MINISTRY OF HEALTH AND FAMILY WELFARE
INDIA

No. 1

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE IMPROVEMENT
OF
MEDICAL EQUIPMENT
FOR
THE INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN
IN
INDIA

MARCH, 1997

JAPAN INTERNATIONAL COOPERATION AGENCY
DAIICHI HEALTH CARE FACILITY CONSULTANTS INC.

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PREFACE

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

JICA sent to India a study team from 29 August, 1996 to 27 September, 1997.

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 the Republic of India for their close cooperation extended to the teams.

March, 1997

Kimio Fujita
President
Japan International Cooperation Agency

March, 1997

Letter of Transmittal

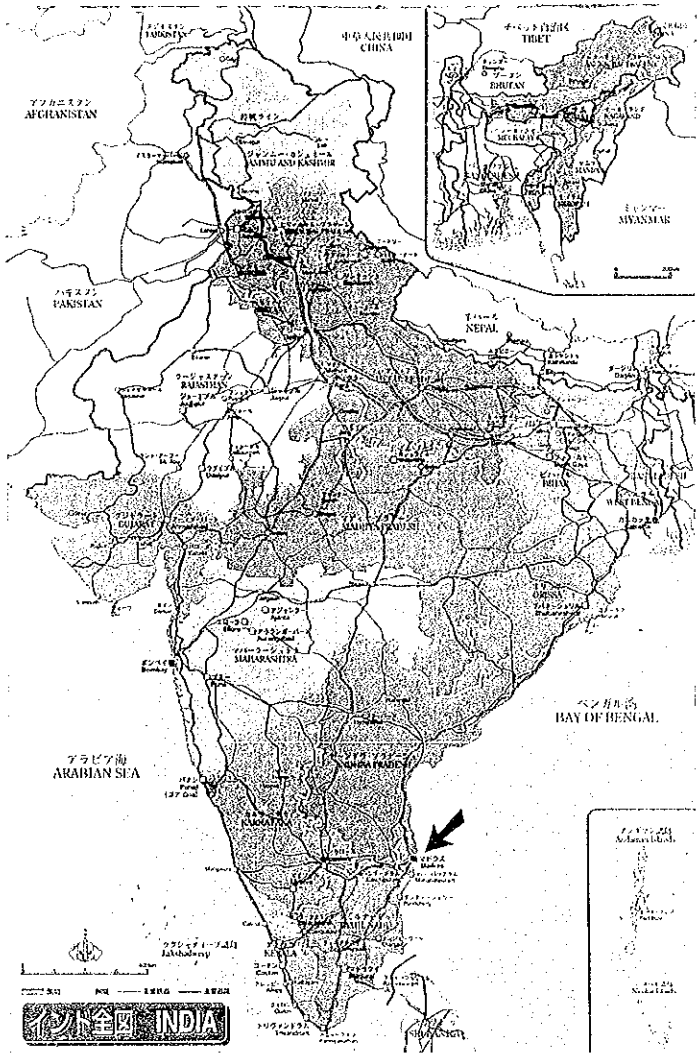
We are pleased to submit to you the basic design study report on the Project for the Improvement of Medical Equipment for the Institute of Child Health and Hospital for Children.

This study was conducted by Daiichi Health Care Facility Consultants Inc., under a contract to JICA, during the period from August 22, 1996 to March , 1997. 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,

