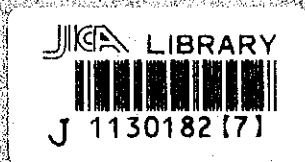


MINISTRY OF HEALTH AND FAMILY WELFARE  
INDIA

**BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT FOR THE IMPROVEMENT  
OF  
KALAWATI SARAN CHILDREN'S HOSPITAL  
IN  
INDIA**

MAY, 1995



JAPAN INTERNATIONAL COOPERATION AGENCY  
YAMASHITA SEKKEI INC.

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YAMASHITA SEKKEI INC.**



## PREFACE

In response to a request from the Government of India, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of Kalawati Saran Children's Hospital and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to India a study team from November 27 to December 31, 1994.

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

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

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

May, 1995



Kimio Fujita  
President

Japan International Cooperation Agency





May, 1995

Mr. Kimio Fujita  
President  
Japan International Cooperation Agency  
Tokyo, Japan

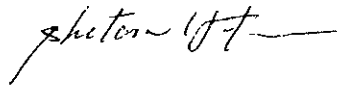
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Improvement of Kalawati Saran Children's Hospital in India.

This study was conducted by Yamashita Sekkei Inc., under a contract to JICA, during the period November 24, 1994 to May 18, 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of India and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

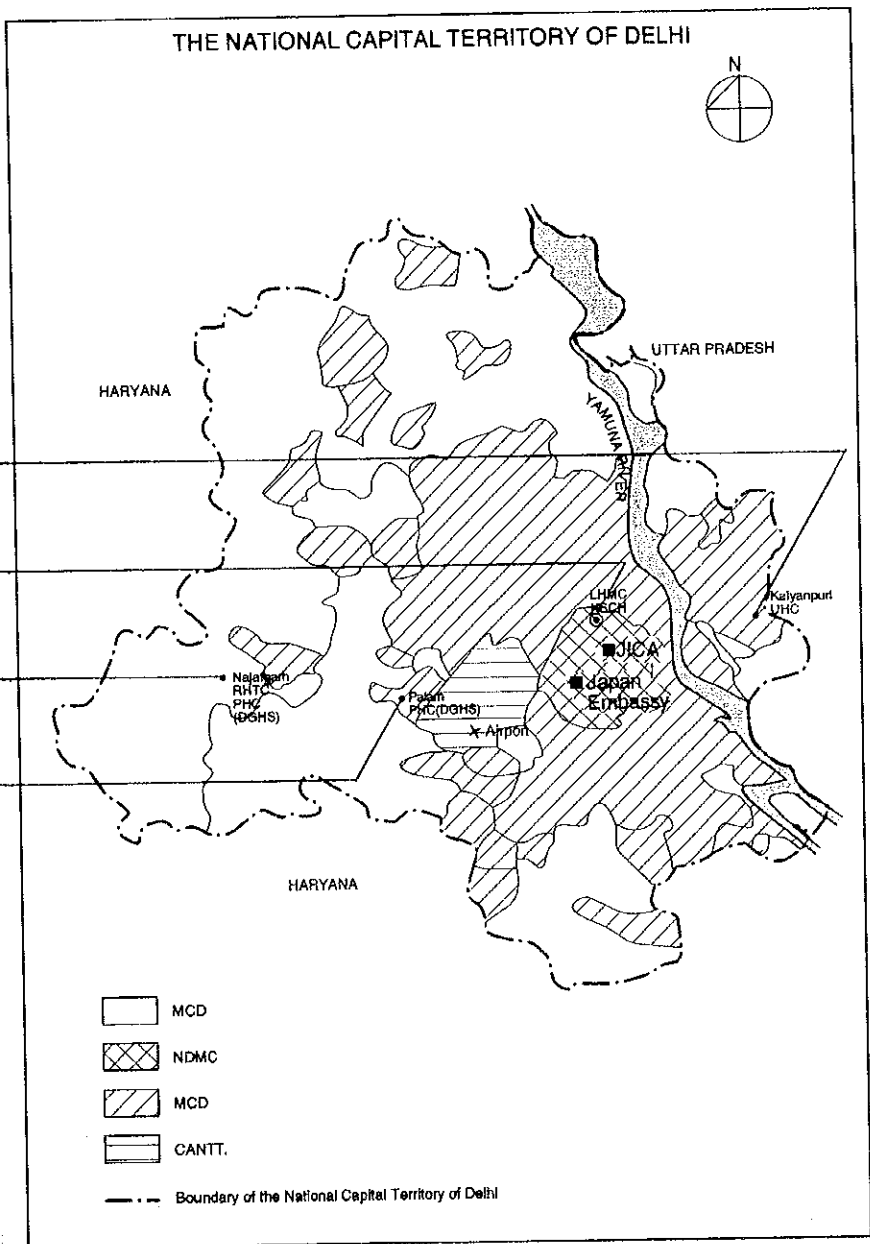
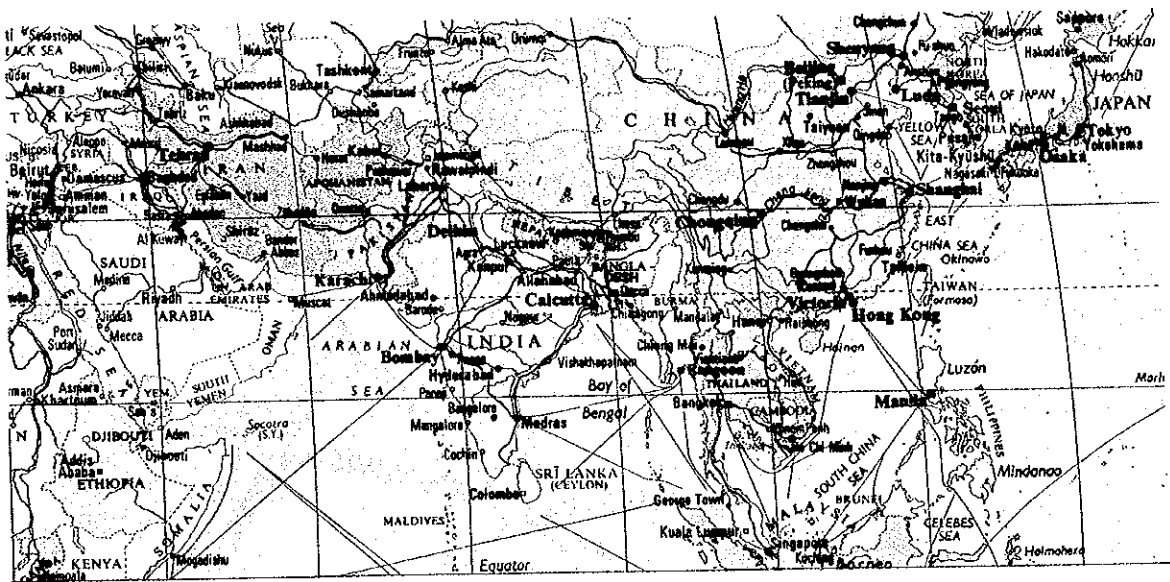
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

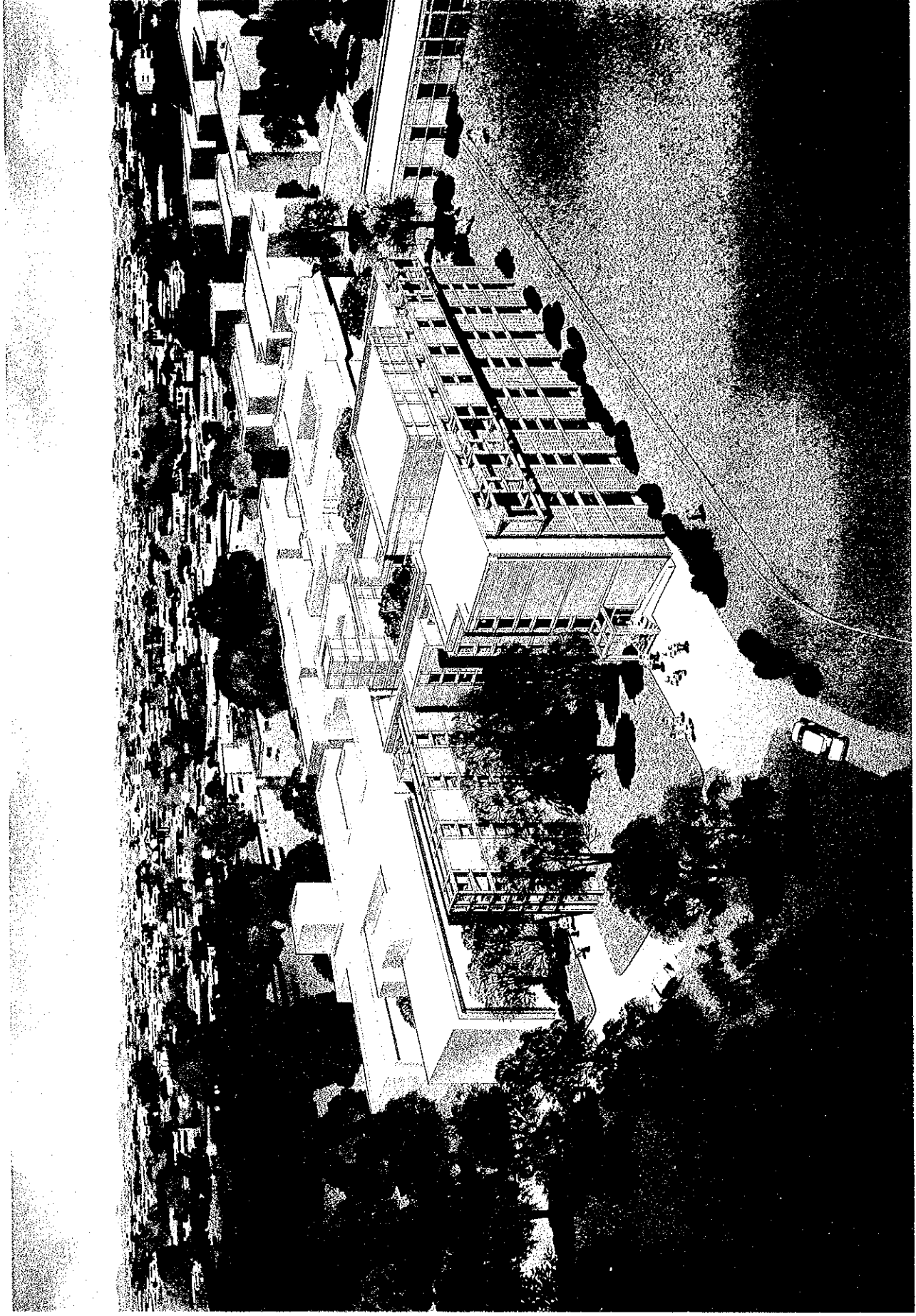


Shotaro Hayashiya  
Project manager,  
Basic design study team of the Project  
for the Improvement of Kalawati Saran  
Children's Hospital in India





**SITE LOCATION MAP**



KALAWATI SARAN CHILDREN'S HOSPITAL

PERSPECTIVE



PROPOSED PROJECT SITE

## SUMMARY

## SUMMARY

In 1991, India had a population of about 840 million, of which nearly 40 percent were children aged 15 and under. Between 1981 and 1991, India's population increased by 23.56 percent. It is particularly noteworthy that population concentration was marked in urban areas. During the same period, the population of urban areas increased by 36.2 percent. Of the country's three biggest cities (Delhi, Bombay and Calcutta), each of which had a population of about 10 million, Delhi had the highest rate of population increase. During the decade from 1981 to 1991, the Population of National Capital Territory of Delhi (hereinafter referred to as Delhi) increased by 47.0 percent. As a result, Delhi now faces various social problems attributable to such rapid population increase. In health care, in particular, improving primary health care facilities is the greatest challenge Delhi faces due to a steep rise in the total population of suburban districts. In Delhi, children under 15 account for 35.5 percent of total population, and the infant mortality rate is 32.96 percent (1992), which is below the national average. But it has only a total of 1,647 children's hospital beds (1992), or 9 percent of the total number of hospital beds. These figures show that the Delhi has 1 hospital bed for each 2,000 infants, which is far below the standard of 1 hospital bed for each 1,000 people recommended by WHO. In Delhi, respiratory infectious disease and diarrhea, both of which are attributable mainly to malnutrition, are the main causes of infant/child death.

Realizing that it was necessary to overcome such infant/child diseases as deformities, heat diseases and metabolic disorders, which had become the main causes of infant/child death, the Government of India formulated a project to establish a clinical, educational and research institution to

conduct advanced research on paediatric medical care, and requested the Government of Japan to provide grant aid cooperation for the Project.

In August 1993, the Japan International Cooperation Agency (JICA) sent a medical project formation study team to India to make investigations related to the request. After returning to Japan, the study team had several discussions with the Japanese organizations concerned, then concluded that it was inappropriate to establish such an institution in view of such factors as the actual needs for such an institution, the Indian system for implementing such a project and possible Indian budgetary appropriations. At the annual joint meeting with the Indian side in 1994, the Japanese side explained how it had reached such a conclusion. The Indian side consented, worked out an alternative project to expand and improve the functions of Kalawati Saran Children's Hospital, which plays a pivotal role in the country's primary and secondary health care, and requested the Japanese side to provide grant aid for the new project. In response to the request, the Japanese side sent a preliminary study team to India in July 1994.

The preliminary study revealed that in India, health conditions for infants/children are still insufficient. The infant mortality rate is 80/1,000, and that of children under 5 is 33.33/1,000 which accounts for 50 percent of the total number of deaths. Reducing the infant mortality rate is one of the greatest challenges facing the national government and along with family planning is a priority in the country's 8th Five-Year Plan (1992/97).

As a result of discussions with the study team, the Indian side agreed that expansion and improvement of primary and secondary health care services would be more effective in reducing infant morbidity and infant mortality rates than advanced health care, and requested the Japanese side



to provide grant aid for the project to expand and improve the functions of Kalawati Saran Children's Hospital.

As a result of the preliminary study, both sides agreed on the framework of the Project to improve the facilities of Kalawati Saran Children's Hospital and three health centres around Delhi, thereby expanding and improving primary and secondary health care for children. In November 1994, JICA sent a Basic Design Study Team to India. On the basis of the results of the preliminary study, the Team talked to representatives of the Government of India, investigated the project site, and collected supplementary data. After returning to Japan, the Team analyzed the results of the discussions and investigations. In April 1995, the Basic Design Study Team explained the contents of the draft basic design study report to the Indian side, then prepared this final basic design study report.

As a result of the basic design study it has been confirmed that Kalawati Saran Children's Hospital, located with Suchita Kripalani General Hospital on the premises of Lady Hardinge Medical College, operates with the cooperation of the Medical College, that with a total of 350 beds, the hospital accepts more than 2,30,000 outpatients a year, therefore overcrowding its facilities, and that the hospital has not adequate facilities and equipment. It has also been confirmed that Kalyanpuri Urban Health Centre has only small temporary insufficiently equipped facilities. Furthermore, Najafgarh Primary Health Centre and Palam Primary Health Centre face shortages of necessary basic equipment. At Kalyanpuri Urban Health Centre and Palam Primary Health Centre, water is in short supply, which is a serious health care problem.

In light of such circumstances, it was decided that the following facilities and equipment be procured under the Project. Utmost emphasis is placed on their respective functions according to scale.

(1) Kalawati Saran Children's Hospital

Project site : Lady Hardinge Medical College, 110001, New Delhi  
District, the National Capital Territory of Delhi

1) Outline of the Facilities

① Central Building

Outline : A central building is to be constructed that houses new facilities of the following departments, whose existing facilities are superannuated.

Facilities : New facilities for Outpatient Dept., Radiology Dept., Laboratory Dept., Operation Theatre, Emergency Dept., ICU, Preventive Social Medicine Dept., Diarrhea Training Unit, Physical Medicine & Rehabilitation Dept.

Structure : 4-story reinforced concrete building

Total floor area : 5,600 m<sup>2</sup>

② Workshop/Substation Building

Outline : Because the existing workshop is superannuated and because the capacity of the existing substation in Lady Hardinge Medical College is insufficient, the following new facilities are to be constructed.

Facilities : A workshop for maintenance of equipment and a substation (transformer room, generator room etc.)

Structure : Single-story reinforced concrete building

Total floor area : 575.0 m<sup>2</sup>

③ Laundry Building

Outline : Existing laundry building is shared with Suchita Kripalani General Hospital, which makes it difficult to handle all washing. The following new facilities are to be constructed.

Facilities : A washing room, a drying room, etc.

Structure : Single-story reinforced concrete building

Total floor area : 234.0 m<sup>2</sup>

④ Incinerator Building

Outline : Existing incinerator is shared with Lady Hardinge Medical College and Suchita Kripalani General Hospital. The following new facility is to be constructed.

Facilities : Incinerator room

Structure : Single-story reinforced concrete

Total floor area : 100.0 m<sup>2</sup>

2) Outline of the Equipment

Procurement and installation of items of equipment in short supply and those to replace the existing superannuated ones.

