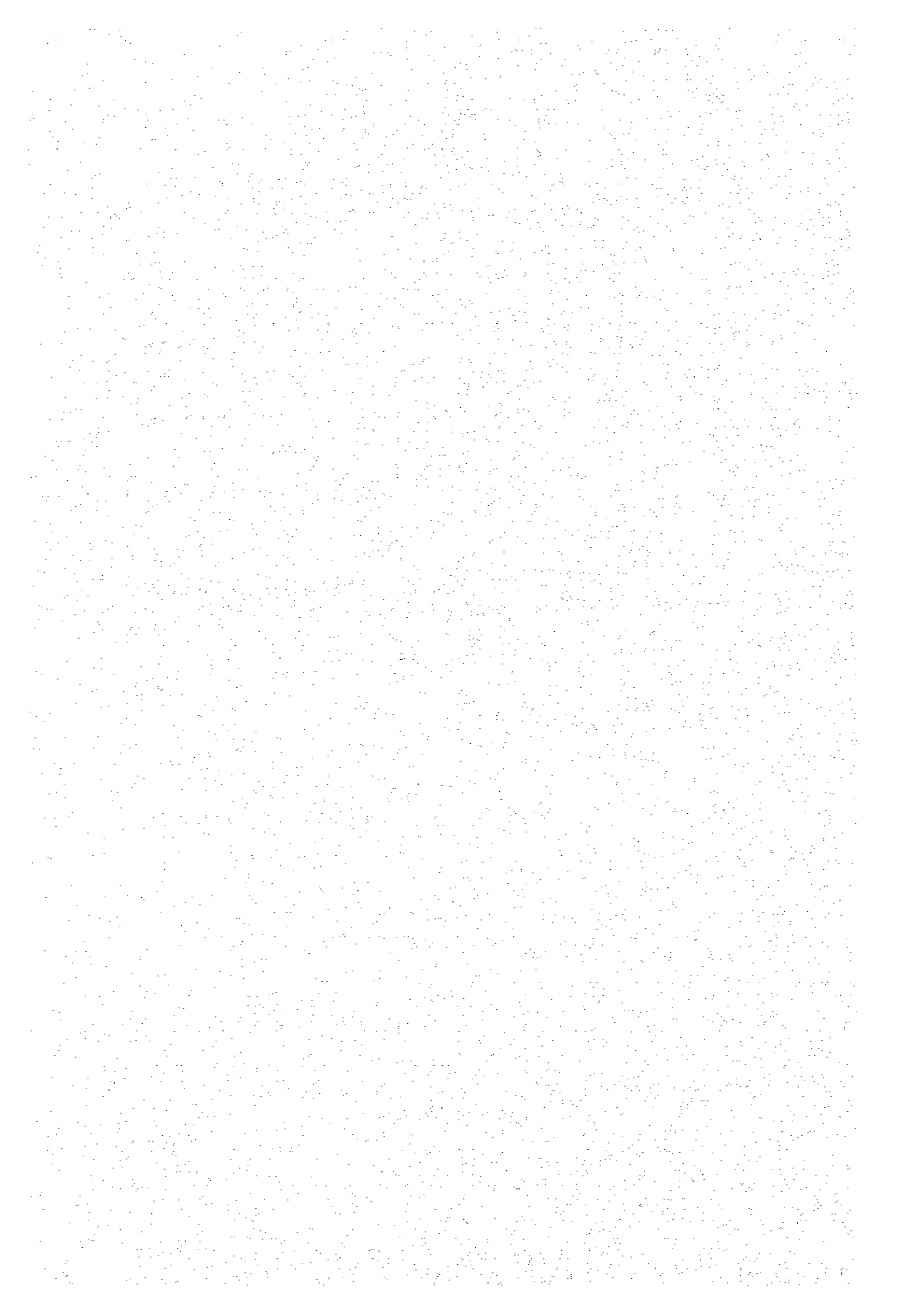


CHAPTER 3 PROJECT IMPLEMENTATION PLAN



Chapter 3 PROJECT IMPLEMENTATION PLAN

3-1 Implementation Plan

3-1-1 Implementation Concept

(1) Basic Matters Relating to Execution Work

The project for rehabilitation of buildings and equipment of Coast Provincial General Hospital in the Republic of Kenya is to be examined by the Japanese organizations concerned on the basis of the contents of this report. An Exchange of Notes (E/N) concerning this project is to be signed by the governments of Kenya and Japan after its certification in a Cabinet meeting of the Government of Japan. In accordance with the E/N which stipulates that the project shall be implemented within the framework of grant aid cooperation of the Government of Japan, the consultant, the building contractor and the equipment supplier shall be Japanese corporations, and their contracts with the Kenyan side must be certified by the Government of Japan.

(2) Execution Period

The works to be carried out under this project is divided into construction works, which include construction of new facilities with a total floor area of about 2,900m² and renovation of the existing facilities with a total floor area of about 2,500m² and equipment works, which include procurement and installation of medical equipment. In light of the details and scope of the works, the present condition of the project site and the actual situation of procurement of building materials in Kenya, as well as the hospital's intention to continue to offer medical care services during the execution period, it will take 15 months to complete both the construction works and the equipment works.

(3) Ordering Method

It is judged appropriate to separately place orders for the construction

works and the equipment works because the two works are expensive and because there is no close relationship between the details of the two works. In accordance with the requirements of the Government of Japan's grant aid cooperation, the building contractor and the equipment supplier are to be selected through conditional public tender in Japan.

(4) Project Implementing System

This project is to be implemented under the supervision of the Ministry of Health of Kenya, and Coast Provincial General Hospital is to be the Kenyan project implementing organization.

The Ministry of Health is to be a party to the design and supervision agreement, the contracts for the construction works and the equipment works and the bank arrangement. On the other hand, the director of Coast Provincial General Hospital is to be responsible for coordination of consultations about the technical aspects of the project as the client.

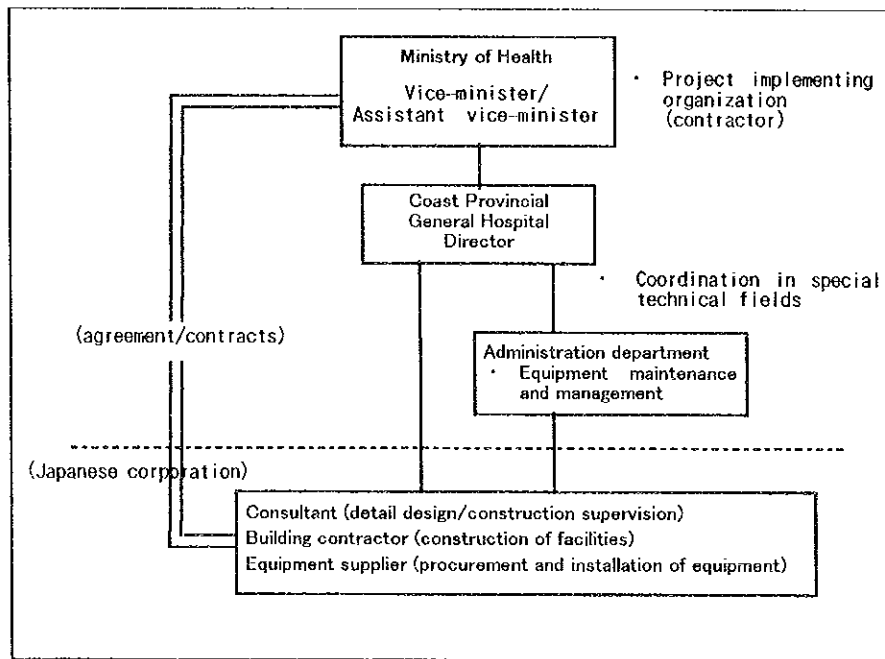


Fig. 3-1 Project Implementing System

(5) Execution System

1) Consultant

After the signing of the E/N, the Ministry of Health of Kenya is to conclude a consultant agreement concerning detail design and construction supervision for this project with a Japanese consultant firm which has been concerned with the basic design study and obtain the Government of Japan's certification of the agreement. If this project is to be implemented smoothly, it is important that such agreement be concluded immediately after the signing of the E/N. Upon conclusion of the consultant agreement, the Japanese consultant firm is to prepare detail design, in consultation with Coast Provincial General Hospital, and have them approved by the Ministry of Health, Coast Provincial General Hospital and the Ministry of Public Works and Housing. Then the consultant firm is to act as an agent in the tender business and conduct construction supervision.

2) Building Contractor/Equipment Supplier

The project for rehabilitation of buildings and equipment of Coast Provincial General Hospital is divided into the construction works (construction of facilities) and the equipment works (procurement and installation of medical equipment). The building contractor is to be selected from among qualified Japanese building contractors through conditional public bidding (only qualified building contractors are allowed to submit tenders). In principle, the lowest bidder is to be the successful bidder. The selected building contractor is to conclude a construction contract with the Ministry of Health of Kenya and have the contract verified by the Government of Japan.

The equipment supplier is also to be selected from among Japanese general trading firms in the same way as in the case of the building contractor. Both the building contractor and the equipment supplier are to complete

their respective works within the time for completion and deliver the facilities and equipment, respectively, to the hospital following the final inspection for completion of the works.

3) Scope and Methodology of the Equipment Supplier's Activities

In installing special items of equipment which are seldom installed in Kenya, appropriate techniques will not be available in the country. In such case, it will be necessary for the equipment supplier to send one of its engineers to the project site. In the case of the piping works to install special piping for medical equipment, the equipment supplier will have to send one of its engineers to the project site.

3-1-2 Implementation Condition

In implementing this project, it is important to pay careful attention to the following points in particular.

(1) To minimize the length of suspension of health care services during the period of implementation of the project.

