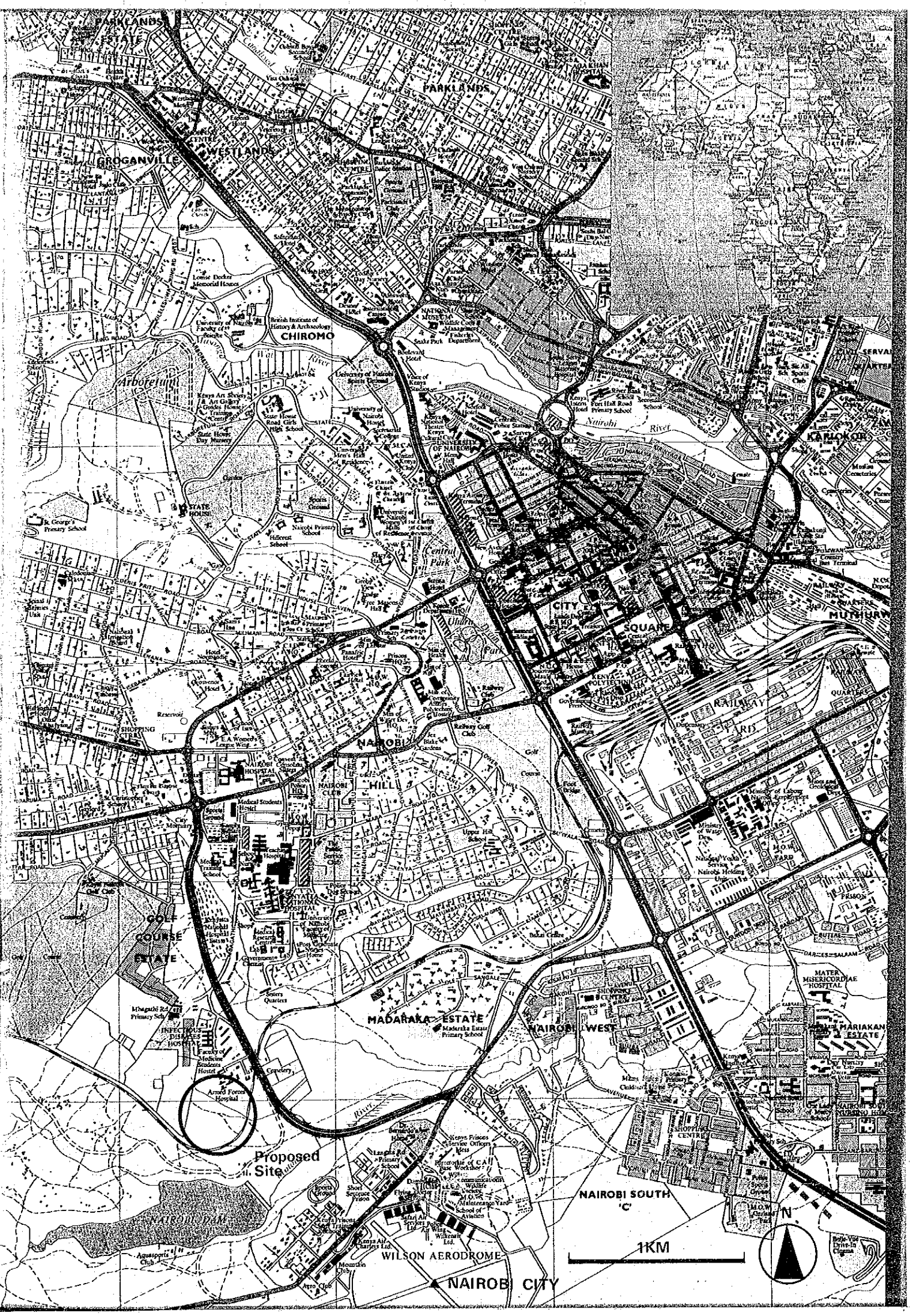
Basic Design Study
on
Kenya Medical Research Institute
(KEMRI) Development Project
in
The Republic of Kenya

March 1982

JAPAN INTERNATIONAL COOPERATION AGENCY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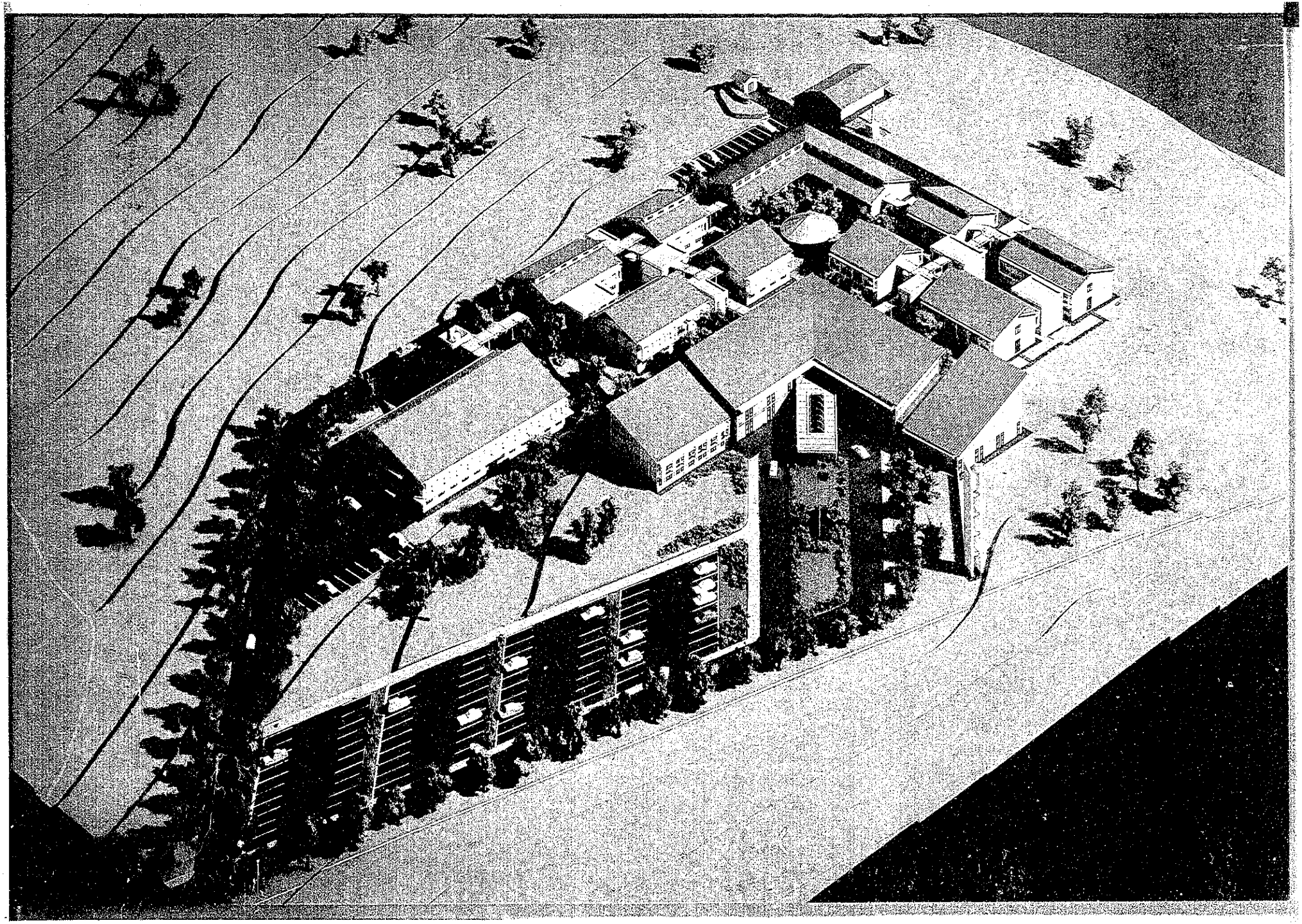


PREFACE

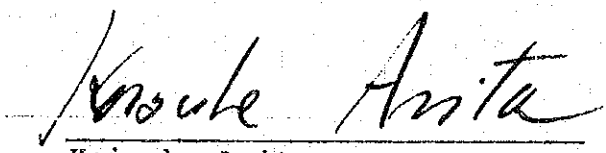
In response to the request of the Government of the Republic of Kenya, the Government of Japan decided to conduct a survey on the Kenya Medical Research Institute Development Project and entrusted the survey to the Japan International Cooperation Agency (JICA).
The JICA sent to Kenya a study team headed by Dr. Keizo Matsumoto, Director and Professor of The Instutute of Tropical Medicine of the Nagasaki University,from 8th to 28th November, 1981.