(2) Kalyanpuri Urban Health Centre

Project site : Kalyanpuri Urban Health Centre, Shahdara District, the National Capital Territory of Delhi

Outline of the Facilities:

Examination room, Treatment room, Laboratory, Pharmacy Doctor's room, Minor Operation theatre, and seminar room

Structure : 2-story reinforced concrete

Total floor area: 410 m<sup>2</sup>

Others : Installation of deep tube well

Outline of the equipment:

Procurement of basic items of equipment in short supply and those to replace existing superannuated ones.

(3) Najafgarh Primary Health Centre

Project site : Najafgarh Regional Health Training Centre, Najafgarh District, Delhi Metropolitan Area

Outline of the Equipment:

Procurement of basic items of primary health care equipment in short supply which eliminate their shortage and those to replace existing superannuated ones.

(4) Palam Primary Health Centre

Project site : Palam Primary Health Centre, the Delhi Country Committee District, the National Capital Territory of Delhi

Facility : Installation of deep tube well

Outline of the Equipment:

Procurement of basic items of primary health care equipment in short supply and those to replace existing superannuated ones.

The estimated total cost of the works to be defrayed by the Government of India is 3,20,87,000 Rs.

It would be difficult to complete construction and equipment procurement & installation work within a single fiscal year. Therefore, it is appropriate to implement the Project in two phases as described below.

Phase 1	Construction	<ul style="list-style-type: none"> <li>■ Kalawati Saran Children's Hospital Central Building, Workshop · Substation Building</li> </ul>
	Equipment Procurement & Installation	<ul style="list-style-type: none"> <li>■ Kalawati Saran Children's Hospital Equipment for; Radiology Dept., Operation Theatre, Central Supply &amp; Sterilization</li> </ul>
Phase 2	Construction	<ul style="list-style-type: none"> <li>■ Kalawati Saran Children's Hospital Laundry Building, Incinerator Building</li> <li>■ Kalyanpuri Urban Health Centre Health Centre Building</li> <li>■ Palam Primary Health Centre Installation of deep tube well</li> </ul>
	Equipment Procurement & Installation	<ul style="list-style-type: none"> <li>■ Kalawati Saran Children's Hospital Equipment for; Outpatient Dept., ICU Isolated Room, Central Laboratory Dept., Surgical ICU, Follow-up Clinic Kidney Dept., Physical Medicine &amp; Rehabilitation Dept., Paediatric Orthopedics Dept., Paediatric ENT Dept., Paediatric Ophthalmology Dept., Paediatric Dermatology Dept., Endoscopy, Workshop, Laundry, Medical Record, Preventive &amp; Social Medicine Dept., Administration, Photography, Transportation, Incinerator</li> <li>■ Nursery, Feeding · Bath and Milk Kitchen Room, Autopsy Room (to be installed in Suchita Kripalani General Hospital)</li> <li>■ Kalyanpuri Urban Health Centre</li> <li>■ Palam Primary Health Centre</li> <li>■ Najafgarh Primary Health Centre</li> </ul>

Lady Hardinge Medical College, which operates under the control of Directorate General of Health Services (DGHS) of the Ministry of Health and Family Welfare (MHFW) is the Indian organization responsible for implementation of the Project. Najafgarh Primary Health Centre and Palam Primary Health Centre operate under supervision of DGHS of the MHFW, while technical aspects of operations of both Health Centres are managed by Lady Hardinge Medical College. For this reason, procedures for installation of the tube wells and procurement of equipment under the Project for both Health Centres are to be followed by Lady Hardinge Medical College.

As of December 1994, Kalawati Saran Children's Hospital has a total of 691 sanctioned posts, of which 605 are occupied. Under the Project, 27 senior

doctors, residents and house surgeons are already been dispatched from Lady Hardinge Medical College. The personnel expenses for the doctors, residents and house surgeons to come from the Medical College are to be defrayed by the Medical College. Therefore, such personnel expenses will not increase the hospital's personnel expenses. The cost of facilities and equipment maintenance and management is estimated at about 1,63,45,000 Rs. In working out the facility plan for the Project, priority is to be given to use of locally available materials and to natural ventilation and lighting, to minimize maintenance and management costs. In selecting required items of medical equipment, priority is to be given to locally available equipment, and most of the selected items should supplement existing items to minimized hospital operating cost. As is clear from the above descriptions, there will be no problem with the Project operating system, budgetary appropriations and the maintenance and management of the facilities and equipment after completion of the Project.

The existing facilities of Kalawati Saran Children's Hospital are expected to be remodeled into wards after completion of the Project and relocation of the hospital's functions in the new facilities by the Indian side. The number of the hospital's beds after such remodeling is expected to be increased by 150, from 350 as of December 1994 to 500. The proposal relating to the cost of the remodeling and an increase in the amount of maintenance and operation cost due to an increase of staff is being considered by the Government of India.

It is expected that implementation of the Project will lead to the following positive effects and improvements.

(1) Kalawati Saran Children's Hospital

- 1) The paediatric internal medicine department's ability to examine outpatients will be increased by 8 percent. The annual number of outpatients examined was about 69,000 as of 1993. It will become possible to examine about 75,000 outpatients.
- 2) Thus the hospital has tried to meet the increasing demand for operations by installing two operating tables in an operation theatre. If a major operation theater and two minor operation theaters are established under the Project, the annual number of major operations performed at the hospital will increase by 48 percent to 879 cases (3 cases/day $\times$ 293days=879 cases/year). The annual number of minor operations will increase by 22 percent to 2,344 cases (4 cases/day $\times$ 2 rooms $\times$ 293 days = 2,344 cases).
- 3) As a result of the replacement of existing radiology and laboratory departments equipment, the hospital's radiological and testing capabilities will increase by 1.5 times.

(2) Kalyanpuri Urban Health Centre

- 1) The annual number of outpatients examined will increase by 7 percent to more than 37,000. The establishment of a treatment room will make it possible to treat external injuries. As a result of the improved laboratory equipment, it will become possible to conduct about 5,800 malaria, blood and urine tests a year.
- 2) The tube well to be installed on the premises of the Health Centre will be able to supply 4,000ℓ of water daily.

(3) Najafgarh Primary Health Centre

If this Health Centre is provided with the required equipment, its basic medical examination ability will be enhanced. So far the hospital has referred about 8,000 cases to upper hospitals, about 60 percent of which can be treated at this Health Centre.

(4) Palam Primary Health Centre

Basic medical examination and treatment capability will be enhanced. At present, annually about 2,000 cases of malaria tests are performed. This can increase to about 2,500 cases and treatment accuracy can be enhanced.

The tube well to be installed on the premises of this Health Centre will be able to supply 2,000ℓ of water daily.

As is clear from the above descriptions, the Project is designed to improve the country's referral structure for child health by linking child health care at the Hospital to the three Primary Health Centres' functions. Consequently, the health care functions of both the Hospital and the Health Centres can improve. It is imperative to improve the quality of child health care and primary health care in Delhi area. In addition, many community residents are to benefit from such improvement. Community residents' welfare will be enhance. It is appropriate to implement the Project under the Government of Japan's grant aid.

The outline of the monitoring and evaluation indicators is included in this basic design study report on the grounds that it is important to conduct detailed monitoring and evaluation of the Project to enhance the effects of the Project implementation. Such indicators will help the Indian side to grasp the extent to which the Project attains its objectives.



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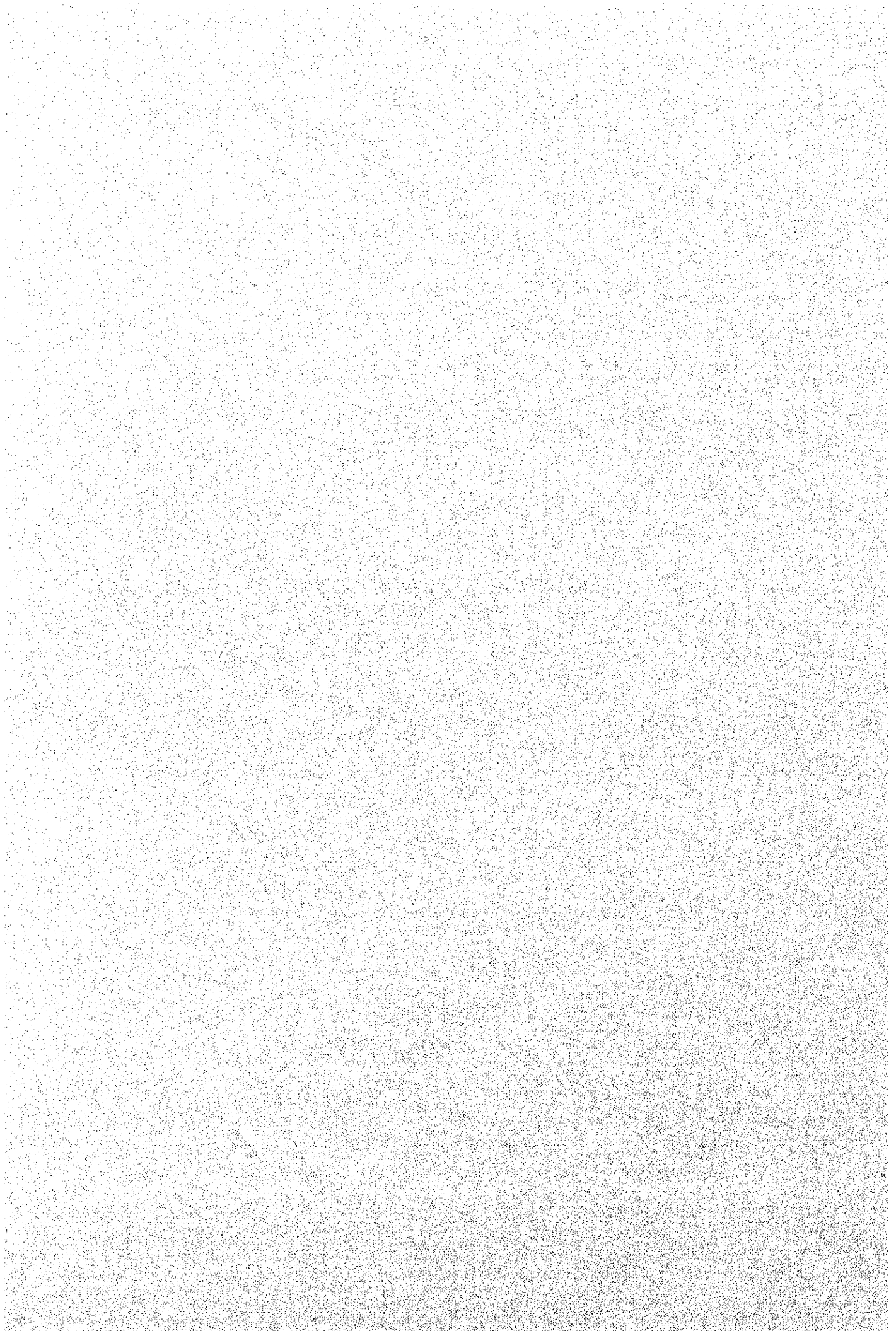
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1. MEMBERS OF THE BASIC DESIGN STUDY TEAM
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## **CHAPTER 1 BACKGROUND OF THE PROJECT**

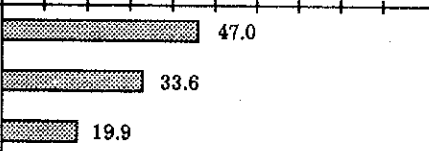


## CHAPTER 1 BACKGROUND OF THE PROJECT

### 1. Background of the Request

In 1991, India had a population of about 840 million, of which nearly 40 percent were children aged 15 and under. According to 1990 statistics, the country's infant mortality rate was 80/1,000, and according to 1988 statistics, the death rate for children under 5 was 33.3/1,000. These figures indicate that many of the country's children are still suffering from their health conditions. The improvement of child health care is one of the most important health policy challenges facing the Government of India. From 1981 to 1991, the country's population increased by 23.56 percent. Population concentration in urban areas has been particularly remarkable. During the same decade, urban population increased by 36.2 percent. Of the country's three major cities, the National Capital Territory of Delhi (hereinafter referred to as Delhi) has the largest population increase rate. During the 1981 to 1991 decade, the population of the Delhi increased by 47.0 percent.

Table 1-1 Population Increase Rates of 3 Major Cities

City	Population in 1991 (in thousands)	Population increase rate for 1981~91(%)									
		10	20	30	40	50	60	70	80	90	(%)
Delhi	8,419										
Greater Bombay	12,596	33.6									
Calcutta	11,022	19.9									

(Source: Statistical Outline of India 1994-95)

Delhi is now faced with various social problems attributable to rapid population growth. Particularly in health care, improvement of primary health care facilities is the greatest challenge Delhi faces, due to a sharp increase in total suburban population. In Delhi, children under 15 represent 35.5 percent of the total population, but there is only a total

of 1,647 hospital beds (1992) for them, or 9 percent of the total number of hospital beds. These figures show that Delhi has 1 hospital bed for each 2,000 children, far below the standard of 6 hospital beds for each 1,000 children recommended by WHO.

Therefore, the Government of India formulated a project to improve the facilities of and procure medical equipment for Kalawati Saran Children's Hospital, which operates with cooperation from Lady Hardinge Medical College in the centre of Delhi and which plays an important role in primary and secondary health care in and around Delhi. The government also sought to improve facilities of and procure medical equipment for the three Health Centres with which the Medical College cooperates to enhance the quality of primary health care in Delhi, and requested the Government of Japan to provide grant aid cooperation for the Project.

## 2. Outline of the Request: The Main Components

### (1) Objective of the Request

The Project is aimed at enhancing the primary and secondary health care functions of Kalawati Saran Children's Hospital, which is operated with the cooperation of Lady Hardinge Medical College, while improving health care activities carried out at the three regional health centres which work closely with the Medical College. This will promote the health of community residents, particularly children, and improve such health indicators as the infant mortality rate.

### (2) Project Implementing Organization

Lady Hardinge Medical College is the Indian organization to implement the Project, and the Ministry of Health and Family Welfare of India is responsible for coordinating all Project efforts.

### (3) Contents of the Project

#### ① Kalawati Saran Children's Hospital

This hospital is India's only national children's hospital. It is located on the premises of Lady Hardinge Medical College in the centre of Delhi. Its three major functions are:

- Primary and secondary health care for newborn babies and infants in the centre of and around Delhi
- Preventive/community health care under the National Health and Family Welfare Programme (family planning, immunization for children, control of diarrhea, cholera and malaria)
- Function as a teaching hospital where, undergraduate and postgraduate students, and interns of Lady Hardinge Medical

College are trained in paediatrics, obstetrics, gynecology and preventive social medicine

The hospital has a total of 350 beds. According to the 1993 statistics, the annual total number of outpatients who visited the hospital was 263,753 and the average annual bed occupancy rate was 86.7 percent.

② Kalyanpuri Urban Health Centre

This Health Centre located in a densely populated district on the eastern side of the Yamuna River running through Delhi is operated by Lady Hardinge Medical College. Due to heavy migration, it is difficult to estimate the number of community residents to benefit from the health care services provided by the Health Centre. The total population of this district is estimated at about 80,000. This Health Centre's three main functions are:

- Community health care (medical examination and treatment of outpatients, mother and child health, family planning, etc.)
- Training (for undergraduate and postgraduate students, and interns of Lady Hardinge Medical College)
- Research (on community health activities)

35,000 outpatients visit this Health Centre annually.

③ Najafgarh Primary Health Centre

This Health Centre located in a western suburb of Delhi is one of the eight primary health centres in the rural districts of Delhi. The technical aspects of this Health Centre's operations are managed by Lady Hardinge Medical College, but this Health Centre



itself operates under the supervision of Directorate General of Health Services (DGHS), Ministry of Health and Family Welfare. This district has a population of 78,000. 80,000 outpatients are examined and treated at this Health Centre annually.

④ Palam Primary Health Centre

This Health Centre located near Delhi International Airport provides primary health care services similar to those offered by Najafgarh Primary Health Centre. The technical aspects of the operations of this Health Centre are managed by Lady Hardinge Medical College, but the Health Centre itself operates under the control of the Directorate General of Health Services, Ministry of Health and Family Welfare. This district has a population of 1,07,000. 46,000 outpatients are examined and treated at this Health Centre annually.

(4) Outline of the Requested Facilities and Equipment

① Kalawati Saran Children's Hospital

- Construction of facilities of Outpatient Dept., Radiology Dept., Clinical Examination, Physiological Examination, Operation Theatre, Recovery/ICU, Preventive & Social Medicine Dept. etc.
- Procurement and installation of medical equipment necessary for primary and secondary health care services

② Kalyanpuri Urban Health Centre

- Construction of facilities to replace the existing facility

- Procurement and installation of medical equipment necessary for primary health care services
- ③ Najafgarh Primary Health Centre
- Procurement and installation of medical equipment necessary for primary health care services
- ④ Palam Primary Health Centre
- Installation of tube well
  - Procurement and installation of medical equipment necessary for primary health care services

### 3. Project and/or Programme of Other Donors

#### (1) By International Organization

International organizations of the United States, Great Britain, Northern European countries, WHO, etc. provide technical and equipment assistance toward primary health care and family planning mainly in rural areas of India. Major projects include the following.