The construction works under this project are to be implemented on the premises of Coast Provincial General Hospital (CPGH). But CPGH intends to continue to offer health care services during the period of implementation of this project, and to this end wants to minimize the length of suspension of its health care services during the construction and equipment works. It will therefore be necessary to define the time for completion for each of the facilities to be constructed under this project, the timing of start of renovation of the existing facilities and the timing of start of delivery and installation of each item of equipment in the tender documents. The building contractor and the equipment supplier will have to be punctual in completing the construction and repair of the facilities and delivering and installing individual items of equipment. It will be necessary for them

to take all necessary safety measures for the patients, the medical professionals and the staff members.

(2) To procure building materials and machines in Kenya or third countries as much as possible.

Building materials that can be procured in Kenya are sand, gravel, roof tiles and concrete blocks. Cement is also manufactured in the country and is exported to Uganda, Tanzania and other neighboring countries. It is supplied in sufficient quantities and its market prices are stable. Sashes, glass, steel frames and ceiling materials can also be procured in the country, but imports are predominant in the markets for these products. In procuring a particular material in large quantities, it will be necessary to place an order for it well in advance. Most items of medical equipment are procured in Britain, South Africa and other third countries. For this reason, in procuring individual items of medical equipment, it will be essential to work out a procurement plan taking into consideration the supply-demand situation, available means of transportation, the main packing methods used and the required delivery time in these third countries.

(3) Customs Clearance and Tax Exemption Procedures

The consultant firm, the building contractor, the equipment supplier and other Japanese corporations concerned with the implementation of this project will be exempted from all taxes imposed in Kenya. At present, a new tax system and new taxation procedures are being introduced to the country but confusion is arising as to how the new system and procedures are to be dealt with. It is very likely that new tax systems will be introduced one after another in the country. It will be necessary to pay careful attention to the future direction of the country's tax reform.

3-1-3 Scope of Works

This project is to be implemented jointly by the Government of Japan and the Government of Kenya within the framework of grant aid cooperation of the Government of Japan. The scope of works to be carried out by the two governments is as follows.

(1) Works to Be Carried Out by the Government of Japan within the Framework of Its Grant Aid Cooperation

1. Facility Works

- Construction of the buildings as specified in this basic design report
- Procurement and installation of electric, air-conditioning and plumbing systems
- Guidance on trial operation, operation, inspection, maintenance and management of equipment

2. Equipment Works

- Procurement of equipment
- Installation of equipment

3. Related Operations and Procedures

- Transportation of materials and equipment from Japan/third countries to Kenya
- Operations and procedures related to the transportation of materials and equipment

(2) Works to Be carried Out by the Government of Kenya

1. Site Preparation and Construction of Outdoor Structures

- Securing a site for the construction of the planned facilities
- Removal of existing structures, trees and others which may hinder the implementation of this project and leveling of ground

2. Making Preparations for the Construction Works

- Provision of spaces for a temporary office, temporary workshops and sheds for building materials
- Installation of temporary electric and telephone systems
- Shifting existing equipment when necessary in order for the contractor to carry out renovation works.

3. Furniture and Fixtures

- Furniture and fixtures other than those which are to be procured and installed by the Government of Japan.

4. Operations, Procedures and Expenditures

- Cost of the bank arrangement
- Cost of following the tax exemption procedures
- Prompt arrangements necessary for customs clearance and inland transportation
- Following the procedures for exempting Japanese nationals concerned with the implementation of this project from customs duties, domestic taxes and other surcharges
- Cost of following other construction-related procedures

3-1-4 Consultant Supervision

In accordance with the procedures for grant aid cooperation of the Government of Japan, the Japanese consultant firm shall conclude a consultant agreement with the Kenyan project implementing organization and shall be responsible for detail design and construction supervision. The main purposes of construction supervision are to confirm whether the construction works are performed in compliance with the drawings and specifications and to give guidance and advice and provide coordination service throughout the period

of the construction works and the equipment works from an impartial point of view for proper implementation of the construction contract and the equipment contract, as well as enhancement of the quality of the construction works. To this end, the consultant firm shall conduct the following operations.

1. Cooperation in the Tender Business and Conclusion of the Construction Contract and the equipment contract

The consultant firm shall prepare tender documents necessary for the tender business to select Japanese corporations to take charge of the construction works and the equipment works, respectively, make a public announcement of invitation of tenders, distribute tender documents, accept application forms, and evaluate the results of invitation of tenders. It shall also give advice on the contracts to be concluded between the Kenyan project implementing organization and the building contractor and the equipment supplier.

2. Guidance, Advice and Coordination Service to the Building Contractor and the Equipment Supplier

The consultant firm shall examine the progress schedule, the scheme of execution, the building machines/materials procurement plan and the procurement and installation of equipment and give guidance and advice to, as well as offer coordination service to, the building contractor and the equipment supplier.

3. Examining and Approving the Working/Manufacturing Drawings

The consultant firm shall examine, give guidance on, and approve the working/manufacturing drawings and related documents submitted by the building contractor and the equipment supplier.

4. Confirming and Approving the Building

Materials/Machines and Equipment for Use in Training

The consultant firm shall approve the building materials/machines and equipment which are to be procured by the building contractor and the equipment supplier after confirming their consistency with the provisions of the contracts.

5. Work Inspection

The consultant firm shall, on as needed basis, attend manufacturing inspections of the component parts for use in construction and the equipment in order to verify their performance and quality.

6. Reporting on the Progress of Works

The consultant firm shall get a clear grasp of the progress schedule and the actual situation of the project site and report the progress of the works to the governments of the two countries.

7. Completion Inspection and Trial Operation

The consultant firm shall attend the completion inspection of the facilities and the trial operation of the equipment in order to confirm that the facilities and the equipment are consistent with the provisions of the contracts and then submit a note of confirmation of completion of the inspection and trial operation to the Government of Kenya.

8. Training in Operation of Building Equipment and Medical Equipment

The items of equipment to be procured under this project include those which require basic knowledge of their maintenance and management on the part of the hospital's staff members in charge. It will be necessary, therefore, to conduct an on-site training program to train these staff members in the operation and repair of these items of equipment throughout the period of installation, adjustment and trial operation of these items of equipment.

The consultant firm shall give guidance and advice on the training program. It is considered appropriate that in conducting the above-mentioned operation, the consultant firm shall have one of its engineers stationed on the project site throughout the period of implementation of this project in light of the scale of this project. The consultant firm shall also send one or more of its engineers to the project site to conduct inspections, give guidance and provide coordination service on an as needed basis as the works progress, and the same time shall establish a liaison/support system in which one of its engineers is appointed to act as the contact at its head office. In addition, the consultant firm shall report the progress of the works, the payment procedures, and the completion, installation and delivery of the facilities and equipment to the officials concerned of the Government of Japan.

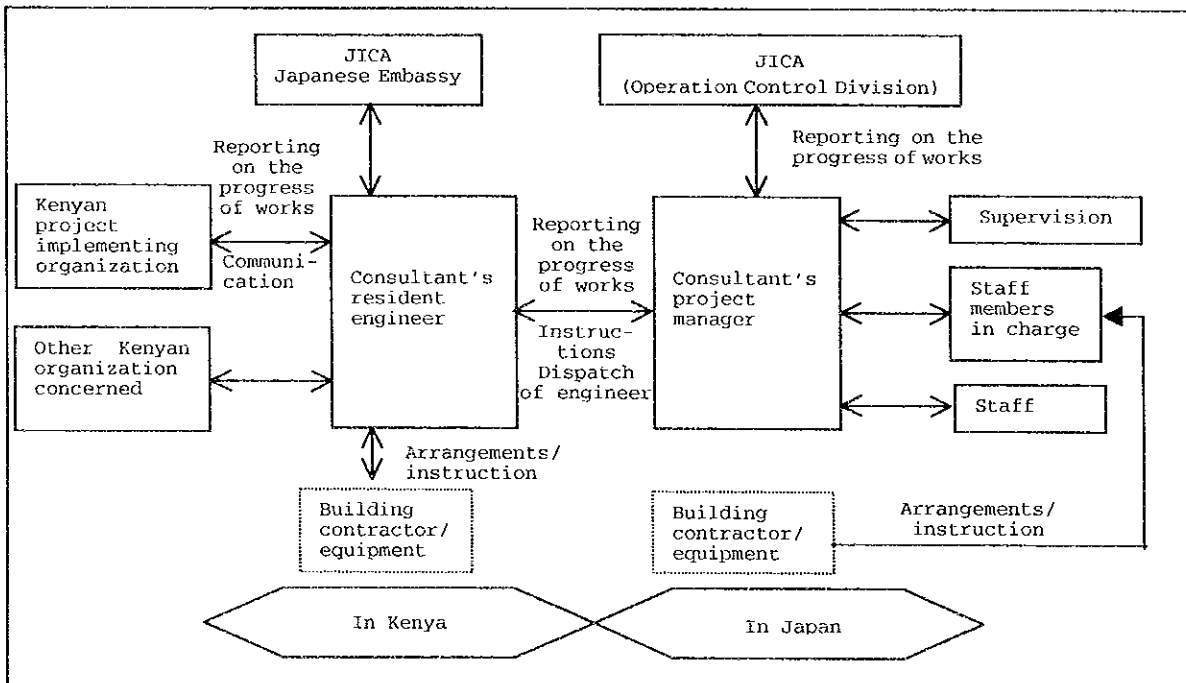


Fig. 3-2 Construction Supervision System

3-1-5 Procurement Plan

(1) Guidelines for the Procurement of Materials/Equipment

Special attention should be given to the following guidelines for the procurement of the materials and equipment for use in the planned facilities.

1) Local Procurement

Materials and equipment should be procured in the country as much as possible to facilitate their repair and management after completion of the facilities. In this case, purchase orders should be issued after the supply situation of individual items has been confirmed to prevent adverse effects on the progress schedule.

2) Import

Those materials and items of equipment which must be of high quality and which are in short supply in the country should be imported from Japan or third countries. In this case, the building contractor and the equipment supplier should work closely with the Kenyan project implementing organization to ensure that the necessary procedures are followed without delay.

