

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR THE ESTABLISHMENT OF
BASIC HEALTH UNITS
AND
RURAL HEALTH CENTERS IN PUNJAB PROVINCE
IN
THE ISLAMIC REPUBLIC OF PAKISTAN

MAY 1988

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan has decided to conduct a basic design study and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Pakistan a study team headed by Dr. Hideaki Suzuki, Deputy Director, Hospital Guidance Division, Health Policy Bureau, Ministry of Health and Welfare from January 18 to February 21, 1988.

The team had discussions on the Project with the officials concerned of the Government of Pakistan and conducted a field survey in Punjab Province. After the team returned to Japan, further studies were made, a draft report was prepared and a mission to explain and discuss it was dispatched to Pakistan. As a result, the present report has been prepared.

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

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

May 1988



Kensuke Yanagiya

President

Japan International Cooperation Agency

SUMMARY

The Islamic Republic of Pakistan is located in the western Asia, and the total population of the country exceeds 97.5 million, of which 70% inhabit in the rural areas.

Among the country's health problems is the imbalance in medical services between urban and rural areas. Health and medical services in the rural areas are far behind those in the cities both in quality and quantity.

In order to alleviate this situation the Government of Pakistan has been implementing various programs focusing on the expansion of primary health care, which include the construction of Rural Health Centers (RHCs) and Basic Health Units (BHUs) in the rural areas. As of June 1986, 2,795 of the 4,712 Union Councils in the country were furnished with at least one RHC or BHU.

Constructing RHCs and BHUs was adopted as one of the main targets of the Prime Minister's "Five Point Policies for Social and Economic Development" which was introduced in 1985. In accordance with this policy, in August 1986, the Government of Pakistan launched the "Establishment of Basic Health Units and Rural Health Centers in 1,312 Union Councils 1986-1990" (hereinafter referred to as the "BHU/RHC Establishment Plan"). The objectives of this Plan are to improve the facilities and staffing for providing primary health care, to establish health and medical care networks based on a referral system and thereby improve the overall system for health and medical services in the rural areas.

The BHU/RHC Establishment Plan aims to furnish all Union Councils in the country with at least one BHU or RHC and to strengthen the function of the existing RHCs and BHUs by upgrading facilities and staffing during the four years period 1986 to 1990.

The Plan estimates that 6,418 million rupees will be required for its implementation, of which 1,259 million rupees are earmarked for purchasing essential medical equipment to be imported from abroad. The Government of Pakistan expects assistance from foreign countries for the procurement of such essential equipment, which must be purchased with foreign currency. Accordingly, a request was made for a grant from the Government of Japan.

In response to this request, the Government of Japan sent a preliminary study team to Pakistan in July, 1987 to evaluate the Plan as well as the organization in charge of the implementation, and the present condition of RHCs and BHUs.

The results of the preliminary study suggested that, when the BHU/RHC Establishment Plan is completed, rural inhabitants would have access to health and medical services within their respective Union Councils, the gap in the levels of medical care between the urban and rural areas would be reduced, and public health standards would be improved.

Under the Plan developed by the Government of Pakistan, however, five years will be required to furnish all the provinces with the necessary facilities and equipment. Thus, the study team found that it would not be feasible to extend assistance for the Plan in one year under the Japanese grant aid program, which requires the project to be completed within a single Japanese fiscal year.

Responding to the advice of the team, the Government of Pakistan prioritized the different areas of the country and chose Punjab Province as the region to be provided with the grant aid. Consequently, the Government of Japan decided to conduct a basic design study on this Project for the Establishment of Basic Health Units and Rural Health Centres in Punjab Province" (hereinafter referred to as the "Project").

JICA sent a basic design study team to Pakistan in January, 1988. This team had a series of discussions on the Project with concerned officials of Pakistan and collected data and information necessary for the basic design study of the Project. After returning to Japan, the team analyzed the data and information collected during the survey these formulated an implementation plan together with the basic design for the Project.

The Project consists of the provision of medical equipment that should be imported into Pakistan in accordance with the BHU/RHC Establishment Plan in Punjab Province, under the grant aid program of the Government of Japan.

Being a component of BHU/RHC Establishment Plan, this Project aims at upgrading rural health services in the Province.

The following is a list of equipment with specifications, and quantities to be provided under the Project.

(1) Equipment to be provided for RHCs.

Item	Specification	Quantity
1. Ambulances	Diesel engine 2 WD modified van, first aid treatment accessories.	96
2. Mobile Shadowless Lights	4 lamp extensible arm type with automatic charge battery.	205
3. Binocular Microscopes	Illumination lamp built-in type, 40-1,000 magnifications. Slide glasses, cover glasses, Hemacytometer.	89
4. Standby Generators	Diesel engine, rated output A.C. 3.0 Kw, 50 Hz.	267
5. Diagnostic Sets	Basic Diagnostic tool set with storage case.	283
6. Manual Resuscitators	For adults and children	203
7. Sphygmomanometer	Desk type mercurial sphygmomanometer	265
8. Centrifuges	Portable centrifuge (15 ml x 8, 4,000 rpm)	81

(2) Equipment to be provided for BHUs.

Item	Specification	Quantity
1. Binocular Microscope	Reflective mirror type 40 - 1,000 magnification	1,463
2. Diagnostic Set	Basic diagnostic tool set with storage case.	1,582
3. Sphygmomanometer	Desk type mercurial sphygmomanometer	1,582

X-ray units and dental units are also listed as essential imported equipment in the BHU/RHC Establishment Plan. The Government of Pakistan has already imported the above items and is installing them in some RHCs. But the quantity purchased was not sufficient to cover all the RHCs planned, the Government of Pakistan requested to include them in the Project. After careful assessment and deliberation, it was however decided that the items would not be included in the Project for the following reasons:

- 1) The existing facilities do not satisfy the requirements for installing the equipment.
- 2) It should be difficult to improve the facilities to satisfy the requirements imposed by the restrictions of the Japanese fiscal system.
- 3) It would also be difficult to recruit the necessary staff with the above time constraint.

The implementation of the Project is expected to take 12.5 months from the Exchange of Notes.

The implementing body for the Project is the Ministry of Health, Special Education and Social Welfare. The Health Department of Punjab Province will supervise the allocation of the equipment after it is delivered.

Operation and maintenance expenses are to be covered by the Government of Punjab Province from its annual budget.

The BHU/RHC Establishment Plan should be implemented as soon as possible in order to improve the health and medical services in the rural areas and thereby alleviate the imbalance that exist in the quality and quantity between the urban and rural areas. All the equipment selected as the result of the basic design study are indispensable to the health and medical care services, especially those providing primary health care to inhabitants in the rural areas. The following results can be expected from implementation of the Project.

- 1) More than one third of all RHCs will be furnished with an ambulance for transporting patients from BHUs to RHCs or from RHCs to upper level hospitals.
This will establish medical care networks which enable people living in the rural areas to receive the proper treatment for their illnesses.
- 2) All the RHCs will be furnished with a standby generator, a shadowless light and a manual resuscitator. With these, vaccines can be stocked safely and surgical operation can be performed even during power failures.
- 3) Almost all RHCs and BHUs will be provided with other kinds of essential medical equipment as well, and the staff will be able to provide the people with essential medical care.

If the Project is implemented, the BHU/RHC Establishment Plan in Punjab Province will be realized as expected, and the health and medical care services in the rural areas of the province will be improved. The level of people's health throughout Punjab Province will be raised as a result.

When the project is implemented, the Government of Pakistan has to bear the expenses only for transporting the equipment from the storehouses in Lahore to the respective facilities. The annual expenses for the operation and maintenance of the proposed equipment are estimated to be 1.77 million rupees.

In conclusion, it is recommended that the Project be implemented under the grant aid program of the Government of Japan and that the Governments of Pakistan and Japan take the necessary measures toward this end.

It should be stressed that establishment of functioning referral system shall depend on such endeavors by the Governments of Pakistan and Punjab as placement and retraining of adequate number of staff and allocation of operating budget for BHUs and RHCs including salaries. The project could effectively contribute to primary health care in rural Punjab only when the provision of equipment are combined with these indispensable efforts.

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CHAPTER 1. INTRODUCTION

CHAPTER 1. INTRODUCTION

About thirty years ago, the rural areas of Pakistan, containing roughly 70% of the population, lagged considerably behind the urban areas not only in education and social development but also in the field of health and medical services.

In search of solution to this problem, the Government of the Islamic Republic of Pakistan has implemented health policies including provision of primary health care to its people. In order to establish facilities to provide the primary health care in the rural areas, the Government of Pakistan launched "The Rural Health Centres Programme of Pakistan". This program began with the construction of 10 pilot Rural Health Centers (hereinafter referred to as RHCs) in 1960. In 1972, Basic Health Units (hereinafter referred to as BHUs) which function as branch centers of the RHCs, were included in the original program.

Implementation of the above program was emphasized during the period, of both the Fifth and Sixth Five Year Plans for social and economic development, because the expansion of rural health services was therein adopted as a main target for the health sector. As a result, in June, 1986, 2,795 of the nation's 4,712 Union Councils were furnished with at least one RHC or BHU.

Priority was given to the promotion of the program also in Prime Minister's Five Point Policies for Social and Economic Development, announced in 1985. The Government of Pakistan, therefore, proposed and started, in 1986, the new plan called "Establishment of Basic Health Units and Rural Health Centres in 1312 Union Councils 1986-1990" (hereinafter referred to as the "BHU/RHC Establishment Plan" or the "Plan").