<u>Supporting Organization</u>		<u>Contents of assistance</u>	<u>Amount of assistance</u>
The United Nations	(WHO)	Assistance for 45 projects on National Health programmes	US\$13.6 million (1992-93)
		Assistance for related PHC	US\$3.2 million
	(UNFPA)	4th Phase of UNFPA assistance (Mainly Population Education in rural areas)	US\$70 million (1991-95)
	(UNICEF)	CSSM (Child Survival and Safe Motherhood) programme	US\$107 million (1991-95)
World Bank		Prevention & control of AIDS project	US\$84 million of financial assistance (6-year)
		To provide MDT (Multi Drug Therapy) against leprosy	US\$85 million of financial assistance (6-year)
		National Blindness Control Programme	US\$513 million of financial assistance (7-year to 1993)
		Secondary health care hospitals in Andhra Pradesh development project	Rs 417crore
		Maternal Health Post improvement project in urban slums of National Capital Territory of Delhi	Rs 35crore (5-year from 1993)
United States	(USAID)	Funding of Voluntary Organisations working in rural area in Preventive Health and Nutrition, MCH and Family Planning Services	US\$10 million (10-years from 1993)
The Overseas Development Administration U.K.	(ODA U. K.)	Assistance for improving the Health and Family Welfare Services in Orissa.	Rs 65.66crore (5-year from 1989)
		Cooperation with New Delhi AIIMS Hospital (Ophthalmology AIIMS)	£ 494,293 (1993-1995)
Danish International Development Agency	(DANIDA)	Related National Blindness Control Programme	Rs 22,245 crone
		Related National Leprosy Eradication Programme	Rs 3.5Crore of financial assistance
Swedish International Development Agency	(SIDA)	Related National Leprosy Eradication Programme	24 million Swedish Kronar financial assistance (1978~)
		Related National TB Control Programme (3rd Agreement)	US\$ 7 million (1990-94)
Norwegian Aid for International Development	(NORAD)	Partial financial assistance for implementation of Post-Partum Programme at Sub-district level Post-Partum Centre	60 million NOK (1991-93)

(2) By the Government of Japan

Cooperation by the Government of Japan toward health sectors in India are as follows.

The implementation organization responsible was the Ministry of Health and Family Welfare of Government of India.

Table 1 - 2 Japan's Financial Assistance - Grants

Project Title	Project Description
Japanese Encephalitis Vaccine Manufacturing Project	By furnishing equipment for manufacturing Japanese encephalitis vaccine in India, to diffuse the vaccine and expand its manufacture inside the country, project-type technical cooperation. Date of concluding E/N : February 6, 1982 Contribution : 300 million yen
Phase I medical equipment improvement project at local cancer centers:	In keeping with the remarkable population growth, to meet the increasing number of patients being treated for cancer, by offering medical equipment such as CT scanners at local cancer centers to enrich examination and treatment systems. Date of concluding E/N : February 22, 1985 Contribution : 500 million yen
Phase II medical equipment improvement project at local cancer centers:	Phase II of above Project. Date of concluding E/N : February 22, 1985 Contribution : 580 million yen
Phase I Sanjay Gandhi Post Graduate Institute of Medical Sciences	To improve local medical services and diffuse project effects in the surrounding area, providing medical equipment such as CT scanners to the institute. Date of concluding E/N : October 8, 1986 Contribution : 1,973 million yen
Phase I of the 2nd medical equipment improvement project at local cancer centers:	To provide medical equipment to the centers based on actual results of cooperation taken from the 1st local cancer center. Date of concluding E/N : April 21, 1988 Contribution : 641 million yen
Phase II of the 2nd medical equipment improvement project at local cancer centers:	Phase II of above project instituted in 1988 Date of concluding E/N : February 6, 1992 Contribution : 616 million yen
Banarasu Hindi Medical College Research Center Improvement Project:	To provide equipment to Banaras University's affiliated hospital (1,500 beds), one hundred million people targeted in UP state and adjacent states who are subject to benefit. Approximately 800 units of equipment. Phase I of the 2nd medical equipment improvement project at local cancer centers: Date of concluding E/N : May 27, 1994 Contribution : 1,058 million yen

Table 1-3 Japan's Financial Assistance - Loans

Project Title	Project Description
Bionic Formulation Quality Control Project:	<p>By constructing a research institute for bionic formulation quality control in the outskirts of New Delhi, to expand the production and diffusion of bionic formulation such as safe and effective vaccine, to improve conditions of sanitation in India.</p> <p>Date of concluding E/N : February 2, 1985</p> <p>Contribution : 580 million yen</p>

Table 1-4 Japan's Project-type Technical Cooperation

Project Title	Project Description
Leprosy Research:	<p>As part of the fight against leprosy in India, the JALMA center was established. At first, private medical cooperation was carried out. Finally, in 1966 the government began providing equipment as a form of technical cooperation. Following this, the dispatch of experts, assistance in the treatment of leprosy, social reintegration, education and research were carried out. Since 1975, a 3-year follow-up was implemented.</p> <p>Date of concluding R/D : July 2, 1972</p> <p>Dispatch of Experts : 4 times/8 experts in total</p>
Japanese encephalitis vaccine manufacturing:	<p>Request for manufacturing of Japanese encephalitis vaccine and its quality control, a preliminary survey has been carried out since 1981, and from 1982 technical cooperation has been achieved. The cooperation includes technical guidance in manufacturing and quality control technology from mass-manufacturing of vaccine to completion of the product by freeze-drying.</p> <p>Date of concluding R/D : March 12, 1982</p> <p>Dispatch of Experts : 5 times totaling 32 experts</p> <p>Expenses : 34.39 million yen</p>
Sanjay Gandhi Post Graduate Institute of Medical Sciences	<p>Upgrading the level of local medical care in quantity and quality to improve medical standards, to provide guidance to foster skilled doctors, nurses and medical researchers.</p> <p>Date of concluding R/D : February 15, 1990</p> <p>Dispatch of Experts : Presently underway</p>

## CHAPTER 2 CONTENTS OF THE PROJECT

## CHAPTER 2 CONTENTS OF THE PROJECT

### 1. Objectives of the Project

#### 1-1 Objectives

This project is aimed at enhancing the primary and secondary functions of Kalawati Saran Children's Hospital located on the premises of Lady Hardinge Medical College and operated with the cooperation of the Medical College. Also, facilities will be constructed and medical equipment procured to improve the quality of regional health activities conducted at the three Health Centres which are working closely with the Medical College. Thereby, the Project will contribute to the improvement in India of such health indicators as the infant mortality rate.

#### 1-2 Facilities to be Covered by the Project

In the Project, first, facilities and equipment of the outpatient, radiology, laboratory, operation theatre and other departments of Kalawati Saran Children's Hospital, which is operated with the cooperation of Lady Hardinge Medical College, will be procured for extensive and effective attainment of objectives. Lady Hardinge Medical College and Kalawati Saran Children's Hospital both operate under the control of the Directorate General of Health Services, the Ministry of Health and Family Welfare of India.

Second, facilities and equipment will be procured for Kalyanpuri Urban Health Centre, which is operated and managed by Lady Hardinge Medical College, and a tube well will be installed on its premises.

Third, equipment will be procured for Najafgarh Primary Health Centre and

Palam Primary Health Centre. A tube well will also be installed on the latter's premises.

The above-mentioned two primary health centres are subordinate to Directorate General of Health Services of the Ministry of Health and Family Welfare of India, but the technical aspects of their operations are managed by Lady Hardinge Medical College. The following diagram outlines the relationships between the above-mentioned organization, Lady Hardinge Medical College, which is the Indian organization to implement the Project, and the Ministry of Health and Family Welfare of India.

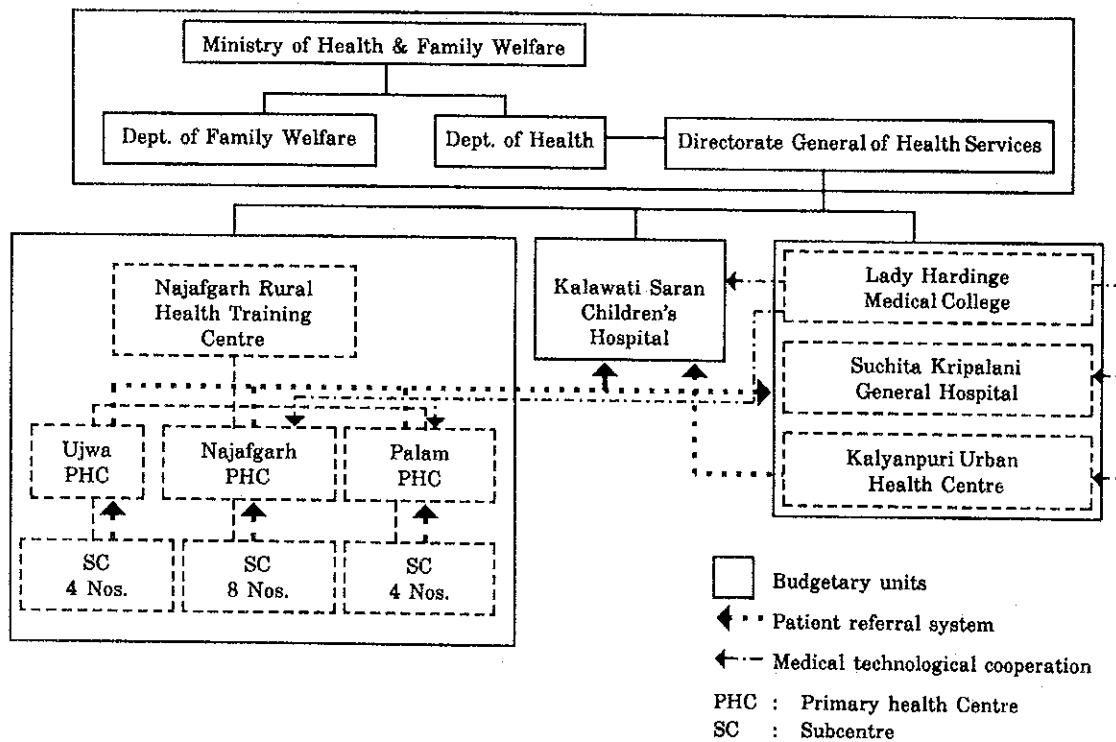


Fig. 2-1 Organization of Ministry of Health and Family Welfare



## 2. Study and Examination on the Contents of the Request

Kalawati Saran Children's Hospital, which is India's only national children's hospital, is located on the premises of Lady Hardinge Medical College in Delhi, adjacent to Suchita Kripalani General Hospital attached to the Medical College. Its three main functions are as follows.

- Medical examination and treatment of infants and children in primary and secondary health care in and around Delhi
  - Preventive/community health care, including family planning, infant immunization and control of diarrhea, cholera and malaria, under the National Health and Family Welfare Programme
  - A teaching hospital (paediatrics, obstetrics and gynecology and preventive social medicine) for undergraduate and postgraduate students, and interns of Lady Hardinge Medical College
- Present Conditions of Medical Services Provided by Kalawati Saran Children's Hospital

### ① Medical Examination and Treatment of Outpatients

Given below is the outline of the statistical data on the medical examination and treatment of outpatients at Kalawati Saran Children's Hospital.

Table 2-1 Annual Number of Outpatients to Kalawati Saran Children's Hospital (1993)

Classification	Annual no. of first visit outpatients	Annual no. of revisit outpatients	Total (annual)
General outpatients	59,358	26,213	85,571
Emergency outpatients	30,630		30,630
Outpatients to Physical Medicine & Rehabilitation Department	4,854	68,100	72,954
Outpatients to Special Clinics	6,953	37,671	44,624
Total	1,01,795	1,31,984	2,33,779

(Source: Kalawati Saran Children's Hospital)

In 1993, a total of 233,779 outpatients visited the hospital. Since the total number of the hospital's working days was 293 in 1993, an average of 797 outpatients visited the hospital every working day in that year. The following table shows a breakdown by department of the annual total of outpatients to the hospital.

Table 2-2 Annual Total Number of General Outpatients to Kalawati Saran Children's Hospital and the Hospital's Working Days/Consulting Hours

Clinical Department	Annual no. of Patient	Working Days	Working Hours
(Medicine departments)			
Paediatric Medicine	69,393	Mon.~Sat.	9:00~13:00
Paediatric Dermatology	5,448	ditto	ditto
(Surgical departments)			
Paediatric surgery	7,152	ditto	ditto
Paediatric orthopedics	1,191	Twice a week	ditto
Paediatrics E. N. T.	1,500	Mon.~Sat.	ditto
Paediatric ophthalmology	887	ditto	ditto
Total	85,571		

(Source: Kalawati Saran Children's Hospital)

The Physical Medicine & Rehabilitation Department's weekly working days are Monday through Saturday from 9:00 to 16:00. The department accepted adult and infant outpatients. The ratio between the former and the latter is 6:4.

② Use of the Ward

The hospital's ward has a total of 350 beds, of which 30 are for use of newborn babies in the Suchita Kripalani General Hospital. The bed occupancy rate, which is usually less than 100 percent, exceeds 100 percent during August and September, which is the monsoon season when general sanitary conditions deteriorate because of high temperature and humidity.

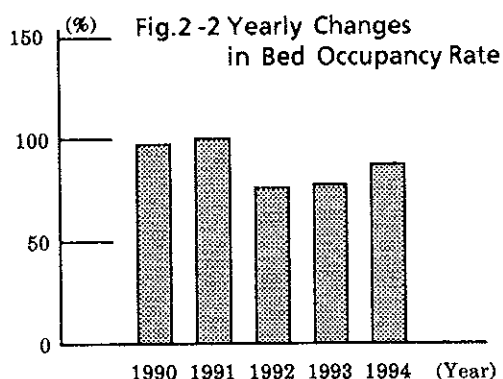
Table 2-3 Monthly Bed Occupancy Rates

(Unit: percent)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1993	59.3	62.2	59.0	66.2	80.4	83.0	83.4	109.2	104.0	92.1	66.3	62.3	77.4
1994	70.2	60.8	76.7	83.7	89.0	99.8	86.9	103.7	106.4	89.4	61.3	84.1	87.1

(Source: Kalawati Saran Children's Hospital)

(Bed occupancy rate)



At Kalawati Saran Children's Hospital, the annual bed occupancy rate exceeded 100 percent in 1991. As a result, its total number of beds increased by 36 to 350. Since 1992, the bed occupancy rate has stayed below 100 percent.

Since occupancy exceeds 100 percent in summer, however, it has been decided to further increase the total number of beds.

○ Preventive/Community Health Care Services Provided by Kalawati Saran Children's Hospital

Since its founding in 1956, Kalawati Saran Children's Hospital has been providing preventive/community health care services to mothers and children in and around Delhi. The hospital is providing these services at its Special Clinics.

Table 2-4 Preventive/Community Health Services Provided by KSHCH

Names and Working Days of Special Clinics	Outline of Services Provided	Annual no. of outpatients received
Child Health Promotion Clinic (Mon.~Sat.: 9:00~16:00)	Immunization service for mothers and children, tuberculin tests under the national tuberculosis control programme, and distribution of vitamin A tablets for prevention of blindness	23,292
Child Guidance Clinic (Mon.~Sat.: 9:00~16:00)	Guidance to retarded and mentally disabled children for their psychological development	3,109
Malaria Clinic (Mon.~Sat.: 9:00~16:00)	Malaria screening tests as part of the national malaria control programme	3,299
Family Welfare Clinic (Mon.~Sat.: 9:00~16:00)	Promotion of the spread of the national family planning programme under the national population policy	4,576
Diarrhea Training & Treatment Unit (Mon.~Sat.: 9:00~16:00,(24 hours in summer))	Treatment of diarrhea patients through the provision of O.R.S. under the national diarrhea/cholera control programme, training in treatment of diarrhea patients and compilation of statistics.	11,373

As is clear from the above descriptions, the hospital is engaged mainly in promoting national preventive/community health care programmes for children.

○ Activities of Kalawati Saran Children's Hospital as a Teaching Hospital

① Outline of Education Provided by Lady Hardinge Medical College and the Relationship with Kalawati Saran Children's Hospital

In India, medical colleges provide four and a half years of undergraduate education, one year of internship and two to three years of postgraduate education. Below is the outline of medical education in the country.

Table 2-5 Education in Medical College

Course	Year									Qualifications after graduation	No. of students enrolled at Lady Hardinge Medical College	
	1	2	3	4	5	6	7	8	9			
Undergraduate course	■										MB, BS	130 per grade
Internship					■							
Graduate course (degree course)						■					MD, MS	54 per grade
Graduate course (diploma course)					■							

(注) MB : Bachelor of Surgery                      MD : Doctor of Medicine  
 BS : Bachelor of Medicine                      MS : Master of Surgery

Kalawati Saran Children's Hospital functions as a paediatric teaching hospital attached to Lady Hardinge Medical College, and is therefore equipped with offices of professors of paediatrics of the college and paediatric seminar rooms. The college's professors of paediatrics examine hospital patients while giving classes.

○ Relationship between Lady Hardinge Medical College and the 3 Health Centres

In 1977 the Government of India announced its new medical education plan (the Rome Plan) whose goals were to promote medical colleges' active involvement in local community health problems and to provide direct health care services to residents of rural areas. The following measures were thereby proposed.