3) Unit Prices of Materials and Equipment

A comparison should be made of the unit prices (including packing, shipping and insurance costs) of the items to be imported and those which can be procured in the country. Priority should be given to the latter when they are found to be cheaper or when there is no significant difference in unit price between the former and the latter.

(2) Building Materials/Machines Procurement Plan

Countries where the main building materials/machines to be used in the construction works are to be procured are as shown in the following table.

Table 3-1 Building Materials/Machines Procurement Plan

Type of works	Materials/equipment	Countries			Remarks
		Kenya	Japan	Third countries	
Construction works	Cement	○			Its supply situation is stable and it will be possible to procure the material in Kenya.
	Sand	○			It is possible to procure river sand in Kenya.
	Gravel	○			It is possible to procure crushed stones in Kenya.
	Reinforcing bar	○			Reinforcing bars made in Kenya are of high quality and there is a plentiful supply of the materials.
	Form	○			It is possible to procure imported in Kenya.
	Coral stone	○			Coral stones can be used as partition walls.
	Concrete block	○			Concrete blocks can be used as partition walls.
	Terrazzo tile	○			Terrazzo tiles are used as flooring material in Kenya but they are available in only a few types.
	Ceramic tile	○			Ceramic tiles are manufactured in Kenya but they are available in only a few types.
	Glass	○			Glass is manufactured in Kenya.
	Roof tile (cement tile)	○			Roof tiles are manufactured in Kenya.
	Lumber	○			It is possible to procure lumber in Kenya.
	Calcium silicate board	○			It is possible to procure imported calcium silicate boards in Kenya.
	Metal doors			○	Its supply situation is unstable. Most articles of metal doors available in Kenya are of poor quality.
	Wooden doors	○			No wooden doors is produced in Kenya.
Metal fittings for doors		○		No metal fittings for doors are produced in Kenya.	
Paint	○			To be procured in Kenya.	
Equipment works	Pump	○	○		General purpose imported pumps are to be procured in Kenya.
	Fan		○		No fans are manufactured in Kenya.
	Air-conditioner	○			Imported air-conditioners are to be procured in Kenya.
	Sanitary equipment	○	○		Imported sanitary equipment is to be procured in Kenya. Fittings are to be procured in Japan.
	Vinyl chloride pipe	○	○		Local vinyl chloride pipes are to be used as outdoor underground pipes.
	White gas pipe	○			Imported pipes are available.
	Concrete pipe	○			Concrete pipes are manufactured in Kenya.
	FRP Panel water tank		○		No FRP panel water tanks made in Kenya is available.
	Horse reel	○			Imported horse reels are to be procured in Kenya.
Fire extinguisher	○			ditto	
Electric work	Incoming panel/switchboard		○		Japanese-made ones are to be procured in consideration of quality.
	Power board/electric light board		○		ditto
	Lighting fixtures	○	○		Local made lighting fixtures are to be used and Japanese-made ones are to be used where necessary.
	Telephone	○			Imported ones are to be procured in Kenya.
	Fire alarm	○	○		Alarms and switches are to be locally procured and casings to be procured in Japan.
	Electric wire pipe (PVC pipe)	○			It is possible to procure these pipes in Kenya.
	Electric wire	○	○		Kenyan-made electric wires are to be used except for CV cable which is not available in Kenya.

(3) Medical Equipment Procurement Plan

1) Local Procurement

In consideration of availability of maintenance service, the following items of office equipment are to be procured in the country.

Personal computer	Typewriter	Copier	Printer
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2) Procurement in Third Countries

Since few items of medical equipment are manufactured and marketed in the country, it will be necessary to procure these items in Japan or third countries. In view of the diffusion of medical equipment, the need to repair procured medical equipment, the difficulty of procurement of component parts and expendables and repair/maintenance services in the country, it is desirable that most items of medical equipment be procured in Western Europe, in Britain or Germany, in particular, rather than in Japan.

① Shown below are those items of medical equipment which it is desirable to procure in third countries in light of the local distributors' past records, the degree of diffusion and the difficulty of procurement of component parts and expendables and the difficulty of securing maintenance services.

Automatic blood cell coefficient equipment, electrolyte analyzer, spectrophotometer, Blood gas analyzer, AIDS tester, Automatic tissue processor, Microtome, Automatic staining equipment, Anesthetizer, Respirator, Patient monitoring equipment, Infusion pump, Pulse oximeter, Radio knife, Defibrillator, Electrocardiograph, X-ray machine for taking simple radiographs, Mobile X-ray machine, Incubator, Ultrasonic diagnosis equipment, Infant warmer

- ② Shown below are those items of medical equipment which it is desirable to procure in third countries in light of their prices and ease of their transportation/maintenance and management.

Bed, Stretcher, Cart, Machine table, Stainless steel product

3) Transportation Time

It will take about four weeks to transport by sea the items of equipment procured in Japan. It will take about three weeks to transport by sea those procured in third countries (notably Western Europe and South Africa).

3-1-6 Implementation Schedule

When the Exchange of Notes concerning the implementation of this project is signed by the governments of Japan and Kenya, the planned facilities and items of equipment are to be procured in stages, as stated below.

1. Preparation of the Working Drawings

Upon conclusion of the design and supervision agreement, the consultant firm shall prepare detail design drawings, specifications and a list of tender requirements on the basis of the contents of this basic design study report. It will take three months to complete this operation.

2. Tender Business

The building contractor and the equipment supplier are to be selected through tender. The tender operation is to be conducted in the order of announcement of invitation of tenders, screening of applicants, acceptance of tenders, review of the tenders submitted, selection and appointment of the building contractor and the equipment supplier, and conclusion of contracts. It will take about two months to complete this operation.

3. Construction/Equipment Works

Judging from the details and scale of the facilities to be procured under this project and the situation of the local construction industry, it will take 15 months to complete the construction works and the equipment works provided that the procurement of building materials and the customs clearance proceed smoothly.

Thus, the progress schedule for this project, from the signing of the Exchange of Notes through the completion of the construction and equipment works is as shown in Table 3-2.

Table 3-2 Implementation Schedule

No. of months		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Working drawings					Detail Design												
					Confirmation												
					Tender (Phase I)												
					Confirmation												
Construction works		Tender (Phase II)															
		1. Maternity block (construction of a new building and renovation of the existing building)															
		2. Kitchen & Laundry															
		3. Toilet blocks (construction of new buildings and renovation of existing buildings)															
		4. Mortuary															
		5. Examination room (renovation)															
		6. Major Operating rooms															
		7. CSSD															
		8. X-ray room (renovation)															
		9. ICU (renovation)															
		10. Minor Operating rooms (renovation)															
		11. CSSD (renovation)															
Equipment		Prequalification															
		Prequalification															
		Manufacturing/Procurement															
		Transport															
		Transport															
		Instruction/Adjustment													Instruction/Adjustment		
Training																	

3-1-7 Obligations of Recipient Country

It was agreed in the Minutes of Discussions that the following necessary measures shall be taken by the Government of Kenya on the condition that the Grant Aid by the Government of Japan is extended to the Project.

1. To secure a lot of land necessary for the Project;
2. To clear and level the site for the Project prior to the commencement of the construction;
3. To provide a proper access road to the Project site;
4. To provide facilities for distribution of electricity, water supply, telephone trunk line and drainage and other incidental facilities outside the site;
5. To undertake incidental outdoor works, such as gardening, fencing, exterior lighting, and other incidental facilities in and around the Project site, if necessary;
6. To ensure prompt unloading and customs clearance of the products purchased under the Japan's Grant Aid at ports of disembarkation in GOM;
7. To exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in Kenya with respect to the supply of the products and services under the verified contracts;
8. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into Kenya and stay therein for the performance of their work;
9. To bear commissions, namely advising commissions of an Authorization to Pay (A/P) and payment commissions, to the Japanese foreign exchange bank

for the banking services based upon the Banking Arrangement (B/A);

10. To provide necessary permissions, licenses, and other authorization for implementing the Project, if necessary;
11. To ensure that the facilities constructed and equipment purchased under the Japan's Grant Aid be maintained and used properly and effectively for the Project; and
12. To bear all the expenses, other than those covered by the Japan's Grant Aid, necessary for the Project.

3-2 Operation and Maintenance

The following table shows trends in Coast Provincial General Hospital's annual facility operation, maintenance and management expenses over the past five years.

Table 3-3 Trends in Coast Provincial General Hospital's Annual Facility Operation, Maintenance and Management Expenses

(in Kshs)					
Item	'92/'93	'93/'94	'94/'95	'95/'96	'96/'97
1. Facility operation expenses					
① Electricity	1,700,000	1,860,000	1,171,800	2,056,680	2,200,000
② Telephone	176,000	180,000	234,000	576,400	900,000
③ Water			1,171,800	1,828,160	2,376,600
④ Fuel				685,560	1,000,000
⑤ Transport	1,100,000	1,020,000	1,436,400	1,436,400	1,800,000
2. Facility maintenance					
① Facility	107,040	120,000	126,000	151,200	181,400
② Equipment	540,000	289,980	696,000	639,400	640,000
Total	3,623,400	3,469,980	4,836,000	7,373,800	9,098,000

A trial calculation of the total amount of an additional annual budget required for the maintenance and management of the facilities and equipment to be procured under this project is made as follows.

Table 3-4 Maintenance and Management Expenses

Item	Amount
1. Facility operation expenses	
① Electricity charges -----	1,972,400 Kshs.
② Telephone charges -----	0
③ Water charges -----	240,360 Kshs.
④ Fuel charges -----	582,400 Kshs.
⑤ Transport expenses -----	0
2. Facility maintenance expenses	
① Facility maintenance expenses -----	240,000 Kshs.
② Equipment maintenance expenses -----	10,458,000 Kshs.
Total	13,493,160 Kshs.

(1) Facility Operation Expenses

Since the hospital's existing facilities which need to be renovated constitute a main factor of this project, the facility operation expenses are to be calculated only for those parts of the existing facilities whose floor spaces are to be increased and whose functions are to be improved.

