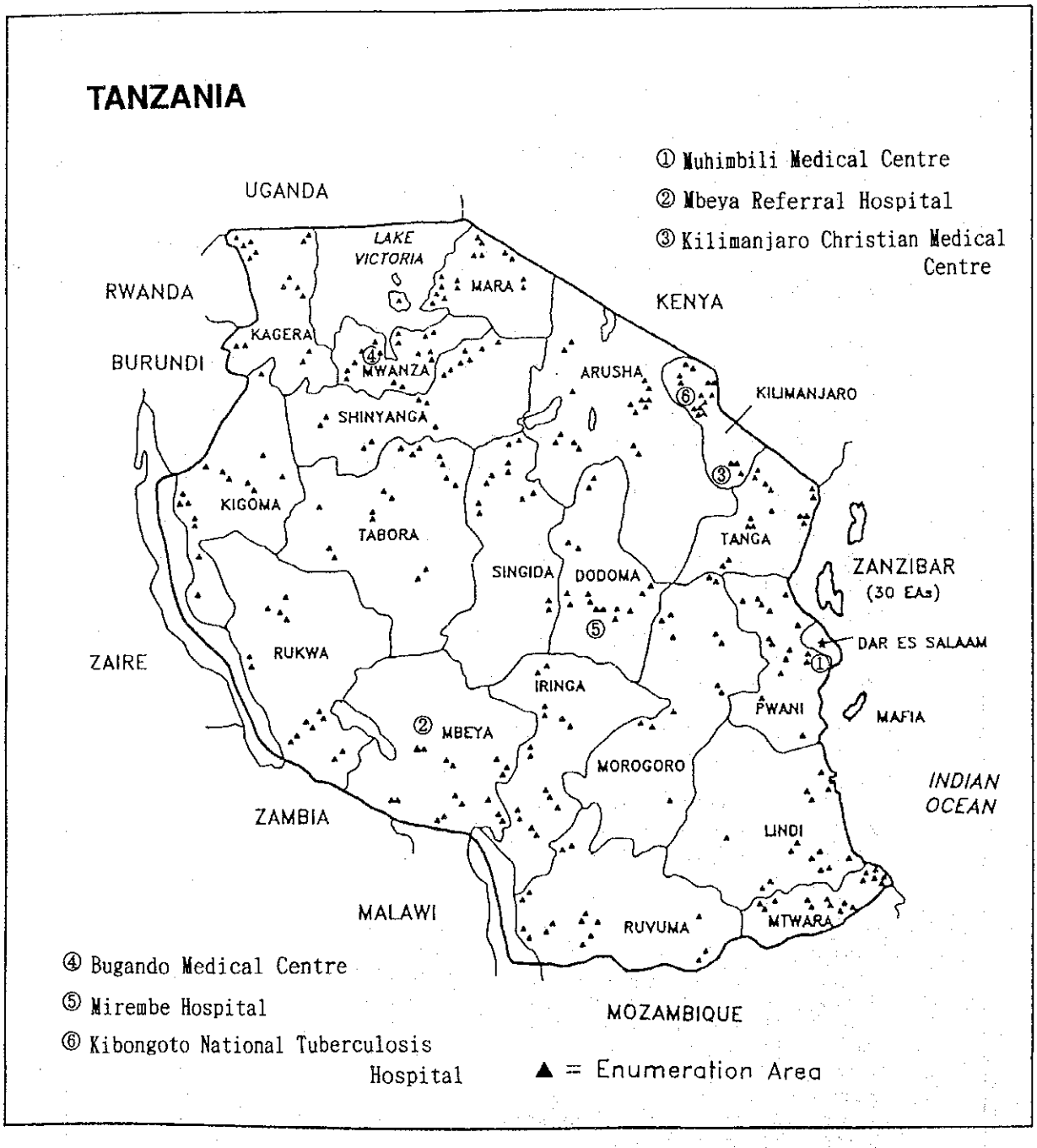
5. Outline of the Project Site

The following shows each location of the proposed facilities. These facilities are located in Dar es Salaam, the coastal capital of Tanzania, in a mountainous district of the Kilimanjaro, in a lake district of Mwanza, and in central cities of hilly areas.

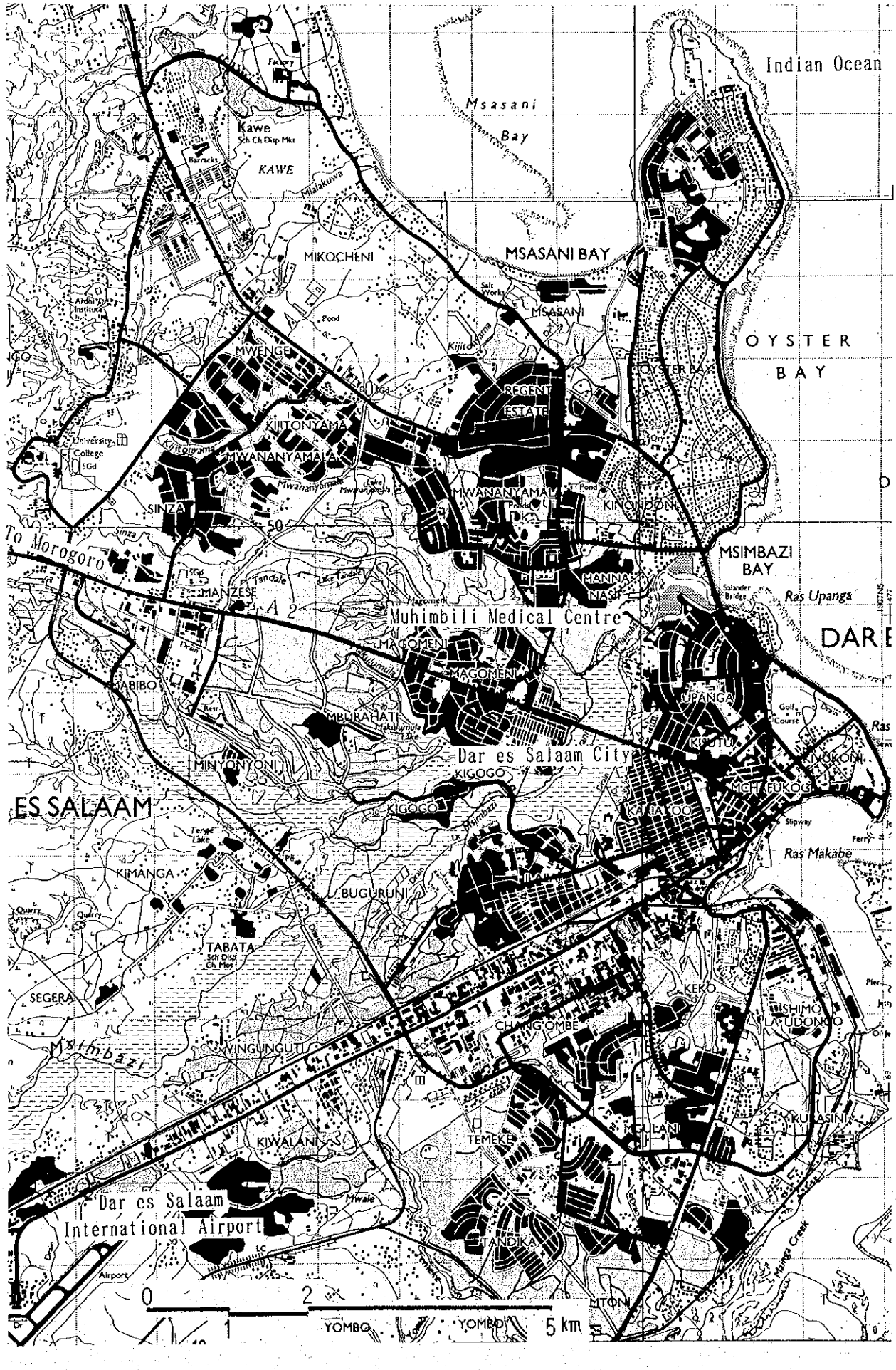



5-1 Status of the Project Site

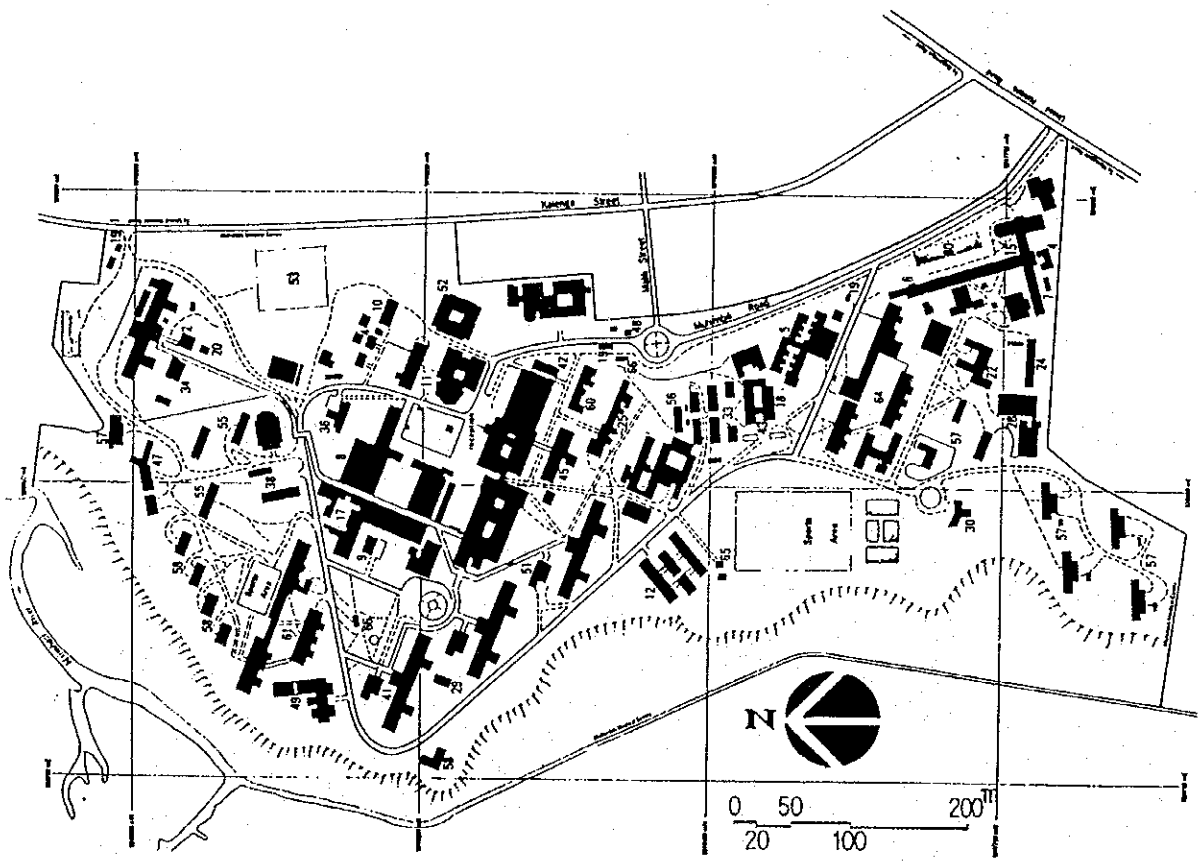
Project site, history of hospitals, state of infrastructure, general information of premises are as follows:

(1) Muhimbili Medical Centre (MMC)

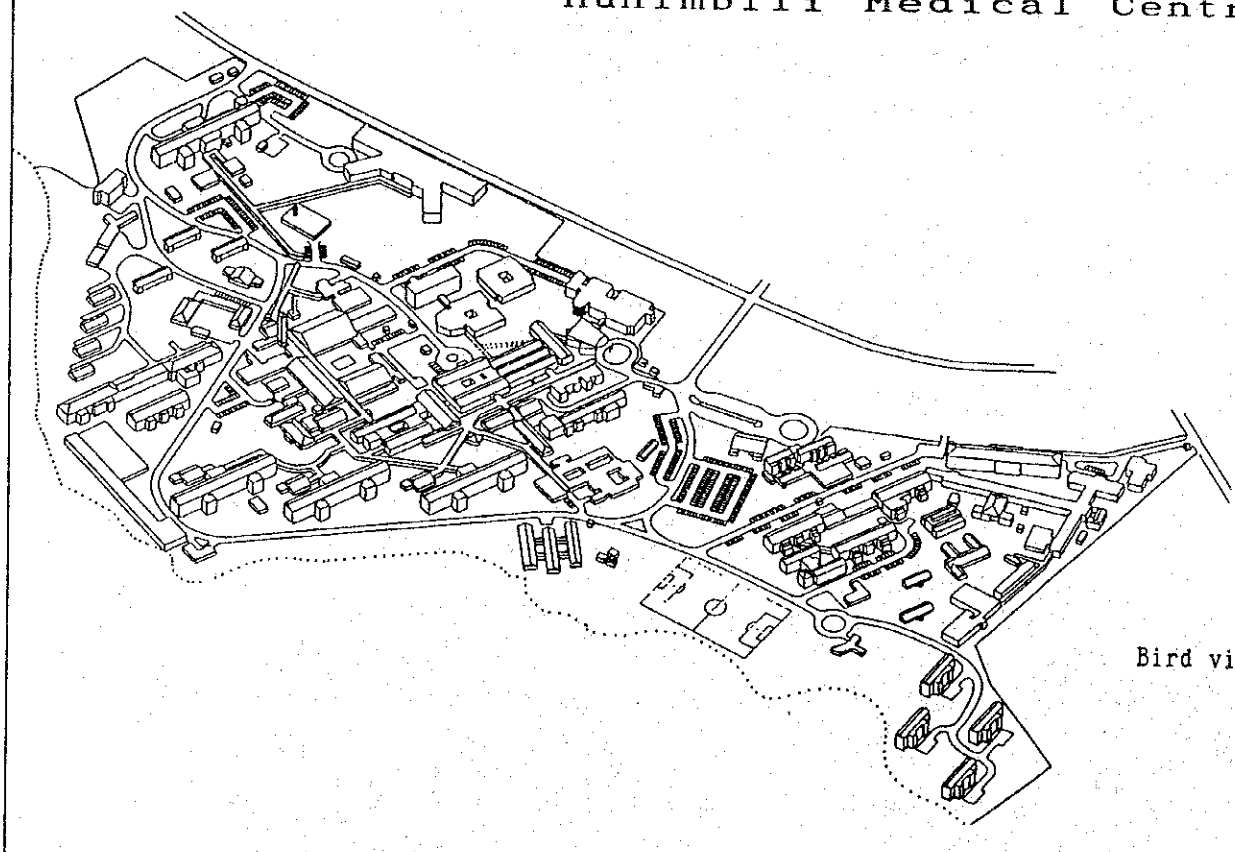
1) Site location map



2) Project site




Muhimbili Medical Centre



Bird view

3) History of Muhimbili Medical Centre

The name of Muhimbili Medical Centre comes from Muhimbili, the place name where the Centre is located. The present general hospital, composed of various wards, was inaugurated in 1956 as Princess Margaret Hospital with princess Margaret in attendance. The hospital also provided education and training for nurses, clinic assistants, chemists, laboratory helpers, assistant nurses, etc.

Later, after the country won its independence, the name was changed from "Princess Margaret Hospital" to "Muhimbili Hospital" (and later to "Muhimbili Medical Centre). Towards the middle of the 1960s, the Muhimbili Hospital established a medical school, which was later renamed as "Dar es Salam University, Medical Faculty" and came to be known as "Muhimbili Medical Training Hospital."

The Medical Faculty provides the postgraduate course in addition to nursing course, pharmaceutical course, dental course, applied health course, academic research course, education course for the handicapped, traditional medicine course, public health development and research course, etc. The hospital is composed of the main hospital and a separate sub-hospital (Ocean Road Hospital) that carries out diagnosis and medical treatment of malignant neoplasm (cancer). The administrative management and responsibility of the Medical Faculty inside the hospital premises were transferred from Dar es Salam University to Muhimbili Medical Centre, with the university taking responsibility only for materials related to educational research.

The Muhimbili Medical Centre was reorganized/reestablished by the Ordinance of 1976 as a parastatal organization (self-governing body) with a council for carrying out self-government. The council, made up of the people related to the Ministry of Health and general economists, has its administration and control under the autonomy of the facility.

The facility running cost, labor cost, etc. are borne by the government of Tanzania through the Ministry of Health.

4) Status of Infrastructure

The hospital stands on a plane land some 1.5km northwest of the centre of Tanzania's capital city Dar es Salam. In addition to 40 buildings related directly to medical treatment such as clinics, wards, laboratories, etc., the hospital has about 30 other buildings scattered over the premises of approximately 224.4 x 103m$^2$ such as personnel quarters, nursing school, dining halls, warehouses, etc.

① Construction

The buildings are mostly ferroconcrete buildings with flat roofs, partially with the steel frame roofs using corrugated galvanized iron sheets and corrugated slates. The buildings are mostly two-story buildings, with the highest building being 4-story building. Approximately 50% of the buildings are leaking, causing damages to the ceilings. The oldest building was built more than 40 years ago, calling for water-proofing reform works at the flat roofs. The buildings don't seem to have been well maintained and well managed since they were built. Most of the steel sashes, used in the old buildings, have got rust on them. About 50% of the lights are either broken down or have no bulbs. The paints on walls, ceilings, etc. have mold on them or are peeled off here and there probably due to dew or water leakage, and water is found leaking through the joint of the washstand pipe in the room.

② Water Supply

The water is drawn from the service distribution line to store into a 225m$^3$ receiving tank on the ground, and is pumped into an elevated water tank of size 108m$^3$ for supply. However, the receiving tank seems to be inadequate in capacity (in case of Japan the figure is 30-60 l/day per m$^2$ ; 1000-2000 l per bed); and the people in the obstetrics department were complaining about the water shortage, with the water supplied until 8:00 in the morning and between 16:00-20:00.

③ Electricity

As for the electricity, 11,000 volt power is received through 6 units of 300kVA transformers, and 3 units of generators with the output 500kVA, 300kVA and 200kVA are installed for emergency use,

with 2 units of size 220kVA installed separately for different clinic blocks, leaving little problem. The power failure recorded for the past one year amounted to 173 hours (less than 30 minutes/day on average). However, the underground cables inside the premises, mostly laid down in the 1950's, are wound with paper and covered with lead, and are well over the durability term, calling for replacement.

④ Air Conditioning

The window-type coolers, installed in the private rooms such as the office, doctor's room, etc., are roughly functioning well. The duct type central cooling system is used in the operating room, with the freezer installed outside the building. Because of the inadequate heat insulation of the duct the dew water is seen to drip down and stain the ceiling downstairs, and the refrigerant gas is mostly insufficient and less effective.