This plan is being implemented so that all the Union Councils in the country will have at least one RHC or BHU within a period of four year, 1986 to 1990. Under the Plan, existing RHCs and BHUs will be improved, so that they can function more efficiently in providing primary health care.

The plan estimates that 6,418 million rupees are required for its implementation, of which 1,259 million rupees are earmarked for purchasing essential medical equipment from abroad. The Government of Pakistan hopes to receive assistance from foreign countries for the procurement of such essential equipment, which should be purchased with foreign currency. Thus, requests was made that the Government of Japan provide a grant aid.

In response to the request of the Government of Pakistan, the Government of Japan sent a preliminary study team to Pakistan in July, 1987. This team investigated the outline of the Plan as well as the organization in charge of implementation, and the condition of existing RHCs and BHUs.

The results of the preliminary study suggested that, when the BHU/RHC Establishment Plan is completed, rural inhabitants would have access to health and medical services within their respective Union Councils, the gap in the health and medical care between the urban and rural areas would be reduced and the general level of public health would be raised as well.

The Government of Pakistan, however, has allowed five years to furnish all the provinces with the necessary facilities and equipment. Thus, the team found that it would not be feasible to extend assistance for the plan in one year under the Japanese grant aid program, which requires a project to be completed within a single Japanese fiscal year. Responding to the advice of the team, the Government of Pakistan prioritized the different areas of the country and chose Punjab Province as the region to be provided the grant aid.

Consequently, the Government of Japan decided to conduct a basic study on the "Project for the Establishment of Basic Health Units and Rural Health Centres in Punjab Province" (hereinafter referred to as the "Project").

The Japan International Cooperation Agency (JICA) dispatched a basic design study team to Pakistan from January 18 to February 21, 1988. This team was headed by Dr. Hideaki Suzuki, Deputy Director of Hospital Guidance Division, Health Policy Bureau, Ministry of Health and Welfare. The team conducted a field survey in Punjab Province which consisted of the following activities:

- 1) Confirmation of the request of the Government of Pakistan.
- 2) Confirmation of details of the BHU/RHC Establishment Plan.
- 3) Investigation of the present state of the project facilities (RHCs and BHUs).
- 4) Investigation of the services and operational systems of similar and related health and medical care facilities.
- 5) Collection of other data and information required for determining the content and scope of the Project and assessing the Project's soundness.

The team had a series of discussions on the Project with concerned officials of the Federal and Punjab Provincial Governments. The basic agreements reached during the discussions were summarized in the Minutes of Discussions. These were signed by the representatives of the Pakistani officials, Dr. Q. A. Saboor Khan, Assistant Director General Health, Ministry of Health, Special Education and Social Welfare; Mr. Akhtar Iqbal, Deputy Secretary, Ministry of Finance and Economic Affairs; and Dr. M. Ayub Salaria, Additional Secretary Technical, Health Department, Provincial Government and by the leader of the Japanese study team, Dr. Hideaki Suzuki.

After returning to Japan, the team analyzed the data and information collected during its survey and then formulated a plan and the basic design for the Project, based on the above analysis and the Minutes of Discussions. The results of the study were organized in a draft final report.

JICA sent a second team to Pakistan from April 15 to 25, 1988 to present the draft final report. This team, also headed by Dr. Suzuki, explained the report to the Pakistani officials concerned and discussed the Project further with them.

The results of the Basic Design Study are presented in this report.

CHAPTER 2. BACKGROUND OF THE PROJECT

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2-1 Health and Medical Care in Pakistan

2-1-1. Health Indices

(1) Health Situation

1) Population

The estimated total population, as of June 1986 was 97.57 million. Of this figure, 28.78 million people (or 29.5% of the whole) inhabit urban areas, while 68.78 million (70.5%) are rural. The annual population growth rate is approximately 3%.

2) Demographic Factors

a) Life expectancy at birth

According to statistics for 1986, the life expectancy at birth is 57 years.

b) Birth Rate

It is estimated that 3.62 million people were born in 1986. The crude birth rate is roughly 40 births per 1,000 persons. (Refer to Table 2-1)

c) Death Rate

According to government publications, the infant mortality rate for 1986 was 90 deaths per 1,000 live births. For every 1,000 pregnant women, 4 die in childbirth.

According to statistics for 1983, the crude death rate is roughly 11 per 1,000 persons, the infant mortality rate 100 per 1,000 live births, and the child death rate (ages 1 - 4) 10 per 1,000. This is exceedingly high.

Table 2-1 Birth and Death Rates

Country	Crude Birth Rate	Crude Death Rate
Pakistan	40.0	11.0
Japan	12.5	6.2
Philippines	32.3	6.9
Thailand	28.6	7.9
Burma	37.9	7.2
Malaysia	29.2	6.4

Reference : U.N. estimate (1980 - 1985)

Figures for Japan are based on 1984 data.

3) Major Causes of Death

Tetanus is the major cause of death for children under 2 years old. Diarrhea and pneumonia is the most common killer of 3 - 5 year olds, adults usually die from tuberculosis, sudden accidents, heart diseases and malignant tumors.

4) Disease Incidence

A large population of people in Pakistan catch infectious diseases, including malaria, which has spread over 50% of the country.

The infectious diseases easily contracted by children include malaria, measles, whooping cough, acute ear, nose and throat diseases (otolaryngology), diarrhea, etc., while malaria, acute ear, nose and throat disease, and gastroenteric disease are widespread among adults.

Approximately 1.6 million are thought to be suffering from active tuberculosis in Pakistan.

The incidence rate for malignant tumor is 40 - 50 per 100,000.

Table 2-2 Diseases by Age Groups

	Less than 1 year old	1 - 4 years old	5 - 19 years old	20 -59 years old
1.	Malaria	Malaria	Malaria	Malaria
2.	Measles Whooping cough	Measles Whooping cough	Acute ear, nose and throat disease	Acute ear, nose and throat disease
3.	Acute ear, nose and throat disease	Dysentery	Other diseases of the resp- iratory organs	Gastroenteric disease, not including cancer
4.	Dysentery	Acute ear, nose and throat disease	Influenza	Rheumatism
5.	Other diseases of the resp- iratory organs	Other diseases of the resp- iratory organs	Other infec- tious diseases	Tuberculosis

Reference : National Health Survey 1982 - 1983

5) Nutrition

In recent years, the growth of food production has far exceeded that of population. However, malnutrition still affects a large part of the population, due to a lack of protein. This is a serious public health problem.

Malnutrition is prevalent among infants and pre-school children. 15% of children less than 5 years old are suffering from the third degree malnutrition (less than 60% of standard).

Malnutrition often leads to anemia and goiter. Pregnant and lactating women suffer from anemia caused by malnutrition, especially in the rural areas, where the incidence is three times as high as in urban areas.

(2) Environmental Sanitation

1) Water Supply

Water supply facilities have a low rate of diffusion in Pakistan. Even in the major cities, only 30% of population living in the central district have water taps in their houses, others must obtain their water supply from public water taps.

Only 28% of people in rural areas have access to potable water supply. Since the public water supply is insufficient in rural areas, residents commonly use private manual water pumps. Residents of rural areas and in the outskirts of cities, where no public water supply facilities exist, depend on canals, water channels, shallow wells or ponds.

2) Sewerage System

Sewerage exists only in the major cities. Residents of cities without a drainage network dispose of waste water via septic tanks, drain trenches, or storm-water drain trenches.

No sewerage facilities exist in the rural areas.

2-1-2. Administration of Health and Medical Affairs

As indicated below, health and medical care is administered through separate agencies at the national, provincial and district levels, but they work in cooperation with each other.

(1) The National Level

The Ministry of Health, Special Education and Social Welfare supervises the administration of health and medical care in Pakistan. Its functions cover the following areas:

- 1) Regulation of health and medical care;
- 2) Planning of health and medical services for the entire nation;
- 3) International relation in the field of health and medical care;
- 4) Health service for government officials and residents of the Capital Territory of Islamabad.
- 5) Establishment of high grade medical centers and maintaining quality in medical care.

- 6) Control and inspection of medical supplies.
- 7) Services for the mentally ill and retarded.
- 8) Control of infectious diseases (e.g. malaria)

Policies are implemented through the provincial governments.

(2) Provincial Level

The Provincial Health Department manages health and medical services at the provincial level. It determines measures to carry out the policies set by the Minister of Health of the Federal Government and implements these through divisional directorates of health services. It also supervises the teaching hospitals and special medical facilities of the respective province.

(3) Rural Level

At the rural level, the divisional directorate of health services is the major body for implementing health policies through the district health offices. The major tasks are as follows:

- 1) Management of district headquarter hospitals, Tehsil hospitals, Rural Health Centers (RHCs), Basic Health Units (BHUs), Dispensaries and Maternal and Child Health Centers (MCH Centers).
- 2) Implementation of health policies in the rural areas in accordance with programs determined by higher-level organizations, including reports to the latter on the execution of, for example, malaria control or immunization.

3) Supervision of the health and medical service including environmental hygiene, carried out by rural administrative bodies.

4) Diffusion of family planning by population control officers in rural areas, supervised by the Director of the Population Control Bureau of each province.

2-1-3. Health and Medical Services

Health facilities in Pakistan are divided into the following groups: public sector, semi-public sector, and private sector health facilities.