- ① Electricity charges for the room air-conditioners to be installed in the existing facilities
- ② Energy cost for improved functions
- ③ Cost of water supply to additional beds to be procured as part of the reconstruction of the Maternity building

1) Calculation of Electricity Consumption

- ① Electricity Consumption to Result from the Installation of Room Air-Conditioners

Operating rooms	12 units
CSSD	6 units
X-ray rooms	7 units
Examination rooms	8 units
Mortuary	8 units
Operating rooms	4 units
<hr/>	
Total	45 units

Given that each unit has a capacity of 4,000 kcal/h, electricity consumption per unit is:

$$4,000\text{kcal/h} \div (860\text{kcal/kw} \times 2.5) = 1.9\text{kw/h}$$

- Monthly electricity consumption

Given that each unit is in use for 10 hours a day and that the monthly load rate is 30 percent, monthly electricity consumption is:

$$45\text{units} \times 1.9\text{kw/h} \times 10\text{h} \times 0.3 \times 30\text{days/month} = 7,696\text{kw/month}$$

Annual electricity consumption

$$7,695\text{kw/month} \times 12\text{months/year} = 92,340\text{kw/year}$$

② Calculation of Electricity Consumption to Result from an Increase in the Washing Equipment's Capacity

The washing machines' total capacity is to be increased by 400 sheets per day.

- Washing machines' total capacity

$$600\text{ sheets} \times 0.7\text{kg/sheet} = 420\text{kg/day}$$

- Electricity consumption by the washing machines with spin driers

Given that each washing machine has a capacity of 20kg and power supply to each washing machine is 18kw and that each washing machine is to be operated for one hour per load, electricity consumption by the washing machines is:

$$(420\text{kg/day} \div 20\text{kg/unit h}) \times 18\text{kw/unit} = 378\text{kw/day} \dots\dots\dots \textcircled{1}$$

- Dryers

Electricity consumption: 1.03kW/h·kg

$$420\text{kg/day} \times 1.03\text{Kw/h} \cdot \text{kg} = 432\text{kw/day} \dots\dots\dots \textcircled{2}$$

- Sheet rolls

Given that the roll speed is 10m/min. and length of a sheet is

2.5m/sheet, electricity consumption is:

$$600\text{ sheets} \times 2.5\text{ m/sheet} \times 1.2 (\text{loss}) = 1,800\text{ m}$$

$$1,800\text{ m} \times 10\text{ m/min} = 180\text{ min/day}$$

$$4.2\text{ kWh/h} \cdot \text{day} \times 180/60\text{ h} = 12.6\text{ kw/day} \dots\dots\dots \textcircled{3}$$

Therefore, daily electricity consumption by the washing equipment is:

$$\textcircled{1} + \textcircled{2} + \textcircled{3} = 822.6\text{ kw/day}$$

Monthly electricity consumption

$$822.6\text{ kw/day} \times 30\text{ days/month} = 24,678\text{ kw/month}$$

Annual electricity consumption

$$24,678\text{ kw} \times 12\text{ months/year} = 296,136\text{ kw/year}$$

2) Electricity Charges

① Increment in Basic Charge

a. The total capacity is 273.82kw and an increment in basic charge is 85kw ($278.62\text{ kw} \times 0.3$).

b. The Maternity Block's total electric load is 50kw ($1,400\text{ m}^2 \times 30\text{ VA/m}^2 \div 1,000$) and an increment in basic charge is 15kw ($50\text{ kw} \times 0.3$).

Therefore, $a+b=100\text{ kw}$ is the increment.

② Electricity Consumption

a. Electricity consumption by the room air-conditioners is 92,340kwh/year (refer to "Calculation of Electricity Consumption" above).

b. Electricity consumption by the washing equipment is 296,136kwh/year (refer to "Calculation of Electricity

Consumption" above).

c. Electricity consumption at the Maternity Block is 54,000kwh/year
(50kw×0.3×10h/day×30days/month×12 months/year).

Total electricity consumption is: $a + b + c \doteq 442,476\text{kwh/year}$

③ Calculation of Electricity Charges

$4.4\text{Kshs.} \times 442,476\text{kwh/year} + 250\text{Kshs.} \times 100\text{KVA} + 500\text{Kshs.}$
 $\doteq 1,972,400\text{Kshs.}$

3) Water Charges

① Increment in Quantity of Water Supplied to the Extension of the
Maternity Block

Given that there is an increment in the quantity of water supplied
for 30 additional beds,

- Increment in the quantity of water supplied

$$30\text{beds} \times 300\ell/\text{person} \cdot \text{month} = 9,000\ell/\text{day} = 9\text{m}^3/\text{day}$$

- Monthly water consumption

$$9\text{m}^3/\text{day} \times 30\text{day/month} = 270\text{m}^3/\text{month} \dots\dots\dots \textcircled{1}$$

② Quantity of Water Supplied to the Washing Room

Given that the total number of sheets washed a day is increased by
440,

$$440\text{sheets/day} \times 0.7\text{kg/sheet} \times 30\ell/\text{kg} = 9,240\ell/\text{day} = 9.2\text{m}^3/\text{day}$$

- Monthly quantity of water supplied

$$9.2\text{m}^3/\text{day} \times 30\text{day/month} = 276\text{m}^3/\text{month} \dots\dots\dots \textcircled{2}$$

③ Annual Water Charges

Water charges vary with the consumption bracket.

The increment in the quantity of water supplied is ①+②=546m³/month

• Water charges

0-10 m ³	9 kshs./m ³	9 × 10 m ³ =	90kshs.
10-30 m ³	15 kshs./m ³	15 × 20 m ³ =	300kshs.
30-60 m ³	20 kshs./m ³	20 × 30 m ³ =	600kshs.
60-100 m ³	30 kshs./m ³	30 × 40 m ³ =	1,200kshs.
100 m ³ or more	40 kshs./m ³	(546-100) × 40 m ³ =	17,840kshs.
Total			20,030kshs./month

• Annual water charges

$$20,030\text{kshs./month} \times 12\text{months/year} = 240,360\text{kshs./year}$$

4) Fuel Charge

An increase by 600sheets/day in the washing equipment's capacity results in an increase in vapor consumption.

• Washing machines' total capacity

$$600\text{sheets/day} \times 0.7\text{kg/sheet} = 420\text{kg/day}$$

• Vapor consumption

Given that the sheet roll is operated for 132 minutes (allowing for a 30% loss), $245\text{kg/h} \times 132/60\text{h/day} \times 1.3 = 700\text{kg/day}$

• Monthly vapor consumption $700\text{kg/day} \times 30\text{day/month} = 21,000\text{kg/month}$

• Annual vapor consumption $21,000\text{kg/month} \times 12\text{month/year} = 252,000\text{kg/year}$

• Annual energy consumption (in kcal) $(252,000\text{kg/year} \times 540\text{kcal}) \div 0.7$ (boiler efficiency) $= 194,400,000\text{kcal/year}$

• Annual (diesel oil) consumption

Given that diesel calorific value is about $9,000\text{kcal/l}$, $194,400,000\text{kcal/year} \div 9,000\text{kcal/l} = 21,600\text{l/year}$

- Fuel charges

$$21,600\ell / \text{year} \times 0.5 \text{US} \$ / \ell = 10,800 \text{US} \$ / \text{year} \doteq 582,400 \text{Kshs.} / \text{year}$$

(2) Facility Maintenance Expenses

① Facility Maintenance Expenses

Facility maintenance expenses differ widely from year to year, but here annual facility maintenance expenses are calculated using 100Kshs/m² as the average annual facility maintenance expenses for 20 years.

$$2,400 \text{m}^2 \times 100 \text{Kshs.} / \text{m}^2 \cdot \text{year} = 240,000 \text{Kshs.} / \text{year}$$

② Equipment Maintenance Expenses

The estimated total annual cost of maintenance of the main items of equipment to be procured under this project is about ¥15,786,000 (7,146,601Kshs.) as shown in table.

Table 3-5 Estimated Annual Cost of Maintenance of Main Items of Equipment

Item of equipment	Cost/unit (¥)	Q'ty	Total (¥)	Kshs.
Patient monitor equipment	266,000	12	3,192,000	1,444,343
Respirator (for children)	233,000	1	233,000	105,429
Respirator (for adults)	247,000	3	741,000	335,294
Anesthetizer	390,000	8	3,120,000	1,411,764
Ultrasonic diagnosis equipment	1,139,000	2	2,278,000	1,030,769
Electrolyte analyzer	1,175,000	1	1,175,000	531,674
Blood gas analyzer	1,288,000	1	1,288,000	582,805
Automatic blood cell counter	1,179,000	1	1,179,000	533,484
Automatic X-ray film developer	500,000	1	500,000	226,244
Mobile X-ray machine	400,000	2	800,000	361,990
x-ray machine for taking sin radiographs	640,000	1	1,280,000	582,805
total			15,786,000	7,146,601