The team had discussions with the officials concerned of the Government of Kenya and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Kenya for their close cooperation extended to the team.

March, 1982



Keisuke Arita
President
Japan International
Cooperation Agency

SUMMARY

After the break-up of East African Community in 1977, Kenya has been confronted with the necessity of developing own medical research system independently. Thus the Government of Kenya has decided to set up KENYA MEDICAL RESEARCH INSTITUTE (KEMRI) which integrates all the necessary medical research activities of the country by developing and reorganizing the existing research functions. For these purpose, the setting-up of KEMRI Headquarter, through which the results of research activities will be reflected effectively into preventive and promotive health and medicine, the facility development of various research units which are now scattered around and physically highly inadequate were decided. Though the effort has been made and progressed especially in reorganizing of research activities etc., the development of facilities has been delayed due to the financial difficulties and the scarcity of trained medical manpower. For these background, the Government of Kenya requested to Japanese Government in grant-in-aid programme the construction of KEMRI (various research units, Headquarter and attached model clinic) as a comprehensive research institute. In response to this request, the Basic Design Study is to be conducted to frame and evaluate the basic concept of the project, and to formulate the most suitable Basic Design, centering on communicable diseases which is the most serious problem in health and medical field of the country.

In this project, the institute for medical research and attached model clinic mainly for communicable diseases will be constructed on the proposed site with 6.1 ha., located about 3 km southwest from the centre of Nairobi. KEMRI consists of administrative headquarter, 11 research units, 7 other supporting common research units, and model clinic with 40 beds. The construction will be divided into two phases with estimated duration of 18 months each.

Based on the discussions and studies with Ministry of Health and Ministry of Works etc. of Kenyan Government on the facility planning, manpower programme and management scheme, it can be concluded that the construction cost of Kenyan side works will be within the bearable range and that the recurrent expenditure after the completion of facilities is also realistical level with small shortage in the beginning stage. As for the procurement of relating manpower, the plan is quantitatively realistical but the special consideration is needed to training scheme for the level-up and independent management of manpower in future.

With the progress of the effective management, the contribution is expected to the comprehensive researches toward the preventive and promotive health and medicine on communicable diseases with viral, bacterial and parasitic causes etc. And the addition of Model Clinic will make it possible not only to treat the patients suffering from communicable disease but also to promote the integrated medical research unified with research institute and to present a model of communicable disease hospital.

As mentioned above, the project is recommendable from the view points of benefit, manpower procurement and financial plan. And by expecting the sufficient arrangement on budgetary and maintenance aspects by Kenyan Government, by arranging the training system linked with the Japanese Technical Cooperation from the opening until the time of getting steady headway, the project will make a great deal of contributions not only to the bringing up of medical manpower but also the promotion of comprehensive medical researches on communicable diseases in preventive and promotive health and medicine, resulting in the improvement of basic needs of peoples of the Republic of Kenya.

CONTENTS

CHAPTER 1 INTRODUCTION

After the break-up of East African Community, Kenyan Government has been trying to develop, integrate and expand the organization and facilities of various medical research fields toward the contribution to the health and medical aspects. The development of Kenya Medical Research Institute (KEMRI) is officially decided and efforts has been made to organize and procure the relating personnels. But mainly because of financial difficulty, actual construction of the KEMRI facilities were delayed until now.

For these background Kenyan Government requested to Japanese Government the development of KEMRI as a grant-in-aid programme. In response to the request, Japanese Government decided to conduct a Basic Design Study and the Preliminary Survey was conducted to confirm the request of Kenyan Government and construction site etc. in June, 1981.

Based on the report of Preliminary Survey, Field survey of Basic Design Study was conducted in Kenya from Nov. 8 - Nov. 28, 1981, headed by Dr. Matsumoto (Director & Professor, Institute of Tropical Medicine, University of Nagasaki). Term of field survey consisted of three stages. On the first stage on which team leader Dr. Matsumoto stayed in Kenya (Nov. 10 - Nov. 14) discussion was made mainly on the basic concept of the project with officials concerned from Kenyan side and on Nov. 14, Agreed Minutes on Discussion was signed. On the second stage study was concentrated to field work visiting related facilities like research institutes, or collecting related data and information about general, cost-relating or technical fields. On the third stage, again series of discussions were held with Kenyan side on such break-down items like model clinic, medical equipments, scope of implementation works, zoning and management plan etc. And those items were agreed and signed in Minutes on Nov. 25, 1981 as shown attached. (See Appendix 3)

After the field survey, the team continued the study analyzing all informations collected during field survey and the results were formed as a draft Report.

In order to explain and discuss the draft report of the Basic Design Study, a Draft Report Explanation Team, headed by Dr. Matsumoto, was sent to Kenya between 9th February and 16th February 1982. The explanation and the series of discussions on the Draft Report were held with Kenyan officials concerned. On February 15th, the agreement was signed between the team leader Dr. Matsumoto and the Director of KEMRI, Dr. Gekonyo. (See Appendix 3)

After the draft report explanation, the Final Report was formulated with correction due to the discussions made during Draft Report explanation

CHAPTER 2 BACKGROUND

2–1 Health and Medical Conditions in Kenya

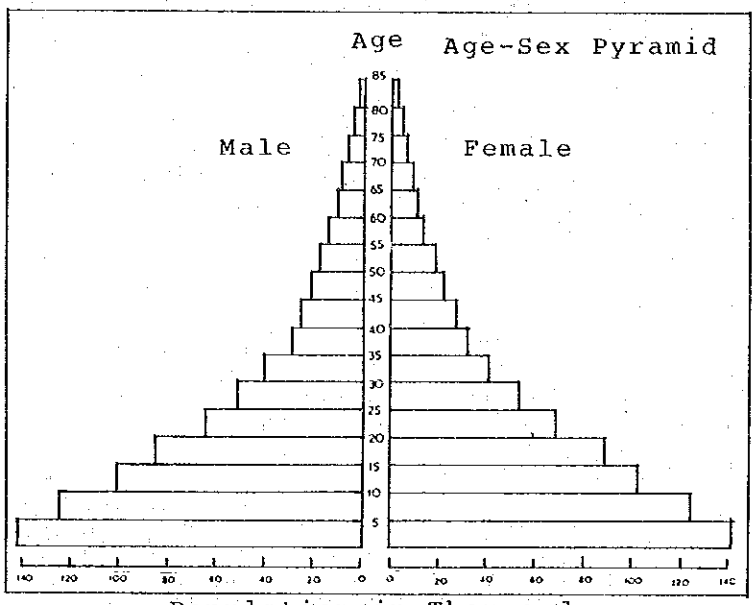
2–2 Health and Medical Policy in Kenya

2–1 Health and Medical Conditions in Kenya

(1) Health and Medical Demands and the Diseases Pattern

(a) Health and Medical Demands from Demographic Point of View

- Population growth 3.4%/year and life expectancy 53.5 years (male 51.2, female 55.8). (National Demographic Survey, 1977).
- Typical population pyramid in developing country with lower age group majority - more than 48.5% of total population is under 15 years.