Junko Tsuda
Project Manager
Basic Design Study Team on the
Project for the Improvement of
Medical Equipment for the Institute
of Child Health and Hospital for Children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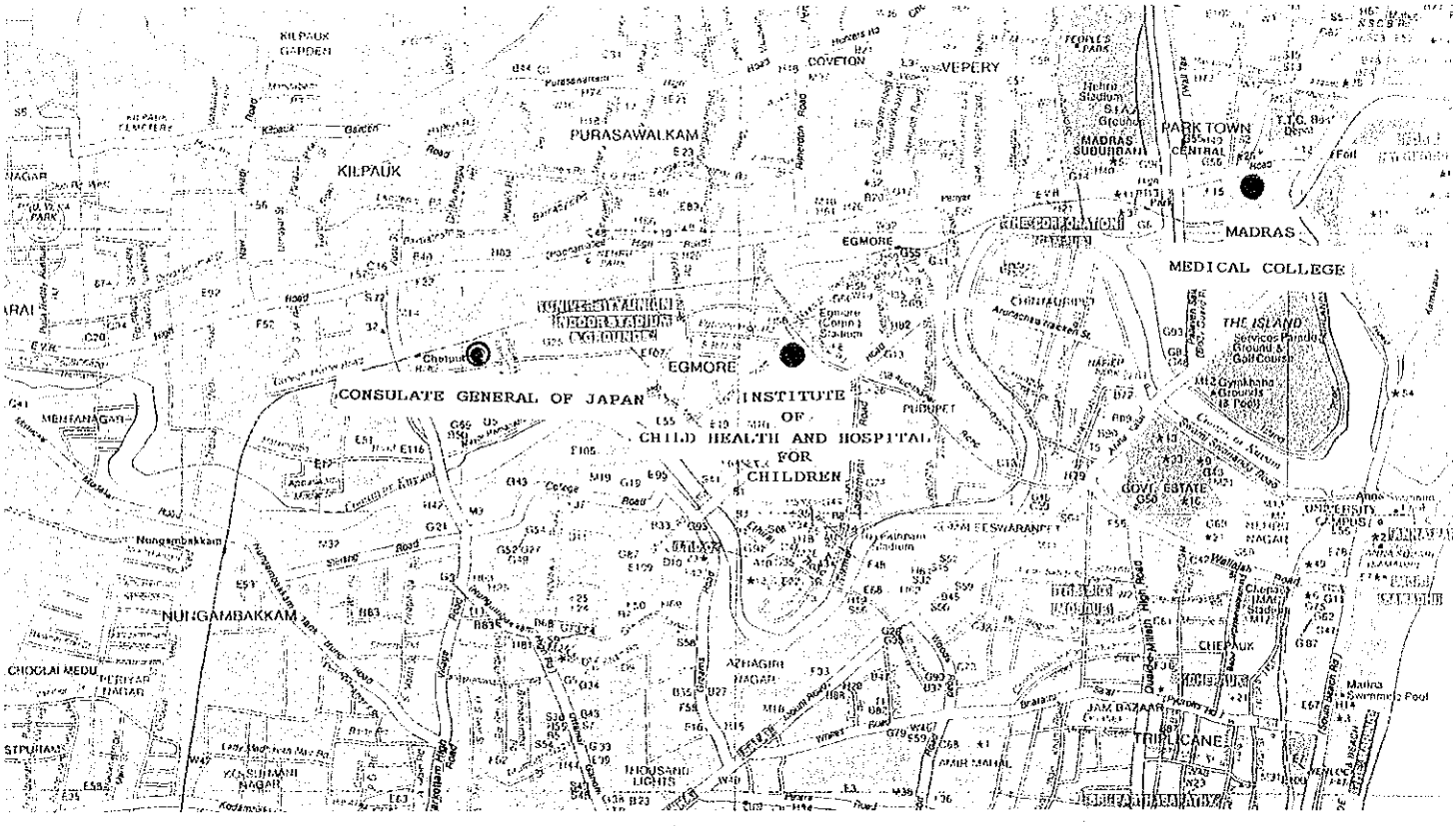
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PURASAWALKAM
COVETON
VEPERY
PARK TOWN
MADRAS
MEDICAL COLLEGE
EGMORE
CONSULATE GENERAL OF JAPAN
INSTITUTE OF CHILD HEALTH AND HOSPITAL FOR CHILDREN
THE ISLAND
NUNGAMBAKKAM
CHOOLAI MEDU
CHEPAUK
TRIPLICANE
THOUSAND LIGHTS

ABBREVIATIONS

AMC	Annual Maintenance Contract
A/P	Authorization to pay
B/A	Banking Arrangement
CSSM	Child Survival and Safe Motherhood
CT	Computed Tomography
DME	Director of Medical Education
DANIDA	Danish International Development Agency
ECG	Electrocardiograph
E/N	Exchange of Notes
ENT	Ear/Nose/Throat
GH	Government General Hospital
GNP	Gross National Product
ICU	Intensive Care Unit
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
N.A	Not Applicable
NORAD	Norwegian Agency for International Development
ODA	Overseas Development Administration
O/M	Operation and Maintenance
R/D	Record of Discussion
RC	Reinforced Concrete
UIP	Universal Immunization Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	U.S Agency for International Development
UP	Uttar Pradesh
WHO	World Health Organization

SUMMARY

The central government of India has been launching its 8th Five Year National Development Plan (1992-97), whose approach is the following four fold focuses:

① Clear prioritization of sectors/projects for investment in order to facilitate operationalisation and implementation of the policy initiatives taken in the areas of fiscal, trade and industrial sectors and human development.

② Making resources for these priority sectors available and ensuring their effective utilization; and completion of projects on schedule avoiding cost and time overruns;

③ Creation of a social security net through employment generation, improved health care and provision of extensive education facilities throughout the country; and

④ Creation of appropriate organizations and delivery systems to ensure that the benefits of investment in the social sectors reach the intended beneficiaries.

The National Health Policy issued in 1983 stipulates the improvement in health status as a stated objective in the development policy of India, with an approach of designing and creating a publicly financed and publicly managed system of health services throughout the country. The strategic purpose of the establishment of social security by the provision of health care services is also based on the principles of the National Health Policy.

Some statistical data as of 1994 shows the current health care status of India: average birth rate is 28.5/1000 persons (9.8/1000 in Japan in 1992), death rate is 9.2/1000 persons (9.2/1000 in Japan in 1994), life expectancy is 62 years (79 in Japan in 1994), infant mortality rate is 74/1000 live births (4/1000 in Japan in 1994), mortality rate of children under five is 119/1000 persons (6/1000 in Japan in 1994). Some indices pertinent to the health conditions of children indicate the underdeveloped status. The government of India has prioritized the improvement of public health care as the national development policy, particularly with emphasis on the reduction of mortality and birth rates. Furthermore, in order to eradicate some common diseases such as respiratory disease and diarrhea, efforts have been made to promote health education and public health care services and health facilities.