Trial Calculations

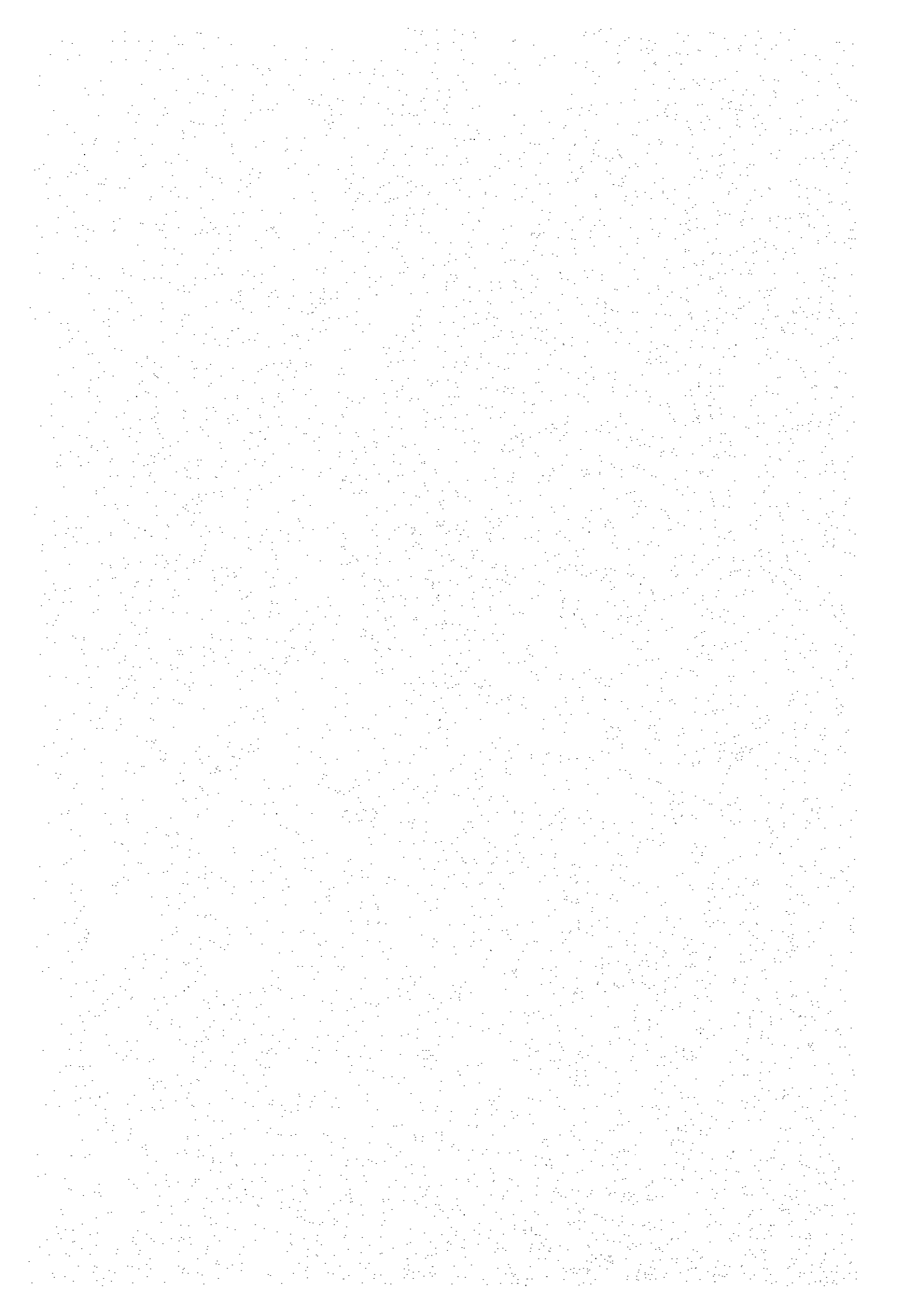
The annual maintenance and management cost is calculated on the assumption that the planned items of equipment will be purchased in 1998. The annual maintenance and management cost for the first fiscal year (1998/99: July to June) is calculated for the six-month period after delivery of the planned items of equipment. Given that an annual inflation rate is 10 percent, the annual maintenance and management cost for 1998/99 is ¥10,505,000 and that for the second fiscal year and after is ¥23,12,000.

- First fiscal year: (maintenance contract expenses + expendable expenses $\times 6/12$) $\times 1.10^3$ ¥10,505,000 $\div 4,753,000$ Kshs.
- Second fiscal year and after: (maintenance contract expenses + repair parts expenses + expandable expenses) = ¥23,112,000 $\div 10,458,000$ Kshs.

It may be inferred from the present size of the operating budget, there will be no problem with budgetary appropriations for equipment maintenance and management. It is assumed that the central government's (namely, the Ministry of Health's) budgetary appropriations will come from medical equipment purchase expenses.

Classification	1998/1999 (first fiscal year)	1999/2000 (second fiscal year and after)
Central government's budgetary appropriations (Kshs.)	1,094,400	1,267,680
Incomes from medical care services (Kshs.)	6,302,400	12,753,560
Total (Kshs.)	7,396,800	14,021,240

CHAPTER 4 EVALUATION OF THE PROJECT AND RECOMMENDATIONS



CHAPTER 4 EVALUATION OF THE PROJECT AND RECOMMENDATIONS

4-1 Verification of the Viability of the Project and the Expected Effects of the Project

4-1-1 Verification of the viability of the Project

In light of the following facts, it is judged to be appropriate to implement this project with the grant aid cooperation of the Government of Japan.

- (1) This project is consistent with the Government of Kenya's policy to improve the quality of local health care services, which is being implemented as part of the Government of Kenya's "Health Policy Framework".
- (2) The objective of this project is to revitalize Coast Provincial General Hospital's health care services which have remained stagnant due to the superannuation of its existing facilities and equipment. It is urgently necessary to improve the facilities and equipment of the hospital, which is playing an important role in Kenyan society as the top referral hospital in Coast Province.
- (3) The details of the Government of Kenya's request concerning this project do not include any requirement which is so excessive or which ignores socio-economical situation and the actual conditions of health care and other fields of health care in local communities. This project is therefore judged to be highly feasible.
- (4) As an analysis of the past records of Coast Provincial General Hospital's incomes and expenditures and the projected changes in the hospital's budget, it is certain that the hospital will be able to secure sufficient budgetary appropriations for the operation, management and maintenance

of the facilities and equipment procured under this project. Furthermore, it is very likely that the hospital's incomes from health care services will increase on the strength of, for instance, the growth of the National Health Insurance Fund (NHIF).

4-1-2 Effects of the Implementation of the Projects

The main effects, which are certain or likely to be produced as a result of the implementation of this project against the background of the present situation, including problems, of Coast Provincial General Hospital, are as shown below.

(1) Effects of Basic Health Care Service

At present, the hospital's facilities and equipment are so superannuated or in short supply that the hospital is unable to provide basic health care service satisfactory to patients. The procurement of basic items of medical equipment, such as stethoscope, sphygmomanometer, basic medical examination/diagnosis equipment and trolley necessary for medical care service provided at the ward, under this project will certainly contribute to the enhancement of the quality of the primary health care service provided by the hospital.

(2) Enhancement of the Quality of Intensive Care Service

The items of equipment for use in intensive care are markedly in short supply. As a result, the hospital has no alternative but to rely on a fragmented monitoring system, which comprises mainly physicians' diagnoses and opinions. It is very difficult for the hospital to carry out continuous monitoring of vital signs. The procurement of patient monitoring equipment, respirators, and pumps will make it possible to conduct continuous patient monitoring and

treatment, which in turn will contribute to the enhancement of the quality of the secondary health care service provided by the hospital. Furthermore, the improvement of the hospital's ventilating/air conditioning equipment, which is now so superannuated, will lead to the enhancement of the quality of medical treatment, medical professionals' working environment and even the management of precision of equipment.

(3) Enhancement of the Quality of Diagnosis Service

At the hospital, clinical tests are limited. This seems to be mainly because of the shortage of basic items of equipment and the poor ventilating/air conditioning equipment installed in the test room. Also noteworthy is the fact that the poor working environment is adversely affecting on working efficiency, the precision and service lives of individual items of equipment. This project is expected to contribute to the hospital's enhanced clinical testing capabilities through the improvement of individual items of testing, in addition to the improvement of its facilities.

(4) Improvement in the Hospital's Facility Operating Capability

At present, it is difficult for the local governments to apply for an increase in the central government's budgetary appropriations for the promotion of decentralization in the field of health care. The central government is directing the local governments to make up for the shortfalls with the incomes from health care services by cost sharing. Personnel expenses and basic facility operating expenses are defrayed by the central government, but this measure does not go beyond making up the shortages. In this connection, this project will play a direct role to increase the incomes from health care services by being able to diversify the kinds of clinical tests and to increase the number of tests to be carried out and to increase the number of diagnoses and treatment of the patients.

4-2 Technical Cooperation and Collaboration with Other Donors

4-2-1 Necessity of Technical Cooperation

As far as medical care services are concerned, there is no need to introduce new medical technologies or techniques. In implementing this project, therefore, no account is to be taken of technical cooperation. As regards the maintenance and management of medical equipment, it is desirable that the maintenance and management of those items of equipment which require no special maintenance skills be carried out by the staff members concerned of the hospital in light of the geographical conditions of Mombasa, a region far away from Nairobi, where the hospital is located. Under this project, for this reason, basic technical guidance is to be given to the hospital's staff members responsible for the maintenance and management of its facilities and equipment within the framework of grant aid cooperation. This arrangement should ensure the smooth initial operation of the facilities and equipment procured under this project. As for long-term technical cooperation for effective use of equipment, however, it is desirable that some form of technical cooperation be arranged in consultation with the Government of Kenya in view of the fact that the technical cooperation program by GTZ of Germany, which had long been implemented in the country, was discontinued last year (in 1996). If it becomes possible to provide short-term training in facility/equipment maintenance and management to the hospital's staff members in charge of facility/equipment maintenance and management and also to dispatch a Japanese expert to give proper technical and operational guidance through the implementation of a technical cooperation project, it will add to the positive effects of this project.

4-2-2 Collaboration with Other Donors

At present, no assistance programs by other donors which are to relate directly to this project are identified, but it is reported that USAID has picked out Coast Provincial General Hospital as the institution for a medical facility operation pilot project. The details of the pilot project are yet to be verified, but if the pilot project is implemented, it is expected that the procurement of facilities and equipment under this project will contribute more effectively to the improvement in the operation of the hospital.

4-3 Recommendations

In improving the functions of Coast Provincial General Hospital, it is desirable that the hospital makes every effort to obtain synergistic effect on improving the hospital functions by grasping its overall operations as well as by improving the sectional operations such as service activities at each clinical department, maintenance activity, administrative activity, training activity and collaborative activities with other medical institutions. If this project is to serve as the first step toward laying the foundations for such improvement of the hospital's functions and if this project is to be implemented smoothly, it is desirable that the following issues be tackled. It is to be hoped that all the staff members of the hospital will become well aware of the need to realize the sound operation of the hospital.