- To send medical students to rural areas
- To send medical college instructors to rural areas
- To enhance quality of health care in rural and urban areas through medical examination and treatment by providing facilities and equipment for tests and X-ray examinations
- To promote transfer in stages of comprehensive health care (preventive medicine, health promotion and medical treatment) to the area covered by each medical college

In this Plan, it is proposed that each medical college take charge of community health care through at least three area health centres. In the case of Lady Hardinge Medical College, it was decided that the College should be responsible for enhancing the quality of community health care through Najafgarh Primary Health Centre, Palam Primary Health Centre and Kalyanpuri Urban Health Centre. At present, the Medical College is training its undergraduate and postgraduate students, and interns by sending them to these three Health Centres and while providing local community health care services to the entire area.

○ Outline of Activities of the 3 Health Centres

Given below is the outline of the activities of the three Health Centres related to the Project.

Activities of Kalyanpuri Urban Health Centre

Medical Treatment

1. Outpatients (internal medicine, surgery, paediatric, obstetrics and gynecology)
2. Immunization
3. Health of mothers and children
4. Family planning
5. Special clinics (ophthalmology)
6. School children's health
7. General medical tests
8. Emergency medical treatment

Training

1. Medical doctors (training of undergraduate and postgraduate students, and interns of Lady Hardinge Medical College)
2. Nurses (including public health nurses), paramedical, medical and social workers (training of the students of the nursing school attached to Lady Hardinge Medical College)

Research

1. Research on schoolchildren's health
2. Research on community health care

## Outline of Activities of Najafgarh and Palam Primary Health Centres

### Medical Treatment

1. Outpatients (internal medicine, surgery, paediatrics and obstetrics and gynecology)
2. 24-hour emergency medical treatment (only at Najafgarh Primary Health Centre)
3. Health of mothers and children (immunization, guidance of childbirth at home)
4. Normal delivery (delivery and hospitalization)
5. Family planning (abortion, sterilization, guidance on family planning)
6. Tests (pregnancy test, blood test, urine test, saliva test)

### Training

1. Medical doctors (training of undergraduate and postgraduate students, and interns of Lady Hardinge Medical College)
2. Nurses (training of nursing school students attached to Lady Hardinge Medical College)

### ○ Present Activities of the 3 Health Centres

Lady Hardinge Medical College is responsible for all operations carried out at Kalyanpuri Urban Health Centre, but its responsibility for Najafgarh Primary Health Centre and Palam Primary Health Centre is limited to management of medical technologies at these Health Centres. The latter two Health Centres operate under the control of the Directorate General of Health Services, Ministry of Health and Family Welfare. Present activities of these three Health Centres are summarized as follows.

Table 2 - 6 Present Activities of the 3 Health Centres

	Kalyanpuri Urban Health Centre	Najafgarh Primary Health Centre	Palam Primary Health Centre
No. of residents to benefit from the project	80,000	78,455	1,07,000
• Curative Services			
Annual no. of outpatients	35,000	80,000	46,000
Annual no. of inpatients	—	10,500	441
Annual no. of laboratory tests conducted	1,800	13,000	2,000
Annual no. of referrals	350	8,000	415
• Family Welfare Services			
Annual no. of operations for sterilization	9	420	101
• Immunization Services			
Annual no. of vaccinations	2,097	15,000	8,400
• MCH Services			
Antenatal clinic	706	3,400	2,025
Deliveries conducted	—	2,050	629
• Nutritional Services			
Annual no. of supplies of iron and folic, vitamin A	3,145	12,810	6,485
• IEC Activities			
Annual no. of events (Motion picture, gatherings/meetings, classes for mothers)	86	730	185

(Source: Lady Hardinge Medical College)

○ Present Conditions of the Facilities and Equipment of Kalawati Saran Children's Hospital and the 3 Health Centres

① Facilities and Equipment of Kalawati Saran Children's Hospital

Facility

Kalawati Saran Children's Hospital began operations in 1956 with 60 beds. At that time, it was estimated that it would accept about 100 outpatients per working day. Since then its facilities have been extended in keeping with the increase in the daily number of outpatients accepted. At present, however, its outpatient building and wards are too small for the scale of medical services it



provides. They are both overcrowded with outpatients and their relatives to take care of them. The facilities had already been superannuated when they began operations, and subsequent facility extension work was of such low quality that almost all the facilities need repair or reconstruction.

#### Equipment

Existing X-ray equipment and many other main items of equipment are superannuated. Equipment for clinical examination and care of patients is not only superannuated but also in short supply, which makes it impossible for the hospital to provide sufficient child health care services for community residents. To improve the quality of the hospital's child health care, it is necessary to replace the superannuated equipment and to increase supplies of equipment in short supply.

#### ② Kalyanpuri Urban Health Centre

##### Facility

This Health Centre's facilities were originally not intended for use as part of a health centre. The space is the lower half of a high-ceilinged building which looks like a warehouse, so the rooms are not partitioned completely. Some of them have no windows. Furthermore, the partitioning work is of such low quality that these rooms are not in good sanitary condition. The Health Centre does not have an adequate number of rooms because of the limited space. It is also difficult to secure sufficient water supply due to a rapid increase in the population of the surrounding local community.

#### Equipment

Superannuated medical examination tables are the only basic equipment for medical examination installed in the health centre. Under such circumstances, the Health Centre is unable to provide sufficient basic health care services to community residents. It is necessary to procure medical examination rooms and equipment for treatment and care of outpatients.

#### ③ Najafgarh Primary Health Centre and Palam Primary Health Centre

##### Facility

Each of these Health Centres is finds it difficult to secure adequate water supply because of rapidly increasing local populations.

##### Equipment

These Health Centres' main items of equipment are monocular microscopes, centrifuges and medical examination tables, almost all of which are no longer serviceable. To improve the quality of primary health care services offered by these Health Centres, it is necessary to replace these superannuated items of equipment and to increase supplies of equipment in short supply.

○ Summary of the Results of the Examination of the Request

Since 1956, Kalawati Saran Children's Hospital, the centre of Delhi's only national children's hospital has provided primary and secondary child health care services, as well as preventive/community health services under the National Health Plan, in and around Delhi. The hospital accepts more than 230,000 outpatients every year. Its annual average bed occupancy rate for 1994 was 87.1 percent. In summer, in particular, the bed occupancy rate exceeds 100 percent. In light of such increasing demand for health care services in and around Delhi, it is necessary to ease congestion in the outpatient building and increase the number of beds installed in the hospital. Existing hospital medical equipment is superannuated. The hospital also functions as the teaching hospital attached to Lady Hardinge Medical College, where students and interns of the College receive practical training. The Hospital gets manpower support from the College, and the Hospital and the College share the use of some facilities. Lady Hardinge Medical College, on the other hand, is cooperating with the three Health Centres, sending its staff members, students and interns to these Health Centres, to improve the quality of primary health care services in and around Delhi. Infant patients with untreatable diseases at these Health Centers are referred to Kalawati Saran Children's Hospital; adult patients with untreatable diseases at these Health Centres are referred to Suchita Kripalani General Hospital. These three Health Centres find it difficult to attain their common objective of promoting the health of community residents because of shortages of facilities and equipment. It is imperative, therefore, to improve the facilities and equipment of these three Health Centres

to reduce the burden imposed on the above-mentioned referral hospitals.

It is difficult, however, for Lady Hardinge Medical College to work out and implement plans to improve the facilities and equipment of Kalawati Saran Children's Hospital and to resolve problems facing the three Health Centres on its own, mainly because of budgetary limitations. Under such circumstances, the principal of the Medical College requested the Government of Japan to provide grant aid to construct a central building on the premises of Kalawati Saran Children's Hospital, for its outpatient, operation theatre, X-ray and laboratory departments, as well as ICUs, to procure equipment for these facilities, to reconstruct the facilities of Kalyanpuri Urban Health Center and procure equipment for the facilities of the Health Centre, as well as Najafgarh Primary Health Centre and Palam Primary Health Centre. The existing facilities of Kalawati Saran Children's Hospital are to be remodeled into wards by the Government of India after the completion of the planned central hospital building.

Facilities and equipment requests are to be examined in light of the above.

## 1. Requested Rooms

### ① Kalawati Saran Children's Hospital

Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
• Outpatient Department			
Reception	1	1	Six reception counters (emergency, new visit, revisit, reporting, hospitalization, Special Clinic reception counters) are to be installed.
Internal Medicine Examination Rm and Doctors' Offices	22	8 (Examination room)  14 (Doctor's offices)	Average daily no. of outpatients: 69,393/year ÷ 293 day/year = 237/day Daily consultation hours: 4 hours (240 minutes) Average consultation time: (5~10 minutes) 7.5 minutes/patient on average 237 patients × 7.5 minutes ÷ 240 minutes = 7.4 rooms → 8 rooms These facilities are equivalent to medical offices in Japan. No. of offices of LHMC professors in charge of paediatric medicine: 9 (1 for the chief, 6 for paediatric internists, and 2 for internists in charge of health care of newborn infants)
Paediatric Surgical Rm Examination Rm	2	2	Average daily no. of outpatients: 7,152/year ÷ 293 day/year = 24 outpatients/day Average daily consultation hours: 4 hours (240 minutes) Average consultation time : 20 minutes/patient 24 patients × 20 minutes ÷ 240 minutes = 2 rooms
Paediatric Orthopedic Examination Rm & Treatment Rm	2	2	1 examination room and 1 treatment room
Plaster Rm	1	1	
Paediatric Ophthalmology Examination Rm	1	1	
Paediatric E. N. T. Examination Rm	1	1	
Paediatric Dermatology Examination Rm	1	1	
Dressing Rm	1	1	For paediatric surgery and paediatric orthopedics
Central Injection Rm	1	1	For all the surgical departments
Specimen Collection Rm	1	2	
Deputy Supt. Nurse Rm	1	1	
Assit. Nurse Supt. Rm	1	1	
Stretcher Rm	1	1	
Pharmacy/Dispensary	1	1	
Storage (general purpose and drug storage)	2	1	
• Physical Medicine & Rehabilitation	2		
(Following rooms are proposed in the basic design as below)			
Reception		1	

Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
Examination Rms		4	Average daily no. of outpatients: 72,954/year ÷ 293 day/year = 249 outpatients/day Average daily consultation hours: 8 hours (480 minutes) Average consultation time: 7.5 minutes/patient 249 patients × 7.5 minutes ÷ 480 minutes = 3.89 → 4 room
Doctor's Rm		3	Two senior doctor's offices and senior residents' office (for two senior residents)
Physiotherapist's Rm		2	A senior physiotherapist's office and a physiotherapists' office (for 5 physiotherapists)
Physiotherapy Treatment Rm		1	To be equipped with two microwave treatment devices, a whirlpool bath device and a low-frequency treatment device (these devices are all for the treatment of both infant and adult patients).
Exercise Therapy Rm		1	To be equipped with devices for the treatment of infant and adult patients.
Occupational Therapists' Office		1	An occupational therapists' office (for two occupational therapists)
Speech Therapy Rm		1	
• Radiology Department			
Reception	1	1	
X-ray Rm	4	3	Annual no. of X-ray examinations (general): 32,191 Annual no. of X-ray examinations (special): 5,112 Average daily no. of X-ray examinations: 102 An average 34 X-ray examinations are to be conducted each working day in each X-ray examination room.
Control Rm	0	1	
Darkroom	1	1	The darkroom is to serve also as a drying room
Radiographer's Rm	1	0	
Ultrasound Rm	1	1	To be equipped with two ultrasonic devices. Annual no. of ultrasonic diagnoses: 3,684
Radiologist's Rm	2	1	A middle-rank radiologist's office cum assistant radiologist's room
Technicians' Rm	1	1	A technicians' room (for 8 technicians)
• Laboratory Department			
Chemical Biochemistry Lab.	1	1	Annual no. of biochemistry tests: 67,875 Average daily no. of biochemistry tests: 201
Biochemical Store	1	1	To serve as a store for common use
Autoanalyzer Rm	1	1	The existing one is to be transferred to the planned facility.
Common Lab. for Bacteriology, Parasitology	1	1	Those tests were conducted at LHMC.
Store	1	0	The above-mentioned store can be utilized also by this section.
Common Lab for Hematology, Pathology	1	1	Annual no. of pathological tests: 133,077

Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
Immuno Hematology Lab.	1	1	
ECG Rm	1	1	To be equipped with three electrocardiographs (two types)
EMG Rm	1	1	An existing electromyograph and a new one are to be installed.
EEG Rm	1	1	The existing electroencephalograph is to be transferred to the planned facility.
Officer's Rm	2	2	Two senior researcher's offices (for a senior bacteriologist and a senior biochemist)
Technicians' Rm	1	1	A technicians' room (for 4 assistant technicians, 9 testing technicians, 4 assistant testing technicians and 5 testing assistants)
Office Rm	1	1	An office room for a middle-rank chemist and assistants
• Operation Theatre			
Reception	1	1	
Major Operation Theatre	1	1	Annual no. of major operations: 591 Major operations such as chest surgery, artificial anus operations and palatoplasmy are to be performed in the major operation room.
Minor Operation Theatre	2	2	Annual of no. of minor operations: 1,919 Minor operations such as simple hernioplasty, artificial anus operations, lithectomy and preputiotomy are to be performed in one of the minor operation rooms. It is to be provided with an anteroom and a store. Another minor operation room is for the use of the paediatric orthopedics and paediatric ophthalmology.
Changing Rm	1	2	One for males and the other for females
Surgical ICU	1	1	For 3 beds
Scrubbing	1	1	2 unit of scrubbers will be installed
Recovery Rm	1	1	
Doctor's Rm	1	1	
Surgical Nurse Station	1	1	
Preoperation/ Postoperation Rms (12 beds)	1	2	A preoperative room with 6 beds and a postoperative room with 6 beds
• Central Supply & Sterilization	1		
▶ The following autoclave- related rooms are proposed.			
Reception		1	
Washing Rm		1	
Autoclave Rm		1	To be equipped with 3 autoclaves (1 large-size and 2 medium-size)
Assembly Rm		1	
Clean Storage		1	
Distribution Rm		1	

Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
<ul style="list-style-type: none"> <li>Emergency Department</li> </ul>			
Reception	1	1	Annual no. of emergency outpatients accepted: 30,630 Average daily no. of emergency outpatients accepted: 104 Working hour: 24 hours  One for an LHMC professor and the other for a senior doctor in charge of emergency medical care  It is a law that a policeman shall be stationed on the premises of the hospital.
Examination Rm	1	1	
Treatment Rm	1	1	
Nurse Station	1	1	
Doctor's Rm	2	2	
Police Post Rm	1	1	
<ul style="list-style-type: none"> <li>ICU</li> </ul>			
Treatment Rm	1	1	There are already 4 ICUs (27 bed) in the hospital which are shared with the Emergency Department. Included in the project are two additional ICUs (for 17 beds and 13 beds).  The existing equipment (autoanalyzer) is to be transferred to the planned facility.  Doctors of the Emergency Department are also to be in charge of medical care at these ICUs.
Examination Rm	1	1	
Nurse Station	1	1	
Isolation Rm	1	1	
ICU	2	2	
Laboratory	1	1	
Doctor's Rm	2	0	
Store	1	1	
<ul style="list-style-type: none"> <li>Preventive &amp; Social Medicine Department</li> </ul>			
Reception	1	1	Annual no. of Immunization DPT (diphtheria, pertussis, tetanus): 12,318 Polio: 13,457 Measles: 2,653 BCG: 5,012 Tetanus: 161 Diphtheria: 997 Annual no. of cases : 23,292 Average daily no. of patients accepted: 60~65  To be used for various follow-up clinics  Annual no. of cases: 3,109  For the use of psychologist  For the use of two engineers from NDMC  Annual no. of patients receiving advice: 9,576  There are already two medical consulting rooms. Average daily no. of patients receiving advise: 15-20
Child Health Promotion Clinic Immunization Rm	1	1	
Nutrition Counselling /Growth Monitoring Rm	1	1	
Child Guidance Clinic	2	1	
High Risk Clinic	1	1	
Psychological Testing Rm	1	1	
Malaria Clinic	1	1	
Family Welfare Clinic	1	1	
Medical Social Services	2	2	



Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
Doctor's Rm	1	1	A doctor's office for a senior doctor in charge of child health promotion.
Store	1	1	Common use with Lab.
• DTTU	1		Annual no. of cases: 11,373
Doctor's Rm	1	1	To serve also as the reception counter
Treatment Rm	1	1	
Children's Sitting Rm	1	1	
Health Education Rm	1	1	
• Others			
Telephone Exchange Rm	1	1	To be provided with a rest station for the operators.
Mechanical Rm	—	1	A substation will be equipped with transformers (including a spare transformer) and a generator. Planned as a independent workshop/substation building
Substation	1	1	
Workshop	1	1	
Laundry	1	1	Planned as a independent building where linen and operating gowns are washed.
Incinerator Rm	1	1	Planned as a independent incinerator room building

