey of agents
						Ar. Paris	Ar. Paris
26	8/17	Thu				Lv. London	Survey
						Lv. Paris	Survey of agents
27	8/18	Fri				Ar. Narita	Lv. Paris Ar. Narita

## Draft Basic Design

No.	Date	Schedule
1	11/7 Tue	Lv. Narita / Ar. London
2	11/8 Wed	Lv. London
3	11/9 Thu	Ar. at Nairobi
4	11/10 Fri	Lv. Nairobi / Ar. Entebbe, Meeting at MOFEP, MOH, Mulago Hospital
5	11/11 Sat	Team Meeting
6	11/12 Sun	Team Meeting
7	11/13 Mon	Meeting at Mulago Hospital
8	11/14 Tue	Meeting at MOFEP, Meeting at Mulago Hospital
9	11/15 Wed	Discussing and Signing of Minutes, Survey of Mulago Hospital
10	11/16 Thu	Lv. Entebbe / Ar. Nairobi
11	11/17 Fri	Reporting the results to Embassy of Japan and JICA, Lv. Nairobi
12	11/18 Sat	Ar. London
13	11/19 Sun	Lv. London
14	11/20 Mon	Ar. Narita

### 3. List of Party Concerned in the Recipient Country

#### Basic Design Study

Abubakar Nadduli	Assistant Director, Public Health, African Department
Nicholas Chaka	Section Head, South American Countries Department
C.U. Hacuma	Principal Finance Officer, Head of East/ South Division
E. Katwe	Principal finance Officer, Asian Desk
Dr. Lawrence N. Kaggwa	Director Mulago
Dr. Gideon Kikampikaho	Deputy Director Mulago
Ms. G. L. Kinimi	S.P.N.O. Mulago
Mr. E. Musitwa	Principal Supplies Officer
Dr. Edward Ddumba	Physician, Mulago Hospital
Prof. C. Ndugwa	Paediatric Dept., Mulago Hospital
Dr. Mrs C. Omaswa	Consultant Anaesthetist Intensive Care Unit
Dr. E. Nzaro	Senior Consultant & Head Clinical Laboratories
Mr. S. A. Anguma	Ag. Laboratory Superintendent Clinical Laboratories
Prof. Ignatius Kakande	Head, Dept. of Surgery
Mr. Katasha E	Engineering Dept.
Prof. F. a. Mmiro	Head Dept. of Obstetrics & Gynaecology
N/O Walusimbi L.M	Nurse Incharge Ward 3D I.C. U.
Ms. Lukwago M	P.N.O. (Administration)
Mr. Kimuli H.K.	Inspector of Works (Engineering Dept.)
Eng. Katesigwa D.M.K.	Secretary NACME
E.F. Kalenzi	Principal Accountant
Kiguuya Mwebaze	Director, H.S.R.P.
F.G. Omaswa	Chairman, Equipment Committee
Dr. J.A.K. Tamale	Member of Equipment Committee

#### Draft Basic Design

Dr. S. M. Zaramba	Director, Health Service Dept. , Ministry of Health
Dr. L. N. Kaggwa	Chairman / Director Mulago
Dr. G. Kikampikaho	Deputy Director
Prof. F. Omaswa	NACME / Chairman
Dr. E. Nzaro	Senior Consultant / Pathology Dept.
Dr. E. Kigonya	Senior Consultant / Physician / Nephrologist
Ms. J. Ecoci	Tutor of Public Health Nurse College
Ms. M. Naluswa	Senior Principal Nursing Officer
Mr. J. A. K. Tamale	Chairman Equipment Committee Mulago Hospital
Ms. C. Rwabwogo	Principal Nursing Officer A & E Dept.