In fact, there are some private hospitals which can serve advanced medical care services in India. However, they are hardly accessible to poor people, which occupy about 40% of the whole population, because they can not afford to pay for the high medical fees. Therefore, the improvement of public hospitals is highly needed.

The public health services of Madras in Tamil Nadu State, unlike other regions of the State, are covered by 14 teaching hospitals affiliated to three medical colleges in Madras, which are under direct supervision of the Health and Family Welfare Department of the Government of Tamil Nadu . These teaching hospitals have functions both as special hospitals like Institute of Child Health & Hospital for Children and general hospitals like Government General Hospital.

The Institute of Child Health and Hospital for Children located in the capital of Tamil Nadu State, Madras, has the vast catchment area as the top referral hospital of the State further covering two neighboring states of Karnataka and Andhra Pradesh. The average number of in-patient is 460/day and out-patients 2000/day. Most of the patients admitted to the Institute of Child Health & Hospital for Children are children between 0 and 12-year old from poor family, the average income of which is less than 1000 rupees per month. Institute of Child Health &Hospital for Children provides free public health care services as well as opportunities for community people to learn public health and for medical college students to get clinical training. It is also specialized in pediatrics with functions of researching and providing basic medical services (primary and secondary) and specialty services (tertiary) as the top referral hospital in the field of pediatrics in Tamil Nadu State and its neighboring states (Karnataka and Andra Pradesh). However, the current situation of the Institute of Child Health & Hospital for Children does not cope with the increasing number of patients and provide adequate medical services due to shortage and obsolescence of the medical equipment. Under these situation, the government of India has requested to the government of Japan the provision of grant aid for the Project for the Improvement of Medical Equipment for the Institute of Child Health & Hospital for Children (hereinafter referred as ICH & HC).

In response to the request, the government of Japan has decided to conduct the basic design study and to send a mission for the study organized by the Japan International Cooperation Agency between August 29 and September 27 of 1996, followed by the mission to discuss on the draft basic design report prepared by the mission between December 12 and 20 of 1996.

The mission had the following objectives.

- To study the pattern and kinds of disease common among children in Tamil Nadu State in order to prioritize departments and equipment which the Project should focus on.
- To make the equipment plan in the basic principle of replacement and supplement to meet the expected roles of the institute with consideration of the strength of the hospital staff and their technical level.
- To suggest an appropriate scope of the Project by confirming the capacity of the operation and maintenance system particularly in the aspect of financial sustainability to provide the required services.
- To suggest the equipment plan together with an appropriate operation and maintenance plan, including the possibility of local/third country procurement from the view point of compatibility with the existing equipment.

The equipment planned is summarized as Table-1 hereunder.

TABLE-1 MAIN EQUIPMENT LIST

EQUIPMENT	Q'ty
NEONATOLOGY	
Infant Incubator	5
Open Care System	2
Infant Warmer	5
Phototherapy Unit	8
Syringe Infusion Pump	5
Pulse Oxymeter	2
Neonatal Ventilator	1
Resuscitation Bag with Laryngoscope	3
Neonatal Monitor (HR,ECG,RR)	5
Oxygen Hood	10
Bilirubin Analyzer	1
Transport Incubator	1
Microscope	1
Opthalomoscope	3
Infusion Pump	7
RADIOLOGY DEPARTMENT	
500mA X-ray TV Unit with Image Intensifier	1
Color Doppler Ultrasound Scanner	1
Ultrasound Scanner	1
Whole Body CT Scanner	1
Mobile X-ray Unit	2
X-ray Unit with C Arm	1
Dark Room Accessories	1
MICROBIOLOGY	
Incubator	1
Water Bath	1
Medical Refrigerator	2
Mixer for Test Tube	1
ANESTHESIOLOGY DEPARTMENT	
Operating Table	6
Suction Unit	10
Infusion Pump	5
Syringe Infusion Pump	5
Operating Light with TV Monitor	1
Operating Light	6
Operating Light with Focused Spot Light	2
Anesthesia Machine with Ventilator and Monitor	6
Defibrillator	2