② Kalyanpuri Urban Health Centre

Table 2-8 Examination of Requested Rooms -2

Room Name	No. of rooms (in the request)	No. of rooms (in the basic design)	Result of the examination
Examination Rms	4	4	Annual no. of outpatients accepted: 35,000 Annual no. of working days: 293 Daily working hours: 4hours Average consultation time: (5-10 minutes) Average: 7.5 minutes/patient $35,000 \div 293 \times 7.5 \div 240 = 3.7 \rightarrow 4$ room One each for the internal medicine, paediatrics, obstetrics/gynecology and ophthalmology departments
Doctor's Rm	1	1	
Medical Social Workers' Rm	1	1	A room where advice on preventive social medicine is given
Seminar Rm (25~30 persons)	1	1	Annual no. of mothers' classes: 86 The seminar room is to serve also as a waiting hall.
Treatment Rm (Minor OT)	1	1	It will be possible to treat more than 586 (2/day $\times$ 293days) external injuries a year in the treatment room
Observation Rm	1	1	To be used for observation of emergency outpatients
Laboratory	1	1	It will be possible to conduct about 5,860(20/day $\times$ 293) basic tests such as malaria, blood and urine tests a year.
Injection Rm	1	1	
Dressing Rm	1	1	
Pharmacy	1	1	
Store	1	1	
Guard Rm	1	1	

## 2. Requested Items of Equipment

Table 2-9 Examination of Requested Equipment

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
<b>Radiology Department</b>				
1	X-ray TV monitor	1	1	It is necessary to take X-ray photos and contrast photos of abdomen and other blood vessels. Since this equipment is operated from the control room, there is no danger of doctors and technicians being exposed to X-rays. Although no TV-mounted X-ray equipment is used at the hospital, its radiologists have the ability to operate such equipment. The existing superannuated equipment is to be replaced.
2	Color doppler ultrasound scanner	1	1	This equipment is used for diagnosis of circulatory disorders. It was difficult to do this type of diagnosis at the hospital due to a lack of the equipment. The introduction of this equipment will make it possible to do more accurate diagnosis of paediatric circulatory disorders, which will lead to a marked improvement in health care in the country.
3	Diagnostic X-ray	1	1	This equipment is used for taking general and emergency photos of bone fractures and chest diseases. The existing equipment is to be replaced.
4	X-ray film changer	2	0	This equipment is not to be included in the project because no contrast photos of blood vessels are taken at the hospital.
5	Contrast medium injection unit	2	0	This equipment is not to be included in the project because no contrast photos of blood vessels are taken at the hospital.
<b>Outpatient Department</b>				
1	Examining light	4	4	These lights are necessary in lighting the affected part and the color of the patient's skin for observation purposes.
2	Cryosurgical unit	2	0	This equipment is not to be included in the project. No significant therapeutic effects can be expected of it.
3	Electro myograph	1	1	This equipment is necessary in measuring the degree of malfunction of skeletal muscles.
<b>ICU Department</b>				
1	Infant incubator	6	3	<u>Standard Type</u> This device is necessary to maintain an environment similar to mother's body for a premature baby until his or her weight reaches normal level. 6 incubators composed of 3 standard type and 3 ICU type.
2	Infant incubator	6	3	<u>ICU Type</u> This device is necessary to maintain an environment similar to a mother's body for a premature baby until his or her weight reaches normal level. This type is definitely required for infants whose conditions are serious.
3	Infant warmer	12	3	To maintain the body temperature of the infant is most important for which phototherapy unit should be included. 3 units are reasonable quantity for 30 ICU beds.
4	Neonatal monitor	4	3	This equipment is necessary to monitor vital changes in a patient's heart, as well as his or her respiration and temperature. 3 units are sufficient for 30 beds ICU.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
5	Infant ventilator (neonatal)	0	1	In 1993, about 6,800 patients, including 3,700 respiratory disorder patients, were treated at the hospital. It is estimated that there were about 300 cases when these patients had to be treated using ventilators. These devices are necessary for artificial ventilation control for newborn infants in the case of IRDS and dyspnea.
6	Infant ventilator	2	2	
7	Defibrillator	0	1	This equipment is necessary in removing ventricle fibrillation. It can also be used for emergency monitoring.
<b>Operation Theatre Department</b>				
1	Operating table	4	3	These are electrohydraulic (height adjustable) operating tables for use with infant patients. A total of 3 such operating tables are to be procured under the project. 1 additional for paediatric orthopedic surgery.
2	Operating light with TV monitor	0	1	Shadowless lamps are indispensable in performing operations. A TV-mounted shadowless lamp is to be procured under the project for educational purposes.
3	Operating light	4	2	
4	Operating light with spot light	0	1	Shadowless lamps are indispensable in performing operations. They are necessary in performing ophthalmological and E.N.T. operations.
5	Anesthesia Mac.	4	3	This device is indispensable when an operation is performed on a patient put under general anesthesia. Though 4 of them are to be procured to match the 4 operating tables to be procured under the project, 3 are reasonable quantity in consideration of one anesthesia machine is now utilized without trouble.
6	Multi channel patient monitor	4	2	This device is necessary to monitor vital changes in a patient's heart, temperature, the oxygen content of blood and his or her respiration and blood pressure during operation. Since this device included in the anesthesia machine, it is appropriate to procure two units of general-purpose anesthesia machine under the project.
7	Table top E.O.G. steriliser	1	0	This equipment is necessary for low-temperature sterilization. However, this equipment should not be procured for this department since it was decided that Central Sterilization Supply will procure it.
8	Hand washing sink unit	0	2	This equipment is indispensable to keep surgeons' and assistants' hands sterile.
<b>Newborn Baby Room in SKGH</b>				
1	Neonate room			No newly equipment is to be procured for this department since the existing equipment is sufficient.
<b>Premature Baby Room in Existing KSCH</b>				
1	Infant care incubator	8	0	This equipment should be deleted since the existing one and the one in use at Internal ICU suffice.
2	Infant care center	4	2	Maintenance of normal body temperature is important for premature babies. The equipment is indispensable to prevent premature babies' temperatures from falling and treatment. The existing superannuated equipment is to be replaced.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
3	Infant ventilator	4	0	No equipment is to be procured since the equipment to be procured for ICU will suffice.
4	Transcutaneous PO <sub>2</sub> /PCO <sub>2</sub> monitor	2	1	This equipment is used for measuring oxygen and carbon dioxide content in blood for premature and newborn babies without collecting blood from them and for monitoring oxygen replacement in these babies' lungs. It is appropriate to procure the equipment under the project since it requires no blood collection and therefore minimizes damage to patients. 1 unit is sufficient from the scale of the hospital.
<b>Ward</b>				
1	Patient bed	150	50	It is appropriate to procure the required number of beds under the project since these beds are necessary for patients to get medical treatment in a healthy environment 50 for new facility will be provided.
2	Bedside cabinet	150	50	
3	Overbed table	150	50	
4	Doppler fetus detector	4	0	This equipment should be deleted since it is for obstetric use.
5	Stretcher trolley	4	0	This equipment should be deleted since ordinary equipment can be used for this purpose.
<b>Feeding, Bath and Milk Kitchen Room in SKGH</b>				
1	Breast pump	4	0	This equipment is unnecessary since there is no need for milking.
2	Nursing bottle sterilizer	2	0	This equipment is unnecessary since there is no need for milking.
3	Nursing bottle warmer	1	0	This equipment is unnecessary since there is no need for milking.
4	Infant warmer	2	3	Declines in newborn babies' temperatures are very dangerous. It is therefore appropriate to procure 3 devices under the project.
<b>Gas Supply System</b>				
1	Medical gas supply system	1	0	This equipment should be deleted since it is included in the facility construction work.
<b>Incinerator</b>				
1	Paging system	1	0	This equipment should be deleted since it is included in the facility construction work.
2	Incinerator	4	3	This equipment is necessary in incinerating medical waste. It is appropriate to procure three units of the equipment under the project. It will be necessary to incinerate 600kg (1.2kg/bed×500) of medical waste a day.
<b>Transportation</b>				
1	Ambulance	4	4	An ambulance is indispensable in transporting an emergency or serious patients to a medical facility when it is impossible to care by themselves. The existing ambulance is to be replaced.
2	Mini bus	1	1	A microbus is indispensable in transporting doctors and nurses for outreach health care services, as well as in transporting them for in-service training programs.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
3	4 wheeler (Jeep)	1	1	This type of motor vehicle is necessary to transport outreach service doctors/nurses to the places where the road conditions are poor, and when the infectious diseases are required to be cared during the rainy season.
Autopsy Room in SKGH				
1	Autopsy table with shower	2	2	Pathological autopsy is indispensable in investigating the causes of diseases. This equipment is necessary in conducting pathological autopsy.
2	Morgue refrigerator	1	1	A refrigerator is necessary to prevent corpses for use in pathological autopsy from decomposing. An additional refrigerator is to be procured for emergency use (when the existing refrigerator with a capacity of up to 12 corpses breaks down.)
Central Laboratory Department				
Chemical biochemistry				
1	Blood cell counter	4	0	This equipment, which is used to count the number of blood corpuscles, should be deleted since it is not needed at any biochemistry laboratory
2	Blood bank refrigerator	2	0	This equipment, which is used in storing blood for use in blood transfusion, should be deleted since it is not needed at any biochemistry laboratory.
3	Refrigerated centrifuge	1	1	This equipment is used to separate tangible ingredients and liquid ingredients in liquid specimens in which cells and special tangible ingredients are suspended. It is therefore appropriate to procure this equipment under the project.
4	Electrophoresis	1	0	This equipment should be deleted since it will not be used at the planned facility.
5	Immuno & Agar Electrophoresis apparatus	1	0	This equipment should be deleted since it will not be used at the planned facility.
6	Electrophoresis (disk type)	1	0	This equipment should be deleted since it will not be used at the planned facility.
7	Thin-layer chromatograph	1	0	This equipment should be deleted since it will not be used at the planned facility.
8	Elisa system	1	1	This equipment, which is used to measure various types of active oxygen in blood and grasp the degree of seriousness of patients' diseases, is indispensable.
Bacteriology				
9	CO <sub>2</sub> incubator	2	1	This equipment is used mainly in culture of bacteria. It is indispensable in culturing bacteria in laboratory dishes or otherwise in not so precisely controlled condition.
10	Low temperature incubator	0	1	This equipment is used mainly in fixed temperature culture of bacteria. It is indispensable for this department.
11	Elisa system	0	1	This equipment is used in biological examinations aimed at identifying pathogenic organisms and is therefore indispensable for this department.
12	Clean hood	0	1	This equipment is necessary to carry out aseptic activities in ordinary rooms and is therefore indispensable for this department.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
<b>Hematology</b>				
13	Electrophoresis apparatus	1	0	This equipment should be deleted since it is hardly needed by this department.
14	Automatic blood cell counter	0	1	This equipment, which is used in screening tests to keep track of the progress of patients suffering from blood diseases, is indispensable in treating these patients.
15	Elisa system	4	0	This equipment should be deleted since it is hardly needed by this department and it is used mainly in the fields of biochemistry and microbiology.
<b>Histopathology</b>				
16	Microscope	8	1	One microscope will suffice.
17	Freezing microtom	2	1	This equipment, which is used to freeze and slice a tissue section promptly when there is not enough time to do paraffin burying, is indispensable for this department.
18	Tissue infiltrator	12	1	This equipment, which automatically does dehydration, decreasing and paraffin penetration of a tissue section, is indispensable for this section. It is appropriate to procure one unit of this equipment under the project.
<b>Surgical ICU</b>				
1	Neonatal ventilator	2	1	This equipment is used for postoperative respiration control and treatment of respiratory disorders.
2	Paediatric ventilator	4	2	There are two existing units for 15 ICU beds and number is insufficient.
3	Defibrillator	0	1	The resuscitation device is important and indispensable for any ICU.
<b>Follow-up Clinic</b>				
1	Hemodialysis system	4	2	Acute diseases such as kidney insufficiency require this system 4 systems are not necessary, but 2 systems are adequate.
<b>Central Supply &amp; Sterilization</b>				
1	High pressure sterilizer, big size	1	1	This equipment is used to sterilize linen, small steel articles at the operation theatre and ward departments. It is indispensable for any hospital.
2	High pressure sterilizer, middle size	1	1	This equipment is used to sterilize linen, small steel articles at the operation theatre and ward departments. It is indispensable for any hospital.
3	High pressure sterilizer, middle size high speed	1	1	This equipment is used to sterilize linen, small steel articles at the operation theatre and ward departments. It is indispensable for any hospital.
4	Ultrasonic equipment cleaner	2	1	This equipment is necessary in cleaning metal goods such as forceps.
5	Washer/Dryer for surgical gloves	2	1	This equipment is necessary in cleaning rubber gloves used in operations. Its use will lead to a reduction in the running cost.
6	EO gas sterilizer table model	0	1	This equipment is required to do low-temperature sterilization. One unit of this equipment, which was originally to be procured for the operation theatre, is to be procured for this department.
<b>Suchita Kripalani General Hospital Dental Department</b>				
1	Dental	1	0	Deleted as project is limited to KSCH.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
<b>Outpatient Department Paediatric Orthopedic</b>				
1	Paediatric orthopedic operation table	1	1	An operating table is indispensable for paediatric orthopedic surgery.
2	Surgical apparatus set for Ortho. Surgery	1	1	These devices are indispensable for paediatric orthopedic surgery.
3	C-arm X-ray TV system	1	1	This equipment is used to take X-ray photos of bone fractures. It is used mainly in the operation theater. Since it is portable, it can also be used in the emergency department.
<b>Outpatient Department E.N.T.</b>				
1	Otorhinolaryngological treatment table	1	1	This equipment is used in minor operations.
2	Otorhinolaryngological treatment unit with compressor	1	1	This equipment is used in E.N.T. treatment.
3	Cryosurgical unit	1	0	This equipment should be deleted because it has no significant therapeutic effect.
4	CO <sub>2</sub> laser surgical unit	1	0	This expensive equipment should be deleted because there is no significant difference in therapeutic effect between this equipment and other similar equipment.
<b>Outpatient Department Paediatric Ophthalmology</b>				
1	Cryosurgical set	1	0	These devices are used in operations for cataract and retinal detachment, as well as for corpus ciliata freezing for hemorrhagic glaucoma, however, this should be deleted as the paediatric cases are rare.
2	Slit lamp with camera	1	1	This equipment is indispensable in conducting the ophthalmological examination of the turbidity of the cornea and the like.
3	Projection perimeter	1	1	This equipment is indispensable in testing the entire vision from the retina to the visual centre to detect glaucoma, retinal optic nerve disorders and cerebral hemorrhage.
4	Autorefractometer	1	1	This equipment, which automatically measures the refractive index of the eyes, the degree of astigmatism and the like, is indispensable in conducting ophthalmological tests.
5	Cataract set microsurgery	12	1	This equipment is used in operations for cataract. The number of units of this equipment in the request are too large. 1 is sufficient.
6	Fundus camera	1	1	This equipment, which is used in observing the condition of the optic disk, the retina and the choroidea, is indispensable in conducting ophthalmological tests.
7	Echo-scan	1	1	This equipment is used in diagnosing timorous lesions in the eye or the eye socket and retinal detachment.
8	Ophthalmology yag laser	1	0	This equipment is used in treating diabetic retinopathy, thrombosis of the central vein of retina, rhegmatogenous retinal detachment and orbit disorders, for which there is no viable pharmacotherapy. This equipment should be deleted since it is not used so frequently in paediatric ophthalmology.
9	Argon laser	1	1	This equipment is necessary in treating diabetic retinopathy, thrombosis of the central vein of retina, hegmatoogenous retinal detachment and orbit disorders, for which there is no viable pharmacotherapy. It is indispensable in treating eye diseases.

No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
10	Vitreous operation apparatus	2	0	This equipment is used in operations to remove suspended vitreous bodies as a result of vitreous bleeding or vitreous acyloidosis. But this equipment should be deleted since it is usually used in operations performed on elderly patients rather than on infant patients.
11	Computer graphic analyzer	1	0	This equipment is used in collecting and analyzing eyeground examination records. But this equipment should be deleted because there is no sufficient application software for it.
12	Phacoemulsifier	1	0	This equipment is suited for use in operations for senile cataract. But this equipment should be deleted since it is rarely used in operations performed on infant patients.
Outpatient Department Paediatric Dermatology				
1	Cryosurgical unit	1	0	This equipment should be deleted since it has no significant therapeutic effect.
2	Dermatology laser unit	1	0	This equipment, which is used mainly in treating congenital hemangioma, should be deleted because there are few cases of this diseases.
Laundry				
1	Washing machine	4	2	This equipment is necessary in washing line and bedclothes. Two washing machines with a capacity of 50kg and one with a capacity of 25kg are to be procured under the project on the assumption that 600kg of linen and bedclothes will be washed daily.
2	Washing machine	0	1	
3	Drying tumbler	4	2	
4	Drying tumbler	0	1	
5	Press machine	2	0	This equipment should be deleted because it frequently breaks down and because it is hard to maintain.
6	Extractor	0	2	This equipment is necessary after washing linen and bedclothes. Two machines with a capacity of 50kg are to be procured under the project on the assumption that 600kg of linen and bedclothes will be washed daily.
Endoscopes				
1	Bronchoscope	1	0	This equipment should be deleted since it is to be procured for E.N.T.
2	Duodenoscope	1	1	This equipment is indispensable in diagnosing and observing the progress of duodenal ulcer, which it is difficult to diagnose by X-ray examination.
3	Laparoscope	1	1	This equipment is necessary in diagnosing chronic hepatitis, cirrhosis of the liver and hepatomegaly, as well as in conducting open biopsy of these diseases.
Medical Record				
1	Computer	4	4	This equipment is necessary in compiling statistics on patients and thereby improving the quality of hospital services.
Preventive Social Medicine Department				
1	Computer	1	1	This equipment is necessary in compiling statistics on public health and thereby improves the community health service level.