4-3-1 Issues to be tackled

- (1) Operation, Maintenance and Management of the Equipment Procured under the Project

- Establishment of a centralized facility/equipment management system to operate under the control of the maintenance and management department for effective use of the limited items of equipment
- Conclusion of maintenance/management agreements with local medical equipment distributors for such items of equipment as computer-controlled ones, which are hard to maintain, manage and operate or which require continual procurement of expendables and inclusion of cost related to such agreements in the funding plan
- Preparation of maintenance manuals, operation manuals, circuit drawings and a table of equipment manufacturers' serial numbers and training of engineers
- Proper understanding of the details of manufacturers' warranty programs (Some manufacturers exclude repairs done by a third party from their warranty programs.) It will be difficult for the hospital's staff members in charge to repair those items of equipment which come with a warranty. They should be repaired by their manufacturers under maintenance and management agreements or on a pay per repair basis.

(2) Budgetary Appropriations

As stated in "CHAPTER 3. 3-2 Operation and Maintenance" it is judged to be possible to make sufficient budgetary appropriations for the maintenance and management of the items of equipment procured under this project. It is to be desired, however, that continuous budgetary appropriations will be made for the replacement of planned equipment. In the case of the main items of equipment as explained in CHAPTER 3, given that the average service life of these items of equipment is eight years, the annual cost of such replacement will be approximately ¥12.53 million. If superannuated or deteriorated items

of equipment are replaced on the basis of such continuous budgetary appropriations, it will certainly prevent reductions in the health care services provided at the hospital.

4-3-2 Recommendations

(1) Improvement in the Management of the Hospital

1) Developing Awareness of Hospital Management (Awareness of Management and Exercise of Leadership)

Managers of public organizations, including public medical institutions, tend to have only a superficial understanding of the concept of management. If the hospital is to attain its two main objectives, namely, to promote public welfare and to make its management efficient, it is necessary that its management - the director and his/her aides - become keenly aware of the importance of hospital management and at the same time make its physicians and other medical professionals have a good understanding of it.

In trying to improve the management of the hospital, the hospital's administrative department must help the director to get a firm grasp on the actual conditions, including problems of the management of the hospital and find ways to solve such problems. The director, in turn, must make all the staff members, including the physicians and other medical professionals, aware of the importance of hospital management and the need to develop an in-house collaboration system.

2) Changing Doctors' Attitude toward Hospital Management

Management of doctors' work is the most important in personnel management at hospitals. Hospitals' functions are centered around doctor's work.

If the start of daily medical care services for outpatients is delayed, it will not only cause many outpatients to wait longer but adversely affect the operations at the nursing, testing, dispensing and administrative departments. If the start of doctors' rounds of patients is delayed, on the other hand, it will badly affect the operations at the ward and those at other related departments. If the hospital's doctors remain unaware of their obligation to act responsibly as its staff members, therefore, it will be difficult to improve the management of the hospital. Being an organization consisting of professionals in various fields, a hospital cannot function well without its doctors' proper and timely instructions. In that sense, changing doctors' attitude toward hospital management is a fundamental precondition for the building of a "good hospital," namely, a hospital which is good in terms of management and many other aspects.

(2) Ensuring Sufficient Incomes

To ensure a sufficient number of patients is one important aspect of effective hospital management. From the standpoint of the main objective of founding a public hospital, however, provision of medical care services of high quality that meet the needs of community residents to as many patients as possible is more desirable. The total number of patients at a hospital varies with the size of the area to be covered by the hospital, the level of demand for medical care services in the area, the types of medical care services provided by other medical institutions and the location of the hospital. For a hospital to ensure a sufficient number of patients, therefore, it is important that the hospital try to provide continuous medical care services of high quality on the basis of its clear grasp of these factors.

Hospitals' incomes from health care services break down into the total number of patients and incomes per patient. To ensure sufficient incomes, hospitals

must first ensure a sufficient number of patients and then carefully examine the details of incomes per patient. The hospital income is multiplication of the number of patients and clinical fee charged to each patient. Therefore, in order to secure hospital income, it is necessary to consider both securing patients and clinical fee for each patient. It is important to go through the following 4 points as setting up the clinical fees.

1. Consistency in clinical fee among department.
2. Figuring out the cost of clinical activities.
3. Study the actuality of fee structures.
4. Comparison of the fee against other clinical institutions

(3) Making Efficient Use of Hospital Management Indicators

In making an analysis of a hospital's management, it is necessary to first get a firm grasp on the supply and demand situation in the area covered by the hospital, the present conditions of other medical institutions in and around the area, and the problems facing the area in addition to the location and history of the hospital, the number of beds installed in the hospital, its clinical departments, the average daily number of patients visiting it and the size of the area covered by it and then carefully examine steps to be taken to cope with these factors. In the case of Coast Provincial General Hospital, it is necessary to improve its management on the basis of the results of analysis of the above mentioned management indicators.

- 1) Bed Occupancy Rate, Average Daily Number of Patients and Ratio of Outpatients and Inpatients

The number of patients visiting a hospital varies with the location of the hospital, the size of the area covered by the hospital, the level of demand for health care services in the area, the present conditions of

other medical institutions, the volume of traffic in the area and the hospital's capability to attract patients (the number of clinical departments, patients' confidence in the hospital's physicians, facilities, patient service, public relations and so on). While the number of inpatients varies the composition ratio of beds by type and the method of bed management, that of outpatients varies with the diagnosis and treatment system employed and the average length of examination of outpatients.

- Bed occupancy Rate

At CPCH, the average on bed occupancy rate is high as 150% in according to the table 2-6 and 2-7. The maternity department and pediatrics departments are especially high as 200%. In order to accomplish an improvement in medical services, it is necessary to achieve either decreasing the period of patients' stay in hospital or increasing the number of patient's bed. However, it is difficult for the hospital to accomplish them immediately. Now it is hoped that hospital should attempt to make an effective utilization of hospital beds and to reduce the difference among departments in utilization of hospital beds. By centralizing the hospital beds management, it is possible to eliminate the difference among departments in terms of utilization of hospital beds. It is ideal to keep the bed occupancy rate to around 120% to use hospital beds most effectively.

- Average Daily Number of Patients

The present condition of the hospital, CPGH offering medical services to patients whom should be taken care at medical institutions that are positioned lower in the medical referral system. Therefore, there is a variation in the number of patients and it is not ideal for the better hospital management. As the top referral hospital in Coast Province,

it is better for CPGH to reduce the number of patients who require primary health care service.

- Ratio of Outpatients and Inpatients

According to the statistical data of 1993 and 1996, the ratio of outpatients and inpatients are 193% and 181% respectively. These ratios are usually low for the larger scale hospital. In another word, as far as the operation of hospital is concerned, smaller scale hospital require more outpatients to receive. Generally speaking, for a 500 bed hospital, the ideal ratio of outpatients and inpatients is around 200%. So, for CPGH with more than 500 beds and 150% of bed occupancy rate, it is necessary to increase the number of hospital beds.

2) Daily Number of Patients per Physician

At first, it is important to grasp the number of patients and inpatients of each department. Then, calculating how many patients treated by one doctor and to make clear the amount of tasks for each doctor. At the ordinary public hospitals in Japan, the number of outpatients taken care by one doctor is 8.2 and the number of inpatients taken care by one doctor is 17.8. For CPGH, at the maternity department and the pediatrics department which are the busiest departments in the hospital, the number of outpatients taken care by one doctor is about 6 and the number of inpatients taken care by one doctor is about 10. Thus, it is important for the hospital to make clinical activities more efficient and increase patients to take care. And it is necessary to correct the difference in tasks for doctors among the departments.

3) Daily Income per Patients

It is necessary to grasp the details of each clinical matter by keeping

a record of the number of clinical activities and examining the contents of the record. Then, it is required to make the clinical fee consistency at each department.

(4) Examples of Tentative Evaluation

1) Cost Accounting by Department

Practical methods for getting an accurate grasp of individual departments of a hospital include one which combines department-to-department business analysis and cost accounting, both of which are aimed at attaining the hospital's business goals by assigning departmental goals. In this case, it is important to first have a clear grasp of incomes and costs and then assign costs of drugs and materials (excluding personnel and deprecations expenses) to departments.

a. Income-Expenditure Composition by Department and Its Effects on Total Incomes and Expenditures

- Profit or Loss

The value of profit or loss is obtained by subtracting the total value of costs from the total value of incomes. This value is a simple indicator of profitability.

- Ratio of Income-Loss Differential to Income on a Total Income=100 Base (by Department)

It is possible to compare departmental ratios of income-loss differential to income by comparing departmental ratios of income-loss differential to income on a total income=100 base.

- Composition Ratio of Total Income by Department

This is an indicator of departmental incomes as the percentages of

total income.

- Rate of Effect (Ratio of Income-Loss Differential to Income on a Total Income=100Base by Department × Composition Ratio of Total Income)

If hospital's ratio of deficits is low but its ratio of incomes is high, it will greatly add to deficits in the hospital's account balance. This is an indicator of the composition ratio of total income's effect on the income-loss differential.

b. Indicators Related to High-Income Services for Outpatients and Inpatients

- Outpatients

Being a public hospital, Coast Provincial General Hospital is providing free health care services to outpatients suffering from tuberculosis, AIDS and serious infectious diseases, those under 15 years of age, and those who are holders of the certificate of poverty. Over the past five years, the hospital's annual incomes have been on the increase regardless of increases or decreases in the total number of outpatients. And they are expected to continue to increase in the future. It will be possible for the hospital to make accurate forecasts of future disease patterns and future composition ratios of outpatients by getting a clear grasp of the details of each clinical department's services for outpatients.