Eng. Katesigwa D.M.K.	Secretary of NACME
Mr. Angma S.A.	Chief Technician of Clinical Laboratories
Dr. C. Omaswa	Consultant / Aneasthetist
N/O Walusimbi L. M.	Senior Nursing Officer
Mr. E. F. Kalenzi	Principal Accountant, Mulago Hospital
Dr. G. S. Bimenya	Clinical Chemistry
Dr. W. Nganwa	Head of Oral Surgery
Mr. H. Lwigale	Hospital Administrator
Mr. S. Barasa	Senior Hospital Administrator
Dr. Kigonya (Mrs.)	Consultant / Pathologist
Ms. M. Lukwago	Principal Nursing Officer
Mr. E. Asiku	Accountant
Dr. Lule J. R.	Medical Officer
Ms. Jemba J.	Nursing Officer Rep. 1/C WD 3D
Mr. Twesigye Patrick	Personnel Officer

**4. Minutes of Discussions (Basic Design Study)**  
MINUTES OF DISCUSSIONS  
BASIC DESIGN STUDY  
ON  
THE PROJECT FOR IMPROVEMENT OF THE MEDICAL EQUIPMENT  
IN MULAGO HOSPITAL  
IN THE REPUBLIC OF UGANDA

In response to a request of the Government of the Republic of Uganda, the Government of Japan has decided to conduct a Basic Design Study on THE PROJECT FOR IMPROVEMENT OF THE MEDICAL EQUIPMENT IN MULAGO HOSPITAL IN THE REPUBLIC OF UGANDA (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Uganda a study team, headed by Ms. Fujiko YOSHIDA, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs from July 23 to August 18, 1995.

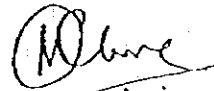
The team held discussions with the officials concerned of the Government of Uganda and conducted field surveys at the study area.

In the course of discussions and the field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study Report.

Kampala, August 2, 1995

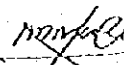
吉田藤子

Ms. Fujiko Yoshida  
Leader  
Basic Design Study Team  
JICA



Mr. Nathan O. Obore  
Permanent Secretary  
Ministry of Health

Witness



Dr. Lawrence N. Kagwa  
Director  
Mulago Hospital



## ATTACHMENT

1. Objectives of the Project  
The Objective of the Project is to improve the essential functions at Mulago Hospital through provision of the essential equipment in Intensive Care Unit and Central Laboratories.
2. Project site  
Mulago Hospital in Kampala.
3. Responsible Agency  
The Ministry of Health of the Republic of Uganda.
4. Executing Agency  
Mulago Hospital.
5. Items requested by the Government of Uganda  
After discussions with the Basic Design Study Team, the following items were finally requested by the Ugandan side.

Provision of the equipment for Intensive Care Unit and Central Laboratories described in Annex I.

(Note: A=1st priority B=2nd priority C=3rd priority)

However, the final components of the Project will be decided after further studies.

6. Comments by the Japanese side on the items in 5 above

The equipment to be given the high priority in the Project is:

- 1) the equipment to be utilized for treatment of the common diseases.
- 2) the equipment to be replaced with the existing equipment which is already deteriorated.
- 3) the essential equipment identified by the Government of Uganda, the World Bank, WHO, UNICEF etc.

While, the equipment to be given low priority in the Project is:

- 1) the equipment not required for health care services such as diagnosis, treatment and prevention.
- 2) the simple equipment /furniture available locally.
- 3) the most advanced equipment to be utilized for research activities.

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- 4) the equipment with some difficulties on installation/ infrastructure conditions.
- 5) the expensive equipment less utilized because of small number of testing/ less number of patients.
- 6) the equipment hazardous to environmental control.
- 7) the equipment only utilized with exclusive reagent kit available from the specific manufacturer.
- 8) the equipment with financial/ marketing difficulties on the procurement of consumable and spare parts etc.

7. Japan's Grant Aid Program

- (1) The Government of Uganda understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of Uganda will take necessary measures described in Annex II, for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.
- (3) The Ministry of Health has responsibility for monitoring the progress of all phases of the Project such as allocation of funds, training and maintenance, and operation of the Mulago Hospital (Example of the indicators are described in our Questionnaire). The Hospital will prepare the indicators by the end of August 1995 and send the report to Embassy of Japan in Kenya.

8. Schedule of the study

- (1) The consultants will proceed to further studies in Uganda until August 18, 1995.
- (2) JICA will prepare the draft report and dispatch a mission in order to finalize the contents of the report around the middle of October, 1995.
- (3) In case the contents of the report is accepted in principle by the Ugandan side, JICA will complete the final report and send it to the Government of Uganda by December, 1995.