No.	Equipment name	No. of units (in the request)	No. of units (in the basic design)	Result of the examination
<b>The 3 Health Centers</b>				
1	Sterilizer table model	4	4	This equipment is necessary in preventing infections and cross infections. 2 units for Kalyanpuri, 1 unit for Najafgarh and 1 unit for Palam are to be procured under the project.
2	Incinerator	3	3	It is necessary to incinerate medical waste.
<b>Administration</b>				
1	Computer	2	2	This equipment is necessary in managing patients records and medical equipment and thereby increasing the efficiency of hospital management.

As a result of the above examination, the expected results of the Project and the practicability of the implementation of the Project and the Indian side's ability to implement the Project were confirmed. Furthermore, the expected results of the Project are consistent with the objective of Japan's grant aid system. It is therefore judged appropriate to implement the Project under the Japan's grant aid. Thus, the basic design for the Project is to be implemented based on results of the examination of the Project outline given that the Project will be implemented under Japan's grant aid. As stated earlier, however, regarding the contents of the Project, it is reasonable to modify part of the request made by the Government of India.

### 3. Project Description

#### 3-1 Project Implementating System

##### (1) Organization and Staff

##### 1) Organization and Staff of Kalawati Saran Children's Hospital

Kalawati Saran Children's Hospital has the following organization. It is expected that the number of beds at the hospital will increase by 150 from 350 to 500 when the Project is completed with the cooperation of the Government of Japan. In this connection, the hospital requested Directorate General of Health Services of the Ministry of Health and Family Welfare to increase its staff and to secure sufficient budgetary appropriations.

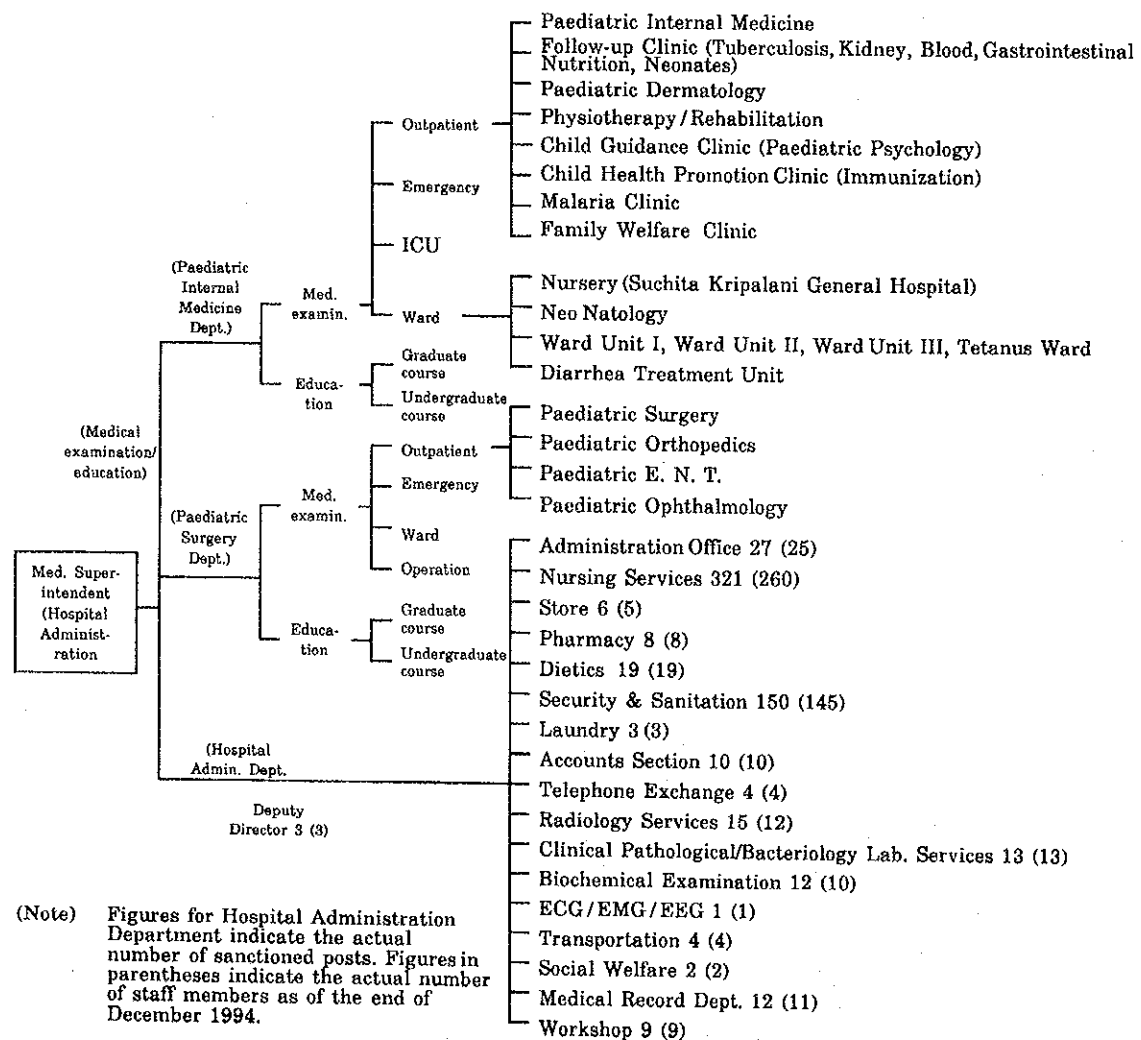


Fig. 2-3 Organization of Kalawati Saran Children's Hospital

Hospital Administration Department of Kalawati Saran Children's Hospital has a total of 619 sanctioned posts, including those of Nursing and Laboratory Departments, of which 544 are actually occupied. The following table shows the present occupied doctors' and nurses' posts.

Table 2-10 Present Situation of Doctors and Nurses in Kalawati Saran Children's Hospital

	Doctor				Physiotherapists senior other	Occupational therapists senior other	Nurses				Others
	Doctors (prof. from LHMC)	Senior doctors	Senior residents	Junior residents			Asst. Nurse Superintendent (ANS)	Public Health Nurses	Nurses Sister (NS)	Nurses	
Paediatric Internal Medicine	Chief (1)										
Paediatric Internal medicine	(6)	<4>	<9>	<6>			<3>		<32>	<66>	
Emergency	(1)	<1>	<9>	<6>			<1>		<12>	<37>	
Neonatal Ward	(2)		<2>	<2>			<1>		<19>	<24>	
Tetanus Patients' Ward	Covered by the Paediatric internist						<1>		<2>	<6>	
Nursery				<3>			<1>		(7)	(13)	
Paediatric Dermatology	(1)		(1)	(1)							
Physical Medicine & Rehabilitation		<2>	<2>		$\frac{1}{5}$ <1>	$\frac{1}{2}$ <1>					
Follow-up Clinic	Covered by the Paediatric internist										
Child Guidance Clinic		Psychologist <1>									Teacher 1 <1>
Child Health Promotion Clinic		<1>						<2>	<3>	<3>	
Malaria Clinic	Examiner from NDMC										
Family Welfare Clinic	(1)		(1)								
Diarrhea Treatment Unit			<2>	<2>					<1>	<2>	
Paediatric Surgery	Chief (1)										
Paediatric Surgery	(1)	<1>	<2>(1)	<2>					<6>	<12>	
Paediatric Orthopedics	(1)		(1)	(1)							
Paediatric E. N. T.	(1)		(1)	(1)							
Paediatric Orthopedics	(1)		(1)	(1)							
Operation Theatre									<3>	<8>	
Radiology			<2>	<1>					<1>	<1>	
Total no. of professionals from LHMC	(17)		(6)	(4)					(7)	(13)	
Total		12 <10>	28 <28>	31 <22>			20 <7>	2 <2>	90 <79>	209 <172>	

Note: Figures in the total column indicate the number of sanctioned posts.  
 Figure in < > indicate the number of actually occupied posts.  
 Figures in ( ) indicate the number of medical professionals from LHMC.  
 NDMC : New Delhi Municipal Committee  
 Senior residents : Doctors who completed graduate course less than 3 years before  
 Junior residents : Doctors who completed undergraduate course less than 3 years before

As can be seen from the above table, the total number of sanctioned posts for doctors, including those for residents, at the hospital is 71, of which 60 are occupied by doctors and residents. In addition to these medical professionals, 17 professors and assistant professors, as well as 10 residents, from Lady Hardinge Medical College are temporarily transferred to the hospital to examine patients. Thus, Kalawati Saran Children's Hospital is operating in close cooperation with Lady Hardinge Medical College. The hospital has a total of 619 sanctioned posts, including those for the medical superintendent, the doctor and the hospital administration department, of which 605 are actually occupied. The post occupancy rate to the sanctioned posts is 87.6 percent.

The following table shows the present staffing of Laboratory Services.

Table 2-11 Staffing of Laboratory Services

Post	Job-rank Grouping	No. of approved posts	Actual number	Remarks
Senior Bacteriologist	A	1	1	In the Indian written request, these staff members are to manage the technical aspects of operations at Biochemistry Lab., Bacteriology Lab., Hematology & Histopathology Lab., and Immune Hematology Lab.
Senior Biochemist	A	1	0	
Junior Biochemist	B	1	1	
Technician's Assistant	C	4	3	
Laboratory Technician	C	9	9	
Laboratory Technician's Assistant	C	4	4	
Laboratory Attendant	D	5	5	
Total		25	23	

In addition to above staff, a professor from Lady Hardinge Medical College will come to supervise the Hematology & Histopathology Lab.

The present staffing of radiology services is as shown in the following table.

Table 2-12 Staffing of Radiology Services

Post	Job-rank Grouping	No. of approved posts	Actual number	Remarks
Senior Radiologist	A	1	0	
Middle-ranking Biochemist	A	1	0	
Technician's Assistant	B	1	1	
X-ray Technician	C	8	8	
Darkroom Assistant	C	3	2	
Low-division Clerk	C	1	1	
<b>Total</b>		<b>15</b>	<b>12</b>	

In addition to the above staff members, two senior residents and a junior resident are to take charge of radiology services.

The following table shows the present staffing of workshop.

Table 2-13 Staffing of Workshop

Post	Job-rank Grouping	No. of approved posts	Actual number	Remarks
Technical Assistant	C	1	1	
Pipeline Operator	C	4	4	
Mechanic	C	1	1	
Autoclave Assistant	C	1	1	
Carpenter (painting/welding)	C	1	1	
Khlas	D	1	1	
<b>Total</b>		<b>9</b>	<b>9</b>	

In addition to the above staff members, a biomedical engineer capable of maintaining medical equipment is to be recruited.

■ Method of Recruitment Employed at Kalawati Saran Children's Hospital

Staff members of Kalawati Saran Children's Hospital are divided into the following 4 categories of posts.

- Group A : Senior doctors in managerial positions, senior nurses and the like
- B : Senior office managers, head nurses, chief pharmacists and the like
- C : Doctors (senior and junior residents), nurses, laboratory technicians, middle office managers and the like
- D : Assistant clerks and the like

Applications for posts in Group A are invited by Union Public Service Commission (UPSC) at the request of the Ministry of Health and Family Welfare of India, the upper organization of the hospital, through advertisements placed in newspapers and other new media. Qualified by the President of India.

Applications for posts in Group B are invited in the same manner as applications for posts in Group A, but qualified applicants are recruited by the Directorate General of Health Services of the Ministry of Health and Family Welfare.

Applications for posts in Group C and Group D are invited through the Employment Exchange Committee, and qualified applicants are recruited by the Medical Superintendent of Kalawati Saran Children's Hospital. In the case of the hospital, the occupancy rate for the sanctioned posts is high, about 90 percent. The Indian side says that there will be no problem with the staffing plan under the Project.

## 2) Organizations and Staffs of the 3 Health Centres

Of the three health centres, Kalyanpuri Urban Health Centre is operated and managed by Lady Hardinge Medical College, while Najafgarh Primary Health Centre and Palam Primary Health Centre are managed by the Rural Health Training Centre in Najafgarh, which is under the control of Directorate General of Health Services, Ministry of Health and Family

Welfare, with the cooperation of Lady Hardinge Medical College on technical aspects.

The organization of Lady Hardinge Medical College is as shown below. The principal of the College is serving concurrently as the medical superintendent of Kalawati Saran Children's Hospital.

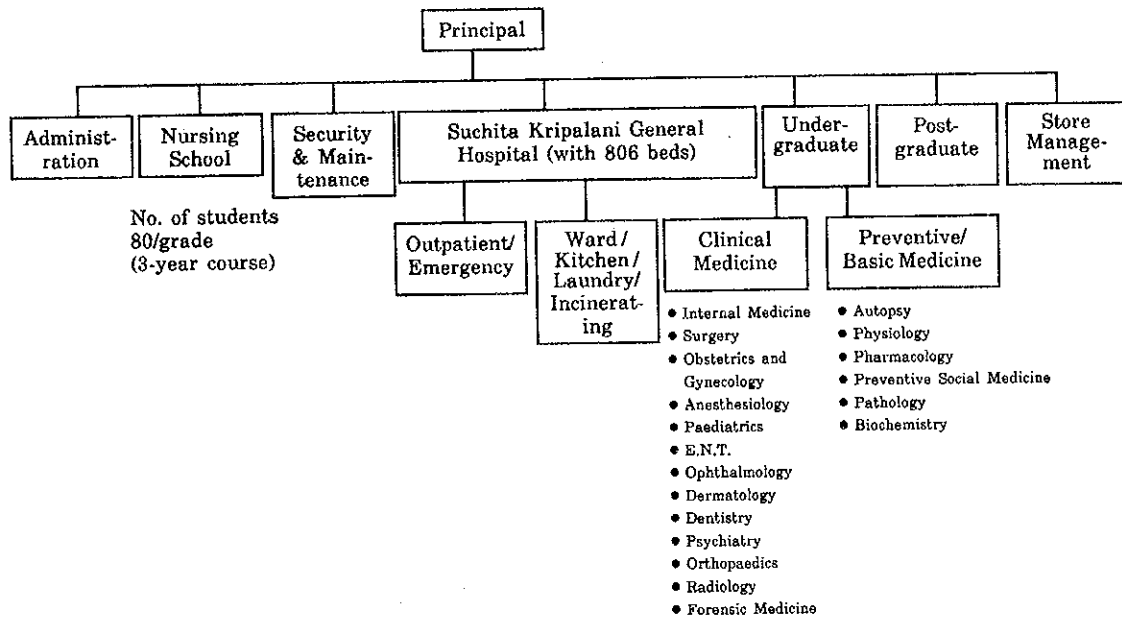


Fig. 2-4 Organization of Lady Hardinge Medical College

Note: 1. Laboratory Department is divided into a number of sections.  
 2. Kalyanpuri Urban Health Centre, Najafgarh Primary Health Centre and Palam Primary Health Centre are managed by Preventive Social Medicine Department.

The Medical College has a staff of 1,667, consisting of a medical superintendent, four additional medical superintendent, 200 instructors and 1,433 other staff members. The occupancy rate to the sanctioned posts is 82.5 percent.

Table 2-14 Staffing of Lady Hardinge Medical College

Breakdown		No. of approved posts	Actual number	Occupancy rate
	Principal	1	1	
	Add. Medical Superintendent	4	3	
Instructors	Director Prof./Professors	42	51	
	Lecturers	2	2	
	Assistants professors	77	53	
	Demonstrators/Tutors Registrars/Sr. Residents	126	114	
	Subtotal	(247)	(220)	(89%)
Non-Teaching Staff		1,768	1,443	81.6%
Total		2,020	1,667	82.5%

(Source: Performance Budget 1994-95, Ministry of Health and Family Welfare)

3) Organization and Staff of Kalyanpuri Urban Health Centre

The organization and staff of Kalyanpuri Urban Health Centre are as shown below. All staff members are dispatched from Lady Hardinge Medical College.

Table 2-15 Staffing of Kalyanpuri Urban Health Centre

Post	No. of posts	Remarks
Professor in charge of the health centre	1	A professor at Preventive Social Medicine Department of LHMC (not permanently stationed)
Medical officer in charge	4	A senior resident, two graduate students and a surgeon (house surgeon) are permanently stationed.
Public Health Nurse	1	Permanently stationed
Pharmacist	1	Permanently stationed
Laboratory technician	1	Permanently stationed
Clerk	1	Permanently stationed
Safaiwala/Chowkidar	1	Permanently stationed
Intern/Trainee	6~7	Permanently stationed
Total	16~17	

(Source: Lady Hardinge Medical College)

All these staff members commute from LHMC because the Health Centre has no boarding facilities.