5) General Information of Premises

Muhimbili Medical Centre

| | |
|---|---|
| Establishment | 1953 |
| Reconstruction | Enlarged several times in 1956, 1960, 1970, 1977 |
| Structure | Reinforced concrete, partly wooden roof, more than 40 buildings are scattered in the premises. |
| Floors | Mostly two-story buildings, four-story is the highest |
| Area | 226,500m$^2$ |
| Total Floor Space | 202,300m$^2$ |
| Access Road | 7m, asphalt-paved road |
| Location | Located about 1.5km west of Dar es Salaam |
| Voltage, Phase, Cycle | 11,000V 3$\phi$ 50Hz |
| Capacity of Transformer | 300KVA 6 units |
| Electric Power | 220V, 415V, 3$\phi$, 12$\phi$, 50Hz |
| Emergency Generator | 500KVA, 200KVA, 300KVA one unit each, 220KVA two units, total 5 units. Power outage hours amount to about 170 hours a year. |
| Telephone | Outside line 40, Extension 300 |
| Lighting | Fluorscent lamps. About 40% of the whole lighting is out of order without light bulbs. |
| Feed Pump | 150$\phi$ Elevated water tank 108m$^3$Receiving water tank 255m$^3$ |
| Water Pipe | 63.5$\phi$ |
| Drainage Pipe | 100$\phi$ |
| Disposal of Drainage | Connected to municipal drainage pipe |
| Disposal of Medical Waste | Incineration |

6) Overview of the Proposed Hospitals

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Name of Hospital | Muhimbili Medical Centre (MMC) Location: Dar es Salaam | | | | | | |
| Year of Establishment | 1950 | | | | | | |
| Range of Activity, Role | Top Referral Hospital of the country, teaching institution of Dar es Salaam University Medical Department, trains interns, studies medical science. | | | | | | |
| Characteristics of Activity | With cooperation of medical study of the university, aims to offer consultations for all the diseases such as infection diseases or cancer. | | | | | | |
| Catchment Area | Dar es Salaam, whole Tanzania | | | | | | |
| Population of Service Area | 2,000,000 approx. (whole Tanzania : 83,000,000 approx.) | | | | | | |
| Increase Rate of Population | 4.8% Density of Population (per $Km^2$) 977 persons | | | | | | |
| Referral from | All of the Tanzania Regional hospitals, Rufji, Nzega, Ifakara, Muheza, Kilwa District Hospital, Others | | | | | | |
| Number of Beds | 1,510 beds Beds for neonate 60 | | | | | | |
| Categories of Services | Out patient, Acute Outpatient, Internal Medicine, Surgery, Paediatrics, Obstetrics & Gynecology, Radio diagnosis, Psychiatry, Physiotheraphy, Dentistry, Ophtalmology, E.N.T. | | | | | | |
| Clinical Examinations | Histopathology, Clinical Chemistry, Entomology, Radio Therapy, Hematology, Microbiology, Parasitology, Immunology | | | | | | |

| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | |
|---|---|---|---|---|---|---|---|---|
| | Internal Medicine | 21 | nurse G."A" | 430 | Radiographer | 53 | Administr-ation | 28 |
| | Surgeon | 20 | nurse G."B" | 837 | Clinical Laboratory Technician | 47 | Nutritionist | 0 |
| | Orthopedic DR. | 5 | Assistant Nurse | 342 | | | Medical consultant | 12 |
| | Obstetric & Gynecologist | 18 | Mid-wife | 0 | Laboratory Assistant Technician | 77 | Maintenance technician | 7 |
| | Radiologist | 7 | | | Paramedical | 3 | Sweeper, Guard | |
| | Paediatric | 6 | | | Pharmasist | 41 | | |
| | Ophthamologist | 3 | | | Dental Assist. | 43 | Medical Recorder | 15 |
| | Anaesthe-sialogist | 9 | | | | | | |
| | Specialist | 5 | | | | | | |
| | Pathologist | 8 | | | | | | |
| | Psycologist | 6 | | | | | | |
| | Total | 108 | Total | 1609 | Total | 264 | Total | 62 |

| Record of Activity | 1991 | 1992 | 1993 | Avg. of 3 years |
|---|---|---|---|---|
| Number of Out Patient | 395,144 | 284,206 | 280,860 | 320,070 |
| Number of In Patient | 515,497 | 552,743 | 533,505 | 533,915 |

| Consultation (1993) | Kind of Consultation | No. | Kind of Consultation | No. |
|---|---|---|---|---|
| | 1 Diarrhea | – | 6 Cardiac Failure | – |
| | 2 Malaria | – | 7 TB cases | – |
| | 3 Typhoidal cases | – | 8 STDS cases | – |
| | 4 Obst. & Gynae. | 3,250 | 9 Paediatrics cases | – |
| | 5 Ophthalmia | – | 10 HIV | – |

| Ten Leading Diseases (1993) | Causes | No. | Causes | No. |
|---|---|---|---|---|
| | 1 Malaria | 5,976 | 6 Bronchiectasis | 1,840 |
| | 2 Inflammation of intestine | 2,760 | 7 Ophthalmia | 1,128 |
| | 3 Anaemias | 2,880 | 8 Pregnancy Abortions | 1,104 |
| | 4 Pneumonia | 2,050 | 9 Malnutrition | 1,080 |
| | 5 TB Meningitis | 1,680 | 10 Hypertension | 525 |

7) Financial Statement

Muhimbili Medical Centre

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 5,333,000,000 | 7,805,000,000 | 8,735,000,000 | |
| Total Income | 3,179,000,000 | 3,858,000,000 | 4,617,596,780 | 100.0 |
| Revenue | 2,226,094,000 | 3,212,836,000 | 4,418,529,000 | 95.7 |
| Medical Service Fee | 128,167,000 | 151,875,000 | 95,093,000 | 2.1 |
| Consultation Fee | 45,438,000 | 50,005,000 | 37,355,000 | 0.8 |
| In-patient Fee | | | | |
| Medicine Fee | | | | |
| Operation Fee | | | | |
| Examination Fee | | | | |
| Medicare Insurance | | | | |
| Supplementation from Company | 82,729,000 | 101,870,000 | 57,738,000 | 1.3 |
| Donations | 19,624,000 | 69,236,000 | 99,756,000 | 2.2 |
| Others | 805,115,000 | 424,053,000 | 4,218,780 | 0.1 |
| Total Expenditure | 2,561,740,000 | 3,191,105,500 | 4,722,069,454 | 100.0 |
| Salaries | 722,115,000 | 1,124,318,000 | 1,895,160,000 | 40.1 |
| Laundry Expenses | 45,992,000 | 37,084,000 | 51,005,000 | 1.1 |
| Surgical/Medical Expenses | 170,276,000 | 186,748,000 | 234,754,000 | 5.0 |
| Cost of Medicines | 366,028,000 | 364,696,000 | 520,968,000 | 11.0 |
| Traveling Expenses | 74,687,000 | 83,102,000 | 60,226,000 | 1.3 |
| Rentals | | | | |
| Water | 19,539,000 | 45,367,000 | 71,690,000 | 1.5 |
| Power, Light Services | 36,286,000 | 84,254,000 | 133,138,000 | 2.8 |
| Postal, Teleg., Tel. Services | 28,765,000 | 29,348,000 | 93,965,000 | 2.0 |
| Repair of Buildings | 110,517,000 | 88,067,000 | 100,189,000 | 2.1 |
| Repair of Equipment | 15,071,000 | 12,009,000 | 13,662,000 | 0.3 |
| Purchase of Equipment | – | 112,311,500 | 156,691,454 | 3.3 |
| Miscellaneous | 972,464,000 | 1,023,801,000 | 1,390,621,000 | 29.4 |

8) Main Equipment　　Muhimbili Medical Centre

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Maternity | | | | | | | |
| Clinic(one room) | | | | | | | |
| Examination Table | | | ① | | 15yr | U.K. | - |
| Instrument Sterilizer | ① | | | | 1992 | Germany | Aesculap(JC-344) |
| Consultation room(five rooms) | | | | | | | |
| Examination Table | | | ⑤ | | 15yr | U.K. | - |
| Sphygmomanometer | ① | | | | 5yr | China | - (LK) |
| " | ① | | | | - | Germany | Riester (Minimus II) |
| Weight & Height Scale | | | ① | | 17yr | U.S.A. | Detecto Medic Scale Ltd. |
| Blood Bank Laboratory | | | | | | | |
| Colorimeter | ① | | | | 1991 | U.S.A. | Corning (252) |
| Blood Bank Refrigerator | ① | | | | 5yr | U.K. | Kelvinator |
| Postneonatal | | | | | | | |
| Instrument Sterilizer | | | ① | | 13yr | Germany | Aesculap |
| Infant Scale | | ① | | | 20yr ～ | Germany | Seca |
| Vaccinating Room | | | | | | | |
| Refrigerator | ① | | | | 5yr | Germany | - |
| Ultrasound Room | | | | | | | |
| Ultrasound Machine | | ① | | | 7yr | Japan | Shimadzu Corp.(SDL-300) |
| " | | | | ① | 12yr | Japan | Aloka (SSD-202) |
| Infant Incubator | | | | ① | - | China | -(YXK-5G) |
| ICU | | | | | | | |
| Instrument Sterilizer | | | | ① | 15yr | Germany | Aesculap |
| Oxgen Monitor | | | ① | | 10yr | U.K. | Meti (400S) |
| Suction Unit | | | ① | | 10yr | U.S.A. | Berkeley Bio-Enginering (VC-V) |
| Instrument Sterilizer (floor type) | | | ① | | 10yr | U.K. | - |
| Delivery Room | | | | | | | |
| Suction Unit | ① | | | | 1993 | U.K. | Eschmann (VP-35) |
| Infant Scale | | ① | | | 15yr | China | Smic |
| Spotlight | | | | ① | 16yr | Germany | Heraeus |
| Neonatal Room | | | | | | | |
| Refrigerator(wide type) | | | | ① | 15yr | - | - |
| Instrument Sterilizer | | | ① | | 10yr | Germany | Aesculap |
| Infant Warmer | | | | ① | 12yr | - | - |
| Infant Suction Unit | ④ | | | | 3yr | - | Schuco Inc. |
| Room Heater | ③ | | | | - | - | (Satrap 1200) |
| Infant Scale | | ② | | | 15yr | Germany | Seca (Hermap) |
| Operation Theatre | | | | | | | |
| Operation Theatre No. 1 | | | | | | | |
| Operation Table | | ① | | | 15yr | - | - |
| Operating Lamp(ceiling) | | | ① | | 10yr | - | - |
| Anesthesia Machine | | | ① | | - | U.S.A. | Ohmeda |
| Suction Unit | | ① | | | 5yr | U.K. | Eschmann (VP-35) |

G = Good　U = Usable with some trouble　N = Not normally function
T = out of order/unrepairable　①② = quantity

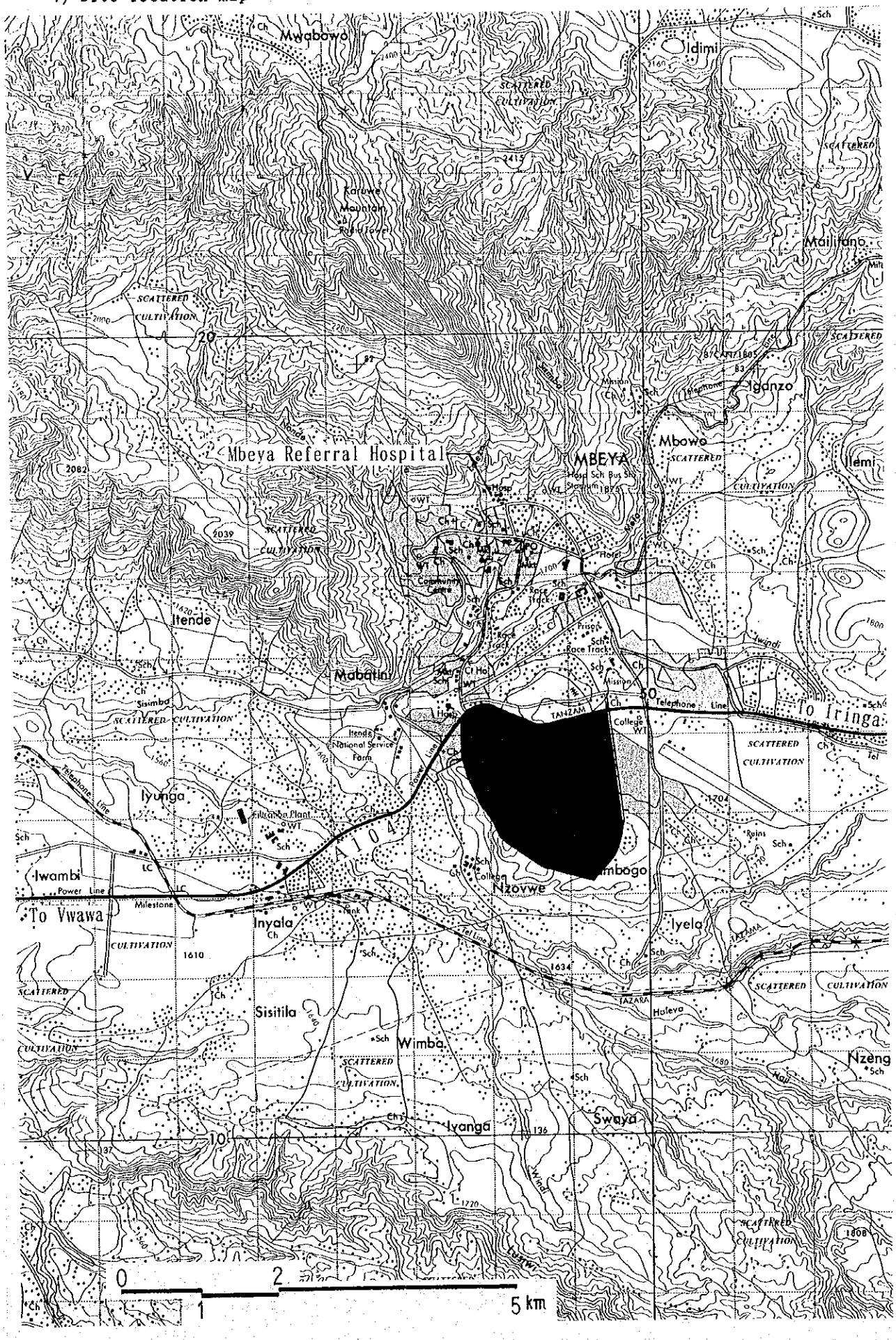
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(Model) |
|---|---|---|---|---|---|---|---|
| Operation Theatre No. 2 | | | | | | | |
| Operating Table | | ① | | | 15yr | - | - |
| Operating Lamp(ceiling) | | | | ① | 10yr | - | - |
| Anesthesia Machine | | | | | - | U.S.A. | Ohmeda |
| Preparation Room | | | | | | | |
| Instrument Sterilizer | | | ① | | 10yr | Germany | Aesculap |
| Sterilizing Room | | | | | | | |
| Autoclave | ① | | | | 1988 | U.S.A. | Consol Idetep Stills & Sterilizers |
| Out-patient & Casualty | | | | | | | |
| Instrument Sterilizer | | | | ① | 15yr | Germany | Aesculap |
| Examination Table | | | ⑧ | | 15yr | - | - |
| Small Operation Theatre | | | | | | | |
| Operating Table | | | | ① | 20yr ~ | Swiss | Kifa |
| " | | | | ① | 20yr ~ | U.K. | Allen & Hanburys Ltd. |
| Operating Lamp(ceiling) | | | | ① | 20yr ~ | U.K. | - |
| Mobile Operating Lamp | | | | ① | 15yr | Japan | Yamada Lamp(NB-541) |
| Instrument Sterilizer | | | | ① | 13yr | U.K. | Weiss |
| Suction Unit | | ① | | | 10yr | U.K. | Eschmenn (VP-35) |
| Suction Unit, Foot Type | ① | | | | 10yr | Denmark | Ambu International |
| Sphygmomanometer | ② | | | | 5yr | Germany | - (Minimus II) |
| Eye Clinic | | | | | | | |
| Slit Lamp Microscope | ① | | | | 5yr | Sweden | Zeiss |
| " " | | | | ① | 13yr | Japan | Topcon (SL-3D) |
| Fundus Camera | | | ① | | 12yr | Japan | Kowa (FX-50R) |
| Visual Field Analyzer | | ① | | | 15yr | U.K. | Clement Clarke International |
| Spotlight | | ① | | | 15yr | - | - |
| Desktop Autoclave | | ① | | | 12yr | Germany | - (Sterimat) |
| ICU(8 beds) | | | | | | | |
| Oxgen Monitor | | | | ② | 15yr | Swiss | Ning Nufer AG (OM-100) |
| Infant Incubator | | | ① | | 7yr | Aust. | Common Wealth Industrial Gass |
| Ventilator | ① | | | | 1991 | U.S.A. | Bourns Life System (BP-20) |
| Defibrillator | | | ① | | 8yr | Holland | Pilips (BD-500) |
| Bedside Monitor | | | | ⑧ | 10yr | U.S.A. | Packerd (7830A) |
| Suction Unit | ① | | | | 1990 | U.K. | Eschmann (VP 35) |
| Operation Theatre | | | | | | | |
| Operating Table | | | ⑥ | | 1983 | U.K. | Eschmann |
| Operating Lamp(ceiling) | | | ④ | | 1960 | Germany | Hanaulux |
| " " | | | ② | | 1979 | Germany | Hanaulux |
| Suction Unit | | ③ | ③ | | - | U.K. | Eschmann |
| Anesthesia Machine | | ③ | ③ | | | | |
| Electro-surgical Unit | | | ⑨ | | 7yr | U.K. | Eschmann |
| Ventilator | | | | ① | 20yr ~ | U.K. | - |
| BP Monitor | ① | | | | 1991 | - | - (Dinamap) |
| Pulse Oximeter | | | | ① | 10yr | U.S.A. | - |
| Operating Microscope | | ① | | | 1990 | Sweden | Zeiss |
| Instrument Sterilizer | | ① | | | 7yr | Germany | Aesculap |

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Defibrillator | | | ① | | 5yr | Russia | - |
| Bronchoscope(metal) | | ② | | | 10yr | Germany | - |
| Light Source | | ② | | | 10yr | Germany | - |
| X-ray Diagnostic Equipment | | | | | | | |
| Basic X-ray unit(B.R.S) | ① | | | | 1992 | Holland | Philips (BRS) |
| X-ray unit, simple | | ① | | | 1978 | Germany | Siemens |
| " with TV | ① | | | | 1992 | Holland | Philips (50CP-H etc.) |
| Basic X-ray Unit | ① | | | | 1992 | Holland | Philips |
| " with TV | ① | | | | 1993 | Japan | Simadzu Corp.(D150-611 etc.) |
| Basic X-ray Unit | | | ① | | 1975 | Germany | Siemens (2RF Unit) |
| Ultrasound Machine(L) | | | | ① | 10yr | U.S.A. | Acuson |
| " (L) | | | | ① | - | Holland | Philips |
| " (S) | | ① | | | 10yr | Japan | Simadzu Corp.(SDL-32) |
| Automatic Processor | | | | ① | 1977 | U.S.A. | Kodak (RPX-OMAT) |
| " | ① | | | | 1992 | U.S.A. | Kodak (RPX-OMAT) |
| Laboratory | | | | | | | |
| Hematology | | | | | | | |
| Cooling Centrifuge | | | | ② | 1974 | Germany | Christs |
| Refrigerator(tall type) | | ① | | | 10yr | U.S.A. | General Electric |
| Deep Freezer(vertical) | | | | ① | 15yr | Germany | Totsch |
| Laboratory Incubator | | | | ① | 15yr | U.K. | Gallenhamp |
| Hot Air Oven | | | ① | | 20yr ~ | Germany | - |
| Centrifuge(floor type) | | | | ② | 14yr | Germany | Christs |
| Incubator | | | | ① | 14yr | U.K. | Gallenhamp(IH-100) |
| Water Bath | | | ① | | 15yr | Germany | Christs |
| Deep Freezer | ① | | | | 5yr | Scandi. | Electro Lux (TCW-1151) |
| Refrigerator(tall type) | | ① | | | 15yr | U.S.A. | General Electric |
| HIV Analyzer | ① | | | | 1993 | Japan | Epson(P-40/SLT963TR) |
| Analytical Balance | | | ① | | 17yr | Germany | Sartroroieus |
| Incubator | ① | | | | 1992 | U.K. | Pickspone |
| Water Bath | | ① | | | 15yr ~ | Germany | Christs |
| Microscope | ① | | | | 1992 | - | - |
| " | | ① | | | 20yr ~ | Germany | Carl Zeiss |
| Deep Freezer | | | ① | | 20yr ~ | Germany | Bosch |
| Refrigerator(tall type) | | | ① | | 20yr ~ | Germany | Bosch |
| Centrifuge, Table Top | | | ① | | 16yr | Germany | Herareus Christs |
| Blood Bank Refrigerator | | | | ① | 20yr ~ | Germany | Thalheimer |
| Vacuum Sealer | | | ① | | 15yr | U.S.A. | Fenwan Laboratories |
| Blood Cell Counter | | | | ① | 16yr | U.S.A. | Coulter (CBC-5) |
| Diluting Apparatus | | ② | | | 7yr | U.S.A. | Coulter (TD3B) |
| Centrifuge | | | ① | | 13yr | Germany | Herareus Christs(Labofuge GL) |
| Electrophoresis App. | | | | ① | 15yr | Germany | Soskamp |
| Refrigerator(tall type) | | | ① | | 20yr ~ | Germany | Frigieaire |
| Hemoglobino Meter | | | | ① | 8yr | U.S.A. | Coulter |
| Incubator | | | ① | | 20yr ~ | Germany | Memmert |
| Refrigerator(tall type) | | | ① | | 20yr ~ | Germany | Bosch |