EQUIPMENT	Q'ty
Multi Channel Patient Monitor	2
Portable Light	6
Instrument Trolley Table	26
Instrument Cabinet	6
Operating Instrument Set	6
Patient Temperature Control Machine	6
Blood Gas Analyzer	1
Handwashing Sink Unit	6
Pulse Oxymeter	6
Electro Cautery	6
Infant Warmer	2
PEDIATRIC HEMATOLOGY AND ONCOLOGY	
Binocular Microscope with Camera	1
Binocular Microscope with 3 Teaching Adapter	1
Hand Tally Counter	1
Infusion Pump	10
Slide Projector	1
Syringe Infusion Pump	5
PEDIATRIC SURGERY	
Infant Warmer	4
Infusion Pump	10
Infant Ventilator	1
Pediatric Ventilator	1
Phototherapy Unit	2
Syringe Infusion Pump	5
Multichannel Patient Monitor	2
Infant Incubator	2
Open Care System	2
Pulse Oxymeter	4
PEDIATRIC NEPHROLOGY	
Patient Cot with Weighing Machine	2
Binocular Microscope	1
PEDIATRIC PATHOLOGY	
Binocular Microscope	4
Water Bath	1
pH Meter	1
Haematocrit Centrifuge	1
Hand Tally Counter	3

EQUIPMENT	Q'ty
Centrifuge	2
Fluorescent Microscopy with Photomicrograhic App.	1
Automated Blood Cell Counter	1
Slide Projector	1
BIOCHEMISTRY DEPARTMENT	
pH Meter	1
Electorolyte Analyzer	1
Calorie Meter	2
HOSPITAL ADMINISTRATION	
Personal Computer with Printer	2
Photocopy Machine	1
Cyclostyle Machine	1
MEDICAL REGISTER - TEACHING	
Slide Projector	2
Overhead Projector	2
MEDICAL RECORDS DEPARTMENT	
Personal Computer with Printer	1
Photocopy Machine	1
PEDIATRIC PULMONOLOGY	
Spirometer	1
Fiber Bronchoscope with TV Monitor	1
Pulse Oxymeter	1
Ultrasonic Nebulizer	5
PEDIATRIC NEUROLOGY	
EEG	1
EMG with Evoked Probe	1
PHYSICAL MEDICINE AND REHABILITATION	
Microwave Therapy Apparatus	1
Paraffin Bath	1
Dumbbell Set	1
Laser Therapy Unit	1
PEDIATRIC ORTHOPEDICS	
Electrical Surgical Saw	1
Spinal Surgical Set	1

EQUIPMENT	Q'ty
Nerve Stimulator System	1
Physiotherapy Bed	5
Traction Unit	5
SCHOOL HEALTH CELL - PREVENTIVE AND SOCIAL-HEALTH EDUCATION DEPT.	
Van	1
Refrigerator	1
Weighing Machine	2
PARENT CRAFT CENTRE	
Exhibition Display System	10
Exhibition Display Kit	2
Combination Board Magnetic Cum Felt	4
Infant Weighing Machine	2
Close Circuit TV	1
V.C.R.	1
Video Camera	1
Epidiascope OHP	1
Slide Projector	1
Photocopy Machine	1
Tape Recorder	1
Model Human System	1
GASTROENTEROLOGY DEPARTMENT	
Pediatric Crossby Jejunal Mucosal Biopsy Set	1
Microscope	1
Pediatric Upper Gastro Intestinal Endoscope	1
EMERGENCY CASUALTY OP.	
Medicine Refrigerator	1
Refrigerator	1
Ultrasonic Nebulizer	4
Stretcher with O2 and IV Set	3
Wheel Chair	3
Suction Apparatus	3
Anesthetic Machine	1
ECG, 1ch	2
Infant Warmer	2
Defibrillator	1
Laryngoscope	2
Examination Light	3
Diagnostic Set	3

EQUIPMENT	Qty
ENT DEPARTMENT	
Otorhinolaryngological Examination Table	3
Mobile Operating Light	1
Optical Fiber Light source for E.N.T.	1
Micro surgery Instrument for E.N.T.	1
Pediatric Hearing Tester	1
Otorhinolaryngological Treatment Unit	1
Instrument Set for Otorhinolaryngological Examination	5
Otorhinolaryngoscope	3
Head Mirror	5
Deep Freezer	1
ENT Operating Microscope with TV Set	1
Telescopic F.B. Forceps No.3.5	1
Impedance Audiometer	1
Dental Chair	1
Dental Unit	1
Ultrasonic Scaler	1
Light Cure Apparatus	1
Intra Oral X-ray Unit	1
Dark Room Equipment	1
Hand Instrument	1
Hot Air Sterilizer	1
GENERAL PEDIATRIC MEDICAL WARDS 7 UNITS	
Weighing Machine	9
Infant Weighing Machine	9
Static Meter	9
Infantmeter	9
Infusion Pump	18
Opthalmoscope	9
Pulse Oxymeter	3
Oxygen Hood	18
Resuscitation Bag	18
Examining Light	9
BLOOD BANK	
Refrigerated Centrifuge	1
Laboratory Incubator	1
Water Bath	1