Population in Thousands

SOURCE;"Population Census 1979"

Central Bureau of Statistics

- Crude death rate (per 1,000 population) is estimated at 14.2*1.
- Infant mortality rate (per 1,000 live births) is estimated 84 - still high even among developing country*2.
- In lower age group, especially in infant group, health and medical demands are high - It is estimated that 15 - 20% of livebirth children will die before 5 years old in East African countries (incl. Kenya)*3.
- Thus, population control, child-maternal health and infant disease control are very important subjects among Kenyan health problems.

*1, *2 A report by the Director of Medical Services on Status of Health in Kenya, 1979.

*3 "Pattern of Mortality & Morbidity" J. Bonte East African Literature Bureau.

b) Pattern of Diseases

① Absolute importance of communicable diseases in Kenyan main diseases pattern.

- 70 % of clinical mortality is cause by communicable disease.
- Diseases already eradicated in Japan, or tropical communicable disease are predominant.
- Childhood diseases cause 60% of clinical death and occupy 5 positions among the first 10 high ranking diseases causing death.

Mortality Rank *1				
Rank	Name of Disease	Rate	Reported Death Case	Character
1.	Enteritis and other diarrhea	9.0%	4,127	○ ●
2.	Pneumonia	7.4%	3,386	○ ●
3.	Measles	6.1%	2,795	○ ●
4.	Tuberculosis (all forms)	5.7%	2,624	○
5.	Meningitis	5.0%	2,279	○
6.	Cerebrovascular diseases	3.0%	1,378	
7.	Neoplasms	2.2%	1,003	
8.	Tetanus	2.1%	981	○ ●
9.	Motor vehicle accident	2.0%	923	
10.	Nutritional deficiency	1.9%	881	●
Total		100%	45,643	

Morbidity Rank *2				
Rank	Name of Disease	Rate	Reported No.of Outpatient	Character
1.	Malaria	21.5%	4,384,712	○
2.	Acute Respiratory Infections	20.6%	4,205,162	○ ●
3.	Disease of Skin (Ulcer)	10.6%	2,164,977	○
4.	Intestinal Worms	5.1%	1,029,735	○
5.	Accident(inc.fracture,burns)	3.2%	643,374	
6.	Rheumatism;Joint pain etc.	2.6%	522,301	
7.	Gonorrhoea	1.9%	390,784	○
8.	Ear Infections	1.9%	384,909	○
9.	Measles	1.6%	323,178	○ ●
10.	Pneumonia	1.1%	220,352	○ ●
Total		100%	20,388,438	
Reattendances			11,119,735	
Referrals			180,313	

○: Communicable disease ● : Childhood disease

*1 Reported Death Data; MOH, A Report by the Director of Medical Services on Status of Health in Kenya 1979

*2 Reported Outpatient Morbidity; - ditto -

Note; These data covers 70% of Kenyan population in clinical cases.

② Malnutrition as base of disease

. PCM (Protein-calorie malnutrition) is evident in many childhood deaths - higher death rate is caused in gastro-entritis, pneumonia, bronchopneumonia, tuberculoses and anaemia, etc.

. Increase of malnutrition in northern Kenya due to recent drought. -kwashiorkor, marasmus is also increasing.

. Great impact of malnutrition is seen both in epidemiological and clinical aspects of diseases.

③ Complex causality of diseases

. Multiple disease occurence in the same patient is common in tropical Africa.

- Many deaths from Pneumonia + Measles, Malnutrition, Malaria.
- Many deaths from Gastro-entritis + Malnutrition, Measles.

④ Potential of Sub-clinical cases not covered by medical data

. Esp. in parasitic disease sub-clinical cases are common and potential number of patients is estimated to be higher than records show.

- Estimated schistosomiasis patient in whole Kenya is around 1 million.
- Estimated filariasis patients will cover 15 - 20% inhabitants (over 15 years) in Kenya Coast.
- Cholera cases are generally higher than the figures recorded as clinically diagnosed.

⑤ Recent increase of disease due to new development projects

. New development projects, especially irrigation schemes and dam projects by Kenyan government aiming population redistribution, expansion of agricultural productive land cause environmental changes in the warm and dry areas and spread of related diseases - schistosomiasis, filariasis, malaria, arbo-virus disease, etc. are increasing due to the expansion of inhabitable area for the vector.

(2) Health and Medical Supplies in Kenya

a) Shortage of Medicare Facilities

. Hospital bed per 100,000 population is ~140 beds (1978) ranking as average among developing countries, but still far from 300 beds of WHO target.

. Importance of mission hospital

- 25 ~ 30% of total hospital beds

. Absolute shortage of medicare facilities for rural population which covers 90% of total population.

. Concentration of private hospitals in big cities like Nairobi, Mombasa.

b) Shortage of Skilled Medical Manpower

. Severe shortage of skilled medical manpower hinders the health and medical services development.

- Physicians ratio 10.5. Nurse ratio (inc. enrolled nurse) 95 (both in 1976) per 100;000 population.
- Physician population ratio is generally lower in developing countries.

. Only physician training institution, University of Nairobi Faculty of Medicine, has 90 graduate per year.

. Tendency of urban concentration of physician.

. Shortage of physician in rural medicare and training of clinical officers.

. Shortage of trained paramedicals (inc. Lab. Technologist, Lab. Technician).

- Training in 6 MTC (Medical Training Center)

c) Financial Arrangement

. Health budget is ranked 5th (7.1%) in total governmental budget following 1. Education (16.6%), 2. Public work (11.5%) 3. Defence (11.4%) 4. Agriculture (11.1%) but is still insufficient.

2–2 Health and Medical Policy in Kenya

(1) Government's Main Objectives for Health Service Development

Main objectives for development of health services of Kenya government since Independence have been as follows;

a) Eradication, Prevention and control of diseases.

- Protection of environment against health hazards
- Vector disease control
- Immunization
- Early detection and treatment
- Health education for the public

b) Provision for adequate and effective health and medicare service for whole population.

- In hospitals, health centers, dispensaries and mobil units.

c) Promotion and development of biomedical and health service research.

- Improved and cost-effective method for protection.

But the major constrains which were recognized during the previous Development Plans, still exist. These include insufficient medical manpower, shortage of funds; as well as inefficient management and organization.

(2) Strategic Targets of Health and Medical Service in the 4th 5-year Development Plan (1979 - 83)

a) Preventive medicine & promotive health

- Epidemiological surveillance and control of communicable and vector-borne diseases
  - Special attention to irrigation schemes, settlement scheme
  - Especially in vector-borne diseases like schistosomiasis, filariesis, leishmaniasis, malaria, trypanosomiasis, plague, onchorcerciasis, arbo-virus, etc.
- Effort to reduce maternal, prenatal and infant mortality and morbidity.
- Promotion of family planning
- Nutrition education and research
- Environmental health
  - Food safety, water quality, water supply, waste disposal

- Prevention of environmental hazard
- Education
- Pollution control

b) Rural health services

. Strengthening and developing primary health services.

. Upgrading of existing health facilities

. Assistance to on-going self-service-basis projects

. Encouragement to community and non-governmental agencies' participation.

. Rural health training

c) Health manpower

. Strengthening of existing basic, post-basic and in service training programme for nurses, public health officer and paramedicals.

. Training for medical equipment maintenance personnels.

. Programme for training of teachers for health allied science.

. Strengthening of manpower planning unit in MOH.

d) Hospital development

. Upgrading of district hospitals

. Improvement and extension of provincial hospitals

. New construction of district hospitals

. Governmental aid to church hospitals

e) Medical supply & equipment

. Improvement and decentralization of essential medical supply and equipment system

. Construction of central medical store and additional stores in strategic regional location

. Construction of equipment workshops in strategic regional location.

f) Medical Research

(1) Institutional development

. Governmental responsibility for all medical research work in the country including that previously undertaken by the East African Community.