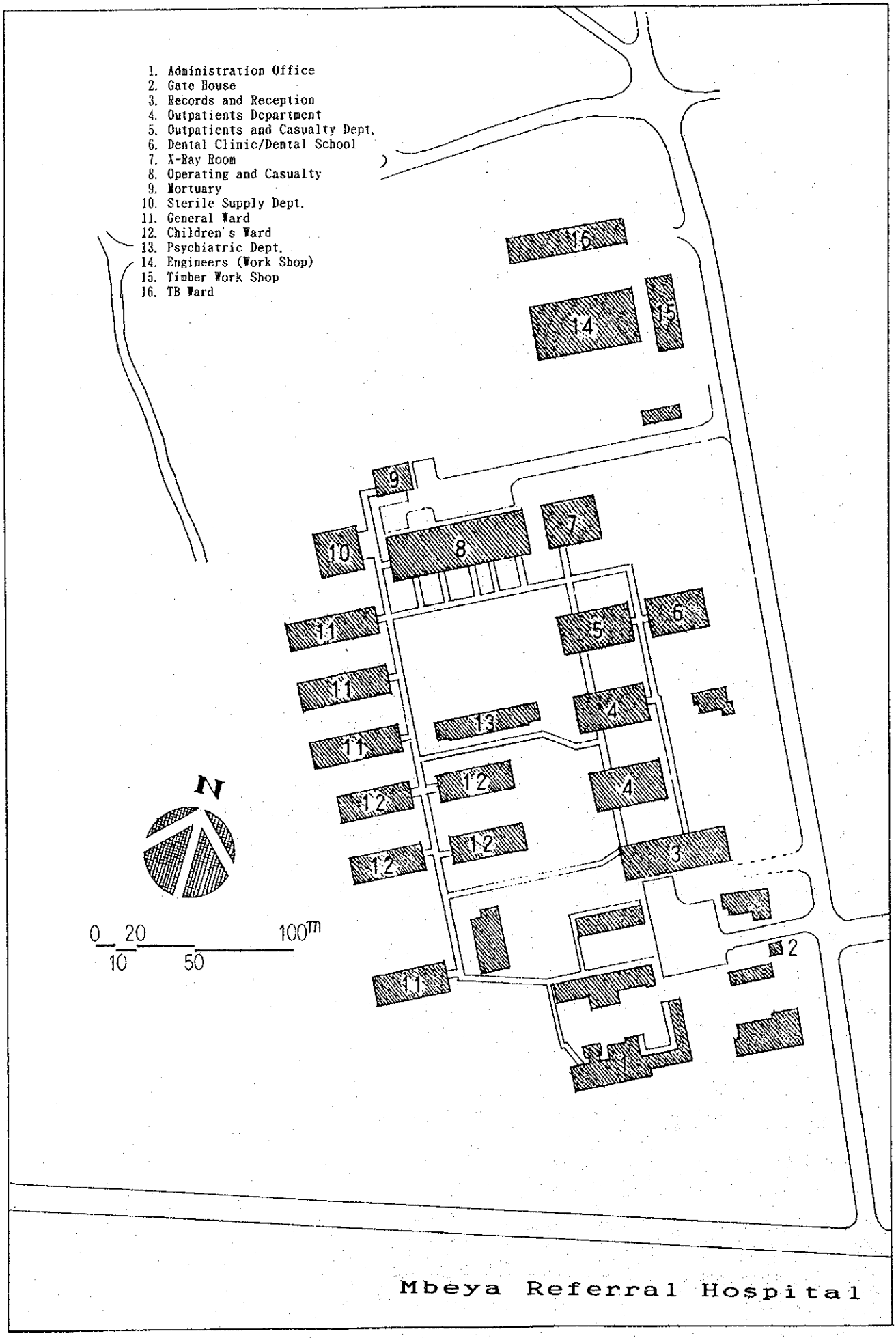
| Section / Equipment | Status G | U | N | T | Using Period | Country Orogin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Water Bath | | ① | | | 15yr | Germany | Memmert |
| Haematocrit Centrifuge | | | ① | | 20yr ~ | U.S.A. | Becton Dicidickinson |
| Distillation Apparatus | | | | ① | 20yr ~ | U.K. | Herearus Christ |
| Incubator | | | ① | | 12yr | Germany | Memmert |
| Desktop Centrifuge | | | ① | | 20yr ~ | U.K. | Gallenkamp |
| Microscope | | | ① | | 20yr ~ | Germany | Litz |
| Microscope | ① | | | | 1991 | Japan | Olympus (SH-2) |
| Coagurometer | | | ① | | 14yr | U.S.A. | BBL |
| Colorimeter | ① | | | | 7yr | U.S.A. | Corning (252) |
| Electrophoresis App. | | | ① | | 13yr | U.K. | - (SAE-2761) |
| Bio-Chemical Lab. | | | | | | | |
| Flame Photometer | | | | ① | 14yr | U.S.A. | Instrumentation Laboratory |
| Analytical Balance | | | | ① | 14yr | - | Sartorius |
| Photometer | | ① | | | 10yr | Swiss | - (Serozyme-1) |
| Water Bath | | | ① | | 1971 | Germany | Memmert |
| Spectrophotometer | | | ① | | 12yr | Germany | - |
| Water Bath | | | ① | | 12yr | - | - (Thermostat 2761) |
| Chemical Analysis Machine | ① | | | | 1992 | Germany | Boehringer Mannheim |
| " " | ① | | | | 1992 | U.S.A. | Technicon (RA-50) |
| PH Meter | ① | | | | 1992 | Germany | Schott (CG-840) |
| Colorimeter | ① | | | | 1992 | U.S.A. | Corning (252) |
| Glucometer | | ① | | | 10yr | - | YSI Clandon (23AM) |
| Refrigerator(tall type) | | ① | | | 10yr | Germany | Bosch |
| Small Freezer(tall type) | | ① | | | 10yr | France | Lec |
| Large Freezer(tall type) | | ① | | | 10yr | Germany | Bosch |
| Desktop Centrifuge | | | ① | | 20yr ~ | Germany | Christ |
| Centrifuge(floor type) | ② | | ② | | 7yr | Germany | Christ (UJ-3-5) |
| Chemistry Analyzer | ① | | | | - | U.S.A. | Beckman |
| Water Bath | | ① | | | 12yr | - | GFL |
| Micro Centrifuge | | | ① | | 12yr | ? | Eppendorf (3200) |
| Freezer | ① | | | | 5yr | - | Lec |
| Hot Air Oven | ① | | | | 5yr | Germany | Hererus Christ |
| Incubator | ① | | | | - | U.K. | Gallenkamp |
| Large Refrigerator(tall) | ① | | | | 8yr | Germany | Bosch |

(2) Mbeya Referral Hospital (Mbeya)

1) Site location map



2) Project site



3) History of Mbeya Referral Hospital

The hospital was reorganised as the Mbeya Referral Hospital on October 1, 1984 by combining the Mbeya Regional Hospital and the Meta Obstetric Hospital. The Mbeya Regional Hospital, inaugurated as the medical facility of the Baptist church, had the three old operating wards in the present site reformed in 1983. The Meta Obstetric (Maternity) Hospital was renovated under the British Overseas Development Agency aid programme in 1981/1982. Both of these medical facilities were officially transferred to the Health Ministry of Tanzania in 1984. The construction works continued till 1989, after which the facilities have received no aid either from the Baptist church or from the British ODA. The ownership of the facilities and equipment lies with the Government of Tanzania, and all operating costs are borne by the Government of Tanzania through the Ministry of Health. The personnel affairs are also under direct control of the Ministry of Health.

4) State of Infrastructure in Mbeya Referral Hospital

① Construction

The hospital stands on the slope of a hill, called "Hospital Hill", about 1km north of the bus station in Mbeya city in southern Tanzania, 1,744m high above sea level and 80km away from the border with Zambia. On the compass of about 10km$^2$, expanding lengthwise in north-south directions with a slight southward slope, lie the 25 one-story buildings connected to one another with the roofed passages. The buildings are made of ferroconcrete pillars and beams, brick-piled walls, and wooden roofs. Some buildings have steel frames and use the corrugated galvanized iron sheets. The buildings housing the radiation department wards, etc. have the roofs thatched on the ferroconcrete roof floor blocks. The stool flush valves and the fence hinges lie broken; otherwise the buildings are comparatively well maintained.

② Electricity

The 3-phase, 11,000-volt power is received from the city's transmission line, and is supplied by changing into 415V and 230V

using a 500kVA transformer. The Rolls-Royce125 kVA diesel generator was installed in 1984 as an emergency power source. However, there is almost no power failure.

③ Water Supply

The water, supplied by the city waterworks through 150mm pipe is sufficient in quantity.

④ Drainage

The drainage is first fed to the purification tank in the campus before being disposed to the city drainage tube. The medical waste is burned in the incinerator.

5) General Information of Premises

Mbeya Referral Hospital

| | |
|---|---|
| Establishment | 1982, established as a consulting hospital. |
| Reconstruction | Constructed from 1983 to 1985. |
| Structure | Reinforced concrete, brick wall, wooden building, partly steel-structure building, slated with corrugated galvanized iron sheets, partly such as X-ray building have steel-framed roof on concrete flooring. |
| Floors | 25 one-story buildings connected by long corridors. |
| Area | 100,000m$^2$ |
| Total Floor Space | 13,000m$^2$ |
| Access Road | 5m, asphalt-paved road. |
| Location | Located on a hillside called Hospital Hill about 1km north of the centre of Mbeya. |
| Voltage, Phase, Cycle | 11,000V, 3$\phi$, 50Hz |
| Capacity of Transformer | 500KVA |
| Electric Power | 415V, 230V, 3$\phi$ 12$\phi$, 50Hz |
| Emergency Generator | 125KVA |
| Telephone | Outside line 7 Extension 68 |
| Lighting | Integrated lighting by fluorscent lamps. |
| Feed Pump | 150$\phi$ |
| Water Pipe | 37.5$\phi$ |
| Drainage Pipe | 150$\phi$ |
| Disposal of Drainage | Drained through purification tank to municipal drainage pipe. |
| Disposal of Medical Waste | Incineration, partly collected by municipal government. |

6) Overview of the Proposed Hospitals

| | | | | |
|---|---|---|---|---|
| Name of Hospital | Mbeya Referral Hospital (Mbeya) | | | Location: Mbeya |
| Year of Establishment | Established in 1984 affiliated maternity hospital which was established in 1983 | | | |
| Range of Activity, Role | Top Referral and Teaching Hospital of the south zone, Study of Medical science. | | | |
| Characteristics of Activity | Training Institute for Medical Student | | | |
| Catchment Area | Mbeya Region | Iringa Region | Rukwa Region | Ruvuma Region |
| Population of Service Area | 1,759,451 | 1,594,700 | 1,233,018 | 1,450,026 |
| Increase Rate of Population | 3.1% Density of Population (per Km²) 25 persons | | | |
| Referral from | Iringa Regional Hospital (87 persons)<br>Sumhawanga Regional Hospital (86 persons) | | | |
| Number of Beds | 409 (Obstetrics 106) Beds for neonate 24 | | | |
| Categories of Services | Out patient Acute Outpatient Internal Medicine Surgery<br>Paediatrics Obstetrics & Gynecology Radio diagnosis Urology<br>Dentistry Ophtalmology Psychiatry | | | |
| Clinical Examinations | Hematology Microbiology Parasitology Immunology | | | |

| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | |
|---|---|---|---|---|---|---|---|---|
| | Internal Medicine | 12 | nurse G."A" | 117 | Radiographer | 1 | Administr-ation | 1 |
| | Surgeon | 4 | nurse G."B" | 352 | Clinical Laboratory Technician | 12 | Nutritionist | |
| | Orthopedic DR. | 1 | Assistant Nurse | | | | Medical consultant | 1 |
| | Obstetric & Gynecologist | 3 | Mid-wife | 159 | Laboratory Assistant Technician | 24 | Maintenance technician | 2 |
| | Dentist | 1 | Dental Hygiemist | 9 | | 1 | | |
| | Paediatric | 2 | | | Paramedical | | Sweeper, Guard | 76 |
| | Ophthamologist | 1 | | | Pharmasist | 2 | | |
| | Anaesthe-sialogist | 1 | | | | | | |
| | Practical Doctor (internal medicine) | 4 | | | | | | |
| | Total | 28 | Total | 637 | Total | 36 | Total | 80 |

| Record of Activity | 1991 | 1992 | 1993 | Avg. of 3 years |
|---|---|---|---|---|
| Number of Out Patient | 302,248 | 276,675 | 245,496 | 274,806 |
| Number of In Patient | 27,770 | 27,186 | 23,941 | 26,299 |

| Consultation (1993) | Kind of Consultation | No. | Kind of Consultation | No. |
|---|---|---|---|---|
| | 1 Surgical cases | 4,912 | 6 Typhoidal cases | 1,912 |
| | 2 Radiography cases | 3,520 | 7 Malaria cases | 1,908 |
| | 3 Obst. & Gynae. | 2,871 | 8 TB cases | 1,890 |
| | 4 Dental cases | 2,798 | 9 Paediatrics cases | 1,560 |
| | 5 Ophthalmia | 2,110 | 10 STDS cases | 810 |

| Ten Leading Diseases (1993) | Causes | No. | Causes | No. |
|---|---|---|---|---|
| | 1 Malaria | 3,977 | 6 Anaemias | 814 |
| | 2 Pneumonia | 1,934 | 7 Tuberculosis | 446 |
| | 3 Pregnancy Abortions | 1,432 | 8 Psychoses | 419 |
| | 4 Intestinal Complications | 1,197 | 9 Measles | 418 |
| | 5 HIV | 991 | 10 Meningitis | 372 |

7) Financial Statement

Mbeya Referral Hospitals

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 350,000,000 | 385,000,000 | 397,200,000 | |
| Total Income | 297,746,783 | 301,179,534 | 235,808,069 | 100.0 |
| Revenue | 270,861,337 | 141,728,626 | 89,851,760 | 38.1 |
| Medical Service Fee | | | 7,112,400 | 3.0 |
| Consultation Fee | | | 5,572,800 | 2.4 |
| In-patient Fee | | | — | |
| Medicine Fee | | | 925,100 | 0.4 |
| Operation Fee | | | 172,000 | 0.1 |
| Examination Fee | | | 442,500 | 0.2 |
| Medicare Insurance | | | — | |
| Supplementation from Company | | | — | |
| Donations | 26,885,446 | 159,450,908 | 138,843,909 | 58.8 |
| Others | | | | |
| Total Expenditure | 297,746,783 | 301,179,534 | 235,808,069 | 100.0 |
| Salaries | 44,270,519 | 32,995,643 | 38,995,643 | 15.5 |
| Laundry Expenses | | | | |
| Surgical/Medical Expenses | 64,486,537 | 31,646,194 | 28,144,500 | 11.2 |
| Cost of Medicines | 85,690,498 | 161,380,000 | 132,670,000 | 52.9 |
| Traveling Expenses | 26,669,161 | 12,311,639 | 11,737,726 | 4.7 |
| Rentals | | | | |
| Water | 674,330 | 1,399,000 | 750,000 | 0.3 |
| Power, Light Services | 27,843,892 | 29,730,199 | 18,999,900 | 7.6 |
| Postal, Teleg., Tel. Services | 999,000 | 100,000 | 100,000 | 0.0 |
| Rapair of Buildings | 1,999,000 | 3,282,799 | 2,329,300 | 0.9 |
| Repair of Equipment | 1,616,760 | 1,444,400 | 1,990,000 | 0.8 |
| Purchase pf Equipment | — | 4,101,800 | — | |
| Miscellaneous | 43,497,086 | 22,787,860 | 15,091,000 | 6.0 |