(1) Health and Medical Facilities in the Public Sector

The total number of available beds in public hospitals such as teaching hospitals and district headquarter hospitals, is approximately 61,700,-- that is, one bed for every 1,580 persons.

Table 2-3 Number of Health and Medical Facilities in the Public Sector (1986)

Name of facility	Number
Primary Health and Medical Care Facilities	
Rural Health Centers	488
Basic Health Units	2,500
Maternal and Child Health Centers	867
Dispensaries	3,994
Sub-Centers	632
Sub-total	8,481
Secondary and Tertiary Health and Medical Care Facilities	
Hospitals	630
Beds	61,690

Reference : Rural Health Programme of Pakistan

(2) Total Medical Expenses

Total medical expenses for the year 1986/1987 came to 16,965 million rupees. This can be broken down as follows: 5,985 million rupees for the public sector, 2,500 million rupees, for the semi-public sector, and 8,480 million rupees for the private sector. The medical outlay per citizen is approximately 173 rupees per year. National medical expenses are equivalent to roughly 2.7% of GNP.

(3) User Charges

The amount of medical expenses paid by patients treated by public medical organization varies from province to province. The basic charge to outpatients of RHCs or BHUs is one rupee. But actual medical cost is much higher than the one rupee paid by the patient, and this deficit is covered by the provincial government and other central executive bodies. The amount charged to patients at private medical facilities varies, depending on the nature of the examination and treatment.

2-14. Health Manpower and Education

(1) Medical Staff

1) Doctors and Dentists

According to statistics for 1986, the number of doctors in Pakistan is 28,650. The number of doctors in the rural areas is small: the ratio of rural to urban population is approximately 7:3, but there is only one doctor in the rural areas for every five in urban areas.

Approximately 6,000 doctors are in practice in the private sector, and there is an increase of approximately 500 doctors each year. The majority of practitioners remain in the cities despite a government policy supporting the establishment of private clinics in rural areas.

The estimated number of traditional practitioners is approximately 51,000. The Government is trying to make practical use of the practitioners by offering them incentives.

There is a surplus of doctors in the cities, which causes an unemployment problem. Religious customs in Pakistan require that women be treated by woman doctors, the number of which is insufficient.

As for dentists, according to 1987 statistics, 1,525 are registered and approximately 1,400 are practicing.

2) Nurses

There is a shortage of nurses, due in part, to the rapid increase in the number of hospital beds, although approximately 7,900 now work at public facilities.

This shortage is also due to the fact that nursing is not appreciated in the country, because the participation of women in society is not yet well accepted for religious reasons.

3) Para-medical Workers and Midwives

The total number of para-medical workers, according to 1986 statistics is 48,920, a figure that includes staff providing medical assistance, such as medical technicians, lady health visitors, dispensers, sanitary inspectors, x-ray assistants, and laboratory technicians.

It is reported that there are 30,750 TBAs. On the whole, there is a shortage of para-medical workers.

Table 2-4 Number of Health and Medical Practitioners

<u>Category</u>	<u>Number</u>
Doctors	28,650
Nurses	7,900
Para-medical Workers	48,920
TBAs/dais(trained)	30,750

Reference: Rural Health Programme of Pakistan

(2) Education

1) Doctors and Dentists

Medical students take a five-year medical course at a medical colleges. This follows high school graduation and two years study at college. A medical license can be obtained after graduating from the university and serving two years as an intern.

There are 16 medical colleges in the country, which graduate 4,000 students annually.

There are 4 dental colleges, and 150 students graduate each year.

2) Nursing

A nursing education starts after graduation from high school (at approximately 15 years old). Students must complete a 4 year program, of which 3 years are in general nursing and one in midwife education. Upon passing the graduation examination, the candidate may apply to be registered nurses.

Graduates are permitted to take English and Moslem ethics at the university. A B. Sc. nursing degree is given to successful candidates.

There are 44 basic nursing educational schools in the country, and 840 students graduate annually.

Advanced education is offered to graduate. Courses in hospital administration and management and the teaching of basic nursing are available at the College of Nursing in the Jinnah Post-graduate Medical Center in Karachi.

3) Lady Health Visitors

There are 10 schools for public health services, with 560 students graduated annually. Courses in midwifery, child care, birth control, dietetics, personal health care and treatment of mild illnesses are studied in a 2 year course..

Students who obtained such licenses can work as Lady Health Visitors at the RHCs, BHUs, and Maternal and Child Health Centers.

4) Midwives

Midwives are educated at nursing schools, schools for public health, and obstetric and gynecological hospitals.

46 educational programs offered at the schools and hospitals listed above require one year of study, with 765 students graduated annually. To qualify for entrance into those schools, a student must either have an education equivalent to that of an applicant for a university-level science course or have completed a 3 year course in general nursing. Midwives without nursing licenses can work at RHCs, BHUs and obstetric and gynecological hospitals.

5) Dispensers

The training of dispensers is given at the district headquarter hospitals, teaching hospitals and a few special hospitals.

The training period is one year: the qualification for entrance is 10 years general education. Trainees are usually unpaid with a few exceptions. There are 1,200 trainees each year.

There are no special classrooms or exclusive instructors for these students, but doctors at the hospitals are in charge of training these students as part of their work.

6) Medical Technicians

There are 30 training schools for medical technicians in the country.

There are only 25 students (13 boys, 12 girls) per school and a total 750 students are presently in training. To date, 1,463 trainees (1,153 male and 310 female) have obtained a medical technician license.

The course covers 18 months, including 6 months practical training. A one year intensive course, equivalent to the 18 month-course, is available in Punjab Province.

Note: Data on doctors and nurses are included in "The Basic Design Study Report on the Improvement Project of Medical Equipment for Public Medical Colleges"

Data on midwives, medical assistants and medical technicians are included in "Evaluation of the Rural Health Programme in Pakistan (1984)".

2-1-5. Production, Supply and Maintenance System for Medical Equipment

(1) Production and Supply of Medical Equipment

Pakistan produces tools for surgical operations and treatment, surgical operation gloves, tables and beds used in the operating theater, dental tools and other. This equipment is also exported to countries in Europe, Africa, U.S.A. and Japan. Exports totalled 842 million rupees in fiscal 1985/1986, according to "Pakistan Statistics for 1987". Other medical equipment is normally imported from Japan, U.S.A., West Germany, England, China, Poland, Czechoslovakia, and other sources.

(2) Maintenance System

X - ray apparatus, dental treatment units, water treatment apparatus, microscopes, centrifuges, and electrocardiographs are maintained by the respective sales agents. Inspection and repair services are provided by technicians dispatched on the request of users.

The Pakistan Government is now proceeding with the construction of medical equipment repair workshops in every province, under assistance from the Asian Development Bank and the U.K. government.

2-1-6. Health Sector Development Plan and Project

(1) Targets of Development

In the Annual Development Programme for 1986/1987, emphasis is placed on achieving the targets of the 6th Five-year Plan and the Prime Minister's Five Point Social and Economic Development programme (hereinafter referred to as the "5-Point Policies"). The objectives in the health sector are listed below:

- 1) Promoting the establishment of RHCs or BHUs in every Union Council along the lines proposed in the Primary Health Care Projects and based on the 5-Point Policies.
- 2) Reducing the neonatal and infant mortality through the expansion of immunization, the education and training of traditional birth attendants, and the spread of Oral Rehydration Therapy (ORT).
- 3) Improving the quality of education in medical colleges by limiting the number of students.

4) Improving the referral system of medical care by strengthening linkage among medical care facilities at different levels.

5) Establishing mobile clinics using ambulances or other vehicles.

(2) Financial Plan

1) An allocation of 3,106 million rupees has been made for health sector development in 1987/88. Allocation by sector is given at Table 2-5. This represents 6.47 percent of the total public sector development budget, as against 5.62 per cent for 1986/87. Provincial development programmes constitute 75 percent of the total health sector allocation.

Table 2-5. Development Budget Allocations by Province (1987-88)

(Unit: Million Rupee)

Sub-sector	Federal	Punjab	Sind	NWFP	Baluchstan	Total	% of Total
1. Hospital Beds	132	276	37	91	74	610	19.64
2. Medical Manpower	121	170	30	21	-	342	11.01
3. Preventive Programmes	313	5	23	9	-	350	11.27
4. Rural Health Programmes	28	949	260	285	64	1584	51.00
5. Nutrition Programmes	11	-	1	1	-	13	0.42
6. Miscellaneous	2	28	10	9	6	55	1.77
7. Special Areas	152	-	-	-	-	152	4.89
Total	759	1458	361	416	142	3106	100.00

- 2) The non-development budget has increased from a revised estimate of 3,102 million rupees in 1986/87 to 3,603 million rupees in 1987/88. This is 16 percent of the overall increase over last year's revised estimates. The total health sector budget is 6,733 million rupees as against 5,915 million rupees in 1986/87, representing an increase of 13.8 percent. This is about 1 % of GNP.
- (3) Overseas Assistance for the Health and Population Sector

The total amount of overseas assistance for the health and population sector from 1979/80 to 1983/84 was 1.8 million dollars, according to the ADB's report. This assistance was received from the following sources:

Table 2-6. Overseas Assistance for the Health and Population Sector

Name of Project	Name of Country or Organization
1. Primary Health Care Project	USA
2. Malaria Control Project	World Health Organization (WHO) USA, Japan
3. Tuberculosis Control	WHO
4. Expanded Programme of Immunization (EPI)	United Nations International Children's Emergency Fund (UNICEF) United Nations High Commissioner for Refugees (NUHCR) WHO USA UNICEF
5. ORS Programme	WHO USA UNICEF
6. Traditional Birth Attendant (TBA) Training Program	UNICEF
7. World Food Programme	World Food Programme Committee

(4) Outline of Major Projects

1) Primary Health Care Projects

In 1977, the Government of Pakistan, recognizing that it was impossible to adequately respond to the health problems in the country with a physician-based system of medical care, launched a Rural Health Programme involving the use of paramedics. The programme was designed to--

- a) build a staff of health workers at the village level, and an appropriate number of medical technicians at the existing RHCs and BHUs; establish a system of Integrated Rural Health Complexes (IRHC) by strengthening mutual cooperation among health workers, BHUs and RHCs.
- b) train staff members engaged in primary health care; establish training schools for medical technicians necessary for the purposes.