- Inpatients

It is necessary to get a firm grasp on the breakdown by ward of incomes and the number of inpatients entitled to disbursement from the NHIF. If data on these inpatients are collected and analyzed, it will be possible to consider a partial introduction of a

centralized ward management policy and introduce a system for effective interdepartmental use of beds.

(5) Preparatory Activities for Uninterrupted Operation of the Facilities and Equipment Procured under the Project

For the smooth operation of the facilities and equipment procured under this project, it is to be desired that the management and the staff members concerned of the hospital carry out the following activities in cooperation with the consultant, the contractor responsible for the construction of the planned facilities and the contractor responsible for delivery of the planned items of equipment. It is expected that the consultant will carry out on-site activities a number of times in the detail design and construction supervision stages. The consultant will also monitor the progress of the project.

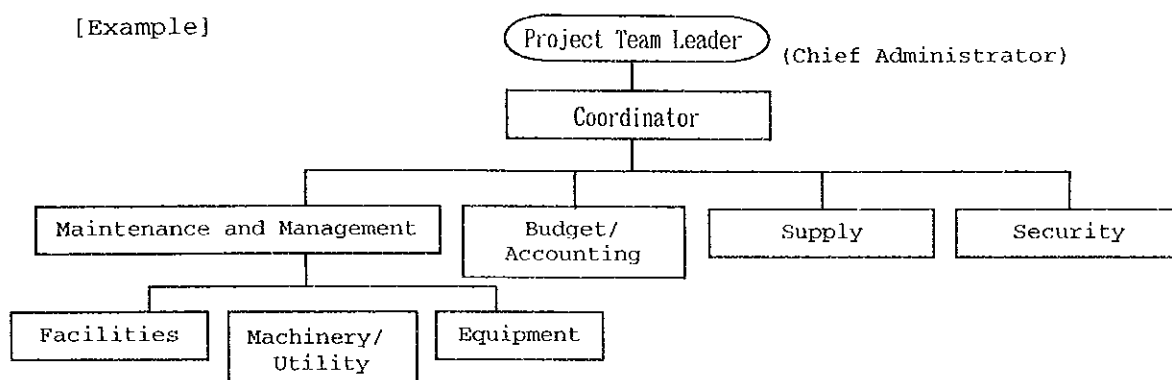
Expected Result : It will be possible to operate the facilities and equipment procured under this project without interruption.

Activity 1 : Organization of the Project Operation Unit (POU)

- Activity 1-1 : Consultations to be held for the purpose of organizing the POU which is to consist of the chief administrator of the hospital and representatives of the hospital's departments concerned.

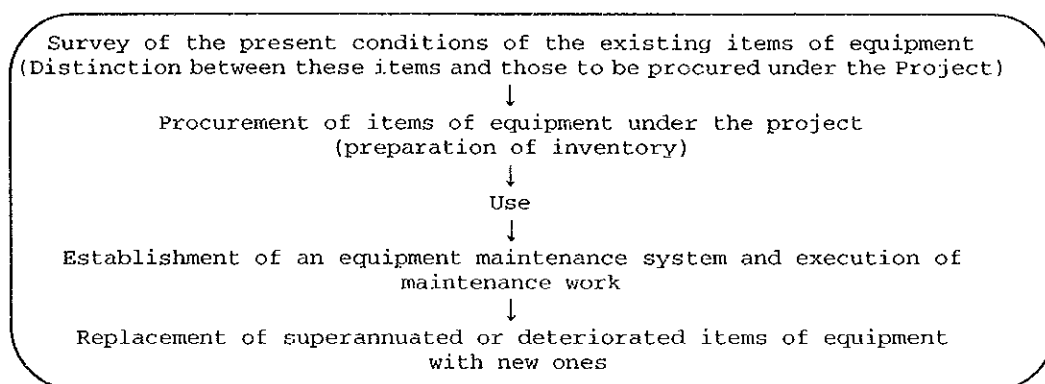
Activity	Expected result	Leader	Participants
1-1-1 Consultations for the organization of the POU	Organization chart	Chief Administrator	Director, representatives of the departments concerned.

[Example]



Activity 2 : Establishment of the Equipment Management System

Definition of EMS : A system which makes possible the following flow.



- Activity Plan 2-1 : Survey of the present conditions of the existing items of equipment (Pigeonholing of the past inventory data)

Activity	Expected result	Leader	Participants
2-1-1 Pigeonholing of data in the format as prescribed by the Ministry of Health	List of inventories of existing items of equipment	HMU	HMU, adviser: JICA expert

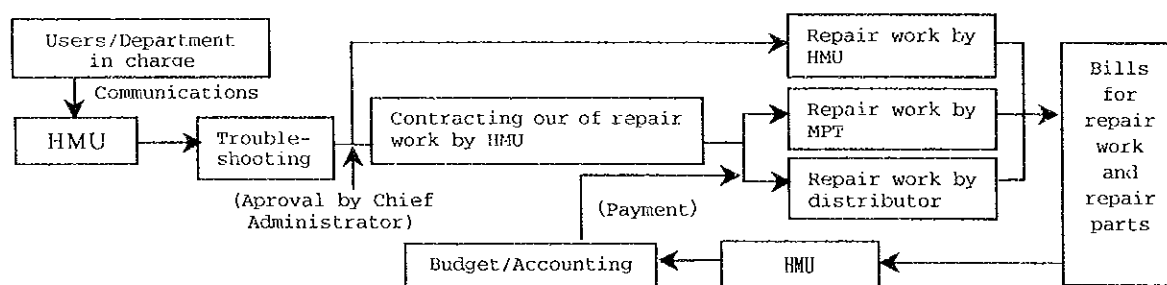
- Activity Plan 2-2 : After bidding, short courses on the items 2-2-2, 2-2-3 and 2-2-4 below are to be given. These short courses are to be participated in by suppliers and distributors of the selected items of equipment.

Activity	Expected result	Leader	Participants
2-2-1 Selection of items of equipment	List of the selected items of equipment	HMU	HMU, consultant, adviser
2-2-2 Consultations for the preparation of basic operation manuals	Basic operation manuals by type of equipment	HMU	HMU, consultant, suppliers, distributors
2-2-3 Consultations for the preparation of basic cleaning manuals (about an A4 sheet each)	Basic cleaning manuals by type of equipment	HMU	HMU, consultant, suppliers, distributors
2-2-4 Consultations for the preparation of basic troubleshooting manuals (2-3 A4 sheets each)	Troubleshooting manuals by type of equipment	HMU	HMU, consultant, suppliers, distributors

- Activity Plan 2-3: Establishment of the flow of chains of command up to repair

Activity	Expected result	Leader	Participants
2-3-1 Consultations concerning the flow of chains of command	Chain of command chart	HMU	HMU, Ministry of Health, MPT, consultant, adviser: JICA expert

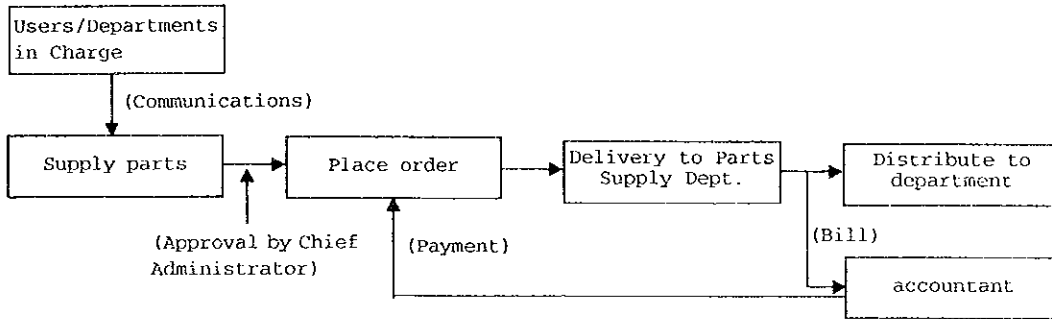
[Example]



- Activity Plan 2-4 : Establishment of the flow of the procedures for purchase of repair parts, expendables and reagents

Activity	Expected result	Leader	Participants
2-4-1 Consultations for the establishment of the flow of purchase procedures	Chart of purchase procedures	Supply Department	HMU, Ministry of Health, Budget/Accounting, consultant, adviser: JICA expert

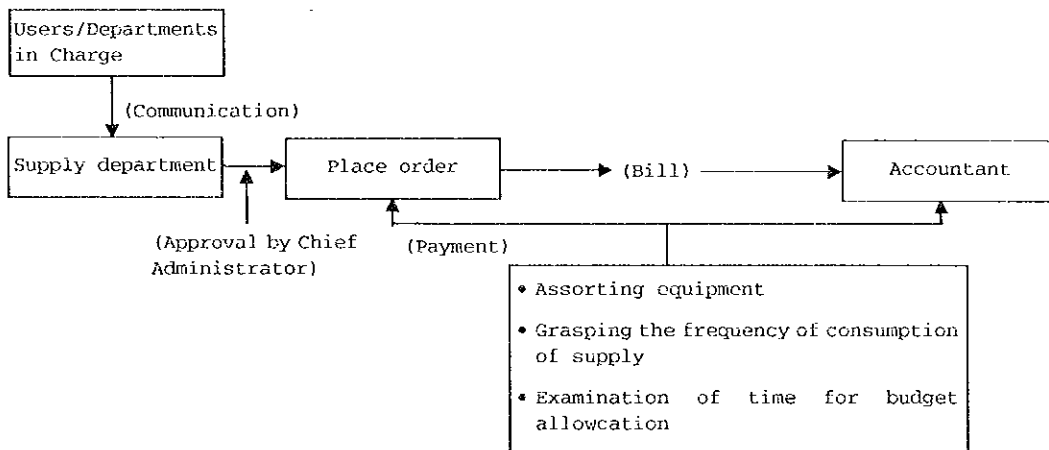
[Example]



- Activity Plan 2-5 : Establishment of the flow of the procedures for purchase of repair parts, expendables and reagents.