8) Main Equipment

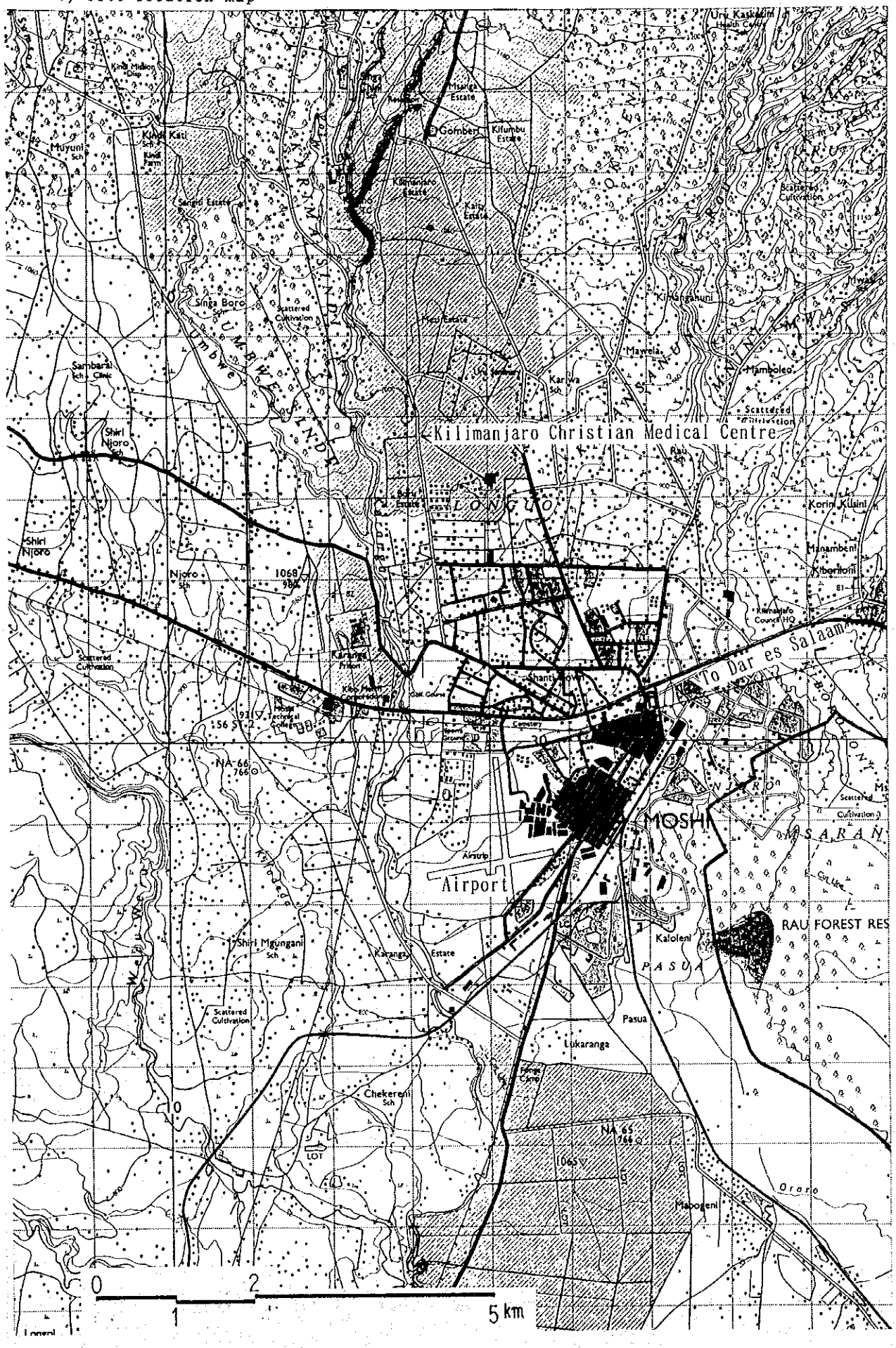
Mbeya Referral Hospital

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Operation Theatre | | | | | | | |
| Operation Theatre No. 1 | | | | | | | |
| Operating Lamp | | ① | | | 15yr | U. K. | Technical Light & Equipment Ltd. |
| | | | | | | | (SCIALYTIC) |
| Operating Table | | | ① | | 15yr | - | - |
| Suction Unit | | | ① | | 10yr | - | Aerosol Medical |
| Anesthesia Machine | | | | ① | 12yr | U. S. A. | Ohmeda |
| Ventilator | | | ① | | 10yr | - | - (TC-50) |
| Autoclave(desk type) | | | ① | | 10yr | U. K. | Little Sister |
| " (tall type) | | | | ① | 15yr | - | Electrical Details |
| " | | | | ① | 15yr | U. K. | - (MATRON) |
| Operation Theatre No. 2 | | | | | | | |
| Operating Lamp | | ① | | | 15yr | U. K. | Technical Light & Equipment Ltd. |
| | | | | | | | (SCIALYTIC) |
| Operating Table | | | ① | | 15yr | - | - |
| Anesthesia Machine | | | ① | | 10yr | U. K. | Penlon |
| Small Operation Theatre No. 1 | | | | | | | |
| Operating Table | | | ① | | 15yr | - | - |
| Operating Lamp(ceiling) | | | | ① | 15yr | U. K. | Technical Light & Equipment Ltd. |
| | | | | | | | (SCIALYTIC) |
| Spotlight | | ① | | | 10yr | - | - |
| Suction Unit | | | ① | | 10yr | - | - |
| Small Operation Theatre No. 2 | | | | | | | |
| Operating Table | | | | ① | 18yr | - | - |
| Operating Lamp(ceiling) | | | | ① | 15yr | U. K. | Technical Light & Equipment Ltd. |
| | | | | | | | (SCIALYTIC) |
| CSSD | | | | | | | |
| Ultrasonic Washing Machine | | | | ① | 16yr | - | Ultrasonics Ltd. (6671A) |
| Hot Air Oven | | | ① | | 15yr | - | - (G 150) |
| Dry Cabinet | | | ① | | 10yr | U. K. | Leec |
| Autoclave(wall mount) | | | | ① | 20yr ~ | - | Chas·F·Phackray Ltd. |
| Glove Washer | | | | ① | 15yr | - | - (HMK-100) |
| ICU | | | | | | | |
| Instrument Sterilizer | | | ① | | 12yr | Germany | Aesculap |
| Suction Unit | | | ① | | 10yr | - | Dschmann (TG 220H) |
| Suction Unit(low prs.) | | | ① | | 15yr | - | - |
| X-ray Diagnostic Equipment | | | | | | | |
| X-ray Equip., Fluorscopy | ① | | | | 1994 | Japan | Shimadzu Corp. |
| Basic X-ray Unit | | | | ① | - | Holland | Philips |
| X-ray Equip., Fluorscopy | | | | ① | - | Holland | Philips |
| Mobile X-ray Machine | | ① | | | 10yr | Holland | Philips (TRACTIX) |
| Film Dryer | | | ① | | 15yr | - | - |
| Eye Clinic | | | | | | | |
| Slit Lamp Microscope | | | ① | | 13yr | Germany | Carl Zeiss |
| Instrument Sterilizer | | ① | | | 10yr | Germany | Aesclap |

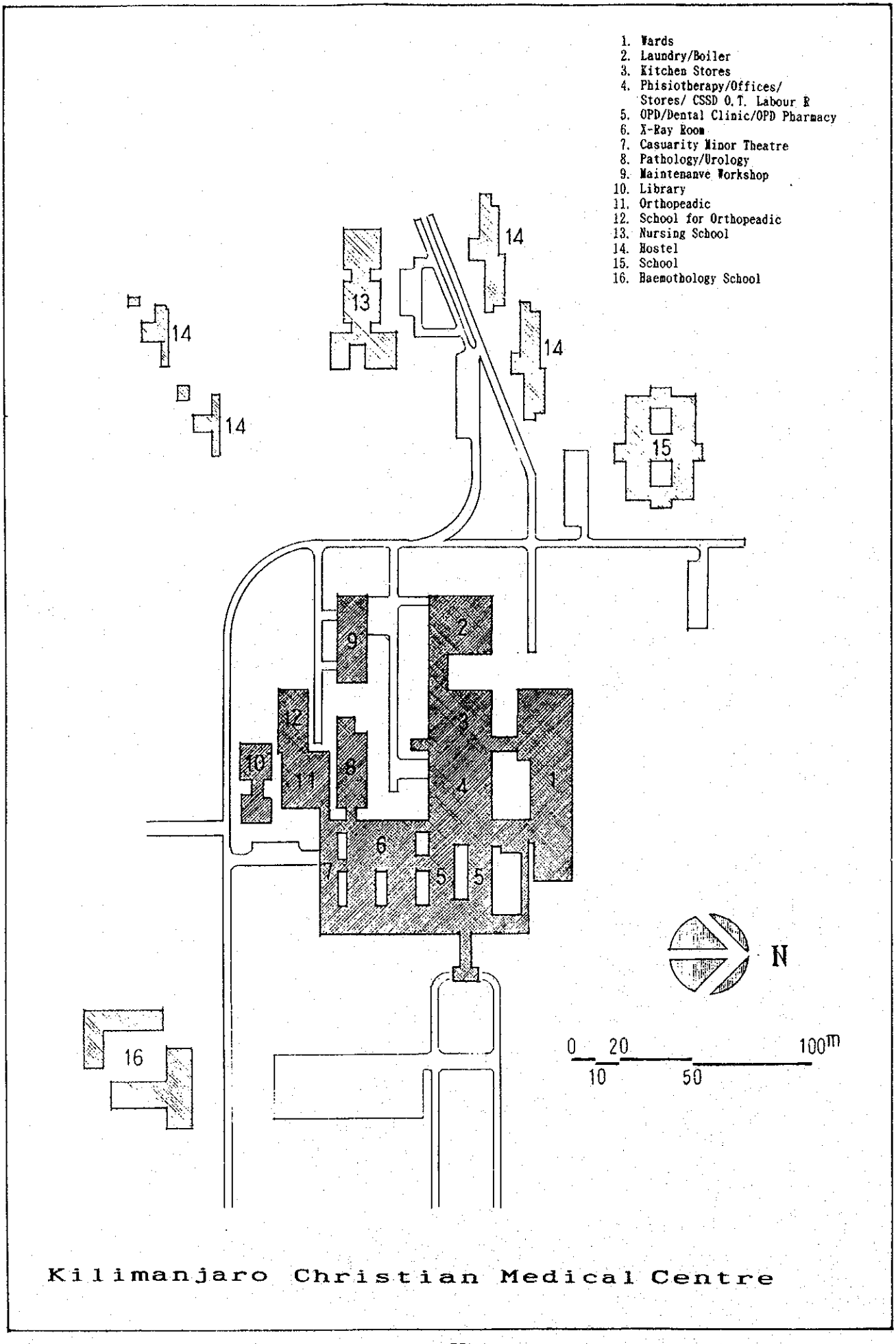
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Spotlight | | ① | | | 10yr | - | - |
| Laboratory | | | | | | | |
| Microscope | ① | | | | 8yr | Germany | Carl Zeiss |
| Incubator | | ① | | | 10yr | Germany | Memmert |
| Flasko Shaker | | | ① | | 15yr | U.S.A. | Yankee Rotor |
| Water Bath | | ① | | | 8yr | Germany | Memmert |
| Balance | | ① | | | 10yr | U.S.A. | Dial-O-Gram |
| Desktop Centrifuge | | | ① | | 14yr | Germany | Hettich (EPA Ⅲ) |
| Blood Bank Refrigerator | ① | | | | - | U.K. | Kelvinator (UE 650) |
| Refrigerator | ① | | | | - | U.K. | Lec |
| Colorimeter | ① | | | | 5yr | U.S.A. | Corning (252) |
| Haematocrit Centrifuge | | | | ① | 15yr | U.K. | Hewksley |
| Flame Photometer | | | | ① | 14yr | Germany | Zeiss (TM 1D) |
| Desktop Centrifuge | | | ① | | 20yr ~ | U.S.A. | Clay Adams Inc. |
| Vacuum Pump | | | ① | | 18yr | Germany | Satrorious-Membranfilter GMBH |
| Mortuary | | | | | | | |
| Mortuary Refrigerator (9 bodies) | | | ① | | 20yr ~ | U.K. | Polysec Ltd. |
| Dissecting Table | | ① | | | 10yr | U.K. | - |
| Spotlight | | | ① | | 10yr | U.K. | Brandon Medical |
| Maternity | | | | | | | |
| X-ray Diagnostic Equipment | | | | | | | |
| Basic X-ray Unit | | ① | | | 8yr | Holland | Philips |
| Delivery Room | | | | | | | |
| Labour Bed | | | ① | | 20yr ~ | - | - |
| Operating Lamp(ceiling) | | | | ① | 15yr | - | - |
| Spotlight | | | ① | | 10yr | - | - |
| Suction Unit | | | ① | | 10yr | U.K. | Eschmann (VP-35) |
| Operation Theatre | | | | | | | |
| Operating Table | | | ① | | 15yr | - | - |
| Operating Lamp(ceiling) | | | ① | | 15yr | - | - |
| Suction Unit | | | ① | | 10yr | U.K. | Eschmann (VP-120) |
| Infant Incubator | | | ① | | 8yr | - | - |
| Suction Unit | | | | ① | 10yr | U.K. | Eschmann |
| Spotlight | | | ① | | 10yr | - | - |
| Infusion Pump(L) | ① | | | | 5yr | - | - |
| CSSD | | | | | | | |
| Ultrasonic Washing Machine | | | | ① | 13yr | U.K. | - (6671A) |
| Autoclave(tall type) | | | ① | | 13yr | U.K. | Boekel |
| " (M) | | | ① | ① | 15yr | U.K. | Thackeay |
| Dry Cabinet | | | ① | | 14yr | U.K. | Lec |

(3) Kilimanjaro Christian Medical Centre (KCMC)

1) Site location map



2) Project site




Kilimanjaro Christian Medical Centre

3) History of Kilimanjaro Christian Medical Centre

The government of Tanzania asked the churches to build a teaching consultant, referral hospital in the northern zone. The Lutheran church responded to the request. The protestant churches (Lutheran, Moravia and Aglican) joined together forming the Good Samaritan Foundation (GSF). This foundation was responsible for the construction of the centre. The Centre opened in March, 1971, and was immediately handed over to the government of Tanzania. However, with the autonomy of the Centre returned to the hospital in 1992, the Centre has been autonomously run by a council made up of 4 members from the church side and 5 people from the Ministry of Health. However, the ownership of the facilities, equipment, etc. is held by the government of Tanzania. The operation costs of all facilities are basically borne by the government of Tanzania through the Ministry of Health, except for some operating cost covered by the aid from the church, etc. The personnel administration authority lies with the Ministry of Health.

4) State of Infrastructure in Kilimanjaro Christian Medical Centre

① Construction

This Medical Centre stands on slopes of Mt. Kilimanjaro about 3km north of the center of Moshi city. Approximately 850 meters above sea level, the ferroconcrete building has its wall partially made of piled-up concrete blocks, and the roof is made of concrete blocks on which steel frames are laid before being thatched with corrugated slates. The four blocks of the partially 4-story building are intricately connected with the covered (roofed) passages, presenting quite a complicated plane shape. The outer walls show some faint stains, but the inner walls are comparatively well maintained. However, the paints on the walls and fixtures are found to be partially peeled off here and there.

② Water Supply

The water is supplied from 70 - 80 meter deep wells inside the premises by using a pressure-feed pump. There are two wells; one of them is currently out of use, but there seems to be no problem of water shortage. Out of the four boilers for supplying hot water,

one is out of use. Solar system is also used partially for supplying hot water.

③ Medical Gas

The operating room does have the centralized piping for oxygen and vacuum, but the facility is currently broken down and unusable.

5) General Information of Premises

Kilimanjaro Christian Medical Centre

| | |
|---|---|
| Establishment | 1968 |
| Reconstruction | 1968～1971. Under construction for enlargement of pathology building |
| Structure | Reinforced concrete, concrete block wall, steel-structure roof, wave-shaped slate, connected with approximately four corridors. |
| Floors | Partly four-story building |
| Area | 10,200m² |
| Total Floor Space | 40,800m² |
| Access Road | 5m, asphalt-paved road |
| Location | Located on a hilltop about 2km north of Moshi. |
| Voltage, Phase, Cycle | 11,000V, 3φ, 50Hz |
| Capacity of Transformer | 800KVA |
| Electric Power | 220V, 415V, 3φ 12φ, 50Hz |
| Emergency Generator | 390KVA |
| Telephone | Outside line 4, Extension 155 |
| Lighting | Integrated lighting by fluorscent lamps |
| Feed Pump | 100φ |
| Water Pipe | 76φ, 32φ |
| Drainage Pipe | 100φ, 225φ |
| Disposal of Drainage | Connected to municipal drainage pipe |
| Disposal of Medical Waste | Incineration |

6) Overview of the Proposed Hospitals

| | | | | |
|---|---|---|---|---|
| Name of Hospital | Kilimanjaro Christian Medical Centre (KCMC) Location: Moshi | | | |
| Year of Establishment | 1968(taken over by the Government(MOH) since 1971) | | | |
| Range of Activity, Role | Top Referral and Educational Hospital of the region, studying Medical science. | | | |
| Characteristics of Activity | The institution for training interns.<br>The main institution offering ophthalmic services, specially opticcure. | | | |
| Catchment Area | Kilimanjaro | Tanga | Arusha | Singida |
| Population of Service Area | 1,210,901 persons | 1,480,458 persons | 1,620,458 persons | 1,105,000 persons |
| Increase Rate of Population | 2.1% | Density of Population (per Km²) 83 persons | | |
| Referral from | Mawenzi Regional Hospital, Kibongoto Hospital, Others | | | |
| Number of Beds | 520 beds | For neonate 40 | | |
| Categories of Services | Out patient<br>Padiatrics<br>Physiotheraphy | Casualty Out patient<br>Obstetrics & Gynecology<br>Dental | Internal Medicine<br>Radio Diagnosis<br>Ophtalmic | Surgery<br><br>E. N. T. |
| Clinical Examinations | Hematology | Microbiology | Parasitology | Immunology |

| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | |
|---|---|---|---|---|---|---|---|---|
| | Physician | 30 | Nurse G."A" | 321 | Radiology Assistant Technician | 4 | Administration | 15 |
| | Surgeon | 10 | Nurse G."B" | 296 | | | Nutritionist | 15 |
| | Orthopedic DR. | 2 | Assistant Nurse | — | Clinical Laboratory Technician | 3 | Medicare consultant | 2 |
| | Obstetric & Gynecologist | 4 | Mid-wife | | | | Maintenance Technician | 9 |
| | Radiologist | 2 | | | Laboratry Assistant Technician | 21 | Sweeper, Guard | 65 |
| | Paediatric DR. | 4 | | | | | | |
| | Ophthalmologist | 3 | | | Paramedical | 19 | | |
| | Anaesthesialogist | 5 | | | Pharmasist | 2 | | |
| | Other specialist | 6 | | | | | | |
| | Total | 66 | Total | 617 | Total | 49 | Total | 106 |

| Record of Activity | 1991 | 1992 | 1993 | Avg. of 3 years |
|---|---|---|---|---|
| Number of Out Patient | 311,397 | 311,839 | 322,110 | 315,115 |
| Number of In Patient | 168,034 | 170,026 | 165,219 | 167,759 |

| Consultation (1993) | Kind of Consultation | No. | Kind of Consultation | No. |
|---|---|---|---|---|
| | 1 Malaria | 9,850 | 6 Diabetes mellitus | — |
| | 2 Respiratory infection diseases | 6,500 | 7 Congenital malformation | — |
| | | | 8 Typhoicl cases | — |
| | 3 Diarrhea | — | 9 HIV | — |
| | 4 Hypertension | — | 10 Malignant tumor | — |
| | 5 心臓疾患 | — | | |

| Ten Leading Diseases (1993) | Causes | No. | Causes | No. |
|---|---|---|---|---|
| | 1 Malaria | 1,020 | 6 Intestinal complications | 280 |
| | 2 Anaemia | 416 | 7 Cardiac Failure | 213 |
| | 3 Diabetes mellitus | 345 | 8 Asthma | 201 |
| | 4 Hypertension | 341 | 9 Tuberculosis | 192 |
| | 5 Hyperplasia Prostate | 286 | 10 HIVH | 150 |

7) Financial Statement　　Kilimanjaro Christian Medical Centre

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 480,176,780 | 538,672,400 | 595,000,000 | |
| Total Income | 337,734,077 | 398,539,615 | 601,466,595 | 100.0 |
| Revenue | 348,758,365 | 375,564,230 | 361,260,468 | 60.1 |
| Medical Service Fee | – | 3,577,509 | 4,371,169 | 0.7 |
| Consultation Fee | – | – | – | |
| In-patient Fee | – | – | – | |
| Medicine Fee | – | – | – | |
| Operation Fee | | 664,675 | 882,675 | 0.1 |
| Examination Fee | – | 2,912,834 | 3,488,494 | 0.6 |
| Medicare Insurance | – | – | – | |
| Supplementation from Company | – | – | – | |
| Donations | 9,024,288 | 19,397,876 | 235,834,958 | 39.2 |
| Others | | | | |
| Total Expenditure | 339,734,077 | 398,539,615 | 601,466,595 | 100.0 |
| Salaries | 115,609,548 | 142,312,744 | 207,470,739 | 34.5 |
| Laundry Expenses | | | | |
| Surgical/Medical Expenses | 35,460,797 | 42,125,323 | 36,120,626 | 6.0 |
| Cost of Medicines | 65,073,180 | 57,191,515 | 89,876,268 | 14.9 |
| Traveling Expenses | 4,168,277 | 13,932,300 | 25,579,443 | 4.4 |
| Rentals | 2,385,750 | 2,455,650 | 11,565,240 | 4.3 |
| Water | 1,432,687 | 1,356,632 | 1,245,245 | 0.2 |
| Power,Light Services | 31,810,102 | 28,485,160 | 56,828,389 | 9.4 |
| Postal, Teleg., Tel. Services | 2,400,161 | 721,483 | 3,827,743 | 0.6 |
| Rapair of Buildings | 4,520,289 | 5,009,552 | 9,689,910 | 1.6 |
| Repair of Equipment | 180,000 | 256,560 | 1,143,600 | 0.2 |
| Purchase pf Equipment | 240,000 | 289,440 | 720,000 | 0.1 |
| Miscellaneous | 76,453,286 | 82,343,256 | 157,399,392 | 26.2 |