Partial assistance was received from the U.S.A. between 1977 and 1981 under on "Basic Health Service Project". The primary health care project is substantially a follow-up to the previous program. The Government of Pakistan has also been executing this Project in cooperation with U.S.A.

The project covers the following specific objectives.

- . Reduction of infant mortality.
- . Reduction of malnutrition.
- . Reduction of mortality from diarrhea.

To that end, a wide range of activities has been initiated such as providing primary health care through the establishment of IRHC, training personnel, research and the evaluation schemes, establishing training schools, and the provision of drugs.

2) Malaria Control Programme

Malaria is wide-spread in Pakistan and is the main cause of death. The malaria control is, therefore, an important theme of the health sector. To cope with this problem, the malaria control programme is executed with aid from the World Health Organization (WHO), the United Nations International Children's Emergency Fund (UNICEF), U.S.A., Japan, and other sources.

The objective of the present program is to achieve effective suppression through the case detection at early stage, providing medical treatment, and preventing the disease through the use of insectides.

3) Tuberculosis Control Programme

To stem the increase of tuberculosis, control since 1949 has involved the prevention, early detection and effective medical treatment. In the area of prevention, BCG inoculations have been provided through RHCs. Detection centers on phlegm inspections and X-ray examinations, whereas treatment depends on medical prescriptions.

The World Health Organization (WHO) provides therapeutic agents to assist this program.

4) Expanded Programme of Immunization (EPI)

To eradicate vaccine-preventable infectious diseases which raise the death rate prevented, immunization is widely used. Children up to 5 years of age are immunized against tetanus, tuberculosis, polio, diphtheria, pertussis and measles, while pregnant women are immunized with tetanus toxoid. The programs have been quite effective in the recent years; achievement ratios for immunization in 1985/86 were 75% for the trile vaccine of pertussis, diphtheria and tetanus, 80% for measles, 75% for polio and 80% for tuberculosis.

Technical cooperation to train staff members who are to be engaged in EPI is being provided by UNICEF, UNHCR, WHO and the U.S.A.

5) Oral Rehydration Salt Programme

To prevent deaths from diarrhea due to dehydration, oral rehydration salt therapy (ORT) is being introduced. This therapy requires no advanced skills. UNICEF, WHO and the U.S.A., are providing ORS and guidance in this area.

6) Traditional Birth Attendant (TBA) Training Programme

The maternal and neonatal mortality are extremely high. The TBA training program has been started to reduce these high mortalities through training of traditional birth attendants.

50,000 traditional birth attendants (TBAs) will be trained to improve delivery skills. Canada and UNICEF are providing training for TBA.

7) World Food Programme

Malnutrition, which is still a major health problem in Pakistan, is resulting in high mortality and morbidity rates amongst infants and pre-school children. Pregnant women and nursing mothers are also seriously affected by malnutrition.

This program is providing food such as wheat, dry skin milk (enriched with vitamin A) and edible oil along with health and nutritional education.

2-1-7. Health and Medical Services in the Rural Areas

(1) Outline

In the rural areas of Pakistan, where 70 % of the population reside living standards are lower than in urban areas, due to the poorer living environment and laggard socio-economic development.

For example, look at the rate of diffusion for potable water facilities, only 28% of the population benefit from them in rural areas, vs. 84% in the urban areas. In addition, sanitary and drainage facilities of an acceptable standard are available to only 5% of the population vs. (56% in the urban areas).

These environmental circumstances and the low development of health and medical care facilities result in much lower health levels in the rural areas. For example, the morbidity rate per 1,000 persons is 182 persons in the rural areas against 143 persons in the urban areas. The number of hospital beds and medical doctors shows the same pattern, 80% are located in urban areas, while the remaining 20% are shared by 70% of the total population.

Since facilities and staff are insufficient in rural areas, such regional differences are intensified by the annual budgetary allocations for health and medical care service. The urban areas are inevitably provided with considerably more budget to operate existing facilities.

Table 2-7. Regional Differences between Urban and Rural Areas

Description	Urban Areas	Rural Areas
Population	28.3%	71.7%
Literacy rate	47.1%	17.3%
Drinking water availability	84.0%	28.0%
Sewage system availability	56.0%	5.0%
Morbidity rate per 1,000 people	143.1 person	182.3 person
Distribution of Hospital beds	80.0%	20.0%
Distribution of Doctors	80.0%	20.0%

(2) System and Organization of Health and Medical Services

There are few private medical care facilities in rural areas. Medical care services are provided to inhabitants by public facilities. The respective roles of health and medical facilities for rural inhabitants are listed below, together with criteria of distribution.

Table 2-8. System of Health and Medical Services in Rural Areas

Administrative division	Population (1,000)	Facility	Service
Union Council	10 - 15	BHU	Preventive medical care, outpatient clinic
		Dispensary	Dispensation of medicine.
		Sub-center	Dispensation of medicine, Temporary clinic
Markaz	40 - 100	RHC	MCH Center
			Preventive medical care, outpatient and inpatient clinic
Tehsil	200 - 300	Tehsil Headquarter	Examination and treatment for inpatients and outpatients.
Hospital			Medicine, surgery, laboratory tests, X-ray.
District		District Headquarter Hospital	Overall examination and treatment, tests, specialty services.

Tehsil hospitals and district headquarter hospitals are located in the respective capitals of the Tehsil or District. They are not included in the BHUs/RHCs Establishment Plan as facilities to be improved.

The gist of the relevant facilities other than BHUs and RHCs, are as follows;

1) Dispensaries

Dispensaries are located in Union Councils having no BHU, they are established as a minimum health care facility to provide drugs to the inhabitants.

There are two types of dispensary: one is established by the district health office (DHO) and the other by the local administrative body. These dispensaries are usually managed by one dispenser under the supervision of the DHO.

2) Sub-centers

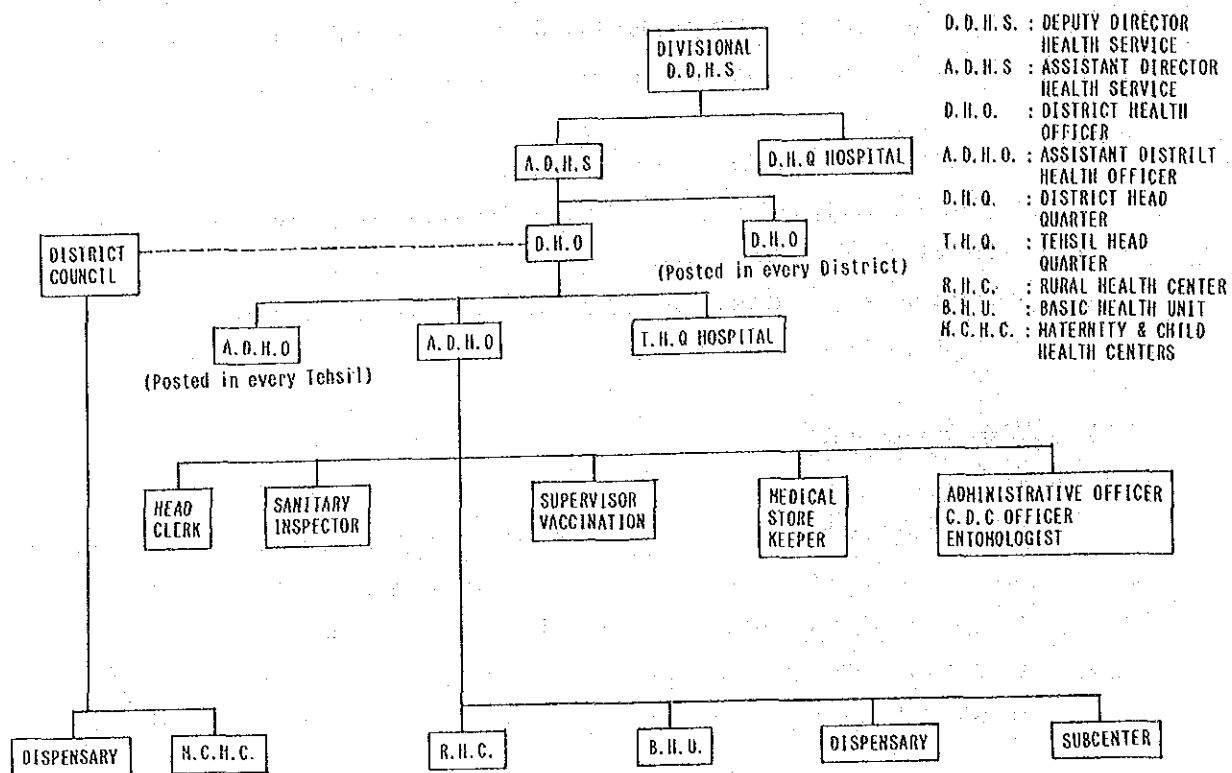
Periodically RHCs send their doctors to union councils where BHUs have not been established. The sub-center is a branch facility for providing health and medical care services by visiting doctors. It is usually managed by one medical assistant.