. Development of medical research institute which is formed already to organize, develop and coordinate all medical research activities, in collaboration with other research agencies, within and outside Kenya.

. Development step

- Organization and co-ordination of all major research activities in the country
- Co-operation and collaboration with reputable research organizations and bodies at local, regional and international levels
- Increased attention to both biomedical and health service research
- Establishment of appropriate communication channel between research activities and services within the Ministry of Health, in order to establish the link between the theoretical knowledge and action
- Construction, extension, upgrading, equipping and staffing of facilities.

. Target facilities for facility development

- Kenya Medical Research Institute in Nairobi to act as the headquarters and base for the co-ordinating role of research activities in the country.
- Associate Research Stations in Alupe (leprosy), Kisumu (malaria) etc.
- Research stations in Nairobi(tuberculosis), in irrigation and other development project are (changes in disease patterns) etc.

. Rearrangement of National Public Health Laboratories(NPHLS) in Nairobi to undertake the laboratory aspects of medical research

- Diagnostic and clinical laboratory services from outside Nairobi
- Toxicology, blood transfusion services
- Laboratory referral services
- Training of laboratory personnel
- Production of chemicobiological substances.

(2) Priority areas of research for communicable diseases and vector-bone diseases

. Biomedical research field

- bilharzia, filariasis, hydatidosis, laishmaniasis,malaria, trypanosomiasis, leprosy, tuberculosis, plaque, selected virus disease, sickle cell disease, cardio-vascular and metabolic and nutritional diseases.
- data collection and epidemiological surveillance

. Health service research field

- research concerned with improvements in the delivery of services.

- research in preventive medicine and promotive health; examination of existing water supply and sanitary facilities in order to provide the basis for surveillance system. evaluation of the effectiveness of currently used method of communication for the purpose of improving present system of health education and information. research and field studies related to food fortification, etc.

③ Attention to traditional medicine

- promotion and encouragement to investigations and research into different fields and aspects of traditional healing
- establishment of traditional medicine unit with close co-operation with the proposed Drup Quality Control Laboratory

CHAPTER 3 TOTAL CONCEPT OF KEMRI

3—1 Total Concept of KEMRI

(1) Establishment of KEMRI

. At the breakup of the East African Community in July 1977, MOH faced urgent necessity for development of medical research institutes by herself.

. Continuation of medical research in existing medical institutes at that time in Kenya

- Kenya Tuberculosis Investigation Centre
- Alupe Leprosy Research Centre

. The Science and Technology Act came into effect in July 1977

- Establishment of scientific and technological policy
- Establishment of the National Council for Science and Technology (NCST)

. Organization of Clinical Research Centre and Malaria and Other Protozoal Diseases Research Centre under above Act.

. Amendment of the Science and Technology Act in May 1979

- Establishment of KEMRI and integration of above research centres under KEMRI
- Discussion on additional research centres to KEMRI (Public Health and Epidemiology research, Traditional Medicine)
- Establishment of Board of Management for KEMRI
- Setting up KEMRI Headquarter
- Establishment of KETRI (Kenya Trypanosomiasis Research Institute)

(2) Total Concept of KEMRI

a) Objectives of KEMRI

Objectives of KEMRI is carry out the development and organization of research in all necessary fields of biomedical and health service sciences.

b) Function of KEMRI Board of Management

. Definition of research priority

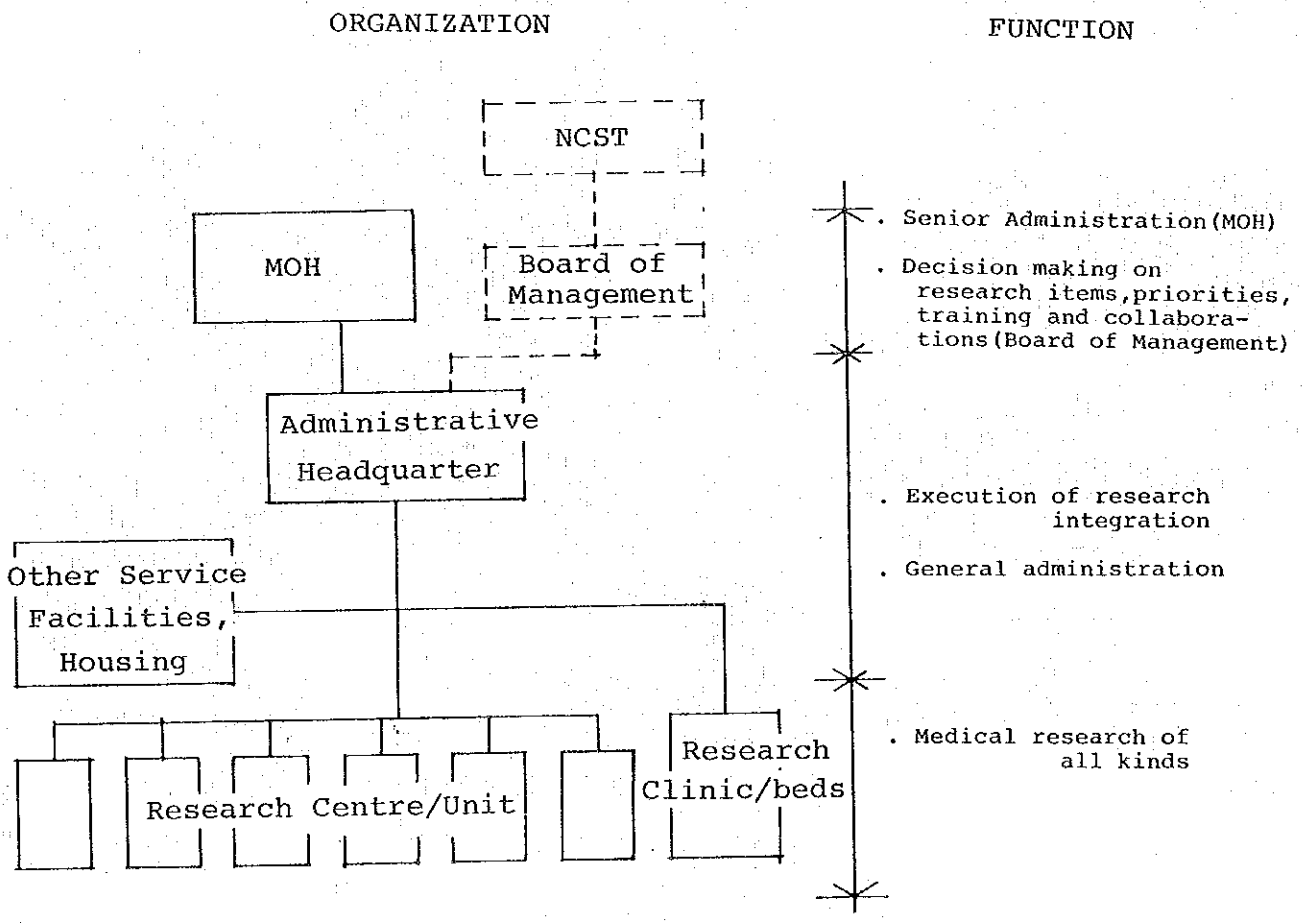
. Definition of development planning

. Definition of training of scientific manpower

- Definition of co-ordination of research activities
- Definition of liaison with external and international scientific community
- Standardization of information collection
- Documentation and dissemination of scientific information both within and outside Kenya
- Collaboration with WHO in Geneva and Brazzaville
- Collaboration with other international and bilateral medical scientific institutions.