その他：病院給食、手当、車両費を含む

8) Main Equipment

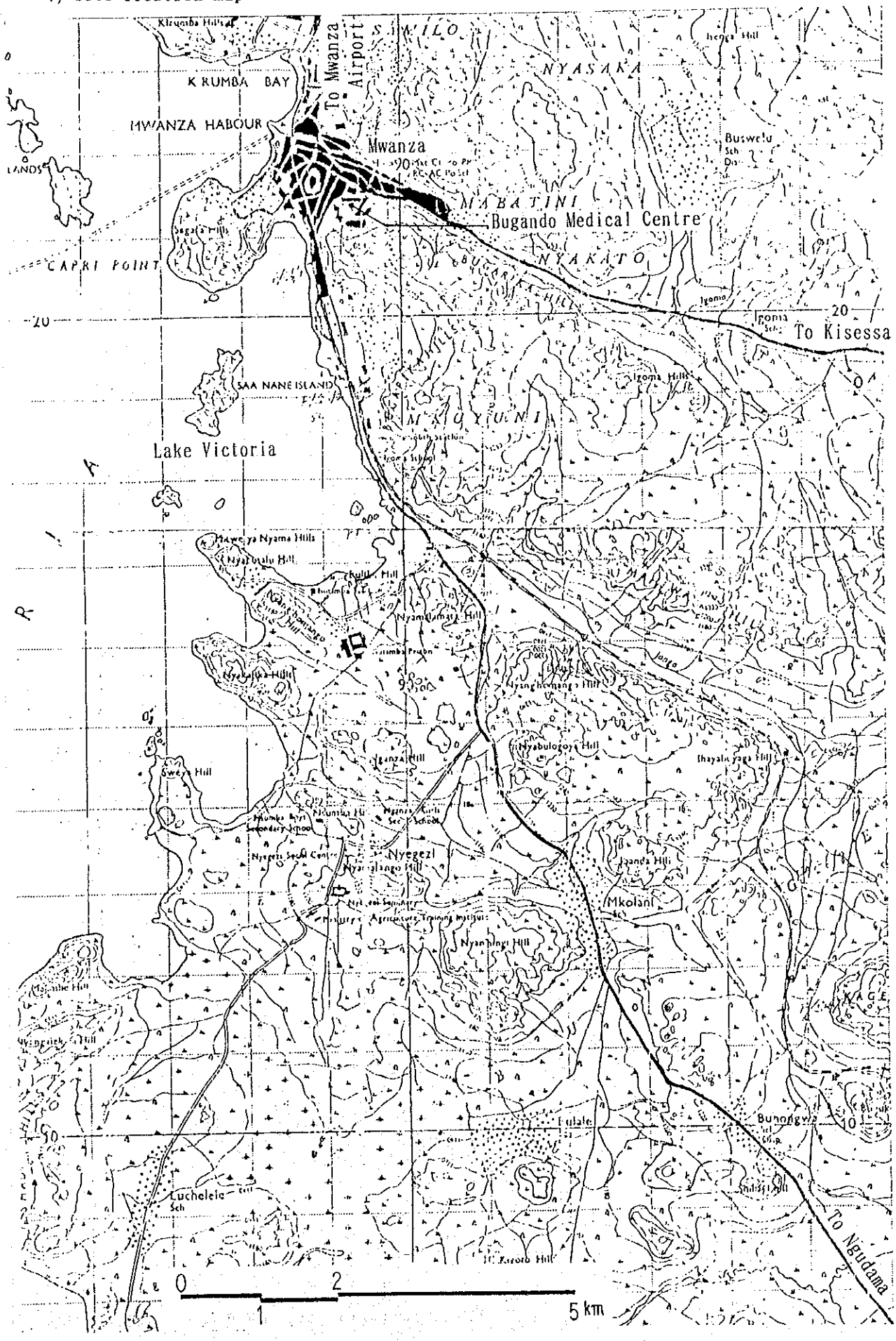
Kilimanjaro Christian Medical Centre

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Operation Theatre | | | | | | | |
| Operating Table | | | ① | | 15yr | U.K. | Unknown |
| Operating Lamp | | | ① | | 15yr | U.K. | Hannalux |
| Anesthesia Machine | | ① | | | 12yr | - | E.M.O. Ether |
| Sphygmomanometer | | ① | | | 10yr | - | - |
| Diatomy | ① | | | | 5yr | - | Valleylal |
| Suction Unit | | | ① | | 15yr | - | - |
| Operating Table | | | ① | | 15yr | U.K. | Unknown |
| Operating Lamp | | | ① | | 15yr | U.K. | Hannalux |
| Operating Table | | | ① | | 15yr | U.K. | Unknown |
| Operating Lamp | | | ① | | 15yr | U.K. | Hannalux |
| Anesthesia Machine | | ① | | | 10yr | U.K. | Penlon |
| Auto. Sphygmomanometer | ① | | | | 1993 | U.K. | - (Dinamap 8100) |
| Suction Unit | | | ① | | 13yr | U.S.A. | C.M.Sorensen Co. |
| Defibrillator | | | | ① | 20yr ~ | U.K.< | Cardiac Recorder Ltd. |
| Ventilator | | | ① | | 12yr | U.K. | Cape Engineering Co.Ltd.(TC50) |
| Anesthesia Machine w/Venti. | | | ① | | 13yr | Germany | Narkose (Spiromat 650) |
| Electro-surgical Unit | | ① | | | 8yr | Germany | Erbotom (T 130) |
| ICU | | | | | | | |
| Suction Unit | ① | | | | 1991 | Germany | Atomos Medizintecier GMBH (GS) |
| CSSD | | | | | | | |
| Autoclave(wall mount) | | | | ② | 20yr ~ | Germany | - (Munchen 25) |
| " (wall mount) | | | ① | | 20yr ~ | Germany | - (Munchen 25) |
| Laboratory | | | | | | | |
| Blood Bank | | | | | | | |
| Blood Bank Refrigerator | ① | | | | 7yr | U.K. | - (Kelvinator) |
| " " | | | | ① | 15yr | U.K. | Designers & Sole Manufacture |
| Refrigerator | | ① | | | 10yr | Germany | BOSCH |
| Cooling Centrifuge | | ① | | | 10yr | U.K. | Chriss (Chriss II KS) |
| Hot Air Oven | | ① | | | 10yr | Germany | Memmert |
| Desktop Centrifuge | | ① | | | 12yr | U.S.A. | DAE |
| Blood Cell Counter | | | | ① | 14yr | U.S.A. | Linson (411) |
| Blood Bank Refrigerator | ① | | | | 1990 | Germany | BOSCH |
| Water Bath | ① | | | | 1990 | Germany | Kottermann |
| Plate Reader | ① | | | | 1990 | Finland | Titertek Uniskan |
| Hematology Lab. | | | | | | | |
| Microscope | | | ① | | 20yr ~ | Germany | Carl Zeiss |
| Desktop Haematocrit Centrifuge | ① | | | | 1993 | U.K. | Hawksley |
| Water Bath | | ① | | | 10yr | Germany | Kottermann |
| Coaglometer | | | ① | | 15yr | Germany | Heirich Amelung KG |
| Colorimeter | | | ① | | 15yr | U.K. | WPA (CO 700D) |
| Biochemistry | | | | | | | |
| Centrifuge | | | ① | | 10yr | Germany | Hettich (UNIVERSAL II) |
| " | | | ① | | 10yr | U.S.A. | DADE |

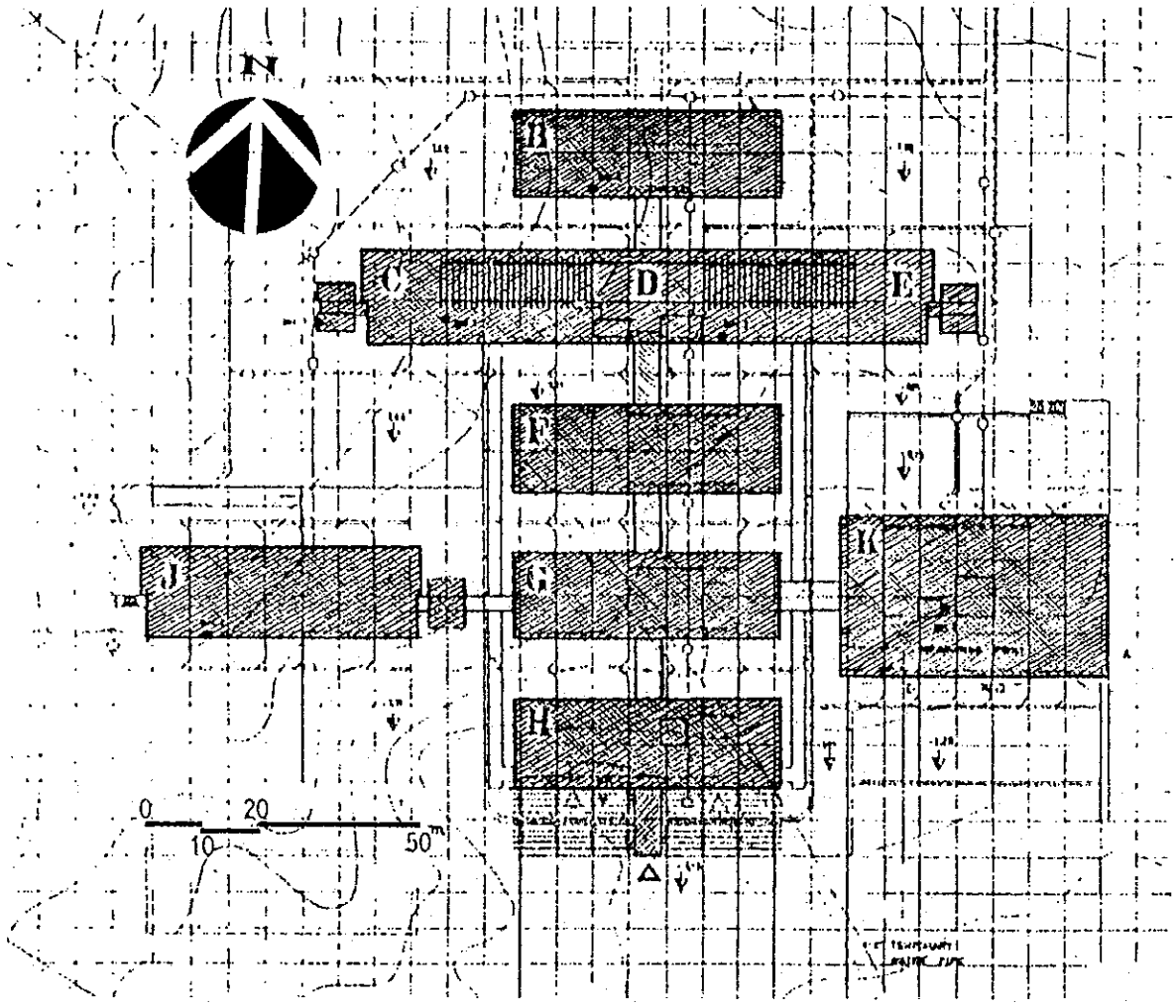
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Refrigerator | | | ① | | 15yr | Germany | Bosch |
| Water Bath | | ① | | | 1980 | Germany | Kottermann |
| Flame Photometer | | | ① | | 16yr | Germany | Eppendolf |
| Microbilogy & Immunology | | | | | | | |
| Lamina FLow | | | | ① | 18yr | U.K. | John Bass Ltd. |
| Centrifuge | | | ① | | 15yr | U.K. | - |
| Incubator | | | ① | | 15yr | Germany | Memmert |
| Refrigerator | | | ① | | 20yr ~ | Germany | Bosch |
| Microscope | | | ① | | 20yr ~ | Germany | Carl Zeiss |
| Freezer | | | ① | | 20yr ~ | Germany | - |
| Shaker | | | ① | | 20yr ~ | U.K. | Luck Man③ |
| Water Bath | ① | | | | 1990 | Germany | Memmert |
| Bacteology Lab. | | | | | | | |
| Freezer | ① | | | | 9yr | U.K. | Lec |
| Autoclave (tall type) | | ① | | | 9yr | U.K. | Astell Hearson |
| Hot Air Oven | ① | | | | 9yr | U.K. | Astell Hearson |
| Safety Chamber | | | | ① | 15yr | U.K. | Medical Air Technology Ltd. |
| Centrifuge(M) | ① | | | | 9yr | U.K. | - (DENLEY F1000) |
| Microscope | ① | | | | 1990 | Germany | Leits Labor Lux K |
| Routine Lab. | | | | | | | |
| Microscope | | | ① | | 16yr | Germany | Carl Zeiss |
| Hot Air Oven | | | ① | | 12yr | Germany | Memmert |
| Desktop Centrifuge | | | ① | | 13yr | Germany | Chriss |
| X-ray Diagnostic Equipment | | | | | | | |
| Ultrasound Machine | | ① | | | 10yr | U.S.A. | Advance Technology Labs. (ATL4000) |
| Mobile X-ray Machine | | | | ① | 20yr ~ | Japan | Hitachi Corp. (UG-41) |
| Basic X-ray Unit w/TV | | | | | 20yr ~ | U.S.A. | G E |
| C-arm surgical X-ray | | | | ① | - | U.S.A. | G E |
| " " " | | | | ① | 10yr | Holland | Philips |
| Orthopantom, Dental | | ① | | | 10yr | Holland | Philips |
| Mirror Camera | | | | ① | 15yr | Holland | - (MCS 70-5) |
| Automatic Processor | | | | ① | 15yr | U.S.A. | Kodak |
| Tomograpy X-ray App. | ① | | | | 1985 | Holland | Philips |
| Basic X-ray Unit w/TV | ① | | | | 1985 | Holland | Philips |
| Ultrasound Machine | | ① | | | 1986 | Germany | Seimens |
| Basic X-ray Unit | | | ① | | 20yr ~ | Holland | Philips |

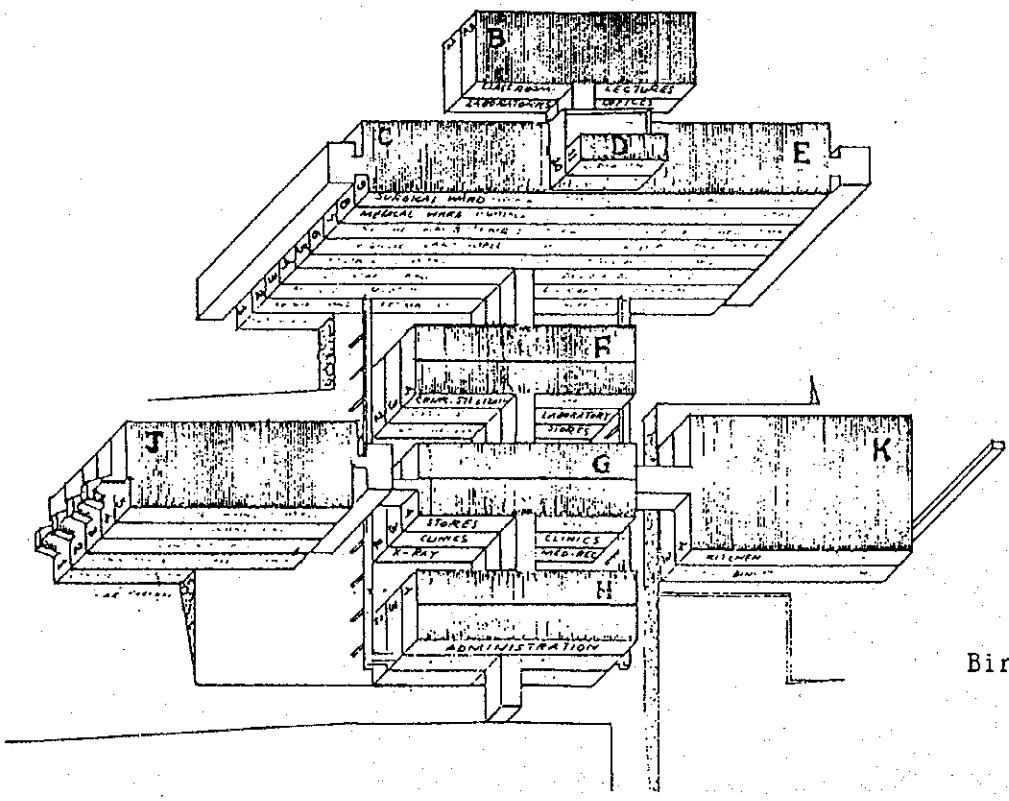
(4) Bugando Medical Centre (BMC)

1) Site location map



2) Project site




Bird view

Bugando Medical Centre

3) History of Bugando Medical Centre

This Medical Centre was established as the Bugando Advisory Hospital in 1960 by using the fund provided by the Roman Catholic Association in response to the call from the government of Tanganyika for carrying out the medical development plan. Construction of the new facilities started in 1968 through 1971, and on December 3, 1971, half-way through the construction, the hospital was inaugurated in the presence of J. K. Nyerere, the president of the country. The hospital operational authority was transferred to the government of Tanzania in 1985, and was reorganized and incorporated as Bugando Medical Centre, operated autonomously by a council made up of the government officials and the members of the board of bishops in Tanzania. The operation of the hospital is consigned to the director of the Centre belonging to the Ministry of Health, and the expenses such as maintenance and control cost, labor cost, etc. are all borne by the government of Tanzania.

4) Status of Infrastructure in Bugando Medical Centre

① Construction

The Bugando Medical Centre stands on a small hill some 1.5 km southeast of the centre of the Mwanza city by the side of Lake victoria in the North of Tanzania, commanding the view of the city. Approximately 1200 meters above sea level, the Centre is composed of 7 ferroconcrete buildings, lined in parallel and connected with one another by means of corridors cum stair rooms. The walls are ferroconcrete, partially piled with concrete blocks, and the roofs are made of concrete floor blocks on which steel frames are laid before being thatched with corrugated galvanized iron sheets. The highest building is 9-story building in addition to one 5-story building, three 4-story buildings and two 2-story buildings. There are four elevators, each with the capacity of carrying 26 people, with two more elevator shafts installed for two more elevators in the future. The outer walls of the building are slightly stained while the floors and walls inside the building show faint but conspicuous stains. The ceiling of the laboratory has its paint partially peeled off or swollen due to dew drops. Except for the

aforesaid items, the buildings are all well maintained and managed.

② Water Supply

The water, drawn from the city's service line, is stored in two 100-ton receiving tanks to supply by using the pressure pump. There are two diesel generators for use at emergency, but since the pressure pump is not connected to the emergency power source, the water does not reach the upper floors at the time of power failure.

③ Electricity

Power failure lasts for 30 minutes to 3 hours every day.

④ Air Conditioning

The operating room does have the central air-conditioning system, but the freezer in the machine room lies out-of-order for a period of over 15 years, with the cold air fed into the operating room through a different freezer installed by the side of the operating room. There is no air-conditioning system in other rooms, except for the window coolers. Ventilation is carried out by opening the windows.