3) Maternal and Child Health Centers (MCH Centers)

Maternal and Child Health Centers are established by the Ministry of Special Education, Health and Social Welfare, the district administrative body or other agencies. The MCH Center provides birth/nursing guidance and a midwifery services for the inhabitants. It is under the supervision of the DHO.

A schematic diagram of organizations providing rural health care services is shown in Fig. 2-1.

Fig. 2-1 Organization Chart of Division Health Directorate



2-2 BHU/RHC Establishment Plan 1986 - 1990.

2-2-1. Historical Background of the Plan

In 1962 the Government of Pakistan, aiming at improving the health and medical services in the rural areas, launched "The Rural Health Center (RHC) Programme of Pakistan" and started to construct and manage RHCs in various part of the nation, following the pilot RHCs constructed in 1960.

RHCs are aimed at providing overall health and medical services to the rural inhabitants under a referral system to be established among the sub-centers of RHC, and a higher level Tehsil or Taluka Hospital.

In order to promote the improvement of the rural health and medical services, construction of BHUs (the upgraded facilities which used to be sub-centers) was added in 1976. This programme aimed at increasing the density of medical facilities in the RHC's service area and further developing the establishment of the referral system.

At the same time, the Government of Pakistan recognized that the present physician-based system of medical care would not adequately respond to expanding the referral system and solving rural health problems and so decided to involve paramedics and health workers in the provision of primary health care.

In 1977, the Government of Pakistan launched the Rural Health Programme with this objective and the primary Health Care Project was drafted for the programme. This project included the training of relevant staff and establishment of rural health complexes of RHCs and BHUs.

The improvement of rural health and medical services was taken up as an important phase of the 5th and 6th Five Year Plan for Socio-Economic Development, and the construction of RHCs and BHUs was encouraged. As a result, in June 1986, 2,795 of the country's 4,112 Union Councils, covering more than half of the country, had been furnished with at least one RHC or BHU.

Construction of RHCs and BHUs was also adopted as one of the main targets of the Prime Minister's Five Point for Social and Economic Development programme, which was announced in 1985. In accordance with this policy, in August 1986, the Government of Pakistan launched a programme to establish Basic health Units and Rural Health Centers in 1,312 Union Councils from 1986-1990. The Plan aims at establishing at least one RHC or BHU in every Union Council throughout the country and improving existing RHCs and BHUs to provide efficient primary health care to inhabitants.

2-2-2. Objectives and Outline of the Plan

The Plan aims to establish an effective system of health and medical services in the rural areas of the country to alleviate the existing imbalance in health and medical services between the urban and rural areas, which is one of the targets of the 6th Five Year Plan. The major points of the Plan are to construct new RHCs and BHUs and, in existing units to expand facilities and provide necessary medical equipment and staff. The Plan is outlined as follows:

- 1) To construct at least one RHC or BHU in each Union Council throughout the country

- 2) To provide beds, a labour room, and area for monitoring the growth of children, immunization, and practical demonstrations for special feeding formulas and health talks.
- 3) To provide a new laboratory in every BHU and to improve the existing laboratories of RHCs.
- 4) To provide all the RHCs with capability for X-ray diagnosis, dental care and emergency care.
- 5) To increase beds in RHCs up to 20-25 beds and to strengthen inpatient care. The RHC will be upgraded to an intermediary facility, standing between BHU and higher-level medical facilities.
- 6) To station, at minimum, the following staff in newly constructed or upgraded RHCs and BHUs:

BHU : Doctors (Medical officer)	- 1
Medical technicians	- 3
RHC : Doctors (Medical officer)	- 3 (including 1 female doctor)
Dental Surgeon	- 1
Medical technicians	- 13
- 7) To place 5 to 10 BHUs under the control of a single RHC, and to position the RHC as a referral agency for Tehsil/Taluka hospitals and district headquarter hospitals, which are positioned as upper-grade hospital and medical care facilities.
- 8) To convert the existing dispensaries and maternity and child health centers into BHUs.

The rural health and medical care services in Pakistan are expected to be improved by executing the BHU/RHC Establishment Plan, and the following goals are expected to be achieved by 1990.

- 1) Every Union Council will be furnished with at least one RHC or BHU (The current coverage is 68%).
- 2) All infants under 1 year will be protected against 6 kinds of preventable diseases.
- 3) All pregnant women will be attended by TBA at the time of delivery and provided antenatal and postnatal care.
- 4) Infant care will be improved.
- 5) The primary health care service network will cover the entire nation.
- 6) Differences between urban and rural areas will be eliminated in the field of health and medical care services.
- 7) As achievement targets for 2,000:
 - a) To reduce the crude infant mortality less than 50 per 1,000 live births.
 - b) To reduce the maternal mortality to less than 1 per 1,000 live births.
 - c) To improve life expectancy at birth in rural areas to over 60 years.

2-2-3. Contents of the Plan

(1) Establishment of the Facility

The newly constructed or upgraded RHCs and BHUs under the Plan are to be a single-story brick building and will be equipped mainly with following rooms and facilities.

RHC : Examination room (separate for male and female)
 Dental room
 X-ray room (with dark room)
 Operation theater
 Labor room
 Immunization and demonstration room for health
 education
 Laboratory
 Dispensary
 Ward (20 - 25 beds)
 Staff room
 Garage
 Residential accommodation for staff
 Boundary wall
 Tube well and overhead tank
 Septic tank and soakage pit
 Telephone

BHU : General Examination room (separate for male and
 female)
 Laboratory
 Labor room
 Maternity room (2 beds)
 Dispensary
 Staff room
 Immunization and demonstration room for health
 education
 Residential accommodations for staff
 Tube well and overhead tank
 Septic tank and soakage pit

Typical proposed floor plans for newly constructed or
upgraded RHCs and BHUs are shown in Figures 2-2 to 2-5.

(2) Provision of Equipment

The major types of equipment provided for newly constructed and upgraded RHCs and BHUs are as follows:

RHC : X-ray unit
 Dental unit
 Centrifuge
 Shadowless light for operation (ceiling type)
 Mobile Shadowless light for operation
 Sterilizer (high pressure type)
 Sterilizer (desk type)
 Operation table
 Stretcher
 Suction unit
 Oxygen cylinder
 Binocular microscope
 X-ray film illuminator
 Diagnostic set
 Refrigerator
 Ambulance
 Stand-by Generator

BHU: Binocular microscope
 Portable operating light (single lamp)
 Suction unit
 Diagnostic set
 Sterilizer
 Wheel chair
 Insecticide pump
 Stretcher
 Cabinet for equipment
 X-ray film illuminator
 Stand-by Generator

(3) Staffing Plan

Newly constructed and upgraded RHCs and BHUs under the Plan are to be operated by the following staff:

Table 2-9. Staff for newly constructed and upgraded RHCs/BHUs

Position	Required Personnel	
	RHC	BHU
Male doctor (Medical officer)	2	1
Female doctor (Female medical officer)	1	-
Dental surgeon	1	-
Dental technician	1	-
Medical technician	-	1
Lady health visitor	1	1
Nurse	6	-
Dispenser/Dresser	3	1
X-ray assistant	1	-
Laboratory assistant	1	-
Midwife	6	1
Clerk	1	-
Sanitary inspector	5	1
Servant	2	1
Ward attendant	4	-
Tubewell operator	1	-
Sweeper	4	1
Janitor	1	1
Gardener	1	1
		(part time)
Cook	1	-
Water carrier	1	1
		(part time)
Driver	1	-
Total	45	11