EQUIPMENT	Qty
INTENSIVE MEDICAL CARE UNIT	
Infusion Pump	10
Defribillator	1
Pulse Oxymeter	2
Infant Warmer	3
Pediatric Ventilator	1
Neonatal Ventilator	1
Ultrasonic Nebulizer	2
Microscope	1
Capnograph	1
Bilirubinmeter	1
Ophtalmoscope	3
Syringe Infusion Pump	5
Multichannel Monitor	2
Electorolyte Analyzer	1
Examining Light	1
Stretcher Trolley	1
AUTOPSY ROOM	
Morgue Refrigerator, Two Bodies	1
PEDIATRIC CARDIOLOGY AND	
Ultrasonic Nebulizer	3
Horizontal Sterilizer	1
Infant Warmer	3
Oxygen Hood	3
Electrocardiogram	1
Neonatal Ventilator	1
Infant Ventilator	1
Pulse Oxymeter	2
Syringe Infusion Pump	5
Infusion Pump	5
Heart Lung Machine	1
Hypothermia Machine	1
Patient Monitor, 6 Channels	1
Patient Monitor, 4 Channels	4
Defibrillator	1
Surgical Diathermy	2
Portable Echo Machine	1
Operating Light with TV Monitor	1
Operating Light	2
Operating Table	2

EQUIPMENT	Qty
Anesthetia Machine with Ventilator	2
Centrifugal Pump with ECMO	1
Blood Coagulation App.	1
Fiberoptic Laryngoscope	2
Tagarno (Cinefilm Projector)	1
Ethylene Oxide Sterilizer	1
Table Top Sterilizer	6
Doppler Flow Meter	1

EQUIPMENT	Qty
AV. Sequential Pacemaker	2
Demand Pacemaker	2
Blood Gas Analyser	1
Color Doppler Ultrasound Scanner	1
HOSPITAL (FACILITY)	
Generator	1
PB. Box	1

The maintenance of the medical equipment existing in ICH & HC is undertaken by Electronics Corporation of Tamil Nadu (ELCOT LTD.) or local agents of the manufacturers under the annual maintenance contract (AMC). Therefore, ICH & HC does not perform maintenance works and then no special staff is allocated. The performance of ELCOT LTD., which has been mainly in charge of caring basic equipment, is satisfactory to some extent since it does not require special expertise and skills. For those that ELECOT LTD. can not cover the maintenance are undertaken by the local agents of the manufacturers under the AMC. The relevant performance is satisfactory as the local agents have their own service network through which required knowledge and skills are updated and the supply of necessary reagents and consumable are secured.

The budget required for the Project amounts to 100,000 rupees for Indian portion. The schedule to implement the Project would require five months for the detailed designing and seven months for the procurement and installation of the equipment.

The expected results of this Project are:

1) To improve medical services of the hospital by strengthening the diagnostic functions;
   By procuring diagnostic equipment such as X-ray unit of various kind and Ultrasound scanner, the current functions of Radiology Department would be strengthened with expanding the scope of diagnosis and improving the quality of services. For instance, patients who need examination by CT scanner are currently transferred to one of the other hospitals (Government General Hospital located 5km away from ICH & HC, or Stanley Medical College Hospital, which is 15km away). However, each of these hospital has limited capacity to accept only 2 patients per day (one for CT, and one for angiography) under the quota basis from ICH & HC, then this results in leaving a number of patients waiting for long time until they receive necessary examination and diagnosis.

2) To improve health status of the children by strengthening the treatment unit;
By procuring some essential equipment such as infant incubator and lung ventilator, wide range of the treatment to cope with various kinds of diseases would be secured. Consequently, infant and child mortality rate could be reduced.

3) To improve medical education activities by strengthening the laboratory unit;
By procuring some basic equipment such as microscope and blood gas analyzer, the unit could manage most kinds of examination, some of which have been subcontracted to other laboratory institutes outside hospital. This would contribute to the strengthening of the educational training/activities necessary for the trainees and laboratory technitians.

4) To improve the quality of the basic and bed-side training for the medical students including doctor/nurse/technician;
By procuring some equipment such as operating light with TV and Tagarno cinefilm projector, the quality of the basic and bed-side training for medical students including doctors, nurses and technicians specialized in pediatrics would be improved. This would contribute to the qualitative improvement of the health educational function of the hospital.

5) To promote public health care education for the community people;
By procuring some equipment such as overhead projector and vehicles for outreach activities, the public health related services would be promoted to disseminate preventive health services among the community people through regular health examination of children at school and the parents at the parent craft centers.

6) To establish the basic platform for further development of health programmes in the State;
By realizing the above expectations, the platform for further development of maternal and child health of Tamil Nadu state as well as the whole country of India would be reinforced.

The following points should be taken into account to be improved so that the smooth implementation of the Project could be achieved.

1) Institutional aspect

Each department is so managed independently that there is lack of inter-departmental communication, resulting in unsystematic hospital administration. In order to make the most of the procured equipment, the following improvement should be taken into account.

- Structuring of the common utilization system
  Though, currently, maintenance of the equipment is undertaken by a medical store officer belonging to the Hospital Administration Office of ICH & HC, further arrangement will be necessary on the management of equipment which is commonly used by several departments.

- Upgrading the skills of nurses and its reallocation
  Skills of medical staff, such as nurses and technicians, need to be improved. In order to optimize nursing function, reallocation of nurses should be considered, if necessary, with inter-departmental cooperation.