5) General Information of Premises

Bugando Medical Centre

| | |
|---|---|
| Establishment | |
| Reconstruction | Enlarged several times between 1968 and 1971. |
| Structure | Reinforced concrete, partly concrete block wall |
| Floors | A total of 7 buildings consisting of two-story, four-story, five-story, nine-story buildings are connected by passage corridors. |
| Area | 127,854m$^2$ |
| Total Floor Space | 17,100m$^2$ |
| Access Road | 4.2m, asphalt-paved road |
| Location | Located on a hilltop about 1.5km southeast of Mwanza. |
| Voltage, Phase, Cycle | 11,000V, 3$\phi$, 50Hz |
| Capacity of Transformer | 603KVA |
| Electric Power | 415V, 230V, 3$\phi$ 12$\phi$, 50Hz |
| Emergency Generator | 123KVAx2, Power outage occurs for thirty minutes a day, The longest outage continues for three hours a day. |
| Telephone | Outside line 5, Extension 100 |
| Lighting | Fluorscent lamps, partly damaged, often without light bulb. |
| Feed Pump | 100$\phi$ |
| Water Pipe | 76$\phi$, 51$\phi$ |
| Drainage Pipe | 300$\phi$ |
| Disposal of Drainage | Connected to municipal drainage pipe |
| Disposal of Medical Waste | Collection and incineration are made by municipal government, partly buried in the ground. Incinerator is out of order. |

6) Overview of the Proposed Hospitals

| | | | | |
|---|---|---|---|---|
| Name of Hospital | Bugando Medical Centre (BMC) | | Location: Mwanza | |
| Year of Establishment | 1968 (reorganized in 1985) | | | |
| Range of Activity, Role | Top Referral and Teaching Hospital of the region, Study of Medical science | | | |
| Characteristics of Activity | Training Institute for Medical Student | | | |
| Catchment Area | Mwanza Rural | Mara | Kagera | Shinyanga |
| Population of Service Area | 2,140,537 | 1,120,136 | 1,515,150 | 2,060,630 |
| Increase Rate of Population | 2.6% | Density of Population (per Km²) | 96 persons | |
| Referral from | Sekou Toure Health Centre, Kagera Regional Hospital | | | |
| Number of Beds | 820 | Beds for neonate 35 | | |
| Categories of Services | Out patient Acute Outpatient Internal Medicine Surgery Paediatrics Obstetrics & Gynecology Radio diagnosis Physiotheraphy Dentistry Ophtalmology E. N. T. | | | |
| Clinical Examinations | Hematology Microbiology Parasitology Immunology | | | |

| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | |
|---|---|---|---|---|---|---|---|---|
| | Internal Medicine | 4 | nurse G."A" | 135 | Radiographer | 10 | Administr-ation | 80 |
| | Surgeon | 7 | nurse G."B" | 158 | Clinical Laboratory Technician | 26 | Nutritionist | 45 |
| | Orthopedic DR. | | Assistant Nurse | | | | Medical consultant | 1 |
| | Obstetric & Gynecologist | 4 | Mid-wife | 129 | Laboratoy Assistant Technician | 13 | Maintenance technician | 2 |
| | Radiologist | - | | | | 1 | | |
| | Paediatric | 5 | | | Paramedical Pharmasist | 2 | Sweeper, Guard | 125 |
| | Ophthamologist | 3 | | | | | | |
| | Anaesthe-sialogist | 3 | | | 物理療法士 | | | |
| | Other specialist | 12 | | | | | | |
| | Total | 38 | Total | 422 | Total | 55 | Total | 253 |

| | | | | |
|---|---|---|---|---|
| Record of Activity | 1991 | 1992 | 1993 | Avg. of 3 years |
| Number of Out Patient | 307,930 | 345,000 | 374,500 | 342,470 |
| Number of In Patient | 24,321 | 25,136 | 26,477 | 25,311 |

| Consultation (1993) | Kind of Consultation | No. | Kind of Consultation | No. |
|---|---|---|---|---|
| | 1 Refractive errors | 908 | 6 Cardioc failure | 185 |
| | 2 Sterility | 861 | 7 Pulmonary TB | 145 |
| | 3 Intenstinal complications | 487 | 8 Psychoses | 134 |
| | 4 Malaria | 334 | 9 Acute diarrhea | 80 |
| | 5 Pneumonia | 284 | 10 | |

| Ten Leading Diseases (1993) | Causes | No. | Causes | No. |
|---|---|---|---|---|
| | 1 Malaria | 1,387 | 6 Meningitis | 247 |
| | 2 Diarrhea | 648 | 7 Anaemias | 241 |
| | 3 Prematurity | 366 | 8 Pulmonary TB | 216 |
| | 4 HIV | 347 | 9 L.S.C.S. | 181 |
| | 5 Pneumonia | 311 | (Complications) | |
| | | | 10 Gastroenteritis | 169 |

7) Financial Statement

Bugando MedicalCentre

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 9,800,000,000 | 1,000,000,000 | 2,800,000,000 | |
| Total Income | 667,106,327 | 681,464,826 | 950,459,217 | 100.0 |
| Revenue | 587,923,600 | 595,593,350 | 806,616,200 | 84.9 |
| Medical Service Fee | 94,610 | 13,754 | 30,328,409 | 3.2 |
| Consultation Fee | 42,050 | 46,200 | 16,193,061 | 1.7 |
| In-patient Fee | | | 6,864,310 | 0.7 |
| Medicine Fee | | | 3,398,910 | 0.4 |
| Operation Fee | | | 268,500 | 0.0 |
| Examination Fee | 52,560 | 91,340 | 3,603,628 | 0.4 |
| Medicare Insurance | | | | |
| Supplementation from Company | | | | |
| Donations | 47,060,982 | 49,179,843 | 102,567,362 | 10.8 |
| Others | - | - | 10,947,246 | 1.2 |
| Total Expenditure | 474,461,092 | 647,743,980 | 847,419,189 | 100.0 |
| Salaries | 80,807,925 | 118,053,234 | 188,606,237 | 22.3 |
| Laundry Expenses | 6,377,375 | 7,088,849 | 16,019,394 | 1.9 |
| Surgical/Medical Expenses | 29,700,371 | 51,388,207 | 102,461,805 | 12.1 |
| Cost of Medicines | 60,223,909 | 116,600,495 | 152,953,432 | 18.0 |
| Traveling Expenses | 4,800,978 | 12,778,884 | 12,404,309 | 1.5 |
| Rentals | 9,543,383 | 6,146,132 | 13,522,448 | 1.6 |
| Water | 2,287,279 | 2,500,000 | 1,817,951 | 0.2 |
| Power, Light Services | 16,393,194 | 21,485,913 | 25,186,610 | 3.0 |
| Postal, Teleg., Tel. Services | 5,087,340 | 6,694,687 | 8,006,933 | 0.9 |
| Rapair of Buildings | 29,747,768 | 64,272,866 | 41,664,012 | 4.9 |
| Repair of Equipment | 970,258 | 961,406 | 2,499,194 | 0.3 |
| Purchase pf Equipment | 42,791,472 | 95,593,729 | 120,838,412 | 14.3 |
| Miscellaneous | - | - | 161,438,452 | 19.1 |

8) Main Equipment

Bugando Medical Centre

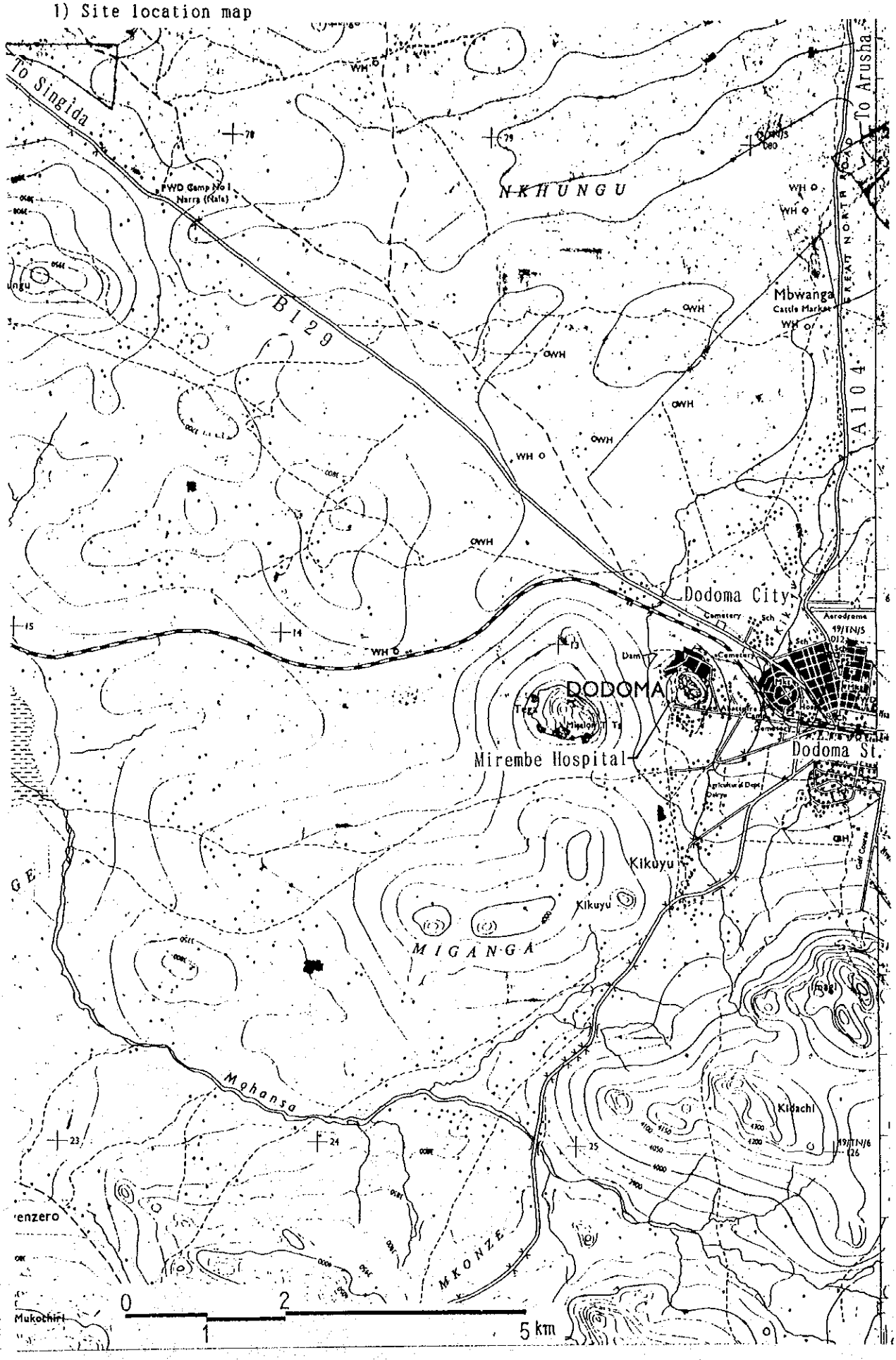
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Out-patient & Casualty | | | | | | | |
| Small Operation Theatre | | | | | | | |
| Operating Table | | | | ① | 30yr ~ | U.S.A. | - |
| Instrument Sterilizer | | ① | | | 10yr | Germany | Aesculp |
| Mortuary | | | | | | | |
| Mortuary Refrigerator | | | ⑧ | | 20yr ~ | U.K. | - |
| X-ray Diagnostic Equipment | | | | | | | |
| Basic X-ray Unit w/TV | ① | | | | 1994 | Japan | Shimadzu Corp. |
| Ultrasound Machine | | | | ① | 13yr | U.S.A. | Picker |
| Basic X-ray Unit | | ① | | | 20yr ~ | Germany | Seimens |
| Mobile X-ray Machine | | | | ② | - | Germany | Seimens |
| Automatic Processor | | | ① | | - | - | Agfar (CURX-400) |
| Orthopantha Dental | ① | | | | 10yr | Holland | Philips |
| Operation Theatre | | | | | | | |
| Operation Theatre No. 1 | | | | | | | |
| Operating Table | | | ① | | 20yr ~ | U.K. | Eschmann (TN195) |
| Operating Lamp(ceiling) | | | ① | | 20yr ~ | Germany | HANAULUX |
| Instrument Sterilizer | ① | | | | 5yr | Germany | Aesculp |
| Anesthesia Machine | | | ① | | 20yr ~ | U.K. | Penlon (EMO) |
| Operating Microscope | | | ① | | 12yr | Japan | Topcon (50) |
| Operation Theatre No. 2 | | | | | | | |
| Operating Table | | | ① | | 20yr ~ | U.K. | Eschmann |
| Operating Lamp(ceiling) | | | ① | | 20yr ~ | Germany | Hanaulux |
| Instrument Sterilizer | ① | | | | 5yr | Germany | Aesculp |
| Suction Unit | ① | | | | 4yr | U.K. | Eschmann (VP35) |
| Ventilator | ① | | | | 1992 | Germany | Ambu International |
| ECG Monitor | | | ① | | - | U.S.A. | American Optical Company |
| Anesthesia Machine | | | ① | | 20yr ~ | U.K. | Penlon (OMV-Fifty) |
| Operation Theatre No. 3 | | | | | | | |
| Operating Table | | | ① | | 20yr ~ | U.K. | Eschmann |
| Operating Lamp(ceiling) | | | ① | | 20yr ~ | German | Hanaulux |
| Electro-surgical Unit | | | | ① | 20yr ~ | German | Seimens (Radiotom 617) |
| CRYO Unit | | ① | | | 18yr | - | - (ACU 12) |
| Anesthesia Machine | | | ① | | 20yr ~ | U.K. | Penlon (OMV-Fifty) |
| Pulse Oximeter | ① | | | | - | U.S.A. | Ohmeda |
| Instrument Sterilizer | | ① | | | 5yr | Germany | Aesculp |
| Operation Theatre No. 4 | | | | | | | |
| Operating Table | | | ① | | 20yr ~ | U.K. | Eschmann |
| Operating Lamp(ceiling) | ① | | | | 1992 | Taiwan | - |
| Anesthesia Machine | | | | ① | 20yr ~ | U.S.A. | Ohio Medical Products |
| Instrument Sterilizer | | ① | | | 5年 | Germany | Aesculp |
| Operation Theatre No. 5 | | | | | | | |
| Ventilator | | | | ① | 20yr ~ | U.K. | - |
| Anesthesia Machine | | | ① | | 20yr ~ | U.S.A. | Ohio Medical Products |
| Operating Lamp(ceiling) | | | ① | | 20yr ~ | Germany | Hanaulux |

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Suction Unit | ① | | | | 4yr | U.K. | Eschmann (VP35) |
| Instrument Sterilizer | | ① | | | 5yr | Germany | Aesculp |
| Mobile Operating Lamp | | | | ① | 20yr ~ | Germany | Hanaulux |
| Central Sterilized Supply Department | | | | | | | |
| Autoclave | | | ① | | 20yr ~ | Germany | - |
| (Installation) | | | | ① | 20ry ~ | Germany | - |
| Autoclave | | ① | | | 12yr | U.K. | Rodwell Scientific Instruments |
| Autoclave | | | | ① | 12yr | U.K. | Rodwell Scientific Instruments |
| Glove Conditioner | | | | ① | 20yr ~ | U.K. | JERICHO |
| Ultrasonic Washing Machine | | | | ① | 20yr ~ | Germany | Stiefenhofer |
| Hot Air Oven | | | ① | | 20yr ~ | Germany | Memmert |
| Eye Clinic | | | | | | | |
| Hot Air Oven | ① | | | | 10yr | U.S.A. | Dri-Clave Company |
| Instrument Sterilizer | ① | | | | 1992 | Germany | Aesculap |
| Incubator | | | | ① | 20yr ~ | Germany | Memmert |
| Examination Light | ① | | | | 20yr ~ | Germany | - |
| Slit Lamp Microscope | | ① | | | 20yr ~ | Germany | G.Rodenstock Instrument |
| Examination Unit | | ① | | | 20yr ~ | Germany | G.Rodenstock Instrument |
| Lensmeter | | ① | | | 13yr | Japan | Topcon |
| Refractometer | | | ① | | 20yr ~ | Japan | Topcon (Vision Tester-D) |
| Laboratory | | | | | | | |
| Blood Bank | | | | | | | |
| Water Bath | ① | | | | 5yr | U.S.A. | Polyscience (MDL5L) |
| Centrifuge | ① | | | | 10yr | Germany | Petalfuge |
| " | | ① | | | 13yr | U.K. | Hawksley |
| Colorimeter | | ① | | | 10yr | U.K. | Corning (252) |
| Freezer | | ① | | | 15yr | Holland | Philips (CF32B) |
| Microscope | | | ① | | 14yr | Germany | Zeiss |
| Refrigerator | ① | | | | 5yr | Luxembg | Electrolux (MRB 1255/4) |
| " | | ① | | | 12yr | Holland | Bosch (KSR2511) |
| " | ① | | | | 10yr | U.S.A. | Kelvinator (UC26RG 5 BX) |
| " | ① | | | | 5yr | Luxembg | Electrolux (MRB 1255/4) |
| Bio-Chemistry Lab. | | | | | | | |
| Balance | | | ① | | 10yr | Germany | Sartorius |
| Centrifuge | | | ① | | 10yr | Germany | Heraeus (LABOFUGE Ⅲ) |
| " | | | ① | | 10yr | Germany | Hettich (UNIVERSAL Ⅱ) |
| Colorimeter | | ① | | | 7yr | Holland | Vitatron (DCP) |
| " | | ① | | | 7yr | U.K. | Corning (252) |
| Flame Photometer | | ① | | | 8yr | U.K. | Corning (410) |
| Glucose Analyzer | | ① | | | 8yr | U.S.A. | Beckman (6517) |
| Incubator | | ① | | | 10yr | Germany | Kotterman (2710) |
| Ph Meter | | | ① | | 12yr ~ | U.K. | Corning (7) |
| Refrigerator | | ① | | | 10yr | - | Privileg |
| Water Bath | | ① | | | 10yr | Germany | Memmert |
| Hematrogy Lab. | | | | | | | |
| Blood Cell Counter | ① | | | | 5yr | U.S.A. | Coulter (CBC5) |