Source: Health and medical department of Rawalpindi Division

Fig. 2-2 Proposed Floor Plan for Newly Constructed RHC

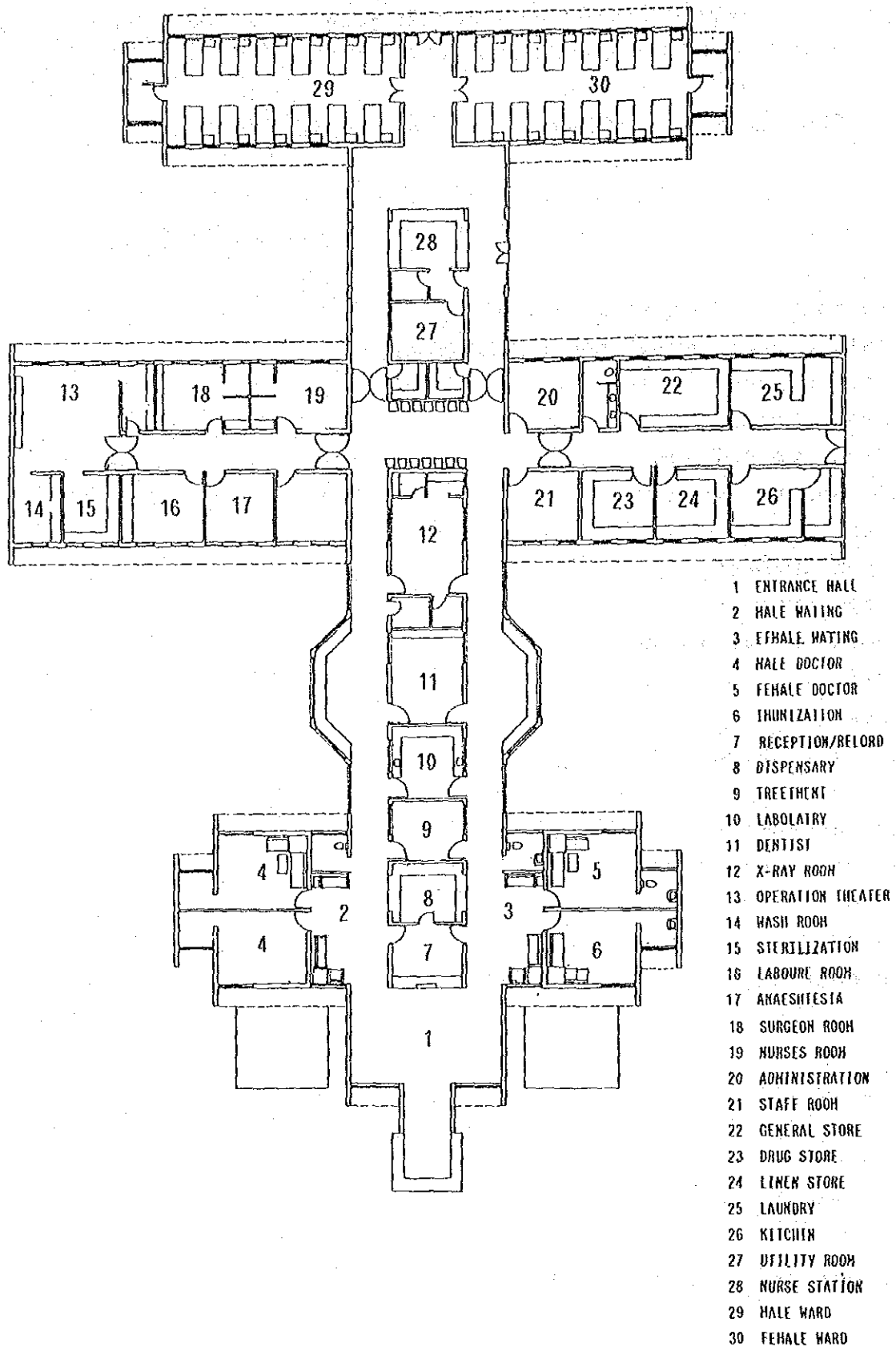


Fig. 2-3 Floor Plan for Upgraded RHC

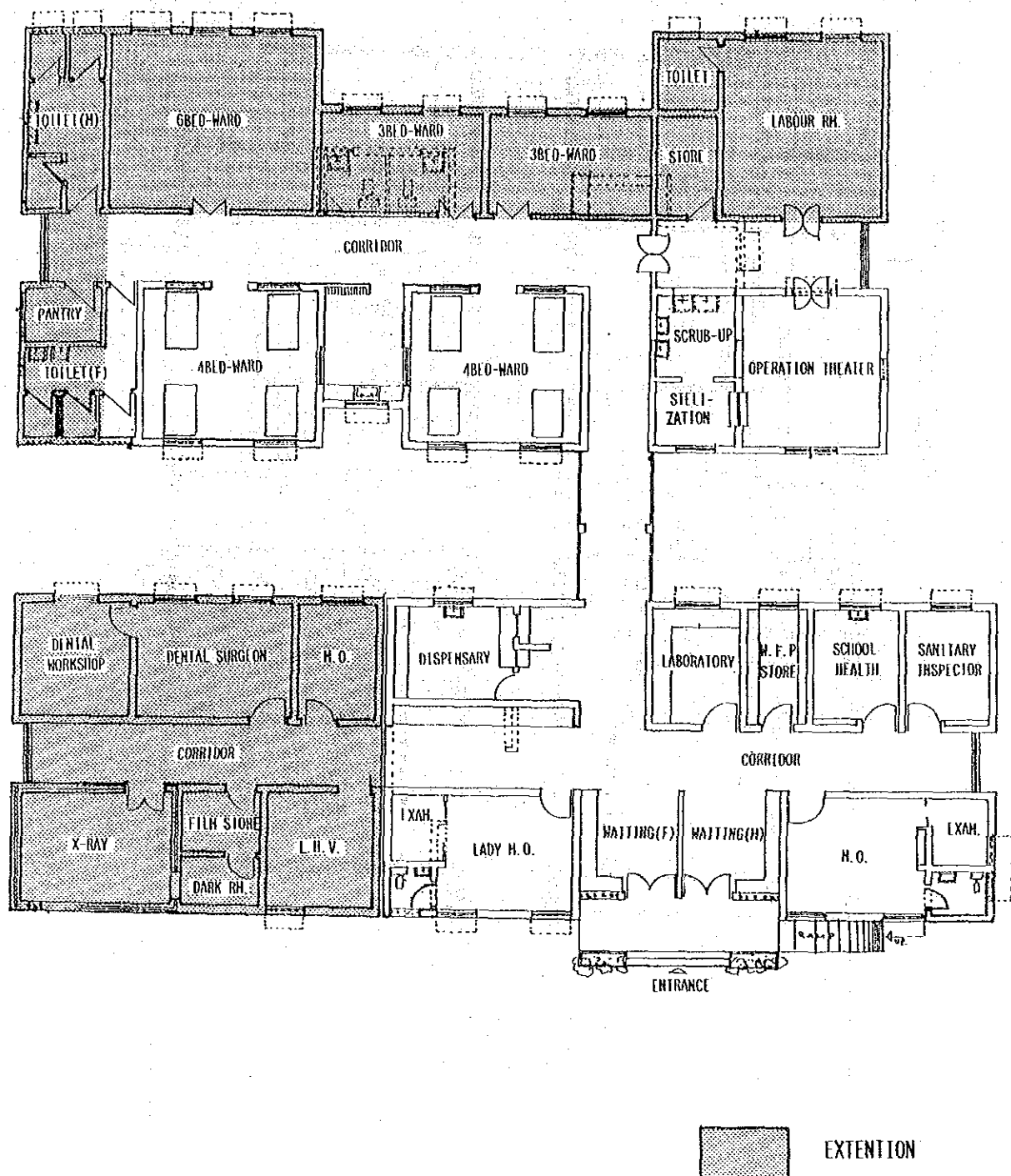


Fig. 2-4 Proposed Floor Plan for Newly Constructed BHU

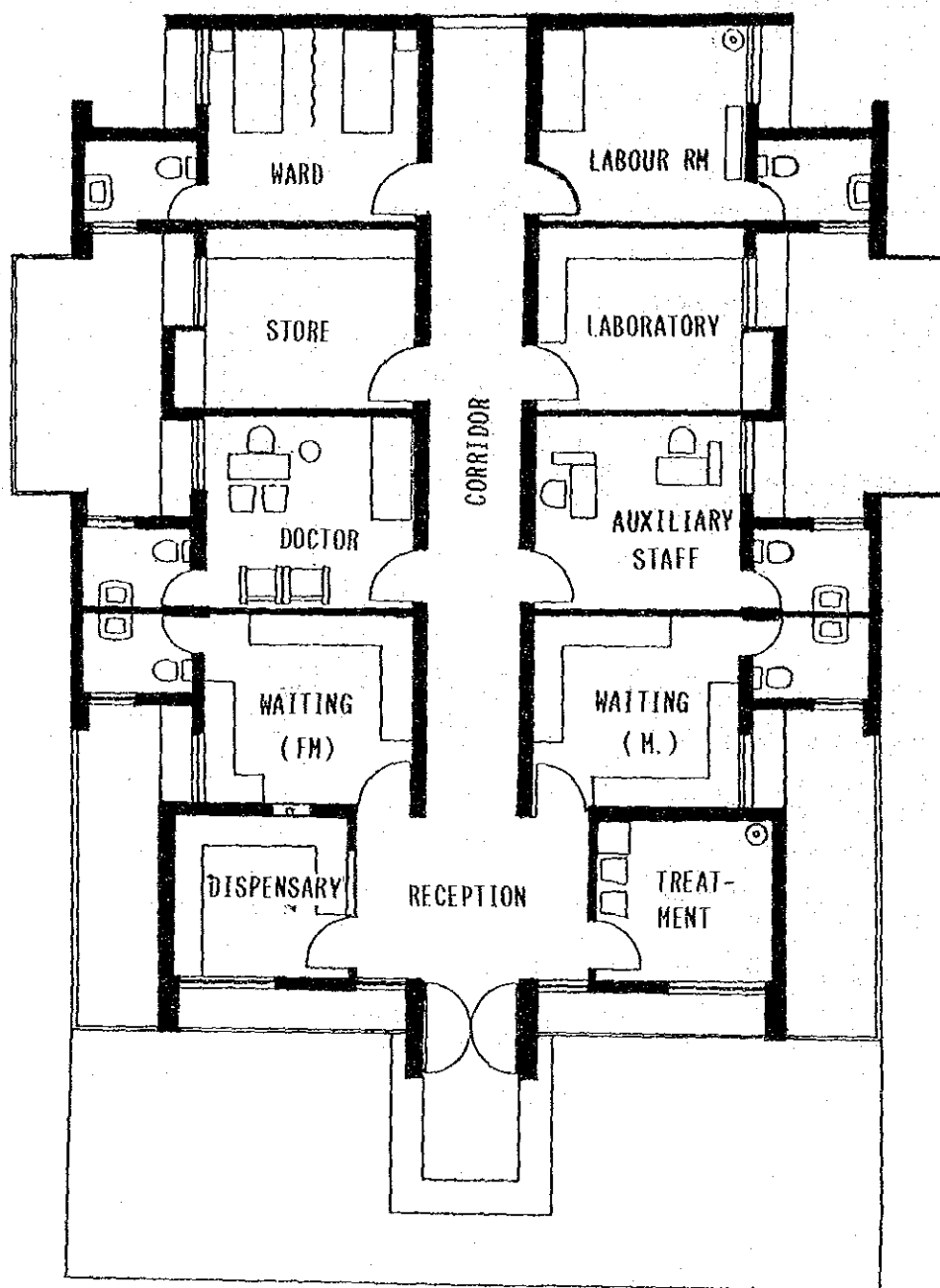
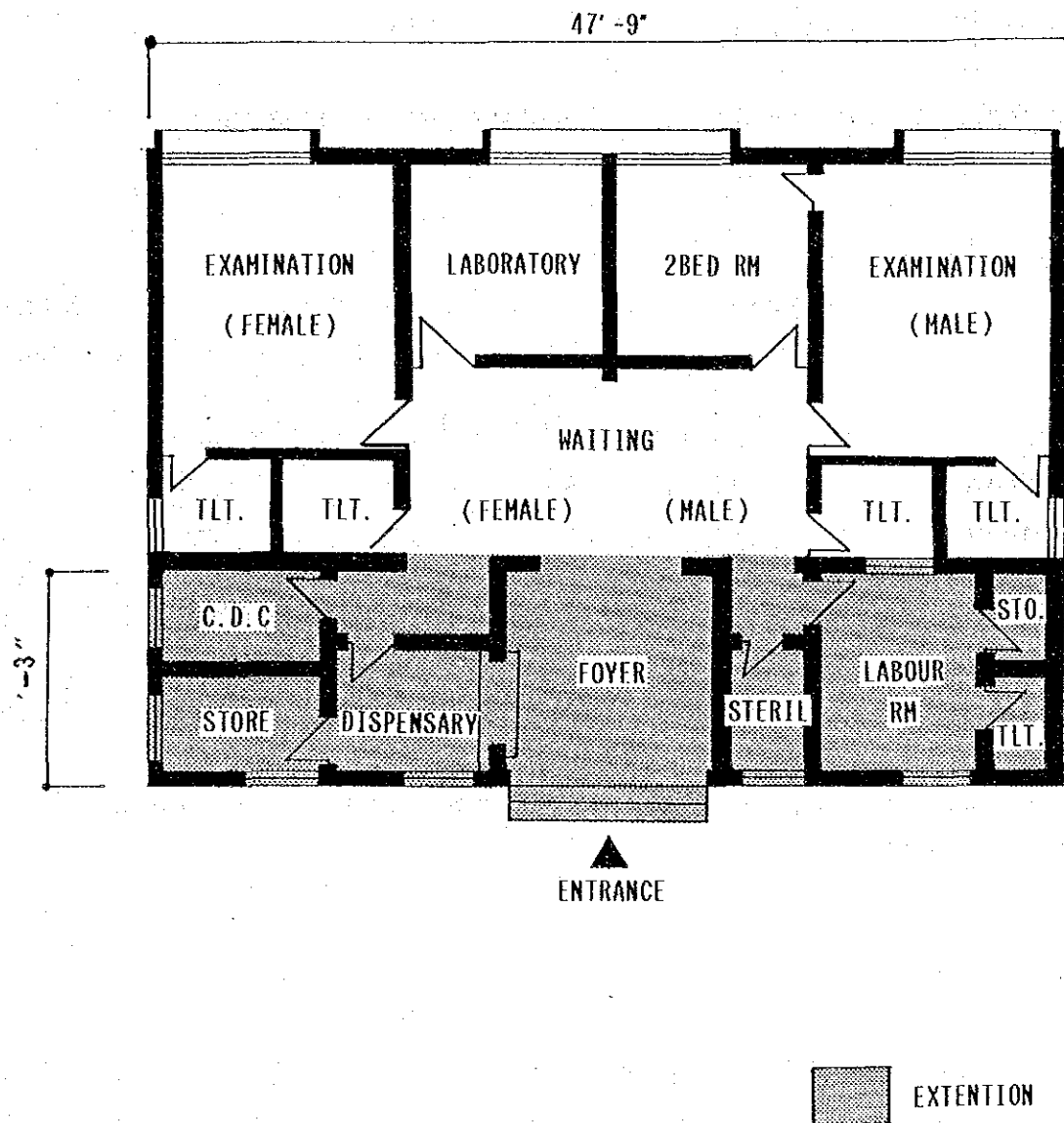


Fig. 2-5 Floor Plan for Upgraded BHU



2-2.4. Plan of Execution

(1) Implementation Program

The annual construction program for RHC/BHUs under the Plan is as follows:

Table 2-10. Planned Annual Construction of RHCs/BHUs (1986-90)

Province/Region	Number of Union Council				Total
	1986-87	1987-88	1988-89	1989-90	
Punjab	300	323	-	-	623
Sind	108	115	98	-	321
N.W.F.P.	83	101	-	-	184
Baluchistan	33	46	47	20	146
A.J & Kashmir	13	-	-	-	13
North Area	16	7	-	-	23
Islamabad Capital Territory	2	-	-	-	2
Total	555	592	145	20	1,312

Note: The above programme was later modified by the annual development program.

(2) Cost of the Plan