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9. The relationship between Japanese Project and AfDB Project

(1) Ugandan side will coordinate the above relation and make no overlappings and conflicts between these donors.

(2) The main components of the Japanese Project are Intensive Care Unit and Central Laboratories.

(3) The AfDB Project of the Mulago Hospital is as follows;

-New construction project

-Rehabilitation project

-Equipment supply project (excluding I.C.U. and Central Laboratories)

-Training project

The map is attached herein.

10. Financial issues

(1) Japanese side stresses the need for the Government of Uganda to provide a clear picture of their plans for operation and maintenance of such certain sophisticated equipment that was identified by the Study Team (see ANNEX IV) by August 10, 1995.

(2) The hospital shall work out the mechanism for recovery of charges of costs involving expensive investigation and treatment.

11. Avoid overlaps of the equipment

To avoid overlaps, the hospital will submit the list of existing equipment and plan of the new equipment which will be purchased by themselves and other donors by August 10, 1995.

12. Reply to the questionnaire

Ugandan side will submit the reply to the questionnaire by August 10, 1995.

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## ANNEX I

### Equipment list

Department	Name of Equipment	Pri.
ICU	ECG	A
	EEG	B
	Ultrasound Diagnosis Apparatus	A
	Bedside Monitor	A
	Central Monitor	C
	Pulse Oxymeter	A
	Defibrillator	A
	Resuscitation Trolley	A
	Spirometer	A
	Stethoscope	A
	Sphygmomanometer	A
	Ultrasonic Doppler Pen Size	C
	Percussion Hammer	A
	Diagnostic Set	A
	Infusion Pump	A
	Syringe Pump	A
	Blood Warmer	A
	Respirator	A
	Anaesthesia Table	A
	Oxygen Cylinder Trolley	A
	Instrument Trolley	A
	Stretcher	A
	ICU Bed with Mattress	A
	Over Bed Table	A
	Haemodialysis Unit	B
	Peritoneal Dialysis Set	B
	Lift of patient	A
	Mobile X-ray apparatus	A
	X-ray film viewer	A
	Ultrasound nebulizer	A

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	Computer with printer	C
	Blood Gas Analyzer	B
Laboratory	Centrifuge	A
	Colorimeter	A
	Refrigerator	A
	Microscope Binocular	A
	Hot Air Oven	A
	Autoclave	A
	Waterbath	A
	Mechanical Shaker	A
	Blood Differential Counter	A
	Flame Photometer	A
	PH meter	A
	Interval Timer	A
	Spectrophotometer	A
	Computer with printer	C
	Anaerobic jar	A
	Timer	A
	Deep Freezer	A
	Analytical Balance	A
	Water Distiller	A
	Hot Plate	A
	Tally Blood Counter	A
	Slide Drier	A
	Drying Cabinet	A
	Autoanalyzer	B
	De-Ionizer Unit	A
	Haematology Analyzer	B
	Fibrinometer Coagulation System	B
	Blood Bank Refrigerator	A
	Overhead Projector	A
	Projector Screen	A
	Slide Projector	A
	Micro Pipette	A

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Pedal Bins	C
High Performance Liquid Chromatography	C
Scientific Calculator	C
Electrical Typewriter	C
Manual Typewriter	C
Glassware Washing Machine	A
Bactometer	B
Immunoanalyzer	C
Automatic Media Dispenser	A
Microtome	A
Microtome Kife Sharpaer	A
Freezing Microtome	B
Tissue Processor	A
Vacuum Impregnator	B

Note )

Priority A : Regarded as the equipment in which consensus was reached on the necessity and the appropriateness by both parties.

Priority B : Regarded as the equipment which needs good condition of maintenance.

Priority C : Regarded as the equipment which is not essential for basic diagnosis and treatment, but which would improve the level of services.

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ANNEX II

Necessary measures to be taken by the Government of Uganda in case Japan's Grant Aid is executed.

1. To provide the land for temporary site office, warehouse and stock yard during the implementation period.
2. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at port of disembarkation.
3. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry in Uganda and stay therein for the performance of their work.
4. To maintain and use properly and effectively the equipment purchased under the Grant.
5. To bear all the expenses other than those to be borne by the Grant.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based on Banking Arrangement.