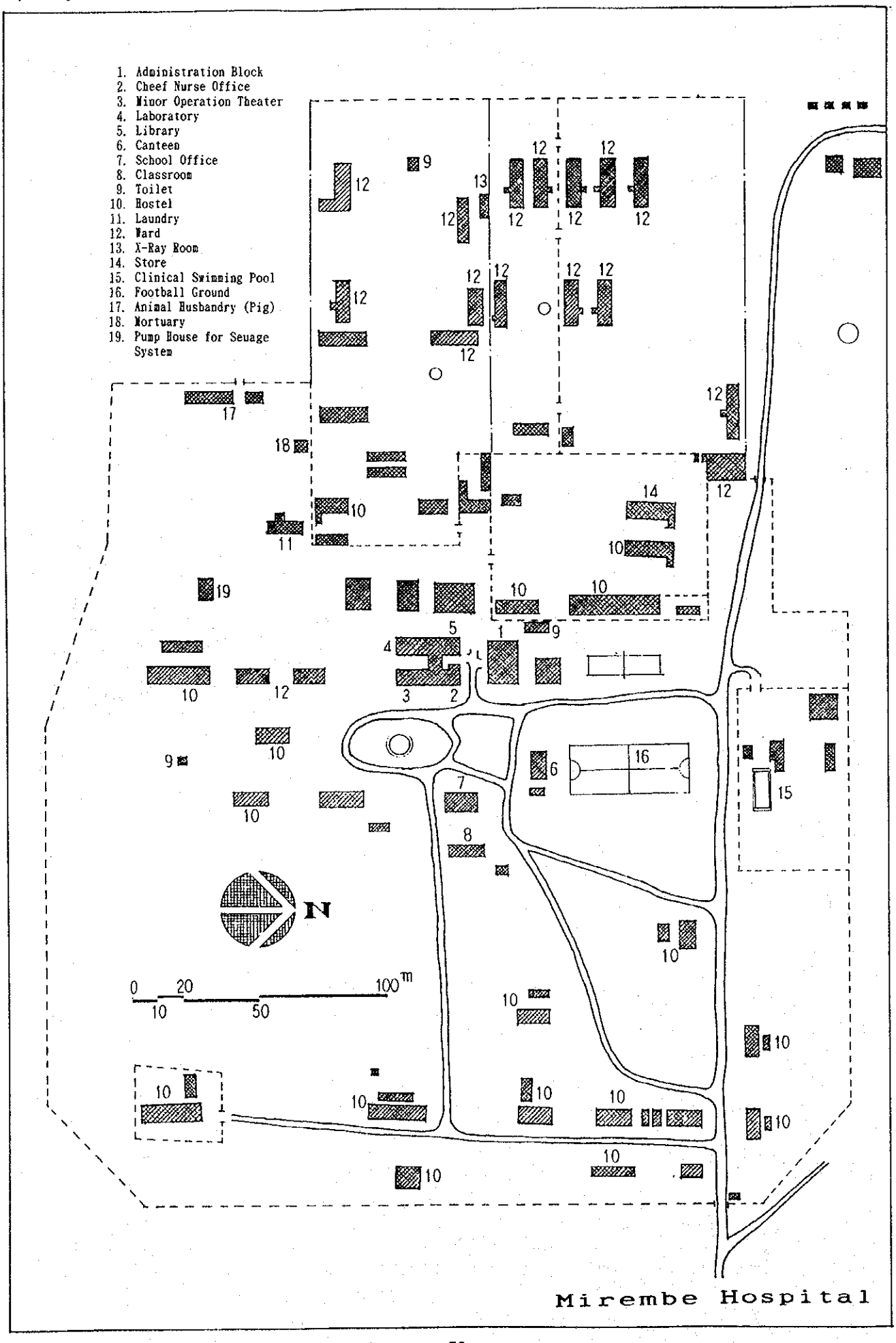
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Diluting Apparatus | ① | | | | 5yr | U.S.A. | Coulter (DDⅢC) |
| Microscope | ① | | | | 5yr | Japan | Olympus (BH-2) |
| Refrigerator | | ① | | | 10yr ~ | - | Privileg |
| Histo Pathology Lab. | | | | | | | |
| Centrifuge | | ① | | | 9yr | Germany | Heraeus (00702) |
| Microscope | | ① | | | 10yr | Germany | Zeiss |
| " | | ① | | | 10yr | Germany | Zeiss |
| " | | ① | | | 13yr | Swiss | Wild |
| " | | | ① | | 15yr | U.S.A. | American Optical (820) |
| " | | | ① | | 15yr | Germany | Jung |
| " | | ① | | | 10yr | Germany | Jung |
| Hot Air Oven | | ① | | | 10yr | Germany | Memmert (Tv 4) |
| Processor | | | ① | | 12yr | U.K. | Shandon |
| Refrigerator | | | | ① | 17yr | Germany | Sell |
| Water Bath | | | ① | | 15yr | U.K. | Electrothermal (MH8501) |
| Microbiology Lab. | | | | | | | |
| Centrifuge | | | ① | | 15yr | Holland | Homef |
| Incubabor | | ① | | | 10yr | Germany | Kotterman |
| Microscope | | ① | | | 10yr | Germany | Zeiss |
| Hot Air Oven | | ① | | | 10yr | Germany | Kotterman |
| " | | ① | | | 13yr | Germany | Kotterman |
| Refrigerator | | ① | | | 15yr | Holland | Bosch (KSR2511) |
| Water Bath | | ① | | | 10yr | Germany | Memmert |

(5) Mirembe Hospital (MIR)

1) Site location map



2) Project site



3) History of Mirembe Hospital

Established at the present location some 67 years ago in 1927, the Mirembe Hospital started its activity as a mental hospital n 1936 according to a mental disease countermeasure ordinance. The hospital grew into the present scale and size by establishing and annexing the 250-bed Isanga Hospital (for prisoners) 1.5 km west of the Mirembe Hospital in 1950, the 50-bed Mirembe Branch Hospital 1.0 km east in 1964, the 50-bed Hombolo Rehabilitation Centre for patients of mental disease 50km north of Dodoma in 1967, the training institute for assistant nurses in 1968, and the training institute for nurses (mental disease) in 1973. This is the only hospital in Tanzania specializing in the treatment for mental disease. The hospital also provides services to the general patients from the neighboring areas as well as the mental patients. The ownership of the facilities, the personnel administrative authority and the allotment of operating cost fall directly to the Ministry of Health.

4) State of Infrastructure in Mirembe Hospital

① Construction

The mental hospital is located on a wide slope at the foot of the rock mountain about 2.5km west of the railroad station of Dodoma city, a city 1,115 meter above sea level and located at the center of Tanzania, with various clinics and dormitories spotted here and there in the vast premises, which lie 15-20 meters higher than the city. The access roads are not paved, and are considerably rough, so that in rainy season they are likely to get muddy. The roads inside the premises are merely graveled. The buildings are all one-story buildings made of ferro-concrete and wood, with the roofs made of corrugated galvanized iron sheets, and partly of cement tiles. The walls are made by piling up concrete blocks or stone. The building with sick rooms is the largest, with the floor space of about 450 square meters, while the building with clinics has the area roughly about 150-250 square meters. These buildings appear to have been poorly maintained since their construction, and look rather stained. The installed wire-screens are broken here and there, and the

galvanized iron sheet roof has rust on it. More than half of the lamps are broken down.

② Water Supply

One of the problems in this hospital is the conclusive shortage of water. In the first place the service pipe by the side of the gate remains broken since July, 1994 with water leaking; secondly the water is supplied only three times a week for six hours in all; and thirdly the weekly water utilization is limited to less than 2,000ℓ due to low water pressure. In order to make up for the water shortage, water is transported by using trucks.

5) General Information of Premises

Mirembe Hospital

| | |
|---|---|
| Establishment | 1927 |
| Reconstruction | Enlarged in 1950, 64, 67, 73, 92 respectively |
| Structure | Pillar and beam of reinforced concrete, concrete block wall, partly piled with stone, wooden building, corrugated slate, partly covered with zincic steel. |
| Floors | A total of 60 one-story buildings consisting of wards, consulting building, laboratory, residences for doctors and nurses, meeting place. |
| Area | 1,090,000m$^2$ Including Insaga Annex and attached hospital. |
| Total Floor Space | 50,000m$^2$ |
| Access Road | 5m, unpaved, ill-conditioned. |
| Location | Each medical facility is located at the foot of a mountain about 2.5km west of Dodoma Station. Roads in the premises are not paved. |
| Voltage, Phase, Cycle | 415V, 3$\phi$, 50Hz |
| Capacity of Transformer | 41.5KVA× 3 |
| Electric Power | 415V, 220V, 3$\phi$ 12$\phi$, 50Hz |
| Emergency Generator | Nothing, power outage often ocurs for 3~4 hours a day. |
| Telephone | Outside line 2, extension 10 |
| Lighting | 50% of the whole lighting of fluorscent lamps are out of order. |
| Feed Pump | 150$\phi$, A damage in July, 1994 caused leaking water. Only 2,000ℓ of water is supplied for a week. The shortage of water is supplemented by trucking. |
| Water Pipe | 25$\phi$ |
| Drainage Pipe | 150$\phi$ |
| Disposal of Drainage | Drainage pump is out of order. |
| Disposal of Medical Waste | Incineration |

6) Overview of the Proposed Hospitals

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Name of Hospital | Mirembe Hospital (MIR) Location: Dodoma | | | | | | | | |
| Year of Establishment | 1927 | | | | | | | | |
| Range of Activity, Role | Regional Top Referral Hospital | | | | | | | | |
| Characteristics of Activity | Speciality Hospital for mental diseases and general hospital for the region. | | | | | | | | |
| Catchment Area | Whole Tanzania. (Accepts all psychiatric patients of the country.) Dodoma region as the General Hospital. | | | | | | | | |
| Population of Service Area | 1,200,000 persons | | | | | | | | |
| Increase Rate of Population | 2.4% Density of Population (per Km²) 80 persons | | | | | | | | |
| Referral from | Muhinbili Medical Center, Bugand Hospital, others | | | | | | | | |
| Number of Beds | 150 Beds for neonate 0 | | | | | | | | |
| Categories of Services | Out patient Acute Outpatient Internal Medicine<br>Radio diagnosis Physiotheraphy Surgery | | | | | | | | |
| Clinical Examinations | Hematology Microbiology Parasitology Immunology | | | | | | | | |
| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | | |
| | Internal Medicine | 3 | nurse G."A" | 100 | Radiographer | 0 | Administr-ation | 2 | |
| | Surgeon | 0 | nurse G."B" | 232 | Clinical Laboratory Technician | 3 | Nutritionist | 0 | |
| | Orthopedic DR. | 0 | Assistant Nurse | 0 | | | Medical consultant | 2 | |
| | Obstetric & Gynecologist | 0 | Mid-wife | 32 | Laboratoy Assistant Technician | 1 | Maintenance technician | 0 | |
| | Radiologist | 0 | | | Paramedical | 2 | Sweeper, Guard | 61 | |
| | Paediatric | 0 | | | Pharmasist | 2 | | | |
| | Ophthamologist | 0 | | | | | | | |
| | Anaesthe-sialogist | 0 | | | | | | | |
| | Specialist | 0 | | | | | | | |
| | Total | 3 | Total | 264 | Total | 8 | Total | 63 | |
| Record of Activity | 1991 | | 1992 | | 1993 | | Avg. of 3 years | | |
| Number of Out Patient | 50,899 | | 49,524 | | 39,471 | | 46,631 | | |
| Number of In Patient | 18,750 | | 20,700 | | 19,500 | | 58,950 | | |
| Consultation (1993) | Kind of Consultation | No. | | | Kind of Consultation | No. | | | |
| | 1 Psychoses | - | | | 6 Respiratory infection diseases | - | | | |
| | 2 Malaria | - | | | 7 Dysentery | - | | | |
| | 3 Epilepsy | - | | | 8 HIV | - | | | |
| | 4 Organic Brain Syndrome | - | | | 9 Manic depressive psychoses | - | | | |
| | 5 Alcoholism | - | | | 10 Anaemias | - | | | |
| Ten Leading Diseases (1993) | Causes | No. | | | Causes | No. | | | |
| | 1 Psychoses | 636 | | | 6 Respiratory infection diseases | 91 | | | |
| | 2 Malaria | 277 | | | 7 Dysentery | 53 | | | |
| | 3 Epilepsy | 166 | | | 8 HIV | 28 | | | |
| | 4 Organic Brain Syndrome | 149 | | | 9 Manic depressive psychoses | 19 | | | |
| | 5 Alcoholism | 110 | | | 10 Anaemias | 11 | | | |

7) Financial Statement

Mirembe Hospital

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 290,000,000 | 312,000,000 | 371,200,000 | |
| Total Income | 154,100,000 | 151,900,000 | 171,400,000 | 100.0 |
| Revenue | 154,100,000 | 151,900,000 | 171,400,000 | 100.0 |
| Medical Service Fee | – | | | |
| Consultation Fee | – | | | |
| In-patient Fee | – | | | |
| Medicine Fee | – | | | |
| Operation Fee | – | | | |
| Examination Fee | – | | | |
| Medicare Insurance | – | | | |
| Supplementation from Company | – | | | |
| Donations | – | | | |
| Others | | | | |
| Total Expenditure | 154,100,000 | 151,900,000 | 171,400,000 | 100.0 |
| Salaries | 49,200,000 | 49,200,000 | 79,000,000 | 46.1 |
| Laundry Expenses | – | | | |
| Surgical/Medical Expenses | – | | | |
| Cost of Medicines | | 21,000,000 | 34,000,000 | 19.8 |
| Traveling Expenses | | 7,100,000 | 7,100,000 | 4.1 |
| Rentals | – | | | |
| Water | | 500,000 | 500,000 | 0.3 |
| Power, Light Services | | 1,400,000 | 6,600,000 | 3.8 |
| Postal, Teleg., Tel. Services | | – | – | |
| Rapair of Buildings | | 2,800,000 | 2,000,000 | 1.2 |
| Repair of Equipment | | 1,300,000 | 1,300,000 | 0.8 |
| Purchase pf Equipment | | – | | |
| Miscellaneous | | | 40,900,000 | 23.9 |

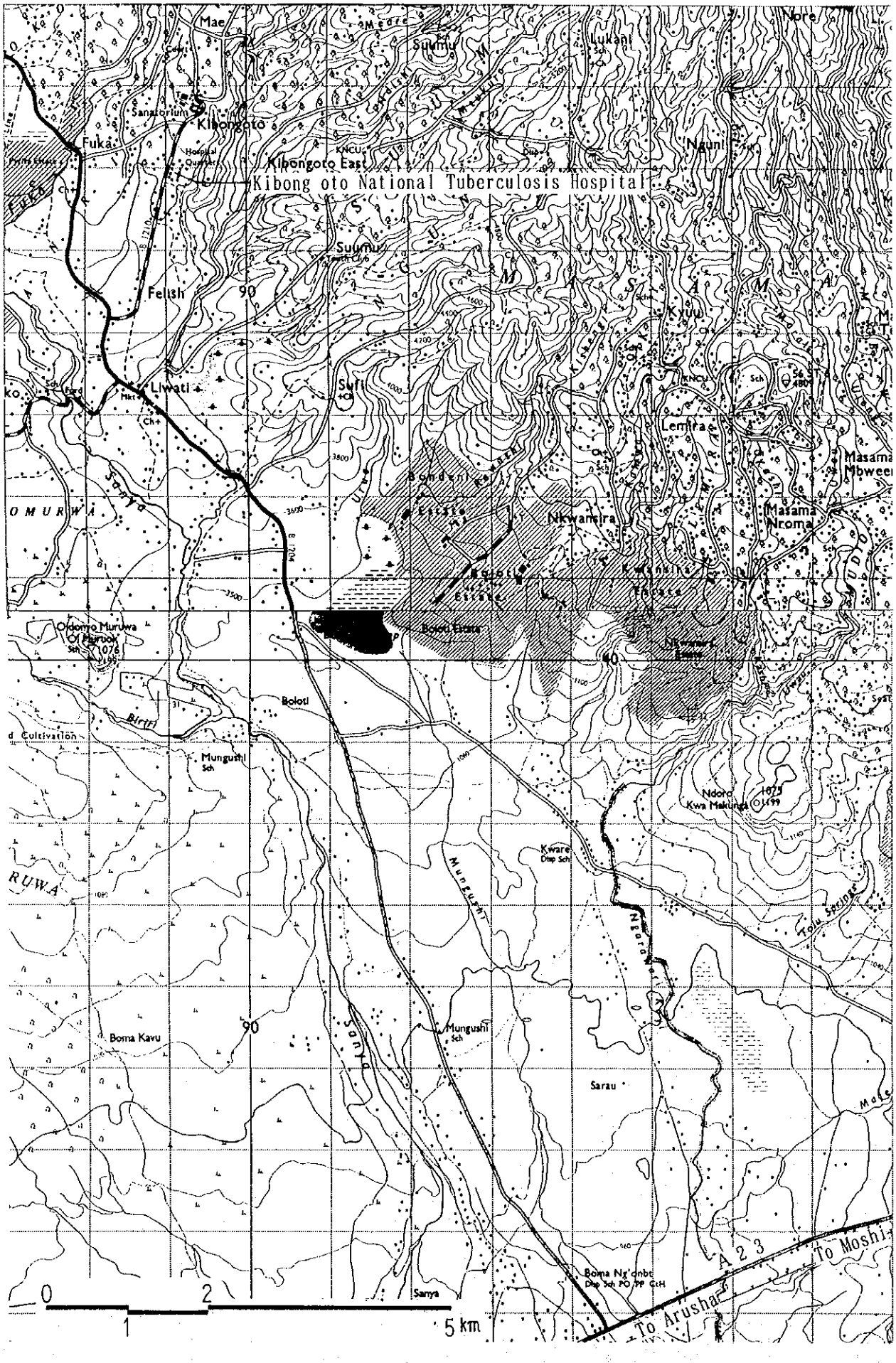
8) Main Equipment

Mirembe Hospital

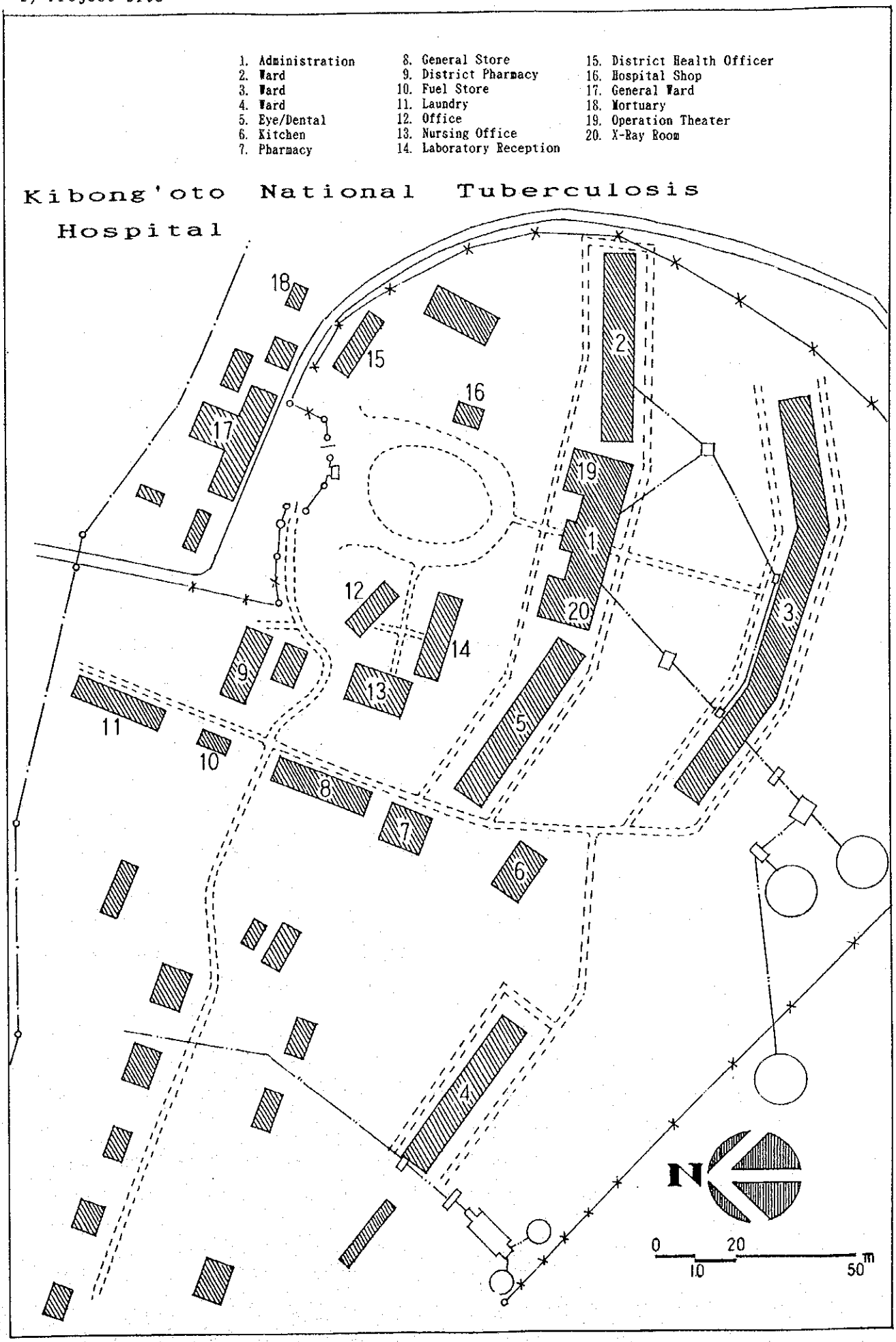
| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Operation Theatre | | | | | | | |
| Mobile Operating Lamp | | | | ① | 25yr ~ | U.K. | - |
| Operating Table | | | | ① | 25yr ~ | - | -Using substitution |
| Ventilator | | | | ① | 25yr ~ | - | - |
| Autoclave | | | | ① | 12yr | U.K. | Surgical Equipment Supplies |
| | | | | | | | Ltd. (MATRON) |
| X-ray Diagnostic Equipment | | | | | | | |
| Mobile X-ray Machine | | | ① | | 12yr | Holland | Phillips |
| EEG | | | | | | | |
| Nerve Stimulator | | | | ① | 20yr ~ | Aust. | Both Equipment Ltd. |
| Laboratory | | | | | | | |
| Microscope | ① | | | | 1992 | Germany | Carl Zeiss |
| " | | | | ① | 1992 | Germany | Carl Zeiss |
| Water Distiller | | | ① | | 15yr | U.K. | Bairo & Tatlock Ltd. |
| Centrifuge | | | ① | | 20yr ~ | Germany | Hettich (EPA Ⅲ) |
| Hemoglobinometer | | | | ① | 13yr | Japan | Atago |
| Balance | | | ① | | 15yr | Germany | Onaus |
| Water Bath | | ① | | | 20yr ~ | Germany | Memmert |
| Instrument Sterilizer | | | ① | | 20yr ~ | Germany | Aesculap |
| Hot Air Oven | | ① | | | 10yr | Germany | Memmert |
| Refrigerator | | ① | | | 8yr | - | Supra (SRF-1000NF) |
| Colorimeter | ① | | | | 5yr | U.S.A. | Corning (252) |

(6) Kibong'oto National Tuberculosis Hospital (KIB)

1) Site location map



2) Project site



3) History of Kibong'oto National Tuberculosis Hospital

This hospital was established in 1926 by Dr. Henry Norman Davis as a tuberculosis sanatorium in Tanzania. The hospital makes a joint use of the facilities and equipment of the neighboring Kibong'oto District Hospital in order to expand the diagnosis service for general patients as well.