Thus the total concept of KEMRI is not limited to basic research but covers all fields which will contribute to health and medicare activities and covers also such functions to organize and control above research activities.

c) Organization Chart of Total Concept



3-2 Existing Conditions of KEMRI

(1) Delay of Facility Development

- In spite of the declared Government policy on research and development, and the institutional and organizational plans, the development of KEMRI's facilities has lagged behind due to constraints in developmental finances.
- Headquarter; borrowed few rooms in MOH headquarter, KEMRI Headquarter is highly inadequate in physical facilities which causes hindrance to information and documentation activities without space for library, etc., to training and meeting functions without space for lecture room or conference room, not to mention general administrative activities.
- Clinical Research Centre; scattered around in borrowed spacesin Nairobi, research activities are in progress financed by KEMRI in collaboration with WHO, Welcome Trust and Walter Reed, etc.
- Virus Research Centre; located in a section of Dutch Royal Tropical Institute with own facilities. Direct responsibility and Netherlands funding of the Dutch Medical Research Centre, Nairobi will be phased out over a period of a few years, but technical cooperation will continue on project basis.
- Kenya Tuberculosis Investigation Centre; Independent and continued activities are expected with own equipments and building.
- Alupe Leprosy Research Centre; located in Busia (Western Kenya) and independent activities are expected.
- Malaria & Protozoal Disease Research Centre; located in Kisumu (Western Kenya) in borrowed room of Kisumu Provincial Hospital with highly inadequate facilities and personnel.

(2) Existing Research Activities of KEMRI

a) Research activities in direction shown in 5 years Development Plan, especially with research priority in communicable and vector-borne disease, are under way with more attention paid to communicable disease control.

b) Highly dependent on the collaboration with oversea.
- Research level, equipments and research staff.

c) Research activities in each research centre

① Clinical Research Centre;
- Leishmaniasis chemotherapy, diagnostic method

- Malaria drug sensitivity, chemotherapy and preventive method
- Schistosomiasis diagnostic method
- Hypertension (epidemiology of rural-urban migration)

(2) Virus Research Centre;
- Arbo-virus research
- Influenza virus surveillance
- Measles vaccine effectivity
- Viral hepatitis test
- Tissue culture

(3) Kenya Tuberculosis Investigation Centre;
- Chemotherapy, field research, labo-service

(4) Alupe Leprosy Research Centre;
- Clinical, biochemical and epidemiological studies

(5) Malaria and Other Protozoal Diseases Research Centre;
- Bionomics of malaria vectors, epidemiology, biological control of vectors, diagnostic studies, malaria nephropathy.

3-3 Request of Kenyan Government on this Project

Following are the requests from Kenyan side on the project.

(1) Facilities (buildings equipments) of research units/ laboratories for comprehensive research

(2) Facilities (building, equipments) of administrative headquarter

(3) Other service facilities and staff housing

(4) Model clinic

(5) Participation of Japanese Technical Cooperation related to this project.

CHAPTER 4 PROJECT

4-1 Outline of the Project

Based on the total concept of KEMRI and the Kenyan side requests,Basic Design Study Team formed the outline of this project as follows;

(1) Objective and priority of the Project

Objective of this project is to conduct the comprehensive research in both basic medical research and clinical research, putting specific priority into communicable diseases which is the most important problem in the health and medical field of present Kenya, to expect proposals for effective countermeasures against communicable diseases.

(2) Contents of the Project

The project contains the facility development(buildings and equipments) of necessary research units/laboratories for the research of communicable diseases, model clinic for the medical treatment of communicable disease patients and headquarter of KEMRI for the integration of researches with necessary functions for general administration.

(3) Planning guideline

- The level and scale of the project are based on the considerations of the possibility of oversea cooperation for communicable diseases by visiting scientists after the completion of facility development.
- Facility planning is conducted with flexibilities for future with due consideration to the total concept of KEMRI as a institutes of comprehensive research in all necessary medical research fields.

4-2 Basic Concept

To achieve the objectives of the project, following departments are considered with organization chart(estimated) shown in next page.

(1) Administration Block

(2) Central Research Laboratories

- Virology unit
- Bacteriology unit
- Parasitology unit
- Vector biology unit
- Nutrition unit
- Clinical research unit
- Pathology unit
- Public health and epidemiology unit
- * Human reproduction studies unit
- * Traditional medicine unit
- * Environmental physiology unit

(3) Common Research Laboratories

- Electron and scanning microscope unit
- Central cold room and chilled room
- Isotope laboratory and disposal facilities
- P_3 -Laboratory
- Medical illustration section
- Laboratory animal houses
- Workshops

(4) Model Clinic

(5) Others (by Kenyan side works)

- Housing
- Laboratory canteen, kitchen

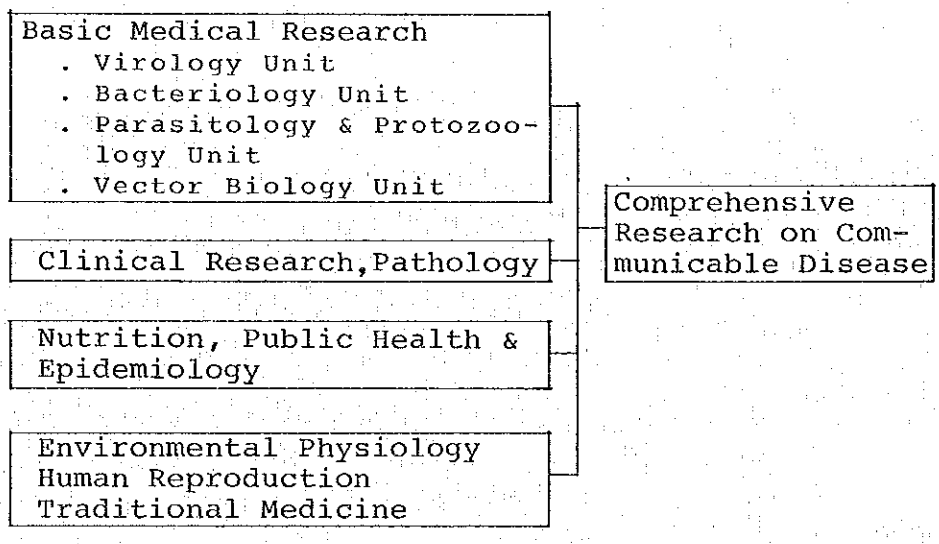
* Regarding the asterisked units above, the Kenyan side will arrange its own medical equipment and materials.

(1) Setting of Each Research Department

a) On the Vaccine Development Unit

The provision of a vaccine development unit was confirmed during the preliminary survey. The basic survey team, however, called for another discussion on this matter. Though the importance of developing vaccine in Kenya was understandable, the basic survey team looked upon the present phase as a period of preparation for the development of vaccine and suggested the direction in which preparations would be made for the future, continuing its research work in the unit of virology or public health and epidemiology, and the Kenyan side approved of this proposal.

b) Concept of Research Unit for Comprehensive Study on Communicable Disease



On the assumption that the comprehensive research of communicable disease could be evolved in an effective manner only when organic research work was conducted in the units of basic medical research, the units of clinical research and pathology and the unit of public health and epidemiology etc., the establishment of a unit of pathology was proposed and approved. It was decided that an independent unit would be established for vector biology due to the fact that it would be of strategical importance in coping with mainly the parasitic and protozoal diseases and viral diseases which has great impact on the medical conditions in Kenya and that research would in many cases be carried out on the field.

A unit of nutrition, public health and epidemiology will be established because these milieus of science, which are interrelated, turn out to be indispensable to the grasping of the overall picture of communicable diseases and their countermeasures.

Following 8 units deeply related to communicable disease research will be facilitated both in building and research equipment.

- virology
- bacteriology
- parasitology (including protozoology)
- vector biology
- nutrition
- clinical research
- pathology
- public health and epidemiology

As regards the following three units with less relation to communicable disease, research equipment will not be offered, only space will be provided(consideration will be given to the equipment which is to be used by Kenyan side in terms of the planning of facilities).