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## ANNEX III

### Japan's Grant Aid

#### 1. Japan's Grant Aid Procedures

The Japan's Grant Aid Program is executed through the following procedures.

(1)

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and approval by Cabinet)
Determination of	(The Notes exchanged between the Government of Japan and the
Implementation	recipient country)

(2) At the first step, the application or request for the grant aid project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the grant aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

At the second step, JICA conducts the study (Basic Design Study) by using a Japanese consulting firm.

At the third step, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Program based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

At the fourth step, the project, which is once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

#### 2. Basic Design Study

(1) The aim of the Basic Design Study (hereinafter referred to as "the Study") conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

(a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.



(b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical, social and economic point of view.

(c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

(d) Preparation of the Basic Design of the Project.

(e) Estimation of cost of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of discussions.

#### (2) Selection of Consultants

For smooth implementation of the Study, JICA uses a registered consulting firm. JICA select a firm based on proposals submitted by interested firms. The selected firm carries out Basic Design Study and writes a report based upon terms of reference set by JICA.

The consulting firms used for the Study is recommended by JICA to the recipient country to also work on Project's implementation after the Exchange of Notes in order to maintain technical consistency and also avoid any undue delay in implementation should the selection process be repeated.

### 3. Japan's Grant Aid Scheme

#### (1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principals in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such

#### (2) Exchange of Note (E/N)

The Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Government concerned, in which the objective of the project, period of execution, condition and amount of the Grant Aid, etc., are confirmed.

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(3) "The period of the Grant" means the one Japanese fiscal year for which the Cabinet approves the Project. Within the fiscal year, all procedures such as Exchange of Notes, concluding contracts with a consultant firm and financial payment to them must be completed. However, in case of delays in delivery, installation due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one Japanese fiscal year at most by mutual agreement between the two Governments.

(4) The Grant is used properly and exclusively for the purchases of products. Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, Grant Aid may be used for the purchase of the products or services of the third country. However the consultants are limited to "Japanese nationals." (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude contracts in Japanese Yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertaking required of the Government of the recipient country

In implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following.

(a) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the site.

(b) To secure buildings prior to the procurement in case the installation of the equipment.

(c) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

(d) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

(e) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this

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operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) "Re-Export"

The products purchased under the Grant should not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

(a) The Government of the recipient country or its designated authority should open an account in the name of Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank".) The Government of Japan will execute the Grant Aid by making payments in Japanese Yen to cover the obligation incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

(b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

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ANNEX IV

Department	Name of Equipment
ICU	EEG
	Haemodialysis Unit
	Peritoneal Dialysis Set
	Blood Gas Analyzer
Laboratory	Autoanalyzer
	Haematology Analyzer
	Fibrinometer Coagulation System
	Immunoanalyzer

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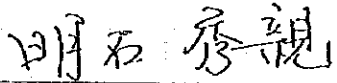
**MINUTES OF DISCUSSIONS**  
**Minutes of Discussions (Explanation of Draft Report)**  
ON  
THE BASIC DESIGN STUDY ON THE PROJECT  
FOR  
IMPROVEMENT OF THE MEDICAL EQUIPMENT  
IN MULAGO HOSPITAL  
IN THE REPUBLIC OF UGANDA  
(CONSULTATION ON DRAFT REPORT)

In August 1995, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Team on the Project for the Improvement of Medical Equipment at Mulago Hospital (hereinafter referred to as "the Project") to the Republic of Uganda, and has prepared the draft report of the study based on the discussions with the Ugandan side and technical examination of the results of the field survey.

In order to explain and consult the Ugandan side on components of the draft report, JICA sent a study team to the Republic of Uganda, headed by Dr. Hidechika Akashi, Bureau of International Cooperation, International Medical Center of Japan, Ministry of Health and Welfare from November 7 to November 20, 1995.

As a result of discussions, both parties confirmed the main items for the Project described on the attached sheets.