4) State of Infrastructure in Kibong'oto National Tuberculosis Hospital.

① Construction

The tuberculosis hospital stands on a moderate slope about 1,200 meters above sea level, approximately 17km off the road passing through Sanya village, north of the National Route A23, connecting Moshi city near Mt. Kilimanjaro in the north of Tanzania and Arusha city. It is located about 43km away from Moshi city and about 74km from Arusha city. Scattered on the southern slope extending in the north-south direction are about 55 buildings, all one-storied, including the buildings for clinics, sick rooms, small warehouses, etc. The building with the largest floor area of about 500 square meters has offices and administration department, radiotherapy department, operating rooms, etc. The buildings have ferroconcrete pillars and beams, while the walls are made by piling up concrete blocks or stones (in case of some buildings). The roofs are made by using wooden frame and corrugated slate, while some buildings have corrugated galvanized iron sheet roofs. Floors are all of mortar finished by using a metallic trowel, except for the operating room floor which has dust preventing paint on it. About 50% of the lamps are either out of order or have no bulbs.

② Electricity

The power is received by using the 3-phase, 415V transformer, which also supplies power to the neighboring 10 residences.

③ Communication

As for the telephone, there are 12 extension lines, and no outside lines; the hospital uses the outside line of the post office near-by.

④ Water Supply

The water is pumped up from a river flowing down the mountain, and is fed into the elevated water tank in order to supply. The quantity of water is sufficient.

5) General Information of Premises

Kibong'oto National Tuberculosis Hospital

| | |
|---|---|
| Establishment | |
| Reconstruction | 1951/2 |
| Structure | Pillar and beam of reinforced concrete, concrete block wall, partly piled with stone, wooden building, corrugated slate, partly covered with galvanized iron sheets. |
| Floors | 26 one-story buildings are scattered in the premises. |
| Area | 200,000m$^2$ |
| Total Floor Space | 3,900m$^2$ and staff houses. |
| Access Road | 5m, Asphalt paved roads are confined to the neighborhood of the hospital. |
| Location | Consultation buildings and wards are scattered on a hillside about 43km west of Moshi, 74km east of Arusha. |
| Voltage, Phase, Cycle | 415V, 3$\phi$, 50Hz |
| Capacity of Transformer | 166KVA×6, supplying neighboring houses as well. |
| Electric Power | 415V, 230V, 3$\phi$ 12$\phi$, 50Hz |
| Emergency Generator | 90KVA, out of order. |
| Telephone | Nothing, using equipment of the post office 300m distant from the hospital |
| Lighting | 50% of the whole lighting, both fluorscent lamps and incandescent lamps, are, out of order. |
| Feed Pump | 80$\phi$ |
| Water Pipe | 30$\phi$ |
| Drainage Pipe | |
| Disposal of Drainage | Drained through purification tank to underground. |
| Disposal of Medical Waste | Burying in the ground. |

6) Overview of the Proposed Hospitals

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Name of Hospital | Kibong'oto National Tuberculosis Hospital (KIB) Location: Moshi | | | | | | |
| Year of Establishment | Established as a T. B. Sanatorium in 1926. | | | | | | |
| Range of Activity, Role | Regional Top Referral Hospital | | | | | | |
| Characteristics of Activity | Speciality Hospital for T. B. and General Hospital for the region. | | | | | | |
| Catchment Area | Kilimanjaro, As for T. B. patients, all Tanzania is service area. | | | | | | |
| Population of Service Area | 1,108,699 persons | | | | | | |
| Increase Rate of Population | 2.1% Density of Population (per Km²) 83 persons | | | | | | |
| Referral from | Mawenzi Hospital (700 persons) Arusha Hospital : 1993 statistics (90 persons) | | | | | | |
| Number of Beds | 256 beds For neonate 0 | | | | | | |
| Categories of Services | Out patient Casualty Out patient Internal Medicine Surgery Padiatrics Radio Diagnosis Dental Ophtalmic E. N. T. | | | | | | |
| Clinical Examinations | Hematology Microbiology Parasitology Immunology | | | | | | |

| Number of Staff (1993) | Doctors person | | Nurses person | | Laboratory Technicians person | | Others person | |
|---|---|---|---|---|---|---|---|---|
| | Physician | 1 | Nurse G."A" | 38 | Radiology Assistant Technician | 1 | Administration | 12 |
| | Surgeon | | Nurse G."B" | 117 | Clinical Laboratory Technician | 1 | Nutritionist | |
| | Orthopedic DR. | | Assistant Nurse | | Laboratry Assistant Technician | 4 | Medicare consultant | |
| | Obstetric & Gynecologist | | Mid-wife | | Paramedical Pharmasist | 2 | Maintenance Technician | 2 |
| | Radiologist | | | | | | Sweeper, Guard | 14 |
| | Paediatric DR. | | | | | | | |
| | Ophthalmologist | | | | | | | |
| | Anaesthe-sialogist | | | | | | | |
| | Clinical officer (internal medicine) | | | | | | | |
| | Total | 6 | Total | 155 | Total | 8 | Total | 28 |

| Record of Activity | 1991 | 1992 | 1993 | Avg. of 3 years |
|---|---|---|---|---|
| Number of Out Patient | 58,950 | 63,000 | 65,000 | 62,310 |
| Number of In Patient | 791 | 850 | 886 | 842 |

| Consultation (1993) | Kind of Consultation | No. | Kind of Consultation | No. |
|---|---|---|---|---|
| | 1 Tuberculosis | 4,000 | 6 Asyphxia | 100 |
| | 2 Malaria | 1,500 | 7 | |
| | 3 Broncho Pneumonia | 300 | 8 | |
| | 4 Diarrhea | 150 | 9 | |
| | 5 TB with HIV | 100 | 10 | |

| Ten Leading Diseases (1993) | Causes | No. | Causes | No. |
|---|---|---|---|---|
| | 1 Pulmonary TB | 37 | 6 PTB with Pleural | 2 |
| | 2 PTB with HIV | 13 | 7 TB Meningitis | 2 |
| | 3 Malaria | 7 | 8 Bronchiectasis | 2 |
| | 4 Pneumonia | 6 | 9 Asyphxia | 2 |
| | 5 PTB with CCF | 4 | 10 PTB Resp. Failure | 1 |

7) Financial Statement — Kibong'oto National Tuberculosis Hospital

| Category | 1991 | 1992 | 1993 | % |
|---|---|---|---|---|
| Required Budget | 90,000,000 | 145,600,000 | 210,000,000 | |
| Total Income | 41,375,220 | 83,778,754 | 108,428,974 | 100.0 |
| Revenue | 41,375,220 | 83,778,754 | 108,428,974 | 100.0 |
| Medical Service Fee | | | | |
| Consultation Fee | | | | |
| In-patient Fee | | | | |
| Medicine Fee | | | | |
| Operation Fee | | | | |
| Examination Fee | | | | |
| Medicare Insurance | | | | |
| Supplementation from Company | | | | |
| Donations | | | | |
| Others | | | | |
| Total Expenditure | 41,361,020 | 83,074,245 | 108,324,974 | 100.0 |
| Salaries | 10,196,660 | 15,968,100 | 20,825,324 | 19.2 |
| Laundry Expenses | | | 4,800,000 | 4.5 |
| Surgical/Medical Expenses | | | 3,200,000 | 3.0 |
| Cost of Medicines | 7,224,400 | 38,200,000 | 40,000,000 | 36.9 |
| Traveling Expenses | 731,000 | 1,923,990 | 3,500,000 | 3.2 |
| Rentals | 0 | 0 | 0 | 0.0 |
| Water | 218,760 | 399,999 | 400,000 | 0.4 |
| Power, Light Services | 1,073,000 | 4,194,149 | 3,805,800 | 3.5 |
| Postal, Teleg., Tel. Services | 40,000 | 63,968 | 69,000 | 0.1 |
| Rapair of Buildings | 443,500 | 443,493 | 1,000,000 | 0.9 |
| Repair of Equipment | | 172,100 | 1,000,000 | 0.9 |
| Purchase pf Equipment | | 499,999 | | |
| Miscellaneous | 16,804,700 | 16,721,872 | 29,724,850 | 27.4 |

8) Main Equipment

Kibong'oto National Tuberculosis Hospital

| Section / Equipment | Status G | U | N | T | Using Period | Country Origin | Manufacturer(model) |
|---|---|---|---|---|---|---|---|
| Operation Theatre | | | | | | | |
| Operating Lamp | | | | ① | 30yr ~ | U.K. | - |
| Operating Table | | | ① | | 30yr ~ | U.K. | - |
| Suction Unit | | | | ① | 20yr ~ | - | - |
| Electro-surgical Unit | | | ① | | 20yr ~ | U.K. | The Genito-Urinary MFG. Co. |
| Anesthesia Machine | | | ① | | 20yr ~ | U.K. | Charles King Ltd. |
| X-ray Diagnostic Equipment | | | | | | | |
| Mobile X-ray Machine | | | ① | | 30yr | Czecho | Chirena (MOVE TA II) |
| Mobile X-ray Machine | | | | ① | 30yr | U.K. | Watosn |
| Film Dryer | | ① | | | 1976 | Japan | Seikosha |
| Laboratory | | | | | | | |
| Centrifuge Refrigerator | | | ① | | 1976 | Japan | Tomy Seiko Co., Ltd. (RP-18-II) |
| Hot Air Oven | | | ① | | 1976 | Japan | Hirayama Seisakusho (DH4PH) |
| Microscope | | | ① | | 1976 | Japan | Olympus |
| Microscope | | | | ① | 1976 | Japan | Olympus |
| Microscope | | | ① | | 1980 | U.K. | Vickers |
| Microscope | | | | ① | - | U.K. | Vickers |
| Refrigerator(tall type) | | ① | | | 10yr | U.K. | Kelvinator |
| Safety Chamber | | | | ① | 20yr ~ | - | Unknown- |
| Water Bath | | | | ① | 20yr ~ | Japan | Thermonics Ltd. (P10) |
| Incubator | ① | | | | 1976 | Japan | Sakura Seiki (IF-4) |
| Refrigerator(tall type) | | | | ② | 1976 | U.S.A. | General Electronics Ltd. |
| Centrifuge | ① | | | | 1982 | Japan | Kokusan Enshinki Co., (H-103) |
| Water Distiller | | | | ① | 15yr | U.K. | Baird & Tatlock Ltd. |
| Hot Air Oven | | | | ① | 1976 | Japan | Sakura Seiki (HF-3NA) |
| Maintenance Workshop | | | | | | | |
| Power Generator | | ① | | | 20yr ~ | U.K. | - |

## 5-2 Maintenance System

### (1) Organization

Each consultant hospital has a workshop that takes charge of the maintenance and control of the facilities, equipment, apparatuses, etc. However, except for the workshop in Muhimbili Medical Centre (See Fig. 2-5), the workshops in other hospitals are engaged mostly in the repairs of simple household items, wooden products, ironwares and electric appliances with little attention paid to the medical appliances. This is attributed to the lack of the machines and tools needed for the repair work in addition to the scanty number of technicians capable of carrying out maintenance of the medical appliances.

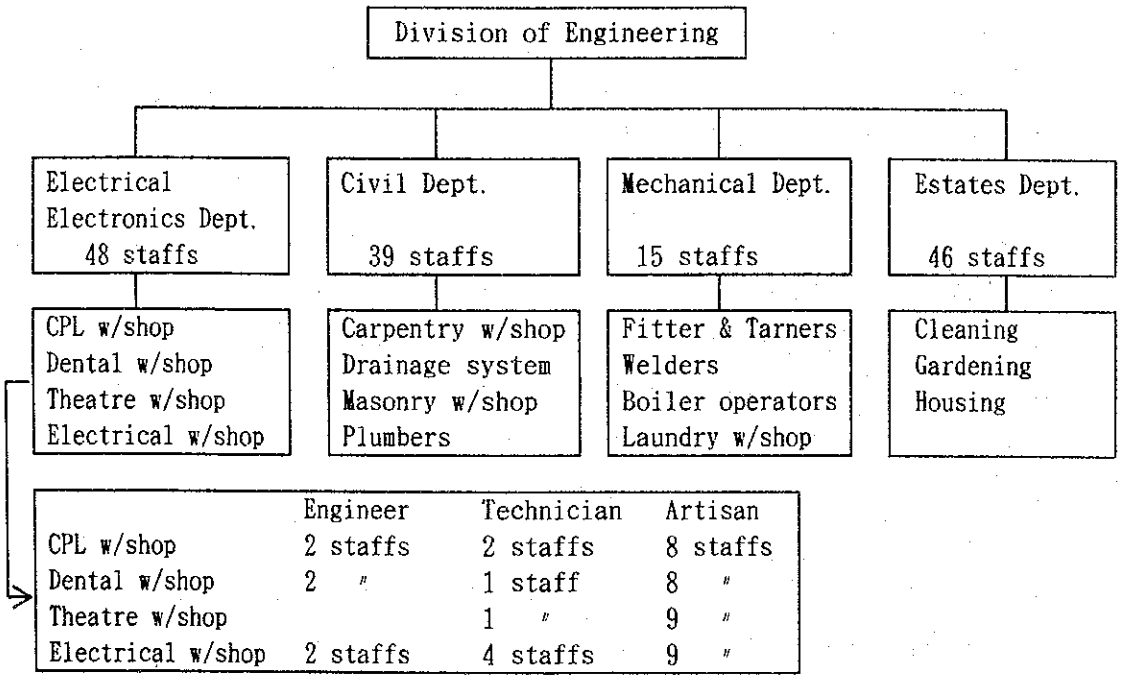
The person in charge of the maintenance is less conscious of the importance of preventive maintenance and periodical inspection, and the medical appliances in unfavorable state are put to use, causing major accident or trouble.

The control and responsibility system regarding the medical appliances is inadequate, so that even the highly expensive machines are left unrepaired once they broke down, and new machines are purchased instead. There are still a few machines in operatable state if they are repaired.

The Muhimbili Medical Centre has the Maintenance Department to take care of the maintenance and control of the medical appliances. The Department is composed of four Sections: Clinical Inspection Appliances Section, Dental Appliances Section, Operating Room Section and Electric Appliances Section. There are 48 staffs in all: 6 engineers, 8 technicians, and the rest artisans.

The maintenance and control of radiant rays appliances are consigned to an outside company. However, because of the tight budget, the spot maintenance system is adopted in case of trouble instead of making the maintenance service contract.

Fig. 2-3 Structure of Division of Engineering, Muhimbili Medical Centre




| | Engineer | Technician | Artisan |
|---|---|---|---|
| CPL w/shop | 2 staffs | 2 staffs | 8 staffs |
| Dental w/shop | 2 〃 | 1 staff | 8 〃 |
| Theatre w/shop | | 1 〃 | 9 〃 |
| Electrical w/shop | 2 staffs | 4 staffs | 9 〃 |

(2) Maintenance budget

The maintenance cost for the medical appliances and other peripheral equipment is basically covered by the budget allotted to each planned facility, so that the aforesaid workshops are not allotted with the budget to pay for the parts needed for the maintenance. The revenue, obtained through the currently adopted the "Cost Sharing System" is partly used for the maintenance of medical appliances. In the case of machine, needing high-level maintenance technology, a maintenance service contract is made between the hospital and the local agent.

(3) Status of maintenance contract for medical appliances

The proposed medical facilities have made a maintenance contract with local agents regarding some of the medical appliances. The contract, however, comprises technical service only, including a few periodical inspections a year and the "on-call service" at the time of trouble, with the parts cost paid separately by each medical facility. This keeps the maintenance contract cost low. However even such contract is becoming an economic burden in recent years because of a

tight budget and the medical facilities have to resort to "on-call service" only.

## 6. Environmental Problem

As mentioned in the aforesaid infrastructure state and building outline, the proposed medical facilities are all abiding the government regulations regarding the countermeasures for disposal of medical wastes, drainage treatment, protection from radiation leakage, etc.

# Chapter 3 Content of the Project

## Chapter 3 Content of the project

### 1. Basic Concept of the Project

#### 1-1 Basic Policy of Implementation of Cooperation

The project is aimed at providing higher medical service for the people residing in the areas of the proposed facilities through improvement of the top referral hospitals, the pivotal institutions for medical and health service in Tanzania. The equipment currently installed at the institution is beyond its limits of use, and the poor efficiency due to obsolescence and quantitative insufficiency caused by breakdown and damage is a major problem. Because of the following reasons, it is judged that this project is appropriate to be promoted under the Japan's Grant Aid.

① The project is intended to enrich the health care activities of the top referral hospitals in Tanzania through the renewal of medical equipment and the replenishment of the shortage of medical equipment due to the growth of population. This assistance is expected to restore the functions of the hospitals which they once had.

② The hospitals are currently operated and there will be no need for the deployment of additional manpower or budgetary arrangement.

③ The examination previously mentioned has proved the effectiveness and feasibility of this project, as well as the preparedness and capability of the Tanzanian counterpart in this project.

④ The scale and the effects of this project are compatible with the criteria for the Japan's Grant Aid system.

Therefore, the outline of the project is examined as described in the following sections so that the basic designs will be worked out. However, as mentioned below, it is considered necessary to change a part of the request.