2) Management aspect

In order for ICH & HC to provide proper medical services and contribute to the improvement of the regional referral system, it is necessary for ICH & HC to have not only proper operation and maintenance of the equipment to be procured, but also have baseline indicators of the Project monitoring and evaluation for further development of the hospital services including educational functions.

CONTENTS

Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Outline of the Project

India is one of the largest countries in the world with its large number of population of 900 million (the second largest next to China) dwelling over the area of approximately 3.29 million Km^2 (the 7th largest in the world, 9 times as large as that of Japan) encompassed by the borderline shared with Pakistan, Chinese Tibet, Nepal and Bangladesh and widely ranging from northern Himalayan covered with eternal snow to tropical Cape Comorin. The nation's wide spreading area over the distance of 3,219 Km from north to south allows to have different climate features in the same country. The hottest season comes between March and May, and during the season average temperature goes up to 45 degree centigrade. Though Monsoon season varies from one region to another, June and September are generally known as hotter and humid season. Madras city of Tamil Nadu state is located at 13 N and 80 E with hot and humid climate through the year. Monsoon usually comes in October and November, with as high average monthly rainfall as 300 mm.

The colonization of India by European imperial power began in 18C, and culminated with British occupation in 19C. Indian's resistance movement against the British colonial power led to win the country's independence in 1947 though the western part was left separated as Pakistan. The new national administration was set up with union of semi-autonomous states, comprising 25 states and 6 union territories, one territory under the direct control of the central government. While the central government is responsible for the overall national political administration, each state keeps autonomous power to a large extent.

While modern industrialization is promoted, agriculture is the main industry of India, in which 70% of the whole population is engaged. The industrialization was promoted in heavy industry sector, such as steel, aluminum, cement, fertilizer, automobile, and so on, leading the country with the development of heavy as well as light industry. The economic principle that the government has been adopting is to keep a good balance between the development of state industries and the promotion of economic activities by private firms.

While experiencing overall economic growth, India has been suffering from rapidly increasing population (with rates of 1,94% in 1988 and 1.87% in 1990) as well as from growing number of poor people (the number of people under the poverty line in India occupies 26.9% of the world in 1992). While many other problems, such as economic infrastructure remain to be solved, India does not have enough economic capacity for investment. Economic indices of 1993 shows that while the total amount of GNP (771.45 billion rupees, the 12th in the world) and the economic growth rate (4.3%) are ranked high, GNP per capita is only 330 dollars, which put the country in the rank of 147th in the world.

The central government of India has launched its 8th Five Year National Development Plan (1992-97), whose approach has the following fourfold focuses:

① Clear prioritization of sectors/projects for investment in order to facilitate operationalisation and implementation of the policy initiatives taken in the areas of fiscal, trade and industrial sectors and human development;

② Making resources for these priority sectors available and ensuring their effective utilization; and completion of projects on schedule avoiding cost and time overruns;

③ Creation of a social security net through employment generation, improved health care and provision of extensive education facilities throughout the country; and;

④ Creation of appropriate organizations and delivery systems to ensure that the benefits of investment in the social sectors reach the intended beneficiaries.

Improvement in health status has been a stated objective in the National Health Policy pronouncements in India. The government has chosen a single approach to achieve this goal: designing and creating a publicly financed and publicly managed system of health services throughout the country, from primary health centers to hospitals, to provide free curative and preventive health services to a large section of the population. Based on the principle that equitable allocation means equal access to health facilities on a per capita basis, nationwide population-based norms were set for the establishment of such facilities. The national Health Policy (1983) expanded this "supply-oriented" approach to policy setting by specifying quantitative targets for health and fertility gains and a timetable to the year 2000 for meeting them, in which strong emphasize is put on the reduction of preventable mortality and morbidity affecting mothers and young children.

The population of India recorded as approximately 814 million at the time of national census in 1991 has grown as large as 913 million in 1994 of which children under 15 occupies about 40%. Some statistical data as of 1994 shows the current health care status of India: average birth rate is 28.5/1000 persons (9.8/1000 in Japan in 1992), death rate is 9.2/1000 persons (9.2/1000 in Japan in 1994), life expectancy is 62 years (79 in Japan in 1994), infant mortality rate is 74/1000 live births (4/1000 in Japan in 1994), mortality rate of children under five is 119/1000 persons (6/1000 in Japan in 1994). Some indices pertinent to the health conditions of children indicate the underdeveloped status. The government of India has prioritized the improvement of public health care as the national development policy, particularly with emphasis on the reduction of mortality and birth rates. Furthermore, in order to eradicate some common diseases such as respiratory disease and diarrhea, efforts have been made to promote health education and public health care services and health facilities. In line with this, the number of the health facilities in 1992, such as hospital, community health center, primary health center, sub-center has increased to 131,692, 2,289, 131,464, 20,719.

Though the quality and number of medical staff and facilities vary from one state to another, a major problem of health care services of India is indistinct differences of the standard of medical services between primary, secondary, and tertiary levels in terms of quality and kinds of services and patients. For instance, WHO and UNICEF report that some outpatients come to tertiary-level hospitals at their first visit. Though some efforts have been made to increase the number of primary health centers, some problems remain unsolved such as the improvement of the facilities and medical manpower.