- human reproduction
- traditional medicine
- environmental physiology

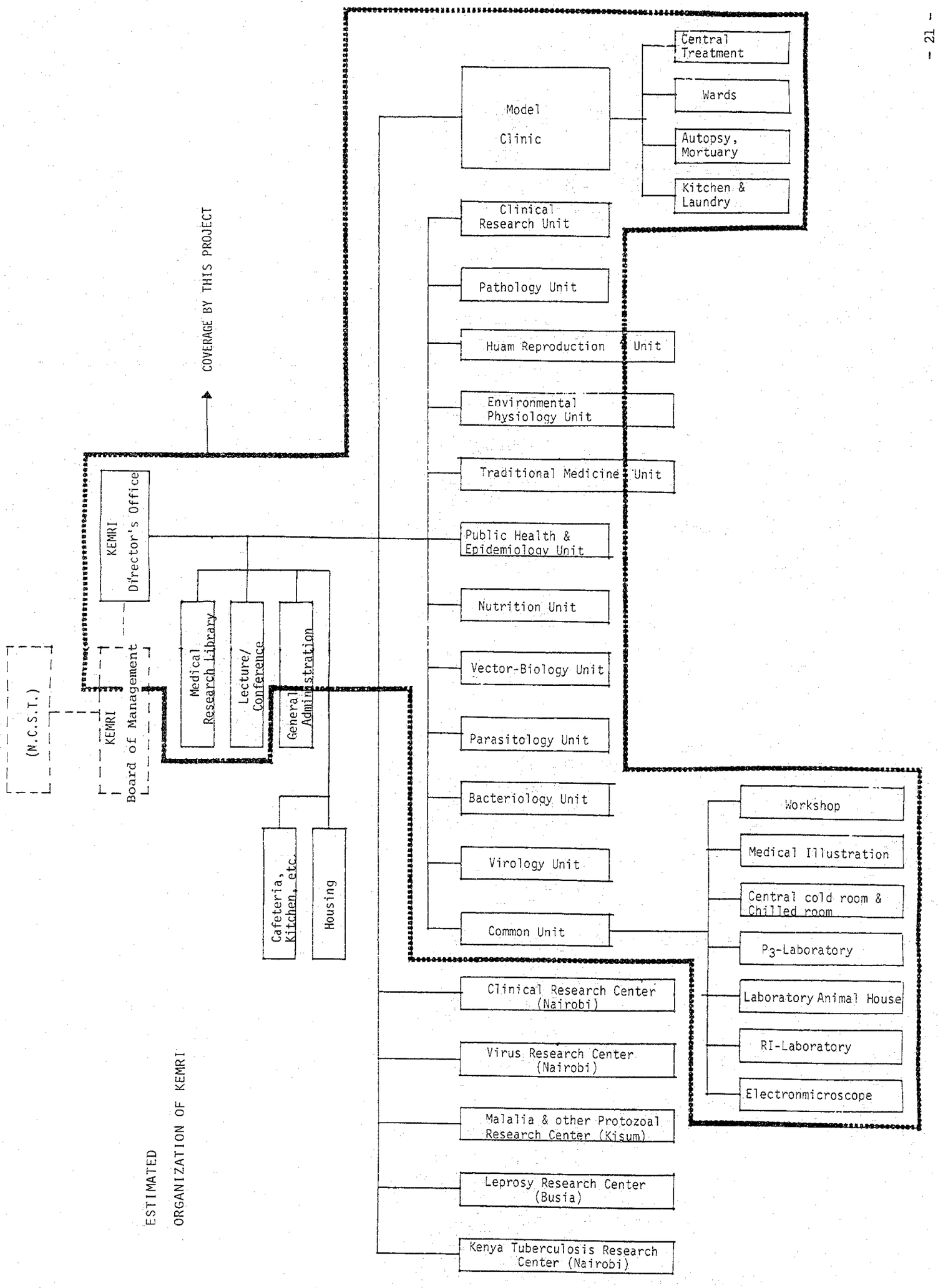
The above three units have come from a proposal made by the Kenyan side against the following background.

° Unit of human reproduction -- To support the comprehenside survey from the viewpoint of promoting the family planning and maternal and child care which are one of the main subjects for the health and medical problems in Kenya.

° Unit of environmental physiology -- Health and medical care workers who are engaged in the front-line eradication of malaria and schistosomes are confronted with problems of highland medicine particularly that of hypertension. There is a need to support them in the research field.

° Unit of traditional medicine -- The research of the methodologies of traditional medicinists who shoulder the greatest burden of rural medical care in Kenya, particularly that of unprocessed medicines, is in line with the basic policy of the Kenyan Ministry of Health, which is looking for the cost-effective measures of medical care. In fact, the scientific research of traditional medicine is taken up as a national policy under the fourth five-year plan.

ESTIMATED ORGANIZATION OF KEMRI



c) Common Units

The common units included in the present programme are as follows;

° Electromicroscope unit

° General cold room and chilled room

° RI laboratory unit

° Medical illustration unit

° Laboratory animal houses

° Workshop

In addition, an attempt will be made, though no comments are made in the Minutes, to explore the possibility of setting up a common laboratory unit of p3 level, where pathogens with relatively high risks will be concentratedly dealt with, for the effective use of facilities, and for cutting down the cost and carrying out concentrated control and maintenance.

d) Administration Block

This block consists of two significant features. One, is that this block will be provided with accounting, personnel management and other functions, as an ordinary administrative department, and the policy is to take account of its facilities centering around the minimum basic necessary functions. The other, is that this block will be characterized as the KEMRI headquarters. Its functions include those for KEMRI's decision-making and training, and those for medical library and information. Fo all these functions, that their scale will be taken into account, depending on their importance. In regard to the medical illustration unit, its close relationship with the library and information sector have been taken into consideration.

e) Other Units

Housing and welfare facilities for the research institute (e.g., cafeteria, kiosk, and kitchen) will be developed by the Kenyan side on a separate basis.

(2) Model Clinic

As for the clinical research system which would be indispensable for the medical research of communicable disease, there was an active exchange of views with the Kenyan side in the latest basic survey.

The Kenyan side stressed the necessity of a "model clinic" and was of the view that its incorporation in the present project would contribute to smooth promotion of comprehensive research work. The basic survey team realized the necessity of the "model clinic" and after the studies in Japan on this items propose to set model clinic together with KEMRI.

The premises of its facilities are;

° The "model clinic" will be made part of the clinical research unit in terms of organization and management.

° As regards the appropriate scale of this clinic, 40 beds will be taken into consideration with necessary facilities and equipment.

° The desirable breakdown of the 40 beds is as follows;

• Gastrointestinal infections	8 beds
• Liver infections	8 beds
• Protozoal and parasitic diseases	8 beds
• Pulmonary infections	8 beds
• Cerebrospinal infections	8 beds

° The above five bed sectors encompass the principal communicable diseases in Kenya, and this clinic will be work out as a model of communicable disease hospital both in facilities and management providing effective medicare based on the symptoms of patient.

° As for physicians, it is desirable that the Kenyan chief of the clinical research unit will concurrently serve as director of the clinic and that foreign physicians (specialists) who may be dispatched to the clinical research unit will concurrently serve as physicians at the model clinic(*). It is also desirable that nurses, paramedicals and other staffers, be allocated by Kenyan side.

° In addition to beds, naturally, clinical laboratory, central treatment, kitchen and laundry (for model clinic only) will be considered.

(3) Manpower Programme and Training

° The Kenyan Government has clarified its position that it will give due consideration in terms of finance and the manpower programme upon completion of the facilities, thus making it possible to entertain hopes on future manpower reinforcement programmes and independent management.

a) Basic Policy of Manpower Programme and Training

(1) Manpower programme will be formulated on the basis of the KEMRI's present manpower, with due consideration given to the Ministry of Public Health's manpower reinforcement programme so that excessive facility planning can be avoided.