Kampala, November 15, 1995

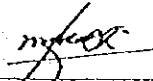


Dr. Hidechika Akashi  
Leader  
Basic Design Study Team  
JICA



Mr. Nathan O. Obore  
Permanent Secretary  
Ministry of Health  
Republic of Uganda

Witness:



Dr. Lawrence N. Kaggwa  
Director  
Mulago Hospital

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## ATTACHMENT

### 1. Components of draft report

The Government of Uganda has agreed and accepted in principle the components of the draft report proposed by the Team that are described in ANNEX-I.

### 2. Japan's Grant Aid Program

- (1) The Government of Uganda has understood the system of Japanese Grant Aid as explained by the Team as ANNEX-II.
- (2) The Government of Uganda will take necessary measures described in ANNEX-III, for the smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

### 3. Schedule of the study

JICA will complete the final report and send it to the Government of Uganda by March 1996.

### 4. Other relevant issues.

On condition that Japan's Grant Aid is extended to the Project:

- (1) The Government of Uganda will allocate the necessary budget, counterpart fund and personnel to the Project for securing sustainable and proper operation and maintenance of the equipment.
- (2) Mulago Hospital will maintain adequate performance and utilization of the equipment included in the Project. The Hospital will submit an annual monitoring report to the Embassy of Japan in Kenya through the Ministry of Health. This monitoring report will cover the general condition and utilization of the equipment included in the Project. For the major four (4) equipment, as shown in ANNEX-IV, the report shall be made with indicators as below:
  - the number of patient examined
  - amount of consumable
  - cost for maintaining the equipment
  - revenues from the services of the equipment

## ANNEX-1

## Equipment list

Department	Name of Equipment	Qty	
ICU	ECG	3	
	EEG	1	
	Ultrasound Diagnosis Apparatus	1	
	Bedside Monitor	6	
	Central Monitor	1	
	Pulse Oxymeter	6	
	Defibrillator	1	
	Resuscitation Trolley	1	
	Spirometer	3	
	Stethoscope	20	
	Sphygmomanometer	20	
	Diagnostic Set	10	
	Infusion Pump	12	
	Syringe Pump	8	
	Blood Warmer	6	
	Respirator	4	
	Anaesthesia Table	2	
	Oxygen Cylinder Trolley	10	
	Instrument Trolley	6	
	Patient trolley	2	
	ICU Bed with Mattress	12	
	Over Bed Table	12	
	Haemodialysis Unit	2	
	Lift of patient	1	
	Mobile X-ray apparatus	1	
	X-ray film viewer	1	
	Ultrasound nebulizer	6	
	Blood Gas Analyzer	1	
	Suction Unit	6	
	Cabinet for ICU	1	
	Laboratory	Centrifuge	6
		Colorimeter	5
		Refrigerator	8
Binocular Microscope		6	
Hot Air Oven		4	
Vertical Autoclave		5	
Waterbath		4	

Mechanical Shaker	1
Blood Differential Counter	7
Flame Photometer	1
PH meter	2
Interval Timer	10
Spectrophotometer	1
Computer with printer	1
Anaerobic jar	3
Deep Freezer	4
Analytical Balance	4
Water Distiller	4
Hot Plate	3
Tally Blood Counter	8
Slide Drier	1
Drying Oven	3
Autoanalyzer	1
De-Ionizer Unit	3
Haematology Analyzer	1
Blood Bank Refrigerator	4
Overhead Projector	1
Projector Screen	1
Slide Projector	1
Micro Pipette Set	1
Glassware Washing Machine	2
Microtome	1
Microtome Knife Sharpner	1
Freezing Microtome	1
Tissue Processor	1
Pipette Washer	1
Stirrer	2
Hemoglobin Meter	1
Haematocrit Centrifuge	1
CO2 incubator	1
Loop Holder	5
Balance	1
Cystocentrifuge	1
Paraffin Dispenser	1
Slide Warmer	1
Stirrer with Hotplate	1
Paraffin Bath	1

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## ANNEX-II

### Japan's Grant Aid

#### 1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed through the following procedures.

- Application : (Request made by a recipient country)
- Study : (Basic Design Study conducted by JICA)
- Appraisal & Approval : (Appraisal by the Government of Japan and approval by Cabinet)

Determination of Implementation : (The Notes exchanged between the Government of Japan and the recipient country)

(2) At the first step, the application or request for the grant aid project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for the grant aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

At the second step, JICA conducts the study (Basic Design Study) by using a Japanese consulting firm.