In fact, there are some private hospitals which can serve advanced medical care services in India. However, they are hardly accessible to poor people, which occupy about 40% of the whole population, because they can not afford to pay for the high medical fees. Therefore, the improvement of public hospitals is highly needed.

ICH & HC located in Madras, the capital of Tamil Nadu State is the top referral hospital of the State which has the population of 5.98 million. In terms of medical functions, the hospital provides not only ordinary medical services of prevention, diagnosis and treatment, but also educational and research activities including training courses for post-graduates to study specialized pediatrics.

ICH & HC was initiated by professors of Madras Medical College in 1948 as a pediatrics department with 50 beds affiliated to Government General Hospital. The department developed by expanding its functions including preventive medicine and regional health care under the support from WHO. As a part of the activities, in 1957, it has established four new health posts in Madras, and Family Folder System including nutrition improvement program, which contributed to the promotion of the comprehensive public services for children and the importance of the community health services. The activity has developed at four pediatrics centers (currently three) as a part of Indian Population Project (IPP-V), resulting in the contribution to 5,000 families in the past 30 years. Then, pediatrics department has been established in Government General Hospital and Madras Medical College. Services for neo-natal health care have started at the Institute of Obstetrics and Gynecology & Government Hospital for Women and Children affiliated to Madras Medical College, and later expanded by adding a room for premature babies (28 beds) and pediatrics department in 1961.

In order to cope with increasing demand for child health services, ICH & HC was established in 1968, and to the same compound, pediatrics and pediatric surgery departments were transferred from Government General Hospital. Initially, ICH & HC composed of four pediatrics units, child surgery, child ENT/dental, radiology, biochemistry, micro-biology and clinical pathology, with bed number of 200 for pediatrics, 40 for pediatric surgery, and 40 for

pediatric ENT. Then, pediatrics specialty unit was added in 1987 with a new building, resulting in that the total bed number counted to 500. The last innovation was made in 1989 when child chest surgery unit with 37 beds was transferred from Government General Hospital. Child Intensive Care Unit has been functioning since November of 1989. Parent Craft Center has started its activities in 1978 with panel exhibition for educational purposes, and to counseling parents of the society to promote the disease prevention. Meanwhile School Health Cell activity started in 1973, and five public hospitals in Madras, including ICH & HC, have provided regular health care services for the community people and children in the region.

ICH & HC is supposed to cover all children (under 12) of 30 schools out of 159 schools in Madras. Every 5 days of the week, a staff-group comprising of 7 medical staff of doctor, resident doctor, nurse, social worker, pharmacist, laboratory technician, assistant nurse, visits schools one by one to examine the health status of children, provide diagnosis and simple treatment, and suggest to transfer to ICH & HC for specialty diagnosis and treatment.

The outpatient services of ICH & HC is unique for its day-long 12-hour services from 7 am to 7 pm. Meanwhile ICH & HC also provides 24-hour emergency services by which patients with their attendance staying any time in the hospital. However, due to the lack of necessary medical equipment, adequate quality of services are hardly provided to the diverse variety of needs of increasing number of patients. For instance, some laboratory examinations have to be contracted out to other laboratory centers due to the lack of examination equipment.

The Table-1-1 given below shows some statistical data on patients to the teaching hospitals in Madras.

Table-1-1 Number of Out-patients and Admissions (1994-95)

No.	Name of Institution	No. of Beds	No. of Doctors	No. of Nurses	No. of Technicians	Total No. of Out-patients	Average No. of Out-patients/ day	Total No. of In-patients	Average No. of Patients/day	Average Length of Stay/Patient	No. of Operations Performed
1	Government General Hospital	2,029	102	493	271	1,574,715	4,341	55,271	152	12	Major 16646 Minor 13858
2	Government Stanley Hospital	1,271	72	354	189	1,568,790	4,398	41,505	1,068	9	Major 7835 Minor 45498
3	Government Kilpauk Medical College Hospital	480	44	164	80	1,071,875	3,034	32,477	89	6	Major 4347 Minor 3914
4	Government Royapettah Hospital	722	67	177	131	555,706	1,623	178,356	489	7	Major 1631 Minor 8290
5	Government Kasthurba Gandhi Hospital for Women and Children	695	39	166	11	231,131	834	257,130	704	10	Major 3317 Minor 2700
6	Institute of Obstetrics and Gynaecology and Government Hospital for Women and Children	764	14	159	1	143,834	451	27,532	75	8	Major 9129 Minor 8782
7	Institute of Child Health and Hospital for Children	537	126	167	60	520,782	2,098	26,156	462	6	2,874 5,220

1-2 Outline of the Request

ICH & HC having vast catchment area further covering two neighboring states, Karnataka and Andhra Pradesh is facing to difficulty caused by the lack of basic and essential equipment, and unable to provide necessary health care services as expected. Therefore, the government of India has planned to make a request to the government of Japan for its grant aid assistance aiming at improving and upgrading the health and medical care of the Hospital.