(2) Desirably training of senior research staff will be continued abroad selecting and despatching the above research staff in the progress of transfer of technology with visiting scientists.

(3) Generally, the training in KEMRI will be promoted mainly on technical transfer base and the direction of independent operation after the completion of oversea cooperation will be aimed.

(4) Instead of confining the transfer of technology within KEMRI, research staffs, physicians, para-medicals and other staffs will be trained, and a collaborative research system incorporated, so that the fruits of this transfer of technology may be put to effective use in ordinary health and medical care -- particularly in the execution of communicable disease control.

Proposed Manpower Allocation for this Project

		Laboratory,etc.		Model clinic		Total	
		KEMRI staff	Training staff	KEMRI staff	Training staff	KEMRI staff	Training staff
Senior research staff	. Research scientist	11	-	(1)*1	-	24 + (16)	10
	. Visiting scientist	(16)	-	(2)*2	-		
	. Research officer	11	8	-	-		
Doctor	. Doctor	-	-	2	2		
	. Clinical officer	-	-	1	1	1	1
Para-medical staff	. Pharmacist	-	-	1	-	1	-
	. Pharm. technologist	-	-	1	-	1	-
	. Radiographer	-	-	1	-	1	-
	. Lab.technologist	12	12	4	-	16	12
	. Lab. technician	27	16	5	-	32	16
	. Other assistant staff	12	-	-	-	12	-
Nursing staff	. Registered nurse	-	-	6	-	6	-
	. Enrolled nurse	2	-	15	-	17	-
ADM staff	. ADM officer	15	-	1	-	76	-
	. Gen. ADM staff	54	-	6	-		
Supporting staff	. Dietary staff	5	-	6	-	54	-
	. Meintenance, transport	20	-	+	-		
	. Service staff	23	-	+	-		
Others	. Subordinate staff	200	-	-	-	200	-
Total (excl. concurrent staff)		392 +(16)	36	49	3	441 +(16)	39

*1 The directorship of the model clinic will be concurrently assumed by the head of the clinical research sector.

*2 In this list it is hypothesized that visiting specialists (physicians) at the model clinic would concurrently serve as specialists in the clinical research unit.

b) Manpower Programme and Training in Research Unit

① Personnel will be assigned to the 8 standard research units with close relationship to communicable disease for which oversea cooperation will be considered, in the following manner.

	KEMRI staff	Staff for training or collaborative research work staff with other institution
· Unit head (Scientist level)	1 (Kenyan)	
· Visiting scientist	(2) (Foreign)	
· Counterpart (Reserach officer level)	1 (Kenyan)	1 (Kenyan, etc.)
· Technologist	1 (Kenyan)	1 (Kenyan, etc.)
· Technician	2 (Kenyan)	2 (Kenyan, etc.)
Total	5 + (2)	3

Note: The values merely represent capacity, and the actual number will naturally be determined on the basis of oversea cooperation.

° On-the-job training will be carried out at a rate of one counterpart (research officer), one technologist and two technicians, to one visiting specialist. Consideration will be given to the training of half of the Kenyan staff for research trainee or for a collaborative study with other institutions. At the same time, an attempt will be made to cope with the scarce availability of manpower at the outset of the programme.

° The acqusition of qualifications for counterparts and the duration of their training are not officially institutionalized, but it will be of importance to come out with a realistic policy during the phase of oversea cooperation.

② In the standard research units associated with three sectors in which the Kenyan side will carry out research work on its own accord, the assignment is estimated as follows;

	KEMRI staff	Staff for training or collaborative research work staff with other institution
· Unit head (Scientist level)	1 (Kenyan)	
· Research officer	1 (Kenyan)	
· Technologist	-	1 (Kenyan, etc.)
· Technician	2 (Kenyan)	
Total	4	1

③ Staff for Common Research Units is estimated as follows.

	KEMRI staff	Staff for training or collaborative research work staff with other institution
· Electronmicroscope unit		
Technologist	2	1
Technician	1	-
· RI-laboratory(*)		
Technologist	1	-
Technician	-	-
· Laboratory animal house		
Technologist	1	-
Technician	1	-
· Central cold room & chilled room		
Technologist	-	-
Technician	1	-
· Medical illustration		
Technologist	-	-
Technician	1	-
· P_3 laboratory		
Technologist	-	-
Technician	1	-
Total	9	1

For electromicroscope unit 1 trainee(technologist) is estimated.

(*) A staff member at the level of scientist or research officer will concurrently serve as the person responsible for the custody.

④ Other research assistant staff are estimated as follows:

	KEMRI staff	Allocation
· Photographer/artist	1	Medical illustration unit
· Computer assistant	1	Public health & epidemiology unit
· Field worker (entomological)	4	Vector biology unit
· Field worker (parasitological)	4	Parasitology unit
· Enrolled nurse	2	Environmental physiology unit
· Animal house assistant	2	Laboratory animal house
Total	14	

c) Manpower Programme and Training in Model Clinic

① Physicians (doctors)

	KEMRI staff	Staff for training or collaborative research staff with other institute
Clinic head	(1) (Kenyan)*1	
Visiting specialist	(2) (foreign)*2	
Counterpart (Doctor level)	2 (Kenyan)	2 (Kenyan, etc.)
Counterpart (Clinical officer level)	,1 (Kenyan)	1 (Kenyan, etc.)
Total	4 + (2)	3

*1 The head of the clinical research unit will concurrently serve as the head of the clinic.

*2 Visiting specialists will concurrently work in the clinical research unit (Despatch of visiting specialist separately for model clinic is also possible).

At the Model Clinic, the training of physicians will be conducted in the same way as in research units.

Judging from the actual conditions of hospitals attached to research institutes in Japan, an assignment of one physician for every five beds seems reasonable.

- In actuality, it would be reasonable for a total of eight physicians to be assigned, as three doctors or clinical officers are assigned for every visiting specialist.
- There is a need to determine a personnel assignment programme, as classified by bed sector, depending on priority to diseases, selection of specialists and other factors.

② Assignment of Nurses

As regards nurses, it seems realistic to adopt a system under which one nurse station would take charge of the model clinic's ward (40 beds). A team of one registered nurse and three enrolled nurses per nurse station will be put on duty in three shifts a day for six work days a week. Taking account of any absence, due to illness or other causes, and possible maternity leave, the work system will be provided with some leeway so as not to create an excessive work load. Moreover, one supervising nurse will be assigned to exercise overall control. As for nurses other than those in the wards, one registered nurse and three enrolled nurses will be assigned to cover the entire part of the medical care sector which encompasses the central medical treatment. However, their duty period will be for eight hours a day.

. The foregoing may be summarized as follows;

	Chief nurse	Registered nurse	Enrolled nurse
General	1	-	-
Ward	-	4	12
Central treatment	-	1	3
Total	1	5	15

③ Assignment of Paramedicals

. The following plan for the assignment of paramedicals seems realistic.

Paramedical*1 (Technologist level)		Assistant paramedical*2 (Technician level)	
Radiographer	1	Radiographic assistant	1
Lab. technologist	2	Lab. assistant	2
Clinical lab. technologist	1	Lab. assistant	1
Endoscopy	1	Lab. assistant	1
Pharm. technologist	1	-	
Pharm. technician	1	-	
-		Autopsy assistant	1
Total	7	Total	6

*1 Desirably technologist level staff will be assigned as paramedical.