The cost for the RHC/BHU Establishment Plan is 6.418 million rupees, of which 1,259 million rupees is required to procure essential equipment from abroad. The annual costs for the plan are as follows;

Table 2-11. Annual Financial Phasing for the Plan (Rs. million)

Province/Region	1986-87	1987-88	1988-89	1989-90	Total
Punjab	612	700	800	865	2,977
Sind	210	373	432	340	1,355
N.W.F.P.	188	334	479	205	1,206
Baluchistan	46	104	128	95	373
Federally Administered					
Tribal Areas	36	39	37	28	140
A.J & Kashmir	32	65	85	98	280
Northern Areas	17	12	13	16	58
Capital Territory of Islamabad	9	10	10	-	29
Total	1,150	1,637	1,984	1,647	6,418

Source: Establishment of BHUs and RHCs in 1312 Union Councils
1986 - 1990

2-3 Rural Health and Medical Care in Punjab Province

2-3-1. Health and Medical Care in Punjab Province

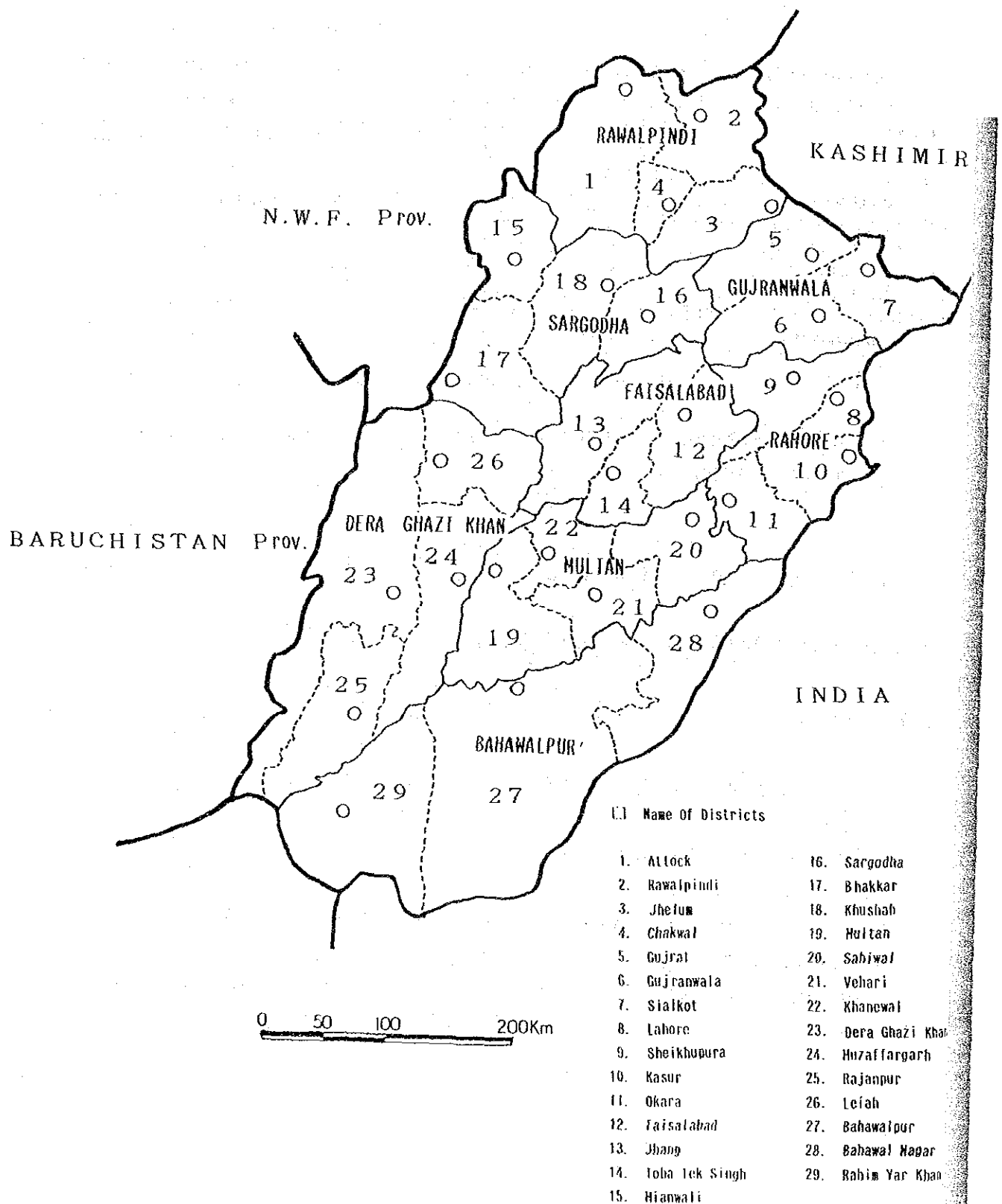
(1) General

Punjab Province covers an area of 205,000 km², which occupies 25.5% of the nation's area. The population of the province is 54 million (Federal statistics for 1986), 56% of the total population of Pakistan.