Equipment requested includes 375 items which will be utilized for the provision of health care services and be used for hospital administration purpose for the following 27 departments so that the medical services and medical education activities could be improved. The major items are summarized as the Table-1-2 hereunder.

Table-1-2 List of Major Equipment Requested for the Project

NO.	DEPARTMENT	Q'ty	Major Equipment
1	NEONATOLOGY	24	Infant Incubator, Open Care System, Phototherapy Unit, Syringe Infusion Pump, Neonatal Ventilator, Pulse Oxymeter, Neonatal Monitor etc.
2	RADIOLOGY	8	X-ray Unit, Color Doppler, Ultrasound Scanner, Whole Body CT Scanner, Mobile X-ray Unit, Dark Room Accessories etc.
3	MICROBIOLOGY	7	Microscope, Incubator, Refrigerator, Co2 Incubator etc.
4	ANESTHESIOLOGY	33	Operating Table, Suction Unit, Syringe Infusion Pump, Operating Light, Anesthesia Machine etc.
5	PEDIATRIC HEMATOLOGY & ONCOLOGY & IMMUNOHAEMATOLOGY	17	Binocular Microscope, Projecting Microscope, Infusion Pump, Slide Projector, Syringe Infusion Pump, Electrolyte Analyzer, Spectrophotometer, Syringe Infusion Pump, Computer etc.
6	PEDIATRIC SURGERY	23	Infant Warmer, Infant Ventilator, Phototherapy Unit, Syringe Infusion Pump, Patient Monitor, Infant Incubator, Blood Cell Counter, Examination Light, Film Illuminator etc.
7	PEDIATRIC NEPHROLOGY	7	Haemodialysis Unit, Blood Gas Analyzer, Microscope, Monitor etc.
8	PEDIATRIC PATHOLOGY	10	Microscope, Water Bath, Haematocrit Centrifuge, Ph Meter, Centrifuge etc.
9	BIOCHEMISTRY	6	Ph Meter, Flame Photometer, Caloric Meter, Aminoacid Aanalyzer etc.
10	HOSPITAL ADMINISTRATION	3	Personal Computer, Photostat Equipment etc.
11	MEDICAL REGISTER - TEACHING	3	Slide Projector, Copying Machine, Public Addressing system
12	MEDICAL RECORDS	4	Personal Computer, Copying Machine, Air Conditioning Machine etc.
13	PEDIATRIC PULMONOLOGY	5	Spirometer, Fiber Bronchoscope, Pulse Oxymeter, Nebuliser, Chloride Analyzer etc.
14	PEDIATRIC NEUROLOGY	2	EEG, EMG

15	PHYSIAL MEDICINE & REHABILITATION	4	Microwave Therapy App., Paraffin Bath, Dumbbell Set, Laser Therapy Unit
16	PEDIATRIC ORTHOPEDICS	5	Electrical Surgical Saw, Spinal Surgical Set, Nerve Stimulator, Bone Plate Set, Bone Screw Set
17	SCHOOL HEALTH CELL	4	Van, Refrigerator, Weighing Machine, Public Address System
18	PARENT CRAFT CENTRE	19	Exhibition Display System, Exhibition Display Kit, Infant Weighing Machine etc.
19	GASTROENTEROLOGY DEPARTMENT	4	Biopsy Set, Microscope, Ph Meter, Gastro Intestinal Endoscope
20	EMERGENCY CASUALTY OP.	29	Medicine Refrigerator, Anesthesia Machine, Nebulizer, Wheel Chair, Suction Unit, Emergency Light, ECG, Mobile X-ray Unit etc.
21	ENT DEPARTMENT	38	Otorhinolaryngological Examination Table, Microsurgery Instrument, Audiometer, Sterilizer Hot Air etc.
22	GENERAL PEDIATRIC MEDICAL WARDS	32	Weighing Machine, Microscope, Opthalmoscope, Pulse Oxymeter Patient Bed etc.
23	BLOOD BANK	11	Refrigerated Centrifuge, Laminar Flow Bench, Plasma Extractor, Water Bath etc.
24	INTENSIVE MEDICAL CARE UNIT	31	Defibrillator, Cardiac Monitor, Pulse Oxymeter, Infant Ventilator, Ophtalmoscope, Apnea Alarm Stretcher Trolley, Ultrasonogram, etc.
25	AUTOPSY ROOM	5	Autopsy Table, Shadowless Light, Morgue Refrigerator , Photographic System etc.
26	PEDIATRIC CARDIOLOGY AND CARDIOTHORACIC SURGERY	39	Anesthesia Machine, Autoclave, Infant Warmer, Infusion Pump, Heart Lung Machine, Oxygen Hood, Tagarno Cinefilim Projector, Ethylene Oxide Sterilizer, Surgical Diathermy, Operating Light
27	HOSPITAL FACILITY	2	Generator, PB Box