At the third step, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Program based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

At the fourth step, the project, which is once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

#### 2. Basic Design Study

(1) The aim of the Basic Design Study (hereinafter referred to as "the Study") conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The comments of the Study are as follows:

- (a) Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the

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Project's implementation.

- (b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical, social and economic point of view.
- (c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- (d) Preparation of the Basic Design of the Project.
- (e) Estimation of cost of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid Project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses a registered consulting firm. JICA select a firm based on proposals submitted by interested firms. The selected firm carries out Basic Design Study and writes a report based upon terms of reference set by JICA.

The consulting firms used for the Study is recommended by JICA to the recipient country to also work on Project's implementation after the Exchange of Notes in order to maintain technical consistency and also avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient county with non-reimbursable funds to procure

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the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principals in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

(2) Exchange of Note (E/N)

The Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Government concerned, in which the objective of the project, period of execution, condition and amount of the Grant Aid, etc., are confirmed.

(3) "The period of the Grant" means the one Japanese fiscal year for which the Cabinet approves the Project. Within the fiscal year, all procedures such as Exchange of Notes, concluding contracts with a consultant firm and financial payment to them must be completed. However, in case of delays in delivery, installation due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one Japanese fiscal year at most by mutual agreement between the two Governments.

(4) The Grant is used properly and exclusively for the purchases of products. Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, Grant Aid may be used for the purchase of the products or services of the third country. However the consultants are limited to "Japanese nationals." (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude contracts in Japanese Yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. The "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(6) Undertaking required of the Government of the recipient country.

In implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following.

(a) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the site.

(b) To secure buildings and provide necessary facilities for the installation of the equipment

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- (c) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
  - (d) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
  - (e) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.
- (7) "Proper Use"
- The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.
- (8) "Re-Export"
- The products purchased under the Grant should not be re-exported from the recipient country.
- (9) Banking Arrangement (B/A)
- (a) The Government of the recipient country or its designated authority should open an account in the name of Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank".) The Government of Japan will execute the Grant Aid by making payments in Japanese Yen to cover the obligation incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
  - (b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

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### ANNEX III

Necessary measures to be taken by the Government of Uganda in case Japan's Grant Aid is executed.

1. To provide the land for temporary site office, warehouse and stock yard during the implementation period.
2. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at port of disembarkation - Nakawa inland port (Kampala).
3. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such enabling facilities as may be necessary for their entry in Uganda and stay therein for the performance of their work.
4. To maintain and use properly and effectively the equipment purchased under the Grant.
5. To bear all the expenses other than those to be borne by the Grant. Especially preparation of electricity, water and drainage is essential.
6. To bear commissions to the Japanese foreign exchange bank for the banking services based on Banking Arrangement.

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**ANNEX-IV**

The equipments as shown below shall be monitored.

1. Haemodialysis Unit
2. Blood Gas Analyzer
3. Autoanalyzer
4. Haematology Analyzer

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## **5. References**

- 1. Answers of the Questionnaire**
- 2. Building Plan**
- 3. Medical Equipment Policy, March 1991, NACME**
- 4. Restructing Report, Mulago Hospital**
- 5. Health Services Rehabilitation Project, Tender for Supply of Medical, Surgical, Laboratory, Dental, X-ray Equipment, Hospital Loose Furniture, Office and Domestic Loose Furniture, Storage and Handling Equipment to Mulago National Referral Hospital**
- 6. List of required equipment**
- 7. List of equipment of old and new Mulago Hospital**
- 8. Report on "MEDICAL EQUIPMENT & FURNITURE STUDY" in Mulago Hospital**
- 9. Report on "MEDICAL EQUIPMENT & FURNITURE STUDY" in Mulago Hospital, Vol. 4, Departmental Medical Equipment & Furniture Requirements**
- 10. Background to the Budget, 1995-1996**
- 11. Primary Health Care Support, February 1992**
- 12. Draft Working Report, Completion of pre Investment Study, Mulago Hospital**
- 13. Incremental Costs as a Result of Supply of Medical Equipment to Mulago Hospital**
- 14. Balance Sheet 1995, Mulago Hospital**
- 15. Water Analysis Report**







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JICA