The organizations and staffs of Najafgarh Primary Health Centre and Palam Primary Health Centre are as shown below.

Table 2-16 Organizations and Staffs of Najafgarh Primary Health Centre and Palam Primary Health Centre

Post	No. of posts	Remarks
Medical Officer in Charge	1	An assistant professor at Preventive Social Medicine Department of LHMC.
Medical Officer	2	
Staff Nurse	1-2	
Public Health Nurse	1-2	
Visitor	4	
Midwife	5	
Laboratory Assistant	1	
Pharmacist	1	
Sanitary Inspector	1	
Others	7-8	
Intern/Trainee	not specified	Dispatched from LHMC
Total	24~27	

(Source: Lady Hardinge Medical College)

### 3-2 Budgetary Appropriations

The annual budget of Kalawati Saran Children's Hospital is about 62 million rupees (1994-95). This amount is equivalent to about one-third of the annual budget of Lady Hardinge Medical College, which includes that of Suchita Kripalani General Hospital (with 806 beds). Personnel expenses accounted for about 50 percent, and the cost of materials and expendable supplies about 30 percent, of the hospital's annual budget for fiscal 1994. The hospital has so far been operating only with budgetary appropriations from the Ministry of Health and Family Welfare. For the future, however, the hospital is considering patients' payment of X-ray film charges and part of bed charges by making single rooms available. The hospital has filed a proposal that its annual budget should be increased when the number of beds increases by 150 from 350 to 500, to the

Directorate General of Health Services of the Ministry of Health and Family Welfare. Its proposed annual budget is about two times as large as that for fiscal 1994.

Table 2-17 Annual Budget of Kalawati Saran Children's Hospital

(Unit: thousands of rupees)

	Actual Expenditure for 1991/93	Actual Expenditure for 1992/93	Actual Expenditure for 1993/94	Budget Estimate for 1994/95	Proposed Budget after increase in no. of beds by 150
1. Salaries	1,67,82	1,93,81	2,39,32	3,10,00	6,23,57
2. Wages (wages for temporary workers)	1,78	1,45	1,62	5,15	6,65
3. Overtime Allowance	—	15	14	20	60
4. (a) Travel Expenses	1	4	—	10	60
(b) Conveyance Allowance	50	75	63	1,25	2,75
5. Office Expenses	5,42	9,61	5,88	9,00	24,00
6. Publication	94	1,99	2	2,00	4,00
7. Machinery & Equipment	69,20	1,62,12	2,47,03	1,06,00	1,06,00
8. Motor Vehicle	15	15	60	1,60	
9. Maintenance	6,61	19,91	6,76	26,20	1,01,20
10. Material & Supply	1,13,86	1,52,10	1,57,69	1,63,00	4,13,00
11. Other Charges	15	4	29	50	1,50
Total	3,66,44	5,42,12	6,59,98	6,25,00	12,83,87

(Note) The amount of each of the above annual budgets is the sum total of the Plan amount and the Non-Plan amount. The Plan amount is the one shown in the 5-year plan and the Non-Plan amount is additional to the Plan amount.

Though the annual budget of Kalawati Saran Children's Hospital has increased by about 20 percent every year from fiscal 1991 to fiscal 1994, the facility and equipment plan under the Project should be planned carefully so that a heavy financial burden may not be imposed on the Government of India when implementing the Project.

The following graph shows changes in the annual budgets of Lady Hardinge Medical College and Kalawati Saran Children's Hospital.

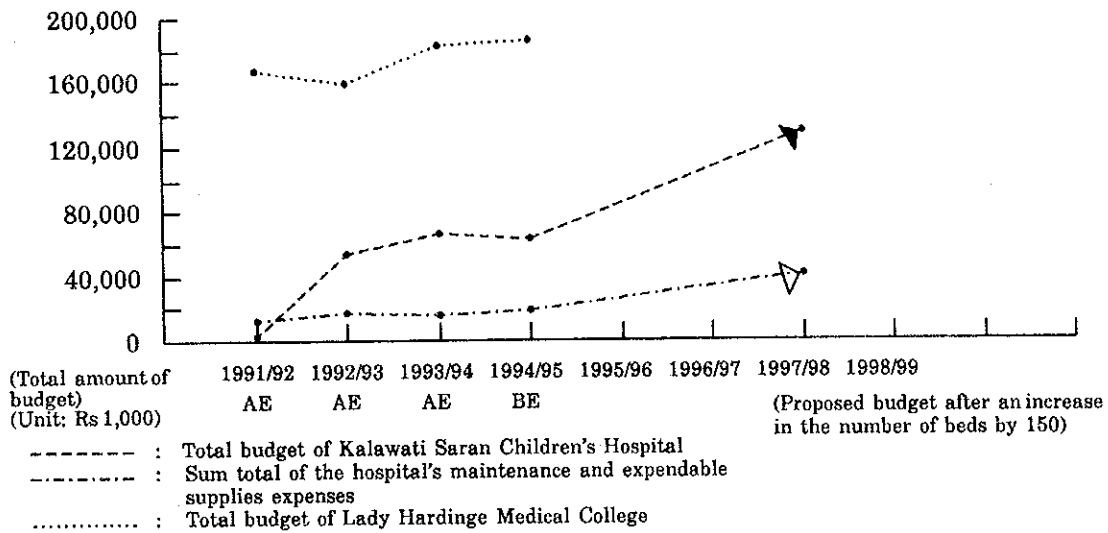


Fig. 2-5 Changes in Annual Budget

Kalyanpuri Urban Health Centre does not have its own budget, budgetary appropriations for its operation and management being made out of the budget of Lady Hardinge Medical College. Changes in the budget of Lady Hardinge Medical College are as shown in the following table.

Table 2-18 Annual Budget of Lady Hardinge Medical College  
(Unit: thousand of rupees)

	1991/92	1992/93	Actual Expenditure for 1993/94	Budget Estimate for 1994/95
1. Salaries	7,19,06	8,26,89	8,59,57	10,20,00
2. Wages	9,42	16,50	17,99	17,00
3. Overtime Allowance	32	34	36	37
4. (a) Travel Expenses	30	32	1,93	2,00
(b) Conveyance Allowance	4,70	6,01	4,39	3,00
5. Office Expenses	154,97	1,49,14	1,83,29	1,89,00
6. Stipend	5	7	36,78	16,33
7. Publication	4,00	27,62	14,54	20,00
8. Machinery & Equipment	5,10,19	2,24,18	2,97,88	2,05,00
9. Motor Vehicle	2,40	4,12	2,09	5,10
10. Maintenance	15,01	69,64	83,88	1,00,00
11. Material & Supply	2,39,68	2,68,03	3,13,07	2,81,00
12. Other	1,30	1,16	1,16	1,20
13. Canteen	2,64	3,64	4,12	5,00
Total	16,64,04	15,97,66	18,21,05	18,65,00

Najafgarh Primary Health Centre and Palam Primary Health Centre, both of which are lower branches of Najafgarh Regional Health Training Centre, do not have their own budgets. The total budget of Najafgarh Regional Health Training Centre for fiscal 1994 is 8.5 million rupees, of which 6.6 million rupees are appropriated for health care services. The table shows a breakdown of the Training Centre's budgetary appropriations for health care services.

Table 2-19 Budget of Najafgarh Regional Health Training Centre  
(Unit: thousands of rupees)

	Budget estimate for 1994/95
1. Salary	52,16
2. Wages	60
3. Overtime Allowance	30
4. Travel Expenses	20
5. Office Expenses	2,00
6. Rent Rates & Taxes	60
7. Material & Supply	9,00
8. Motor Vehicle	30
9. Machinery & Equipment	15
10. Stipend	15
11. Maintenance	15
12. Other Charges	40
Total	66,00

### 3-3 Location and Condition of Project Site

#### (1) Natural conditions

##### ■ Climate conditions in the Delhi region

The National Capital Territory of Delhi is situated at 28° 57" N latitude 77° 12" E longitude. It is located in a semi-arid region with wet and dry seasons. Monthly precipitation exceeds 200mm in July and August. However, precipitation throughout the year is low so the yearly average is only 786.9mm. The temperature difference between the cold and hot seasons

is large. The average temperatures in the months of May and June exceeds 30°C, the maximum temperature reaching up to 45°C. The monthly average temperature between December and February is around 15°C, and the minimum temperature falls to 4°C.

Table 2-20 Weather of Delhi City

Temperature (°C)	Max. average (month)	33.8	(Jun.)
	Min. average (month)	14.2	(Jan.)
	Maximum	45	
	Minimum	3.9	
Humidity (%)	In the month of max. temp. (month)	41	(Jun.)
	In the month of min. temp. (month)	58	(Jan.)
	Max. average (month)	75	(Aug.)
	Min. average (month)	30	(May)
Rainfall (m/m)	Max. average (month)	248.1	(Aug.)
	Min. average (month)	4.9	(Nov.)
	Annual average	786.9	

(2) Water supply at the sites

■ Kalawati Saran Children's Hospital

At the project site, city and well water are combined in 3 underground tanks before it is supplied. From the results of water quality analysis, chlorine ion, solidity and evaporation residue levels did not meet Japanese standards as set by the Ministry of Health and Welfare. Although chlorine ions slightly exceeded standards, their quantity remained small. Chlorine is used to decrease general bacteria and colon bacilli, which were not detected at this time. So by contrast, it was determined that chlorine management is being carried out sufficiently. Chlorine evaporates into the air so the amount of chlorine detected poses no problem taking scattering from

storage into consideration. Solidity and evaporation residue is due to multiple hard-calcium components detected as a result of evaporation residue testing. The results of water analysis testing is attached in the "Appendix" of this report.

■ Kalyanpuri Urban Health Center and Palam Primary Health Center

Well water is supplied regionally to both health centers. The water quality is good, and no particular offensive odor was observed. Therefore, there are no problems regarding the water quality.

(3) Geographical features and soil condition at the sites

■ Kalawati Saran Children's Hospital

The site for the Project, approximately 4,400m<sup>2</sup>, is adjacent to the existing Kalawati Saran Children's Hospital, located on the premises of the Lady Hardinge Medical College and its affiliated Suchita Kripalani General Hospital. The entire site is almost flat and is presently used as a playground, a garden and some internal roads. Moreover, large trees are scattered throughout the existing garden. The results of boring tests carried out during field survey, show that the soil at the site is nearly all homogeneous. Back-filled soil with N-value of 0 to 5 exists down to 3.0m below the surface, 3.0m to 6.0m below the surface, N-value of approximately 10 of sandy silt with trace of ballast, and N-value of 15 to 20 clayey silt with trace of ballast below. Underground water was confirmed at 4.5m below the surface. However, the survey was conducted in the dry season of December, so underground water is expected to rise about 2.0m during the rainy season (June to August).

Note) N-value: Drop 65kg of weight to the drill rods from a height of 75cm, N-value is the number of hits required for

the drill rods to penetrate 30cm into the ground. In general, the harder the ground, the higher the N-value.

#### ■ Kalyanpuri Urban Health Center

The Project site is almost rectangular in shape, 21m×33m (approximately 700m<sup>2</sup>) and flat. Presently, a single-story brick building of approximately 150m<sup>2</sup> is built in the center of the site. Around the building, the entire site is paved with approximately 10cm thick concrete. The results of boring investigations carried out in a field survey have revealed that soil at the site exhibits an N-value of 10 to 13 and is relatively hard clayey silt soil down to 1.5m below the surface after a surface layer of approximately 30cm, followed by N-value 15 to 20 medium fine sandy layer. It was confirmed that underground water lies 3.5m below the surface in the dry season of December. The site is close to the river. Therefore, it is expected that the ground water level will rise to 1.5m below the surface in the rainy season. Results of the boring are attached in the "Appendix" of this report.

#### (4) Condition of the Social Infrastructure

##### 1) Condition of access roads to the site

The Project site and existing Kalawati Saran Children's Hospital face a road approximately 6m wide which passes along the west side of the Lady Hardinge Medical College premises. The main entrance of the existing Kalawati Saran Children's Hospital faces this road. To enter the site, the entrance of the existing hospital is used after completion of facilities. However, during construction, the entrance of the south side will be used so as not to hinder the hospital's activities.

## 2) Construction of Public Facilities

### ■ Kalawati Saran Children's Hospital

- Water Supply:

City water and well water is combined in the underground reservoir and sent to 3 elevated water tanks to supply water to the facilities in the premises. City water is fed to 8 places and well water is pumped from 3 deep tube wells to each underground reservoir tank. Water for each facility in the premises is pumped to 3 elevated water tanks (height 28m - 30m) from the underground reservoir tanks, then supplied to each facility. Water is supplied from 2 elevated water tanks for the Kalawati Saran Children's Hospital. Capacity of these tanks is 227.5kl each, so that supply for the Project is sufficient.

- Sewage

Sewage in the premises is discharged directly to the main sewer pipe under an adjacent road by a combined system of soil water and waste water. Although drainage of the existing Kalawati Saran Children's Hospital is also discharged to the sewer pipe under the adjacent road mentioned above. The diameter of the sewer pipe in the premises is limited. Therefore, it is necessary to establish a new sewer pipe up to the main for exclusive use for this Project (approximately 500m). As for rain water drainage, in accordance with regulations of the National Capital Territory of Delhi, rain water can not be drained to the sewer, so that drainage for rain water of entire premises is treated through natural permeation.



- Electricity

Power is supplied to the existing Kalawati Saran Children's Hospital through a substation located in the College premises. However, total capacity will not be adequate following implementation of the Project, so it will be necessary to feed in extra power by constructing a new substation for the new hospital facilities.

- Voltage : primary voltage (initial power receiving)

11KV 3 phase 3 line 50Hz

secondary voltage

400/230V 3 phase 4 line 50Hz

- Voltage fluctuation and power failures:

Electricity supplied to the substation at Lady Hardinge Medical College is managed by maintenance staff dispatched from the Central Public Works Department (CPWD) and are stationed in the College premises so that voltage fluctuation can be monitored 24 hours a day. The amount of voltage fluctuation is kept within approximately 5%, so voltage is almost stable. However, a voltage regulator is required by each precision equipment to be supplied under the Project. One or two power failures lasting approximately 10 to 15 minutes are experienced in any given. The frequency of power failure is relatively low, however, considering the building is used as a hospital. Generator facilities are necessary as back-up in case a power failure should occur.

- Telephones

Telephoning to the existing Kalawati Saran Children's Hospital is done via telephone exchange installed in the Suchita Kripalani General Hospital on the College premises. Exchange services are carried out via 2-person system. However, the facilities and lines are deteriorating so service to the Kalawati Saran Children's Hospital is insufficient. There are presently 6 lines to the hospital, so 6 to 10 new lines are needed after installing new telephone exchange facility for exclusive use by the Project.

- Kalyanpuri Urban Health Center

- Water supply

The city water main is arranged and supplied to the facility through a 1/2" diameter pipe. However, water pressure of the main is too low to supply sufficient quantity. It is necessary to install a deep tube well on the Project premises.

- Sewage

Sewage is discharged via septic tank by permeation. However, the existing septic tank is deteriorated and impossible to repair. A new septic tank will be constructed for the Project.

- Electricity

Power is supplied after stepping down 400V to 230V by transformer at nearby substation. The results of a survey on electrical conditions indicate that voltage fluctuation is great, so voltage regulators are needed when using precision medical equipment.

■ Palam Primary Health Center

● Water supply

Water is fed in via a 1/2" diameter pipe from the main water line. A concrete elevated tank has been installed. However, it has deteriorated so much that it cannot be used. The city main runs directly between the clinic and the dormitory. However, water stoppages occur frequently during the day. As a result, supply is carried out only at night. It is essential that a deep tube well be installed for the Project. An application is required to bore a well, after which the Central Underground Water Board decides the depth of the tube well and work specifications.

● Sewage

Discharging of sewage is carried out by a permeation system. There are no problems regarding permeation on the premises.

● Electricity

Power is supplied after stepping down 400V to 230V by transformer at a nearby substation. The results of a survey on electrical conditions indicate that voltage fluctuation is great, so voltage regulators are needed when using precision medical equipment.