*2 Desirably technician level staff will be assigned as paramedical assistant.

d) Assignment of Staff Common to Research Labo/Adm. Headquarters and Model Clinic

① Assignment of Administrative Staff

Unit	Section	ADM. officer	Gen. ADM staff	Total
Director's office		· KEMRI director 1 · KEMRI deputy director 1 · Principal research office 1 · Administrative secretary 1 · Committee clerk 1	· Clerk 4 · Secretary 4 · Typist 2	
	Subtotal	5	10	15
Medical research library	Library	· Librarian 1 · Statistician 1	· Library assistant 2 · Typist/copy 2	
	Printing/copy		· Printing technician 2 · Copy staff 2	
	Subtotal	2	8	10
Training & lecture		· Trainning officer 1	· Clerk 1 · A/V technician 1 · Typist/copy 1	
	Subtotal	1	3	4
General administration	Gen. administration office	· Principal adm. officer 1	· Clerk 2 · Sec/typist 1	
	Accountant's office	· Chief accountant 1	· Accountant 3 · Cashier 3 · Typist/copy 2	
	Personnel office	· Personnel officer 1	· Personnel clerk 2 · Typist/copy 1	
	Security office	· Security officer 1	· Clerk/typist 1	
	Supply office	· Supply officer 1	· Storeman 1 · Supply assistant 2 · Typist/copy 1	
	Transport office	· Transport officer 1	· Clerk 1 · Typist/copy 1	
	Estate office	· Estate officer 1	· Clerk/typist 1	
	Subtotal	7	22	29
Laboratory office	Each lab. unit		· Typist/copy 11	
	Subtotal		11	11
Model clinic administration		· Medical officer 1	· Admission/discharge clerk 1 · Clinic cashier 1 · Supply assistant 1 · Medical record assistant 1 · Secretary 1 · Typist/copy 1	
	Subtotal	1	6	7
Total		16	60	76

② Assignment of Supporting Staff

Unit	Staff		Total
· Dietary staff	· Nutritionist	1	
	· Cook	4 (*)1	
	· Meal service assistant	6 (*)2	11
· Maintenance/ transport staff	· Building maintenance staff	2	
	· Equipment/vehicle mechanics	2	
	· Maintenance trainee	2	
	· Tel. operator	2	
	· Driver	10	
	· Gardener	2	20
· Service staff	· Laundry staff	3	
	· Mending staff	1	
	· Guards	4	
	· Janitor	15	23
Total			54

(*)1 2 persons of them are for laboratory canteen
(*)2 3 persons of them are for laboratory canteen

4-3 Project Site

(1) Outline of Nairobi City

Nairobi is located nearly under the equator, about 500 km from coast line and in highland area with altitude, 1,700 m above sea level.

Population of Kenya is about 15 million (1979) and that of Nairobi is about 830 thousand composing by about 100 different tribes.

In the city area, many modern buildings are build up with urban atmosphere.

(2) Climate

Average mean temperature is constant and rather low (11°c - 30°c) with slightly lower atmospheric pressure because of highland. There are two rainy seasons (April - June, major rainy season, November - December, minor rainy season), but wholeday rainfall are not seen but only 2 - 3 hours shower a day.

Winter season is from July to August and Summer season is from December to January.

(3) Construction Site

The site is located about 3 km Southwest from the centre of Nairobi. It is a part of hill with magnificent view toward from NE to SE. It has the total area of 6.11 ha and slopes of 1/10 gradient to three directions from western part with the maximum level difference 18 m at the East boundary. North side of the site is Forces Memorial Hospital and among these two site runs so called seasonal stream which functions as natural rainwater drain during heavy rainfall and also as the boundary of both site. Eastern and Western side of the site is surrounded by railway line (Nairobi - Kisumu) and exposed rock plate are seen partly along the railway.

Approach road to the site will be easily introduced from the northern end of housing area(Magiwa Estate).

(4) Infrastructure

The proposed site is located in Nairobi City is in a favourable position for all kinds of energy supplies. But early negotiation with the authorities concerned is highly required because the intakes of those infrastructure generally takes a long time.

a) Water Supply

Water supply is run by Ministry of Water Development. For this project the intake can be extended from the main pipe laid under the main road nearby. Quality of supplied water is generally good and potable. However, the water reservoir of one day capacity is required in the site against the shortage of the supply.

As the water supply to hospitals takes the first priority in the period of water shortage the connection to the supply pipe for the Force Memorial Hospital will be very convenient if allowed. (Chemical analysis data and city water charge list were obtained).

b) Electric Power Supply

Electric power is supplied by semi-governmentally run East African Power & Lighting Co., Ltd. It is possible to extend the incoming line from the existing high tension power line (11,000 V) installed along the railway in the South of this site. The necessary voltage will be obtained through transformer (415 V/240 V). The spare incoming installation from another high tension power line running in the North of the site is under consideration in order to obtain the stable supply to this facility.

c) Telephone System

The existing telephone line is also running along the railroad from where the intake is possible connecting to the Main Distribution Frame. Currently telephone condition is not good in Nairobi City and the failure or malfunctioning often take place in the afternoon.

d) Sewage and Drainage System

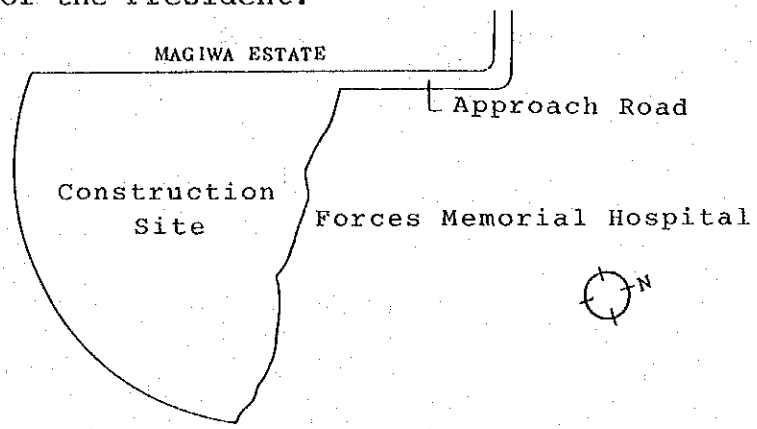
Sewer system is under the control of Water and Sewage Department of Nairobi City Counsil and the terminal sewage treatment is made in the municipal disposal plant. The sewer pipe from KEMRI can be directly connected to the sewer main laid under ground running along seasonal stream. Laboratory waste has to be lead to the sedimentation tank and connected to the sewer main after sufficiently dilluted. Rainwater will be drained directly outside of the site.

e) Gas Supply

Only LPG gas is available and gas will be supplied from installing LPG gas bombe central storage in the site. LPG gas in Nairobi consists of 97.1% Butan gas with 13,000 kcal/kg. Recently in Nairobi shortage of LPG gas often take place and thus the installation of 1 - 2 m^3 LPG storage tank is also under consideration.

f) Approach Road

The approach road starts from the same point in the site as indicated in the preliminary survey. But the route outside of the site is changed. New route pass through the border of adjacent Force Memorial Hospital site. This was instructed by MOW and MOH as an official opinion of Department of Lands, in the Office of the President.



(5) Soil Conditions of the Site

With regard to the soil conditions, followings can be commented based on the collected geological data in the neighbouring places and the test pits at four points in the site during field survey.

Except for the area along the seasonal stream, all the surface of main hill side is covered with Murram soil layer mixed with rock pieces untill about 1.5 m from the surface. The expected bearing capacity to this layer is about 10t/m^2. Under this, so called Tuff layer continues with bigger bearing capacity about 20t/m^2 or more.

On the other hand, test pit observation indicates that along seasonal stream, surface until 1 m deep is covered by Black Cotton layer under which lays murram soil. Underground water level in this area is rather high. Black Cotton Soil has high water content ratio, 200% expansion ratio when get wet and no bearing capasity. In field survey, the existence of murram soil layer to which the bearing capacity of building is expected, is confirmed, but its physical and dynamic property and also its depth of layer is not known yet.

Final dicision shall be done after the study of results of soil test which is supposed to be done by MOW. For the time being, it is supposed that the Murram Soil layer has enough bearing capacity for the project with two storied buildings. It is also recommendable that along the seasonal stream, construction of facilities shall be avoided because of bearing capacity expansiveness and higher water level.