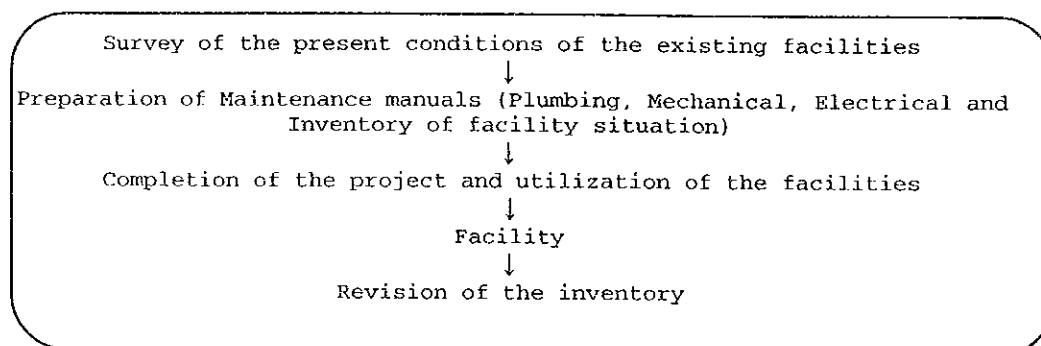
Activity	Expected result	Leader	Participants
2-5-1 Consultations concerning the flow of chains of command	Chart for the drawing up budget for purchase supply	Accountant	HMU, Ministry of Health, Accountant, Parts supply dept., Consultant adviser: JICA expert

[Example]



Activity 3 : Establishment of the Facility Management System (FMS)

Flow of FMS : A system which makes possible the following flow.



- Activity Plan 3-1 : Survey of the present conditions of the existing facilities

Activity	Expected result	Leader	Participants
3-1-1 Survey the existing facilities and prepare inventory	List of inventories of existing facilities	HMU	HMU, adviser: JICA expert

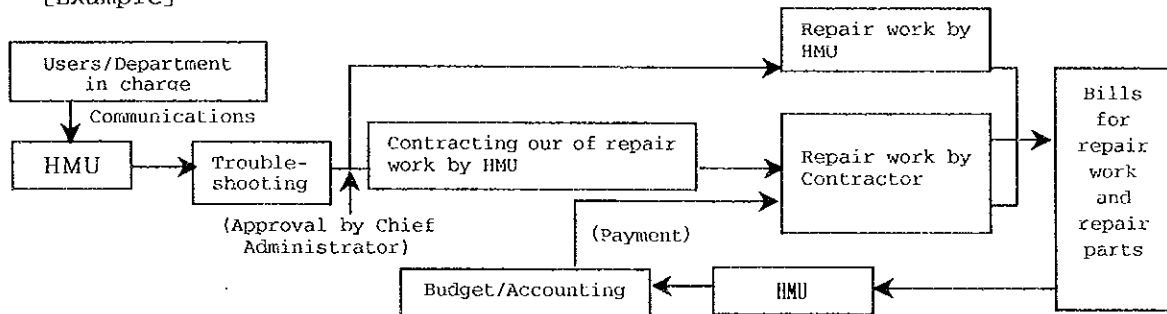
- Activity Plan 3-2 : Prepare maintenance manuals for Plumbing, Mechanical and Electrical fittings and equipment.

Activity	Expected result	Leader	Participants
3-2-1 Consultation for preparation of manuals	Operation manuals	HMU	HMU, consultant, contractor
3-2-2 Consultations for the preparation of cleaning manuals	Cleaning manuals	HMU	HMU, consultant, contractor
3-2-3 Consultations for the preparation of examination manuals	Examination manuals	HMU	HMU, consultant, contractor
3-2-4 Consultations for the preparation of basic troubleshooting manuals	Troubleshooting manuals	HMU	HMU, consultant, contractor

- Activity Plan 3-3: Establishment of the flow of chains of command up to repair

Activity	Expected result	Leader	Participants
3-3-1 Consultations concerning the flow of chains of command	Chain of command chart	HMU	HMU, Ministry of Health, MPT, consultant, adviser: JICA expert

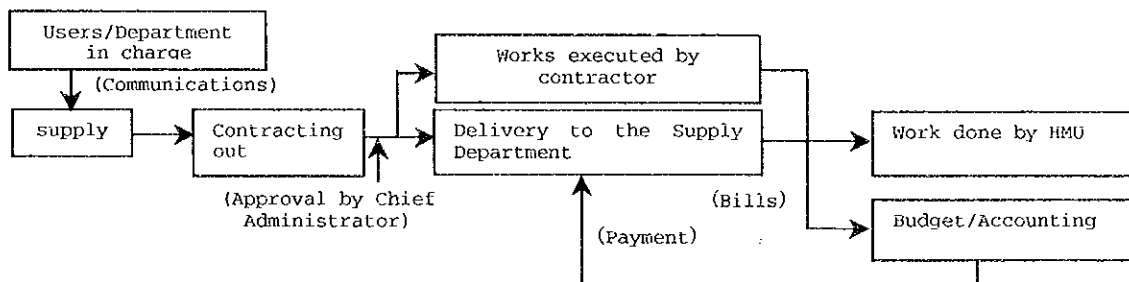
[Example]



- Activity Plan 3-4 : Establishment of the flow of the procedures for purchase of rapier parts, expendables and regents

Activity	Expected result	Leader	Participants
3-4-1 Consultations for the establishment of the flow of purchase procedures	Chart of purchase procedures	Supply Department	HMU, Ministry of Health, Budget/Accounting, consultant, adviser: JICA expert

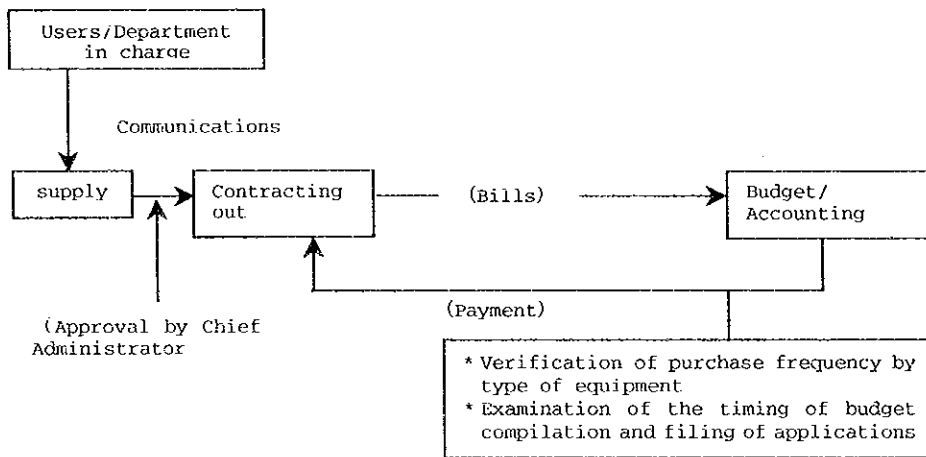
[Example]



- Activity Plan 3-5 : Establishment of the flow of budget compilation for purchase expenses

Users/Department in charge	Expected result	Leader	Participants
3-5-1 Consultations for the establishment of budget compilation for purchase expenses	Chart of budget compilation for purchase expenses	Budget/Accounting	HMU, Ministry of Health, Budget/Accounting, Supply, consultant, adviser : JICA

[Example]



[Schedule for the Implementation of Activity Plans]

January 1998	
Design stage	Construction
	(Bidding)
Activity plan numbers	Activity plan numbers
1-1-1	2-2-2
	2-2-3
2-1-1	2-2-4
2-2-1	3-1-1
2-3-1	3-2-1
	3-2-2
2-4-1	3-2-3
2-4-2	3-2-4
	3-3-1
2-5-1	3-4-1
	3-5-1

(5) Monitoring after the Implementation of the Project

In implementing this project, it is desirable that steps for further improvement be taken on the basis of the results of an evaluation of the past

activities so that the efficiency of the hospital's medical care services may be further enhanced. The Appendices No. 6 gives a summary of the workshops conducted by the hospital during the basic design study. Both sides have agreed on the need to make a survey of future changes in the hospital's medical care operations as an indicator of the effects of the implementation of this project. It is to be desired that concrete effects be verified before and after the implementation of this project by conducting evaluation surveys on the basis of the following evaluation indicators established as examples of more specific indicators. Due consideration should be given to the effective use of the items of equipment procured under this project. It is expected that in the construction supervision stage the consultant firm will send one of its engineers to the project site for monitoring purposes after the end of the equipment installation work. Such engineer is expected to do his utmost to promote effective use of individual items of equipment and the establishment of a viable maintenance and management system and maintenance and management techniques.

1) Medical Care Services

- Number of outpatients
- Number of emergency outpatients
- Occupancy rate of each ward
- Number of patients admitted to ICUs/bed occupancy rate
- Number of surgical operations by part of the body
- Number of childbirths (normal deliveries, Caesarean sections)
- Number of tests by item
- Number of image diagnoses (radiographs, ultrasonographs)
- Number of patients referred from lower-level medical institutions/
number of patients referred to Kenyatta National Hospital/private
hospitals

2) Business Analysis

- Income/expenditure analysis (analysis of incomes and costs by clinical department)
Outpatients, inpatients, operations, ICUs, deliveries, tests, image diagnoses, mortuaries
- Comparison of medical fees and costs
All clinical departments (excluding those which are providing free medical care services)
- Review of medical fee structure

3) Main Items of Equipment

- Respirator (annual number of patients who used respirators, annual number of days of use of respirators, death rate for patients who used respirators)
- Ultrasonic diagnosis equipment (annual number of users)
- Simple image X ray machines (annual number of users)
- Automatic film developing equipment (annual number of films developed, annual number of days of operation of the equipment)
- Blood gas analyzer (annual number of tests conducted using the blood gas analyzer--by type of test)
- Hematology analyzer (number of tests according to the kinds of tests)
- Spectrophotometer (annual number of tests conducted using the spectrophotometer--by type of test)