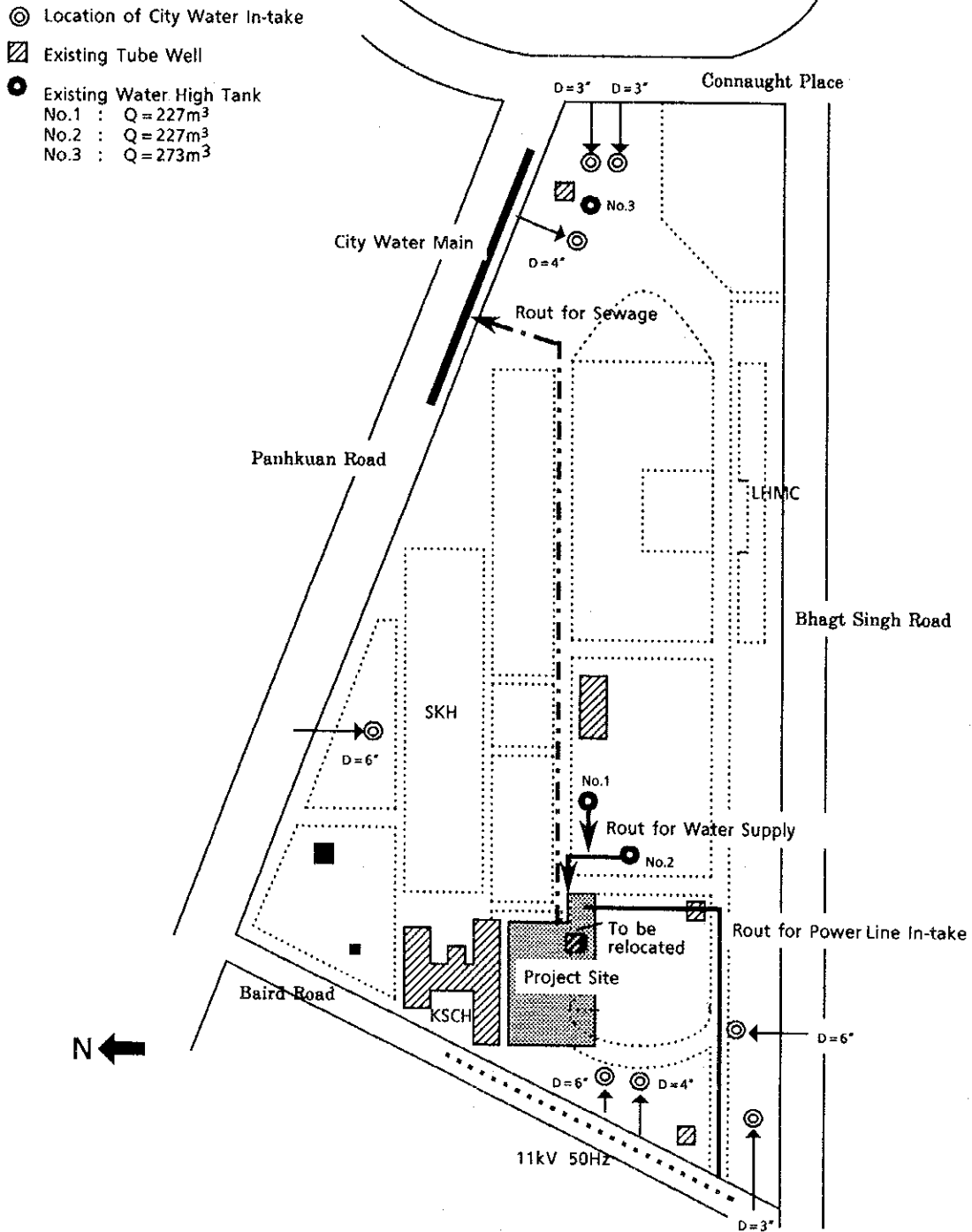


Fig. 2-6 Present Situation of Infrastructures on Lady Hardinge Medical College Premises

(5) Environmental Concerns

In India, the Central Pollution Control Board of the Ministry of Environment and Forest administers various standards on environmental pollution. The major ones relating to facilities are the sewage standards in accordance with the Environmental Protection Rules (1986), and standards on exhaust gas emissions in accordance with the National Ambient Air Quality Standards (1981). However, applications targeted for these regulations are limited to industrial facilities (including hotels), and 61 items in the facilities targeted in detail. In case items for industrial facilities are not applicable, only general industry standards apply. Institutions such as hospitals, schools, test and research institutions do not apply to those standards, and at present, standards have not been established for such facilities. However, even though drainage from the hospital laboratories and general living areas is not subject to regulation, it is natural to consider the processing method to satisfy general industry standards.

General industry standards on drainage and exhaust gases in India are given below.

Table 2-21 General Standards for Discharge of Effluents

Parameter	Standards			
	Inland surface water	Public sewers	Land for irrigation	Marine coastal areas
1. Colour and odour	eliminate as much	—	eliminate as much	eliminate as much
2. Suspended solids (mg/l)	100	600	200	100
3. Particle size of suspended solids	shall pass 850 micron IS Sieve	—	—	Floatable solids, Max. 3mm Settleable solids Max. 850 microns
4. dissolved solids (inorganic), (mg/l)	2,100	2,100	2,100	
5. pH value	5.5~9.0	5.5~9.0	5.5~9.0	5.5~9.0
6. Temperature (°C)	40	45	—	45
7. Oil and grease, (mg/l)	10	20	10	20

Parameter	Standards			
	Inland surface water	Public sewers	Land for irrigation	Marine coastal areas
8. Total residual chlorine, (mg/l)	1.0	—	—	1.0
9. Ammonical nitrogen (as N), (mg/l)	50	50	—	50
10. Total Kjeldahl nitrogen (N) (mg/l)	100	—	—	100
11. Free Ammonia (mg/l)	5.0	—	—	5.0
12. B.O.D.	30	350	100	100
13. C.O.D.	250	—	—	250
14. Arsenic (mg/l)	0.2	0.2	0.2	0.2
15. Mercury (mg/l)	0.01	0.01	—	0.01
16. Lead (Mg/l)	0.1	0.1	—	0.1
17. Cadmium (mg/l)	2.0	1.0	—	2.0
18. Hexavalent chromium (mg/l)	0.1	2.0	—	1.0
19. Total chromium (mg/l)	3.0	3.0	—	3.0
20. Copper (mg/l)	5.0	15	—	15
21. Selenium (mg/l)	0.05	0.05	—	0.05
22. Nickel(mg/l)	3.0	3.0	—	3.0
23. Boron (mg/l)	2.0	2.0	2.0	—
24. Per sodium, Max(mg/l)	—	60	60	—
25. Residual sodium carbonate, (mg/l)	—	—	5.0	—
26. Chloride Cl(mg/l)	1000	1000	600	—
27. Fluoride F(mg/l)	2.0	15	—	15
28. Dissolved Phosphates P(mg/l)	5.0	—	—	—
29. Sulphate SO <sub>4</sub> (mg/l)	1000	1000	1000	—
30. Sulphide S(mg/l)	2.0	—	—	5.0
31. Pesticides	0	0	0	0
32. Phenolic compounds C <sub>6</sub> H <sub>5</sub> OH (mg/l)	1.0	5.0	—	5.0
33. Radioactive materials				
(a) α emitters (MC/l)	10 <sup>-7</sup>	10 <sup>-7</sup>	10 <sup>-8</sup>	10 <sup>-7</sup>
(b) β emitters (μC/l)	10 <sup>-8</sup>	10 <sup>-8</sup>	10 <sup>-7</sup>	10 <sup>-6</sup>

(Source: Central Population Control Board)

Table 2-22 National Ambient Air Quality Standards

Pollutant	Time weighted average	Concentration in ambient air			Method of measurement
		Industrial Area	Residential, rural & other areas	Sensitive Area	
Sulphur Dioxide (SO <sub>2</sub> )	Annual Average	80µg/m <sup>3</sup>	60µg/m <sup>3</sup>	15µg/m <sup>3</sup>	Improved West and Gaoke method
	24 hours	120µg/m <sup>3</sup>	80µg/m <sup>3</sup>	30µg/m <sup>3</sup>	Ultraviolet fluorescence
Oxides of Nitrogen (NO <sub>2</sub> )	Annual Average	80µg/m <sup>3</sup>	60µg/m <sup>3</sup>	15µg/m <sup>3</sup>	Jacob & Hockheister modified
	24 hours	120µg/m <sup>3</sup>	80µg/m <sup>3</sup>	30µg/m <sup>3</sup>	
SPN	Annual Average	360µg/m <sup>3</sup>	140µg/m <sup>3</sup>	70µg/m <sup>3</sup>	
	24 hours	500µg/m <sup>3</sup>	200µg/m <sup>3</sup>	100µg/m <sup>3</sup>	
RPM	Annual Average	120µg/m <sup>3</sup>	60µg/m <sup>3</sup>	50µg/m <sup>3</sup>	Respirable particulate matter sampler
	24 hours	150µg/m <sup>3</sup>	100µg/m <sup>3</sup>	75µg/m <sup>3</sup>	
Lead (Pb)	Annual Average	1.0µg/m <sup>3</sup>	0.75µg/m <sup>3</sup>	0.5µg/m <sup>3</sup>	
	24 hours	1.5µg/m <sup>3</sup>	1.00µg/m <sup>3</sup>	0.75µg/m <sup>3</sup>	
Carbon Monoxide	8 hours	5.0mg/m <sup>3</sup>	2.0mg/m <sup>3</sup>	1.0mg/m <sup>3</sup>	
	1 hour	10.0mg/m <sup>3</sup>	4.0mg/m <sup>3</sup>	2.0mg/m <sup>3</sup>	

(Source: Central Population Control Board)

### 3-4 Maintenance and Management Plan

#### (1) Facility Maintenance

In designing the planned facilities, the scope of air conditioning should be limited and natural lighting and ventilation should be considered as much as possible so that the maintenance cost under the Project may not hamper implementation of the Project. Daily inspection of the facilities and building equipment, maintenance of building equipment in accordance with the instruction manuals and repairs will be conducted by the maintenance staff members from the Central Public Works Department (CPWD) stationed at the Maintenance Department of Lady Hardinge Medical College.

(2) Medical Equipment Maintenance

The medical equipment maintenance and management system are as shown in the following table.

Table 2-23 Maintenance & Management System on Medical Equipment

Maintenance and Management Operations		Maintenance and Management System	
Maintenance and management of medical equipment	Daily inspection	Precision management.....	To be conducted mainly by doctors and laboratory technicians in charge.
		Inspection of equipment cleaning and lubrication, replacement of expendable supplies, adjustment .....	To be conducted by equipment operators
	Repairs	In-house repairs .....	To be conducted at the workshop.
		Repairs by manufacturers .....	Suppliers are requested to do repairs.
		Annual maintenance contract .....	Under such maintenance contract, the equipment is to be inspected and adjusted every 1 to 4 months.

At present, such items of simple equipment such as suction unit and operating tables are repaired at the workshop. The equipment maintenance and management system is to be worked out and implemented by the workshop, but no bio-medical engineers are stationed at the workshop (applications for this post are being invited). Those items of equipment which require repairs by manufacturers' engineers are taken care of by suppliers. Expendable supplies for these items are also provided through these suppliers.

Some items of equipment require annual maintenance contracts to use them and maintain them in satisfactory condition. Some existing equipment use such annual maintenance contracts.



Table 2-24 Annual Maintenance Contracts for Existing Items of Equipment

Equipment	Q'ty	Contractor	Terms and conditions of contract
1. Portable incubator	7	Rustagi Surgical	Inspected and adjusted every month.
2. Pulse oximeter	6	Rustagi Surgical	Inspected and adjusted every month.
3. Autoanalyzer	1	J. Mitra & Sons	Inspected and adjusted every 4 months.
4. Blood corpuscle counter	1	J. Mitra & Sons	Inspected and adjusted every 4 months.
5. X-ray equipment	2	Wripto GE Pvt. Ltd.	Inspected and adjusted every 4 months.
6. Electromyograph	1	Cardiotrace Pvt. Ltd.	Inspected and adjusted every 4 months.
7. Artificial respiratory machine	4	Rustagi Surgical	Inspected and adjusted every month.
8. Artificial respiratory machine	3	Medicare	Inspected and adjusted every month.
9. Artificial respiratory machine	1	Usha Dragger	Inspected and adjusted every 4 months.
10. Open-type treatment device	6	Rustagi Surgical	Inspected and adjusted every month.
11. Blood gas analyzer	2	Kopran Ltd.	Inspected and adjusted every 4 months.
12. Blood gas analyzer	1	AVL Pvt. Ltd.	Inspected and adjusted every 4 months.
13. Oxygen producing equipment	6	Elder	Inspected and adjusted every 4 months.
14. Oxygen analyzer	2	IOL	Inspected and adjusted every 4 months.
15. Water softener	1	Indian, Nat steel works	Inspected and adjusted every 4 months.
16. Ultrasonic diagnosis equipment	1	Rustagi Surgical	Inspected and adjusted every 4 months.
17. Ultrasonic diagnosis equipment	1	Cardiotrace Pvt. Ltd.	Inspected and adjusted every month.

The following table shows those items of equipment to be procured under the Project for which it is desirable to conclude similar annual maintenance contracts.

Table 2-25 Items of Equipment to Be Procured under the Project for which It Is Desirable to Conclude Annual Maintenance Contracts

Equipment	Q'ty	Terms and conditions of contract
1. X-ray equipment for use in diagnosis (with 2 bulbs and a TV)	1	To be inspected and adjusted every 4 months
2. Movable X-ray equipment	2	To be inspected and adjusted every 4 months
3. Collared doppler ultrasonic diagnosis equipment	1	To be inspected and adjusted every 4 months
4. Automatic blood corpuscle counter	1	To be inspected and adjusted every 4 months
5. Artificial respiratory machine	6	To be inspected and adjusted every 4 months
6. Anesthetization equipment	3	To be inspected and adjusted every 4 months
7. Higher-pressure sterilizer	3	To be inspected and adjusted every 4 months
8. Ultrasonic cleaning machine	1	To be inspected and adjusted every 4 months
9. Ethylene oxide sterilizer	1	To be inspected and adjusted every 4 months
10. Dialyzes	2	To be inspected and adjusted every 4 months
11. Ultrasonic diagnosis equipment for dental use	1	To be inspected and adjusted every 4 months
12. Argon laser equipment	1	To be inspected and adjusted every 4 months
13. Washing machine	3	To be inspected and adjusted every 4 months
14. Dewaterer	2	To be inspected and adjusted every 4 months
15. Dryer	3	To be inspected and adjusted every 4 months

### (3) Tentative Calculation of the Operation Cost

The operation cost of Kalawati Saran Children's Hospital is divided broadly into personnel expenses, office expenses, facility maintenance and management expenses and equipment maintenance and management expenses. Since the Project aims to expand the hospital's existing facilities, not at increasing staff after procurement of the planned facilities and equipment, only the facility maintenance and management expenses and the equipment maintenance and management expenses are tentatively calculated for implementation of the Project.

1) Facility Maintenance and Management Expenses

① Electricity Expenses

○ Estimated power consumption

Calculating conditions:

- The times for operation of lighting fixtures, sanitary equipment, air conditioners and medical equipment is calculated on the assumption that the planned facilities will be used 293 days a year (actual working days in 1993) and that the net working rate will be 0.2, which is a standard rate for medical facilities.

Table 2-26 Electric Power Consumption

Item	Equipment load	Power consumption
General Lighting	125 kW	$125 \text{ kW} \times 24.0 \text{ h/day} \times 293 \text{ day/year} \times 0.2 = 1,75,500 \text{ kWh/year}$
Air conditioning/ Ventilation	240 kW	$240 \text{ kW} \times 24.0 \text{ h/day} \times 192 \text{ day/year} \times 0.2 = 2,21,200 \text{ kWh/year}$
	680 kW	$680 \text{ kW} \times 8.0 \text{ h/day} \times 192 \text{ day/year} \times 0.2 = 2,08,900 \text{ kWh/year}$
Medical Equipment	800 kW	$400 \text{ kW} \times 24.0 \text{ h/day} \times 293 \text{ day/year} \times 0.2 = 5,62,600 \text{ kWh/year}$
		$400 \text{ kW} \times 8.0 \text{ h/day} \times 293 \text{ day/year} \times 0.2 = 1,87,500 \text{ kWh/year}$
Other	65 kW	$65 \text{ kW} \times 8.0 \text{ h/day} \times 293 \text{ day/year} \times 0.2 = 30,500 \text{ kWh/year}$
Total		13,86,500 kWh/year

○ Calculation of charges

- Basic rate :  $1,000 \text{ kVA} \times 60 \text{ Rs/kVA} \cdot \text{month} \times 12 \text{ month/year}$   
= 7,20,000Rs/year

- Electricity charges:  $13,86,500 \text{ kWh} \times 1.7 \text{ Rs/kWh}$   
= 23,57,000Rs/year

Total                      30,77,000Rs/year ..... ①

② Telephone charges

Local calls: 100 calls/day (less than 3 minutes each call)

100 calls×26days/months×12months/year×1.1Rs

= 34,320 Rs/year

Long-distance calls:

20 calls/day (less than 3 minutes each call)

20 calls×26days/months×12months/year×180seconds

×0.8Rs/sec.= 4,49,280 Rs/year

Total 4,84,000 Rs ..... ②

Total facility maintenance and management cost (①+②)

30,77,000Rs/year+4,84,000 Rs/year=35,61,000Rs/year

2) Medical Equipment Maintenance and Management Cost

Cost of annual maintenance contracts: 58,49,000 Rs/year .... ①

Cost of expendable supplies: 46,60,000 Rs/year .... ②

Cost of spare parts: 22,75,000 Rs/year .... ③

Total equipment maintenance and management cost (①+②+③)

58,49,000Rs/year+46,60,000Rs/year+22,75,000Rs/year=1,27,84,000Rs/year

Grand Total 1,63,45,000 Rs/year

Above total expense 1,63,45,000 Rs/year is about 12.7% of the proposed budget for Kalawati Saran Children's Hospital after their increase in number of beds by 150.