72.5% of the provincial population inhabits rural areas and 27.5% urban.

Punjab province consists of 8 divisions which are divided into 29 districts, 86 Tehsils or 2367 Union Councils.

Figure 2-6. Administrative Divisions and Districts in Punjab Province



(2) Health and Hygiene Situation

The population density in Punjab Province is relatively high, at 265 persons/km², while the national average is 121 persons/km². But its rate of population growth is low, at 2.75%, compared with the national average of 3.1%. The population of the rural areas is 72.4% of total, vs. the national average of 70.5%.

The tendency of disease occurrence is almost the same as for the rest of the country. Fever, malaria, dermatitis, diseases of eyes, ears and nose, as well as injuries occupy a high percentage of the most prevalent diseases, in addition to illnesses of the respiratory and digestive organs. The infant mortality rate in Punjab Province is 85 per 1,000 live births, according to 1984 data of the Directorate Health Services (DHS) of the Health Department, 39% of the rural population benefit from potable water supply facilities in Punjab Province, as against only 28% for the nation as a whole.

(3) Administration of Health and Medical Care

Health and medical care is administrated in Punjab Province mainly by the Department of Health. The DHS of the Department of Health administers health care through the eight (8) Divisional Directorate Health Services and 29 District Health Offices (DHO). The District Headquarter Hospitals located in every district are usually furnished with more than 125 hospital beds and 11 clinical departments and are directly controlled by the Divisional Directorate Services. The DHO is responsible for general health services, preventive medicine and guidance to the inhabitants of the district.

The organization charts of the Provincial Health Department, the Directorate Health Services and the Divisional Directorate Health Services are given in the Appendix.

(4) Health and Medical Service

According to DHS data, as of February 1988, the health and medical care facilities inside the province include 225 hospitals, 1,068 dispensaries, 235 (239) RHCs, 618 sub-centers, 50 tuberculosis clinics, 449 MCH centers, and 1,492 (1,522) BHUs, (The figures in parenthesis were collected during the field survey). The number of beds in hospitals and RHCs is 25,773, and the population per bed is 2,114.

The number of outpatients from January to December 1986 were 7.965 million at hospitals, 4.298 million at dispensaries, 2.829 million at RHCs, 4.920 million at BHUs, and 122,000 at TB centers. According to "Existing Health Services in Punjab", issued by the DHS, 60% of the population live within 3.5 km of a health and medical care facility, and more than 85% within 8 km.

(5) Health Manpower and the Education

The repletion rate of medical staff, against the required number, is still low in public facilities. According to data obtained from the DHS, the rate for doctors were 71% in Punjab Province in June 1986, and 79% for January 1987. Based on the data collected during the field survey, the rate for RHCs is 80%. The repletion rate for laboratory technicians was 88.8%, as of June, 1985 and 86.9%, as of January, 1987, respectively. However, that for RHCs is 74%, according to the field survey.

The education of medical doctors is provided by the following 7 medical colleges and one dental college in the province.

Name of University	Teaching Hospital
1. King Edward Medical College (Lahore)	Mayo Hospital Lady Willingdon Hospital Lady Aitchison Hospital Mental Hospital
2. Allama Iqbal Medical College (Lahore)	Services Hospital
3. Fatima Jinnah Medical College (Lahore)	Sir Ganga Ram Hospital
4. Rawalpindi Medical College (Rawalpindi)	DHQ Hospital, Rawalpindi Holly Family Hospital
5. Punjab Medical College (Faisalabad)	Allied Hospital DHQ Hospital, Faisalabad
6. Nishter Medical College (Multan)	Nishter Hospital Civil Hospital, Multan
7. Quaide-Azam Medical College (Bahawalpur)	B. V. Hospital
8. De'Montmorency College of Dentistry, (Lahore)	Dental Hospital

At all of those colleges, the period of study is 5 years, and the number of graduates per year is 1,560 from medical colleges and 90 from dental colleges. The Fatima J. Medical College is for women.

In addition to the above colleges, a post graduate medical school in Lahore Institute trains specialized medical doctors in courses of one and two years.

Table 2-12. Facilities for Para-Medical Staff

(DHS Data as of March 1985)

Field	No. of Facilities	Length of Study (year)	No. of Students
1) Nursing	13	3	534
2) Midwife (with nursing license)	12	2	411
3) Midwife	19	1	406
4) Lady health visitor	2	1	173
5) Dispenser	41	1	1,541
6) Medical Technician	11	1.5	300
7) Sanitary Inspector	1	1	100
8) Laboratory Technician	6	1	155

Source : Data provided to the team by DHS

Moreover, schools for training X-ray technicians, operating theatre staff, laboratory technicians and dispenser are established in the following at 5 locations: Bahawalpur, Jhelum, Sargodha, Sahiwal and Sialkot. The courses of study are one year in all cases, and 25 students are admitted to each course.

As to facilities for training dental technicians and dental hygienists, a school annexed to the Dental College in Lahore is providing the respective courses. The period of study is 2 years, with 30 dental technicians and 20 dental hygienists per course.

(6) Supply and Maintenance System for Medical Equipment

The production of medical equipment in Pakistan is concentrated in Sialkot in Punjab Province. The items produced are instruments for surgical operations or treatment, surgical operating gloves, beds, and dental equipment. Some of this equipment is exported, but most medical equipment must be imported.

Punjab Province has a plan to establish medical equipment repair workshops. One has already been completed in Lahore and, started operation. X-ray film illuminators, suction units, sterilizers, centrifuges, beds, stretchers and others equipment are repaired there. The workshop in Sargodha has also already been completed, but is not yet in operation. However, in Multan, construction work has not yet started.

In general, manufacturers provide repair services in the province. For example, in the case of the dental units and X-ray units which were purchased by the provincial government, local agents contracted with the government for maintenance service. In the case of dental units, the agent is responsible for inspection and repairs, which are provided twice a year by an engineer from a Japanese manufacturer. For the X-ray units, it is specified that technicians of the provincial government should be dispatched to the manufacturer's factory to obtain necessary maintenance training.

2-3-2. Rural Health Centers (RHCs)

As noted in Sub-section 2-1-7, a RHC is located in an administrative unit with a population of 40,000 to 100,000, or in a Markaz, consisting of several union councils. The main activity of the RHC is to provide primary health care to inhabitants of the union councils, in which the RHC is located. However, RHCs often function as a base camp for preventive medicine in a Markaz. The Malaria Control programme and the Expanded Programme for Immunization are being developed. Some RHCs situated along the trunk road between Karachi and Islamabad also provide emergency care for traffic accidents as bases of the Flying Squadron.

The field survey clarified as follows, the present condition of RHC with regard to medical care, facilities, and operational system:

(1) Medical Care by RHC

1) Number of patients

Outdoor patients : 20 to 220 persons per day
90 persons on average.

Indoor patients : Number of beds is 8 to 10,
approximately 50% of which
are occupied on average

2) Service Area

The service area of RHC is officially the entire Markaz, but, in reality the RHC covers a radius of 15-16 km where access by foot, bus or wagon is available.

3) Major diseases of outdoor patients

Entrogastritis, respiratory organ infectious diseases, anemia, dermatitis due to insects, hypertension, urologic organ diseases.

4) Laboratory examination

According to the results of the field survey, the percentage of RHCs which conduct some type of laboratory examinations is about half of all RHCs. Examination are mainly blood tests, urine tests, stool tests, sputum tests, and malaria protozoan detection.

5) Operations

Operations are performed at about 40% of all RHCs. The number of operations is in the order of 1,000 per year, which include surgical treatment. About 1/3 are called surgical operations, such as appendix excision and vesical calculus removal.

Surgical treatment, as opposed to operations, include circumcision, injuries, and cystoma incisions.

(2) RHC Facilities

1) Building

a) Plan : In general, outpatient clinics are separated into two parts, for men and women and located near the main entrance. An operating theatre and ward are located at the back.

b) Structure : Single story brick masonry

c) Installations : Power supply, tube well, roof elevated water tank, septic tank.

2) Major medical equipment

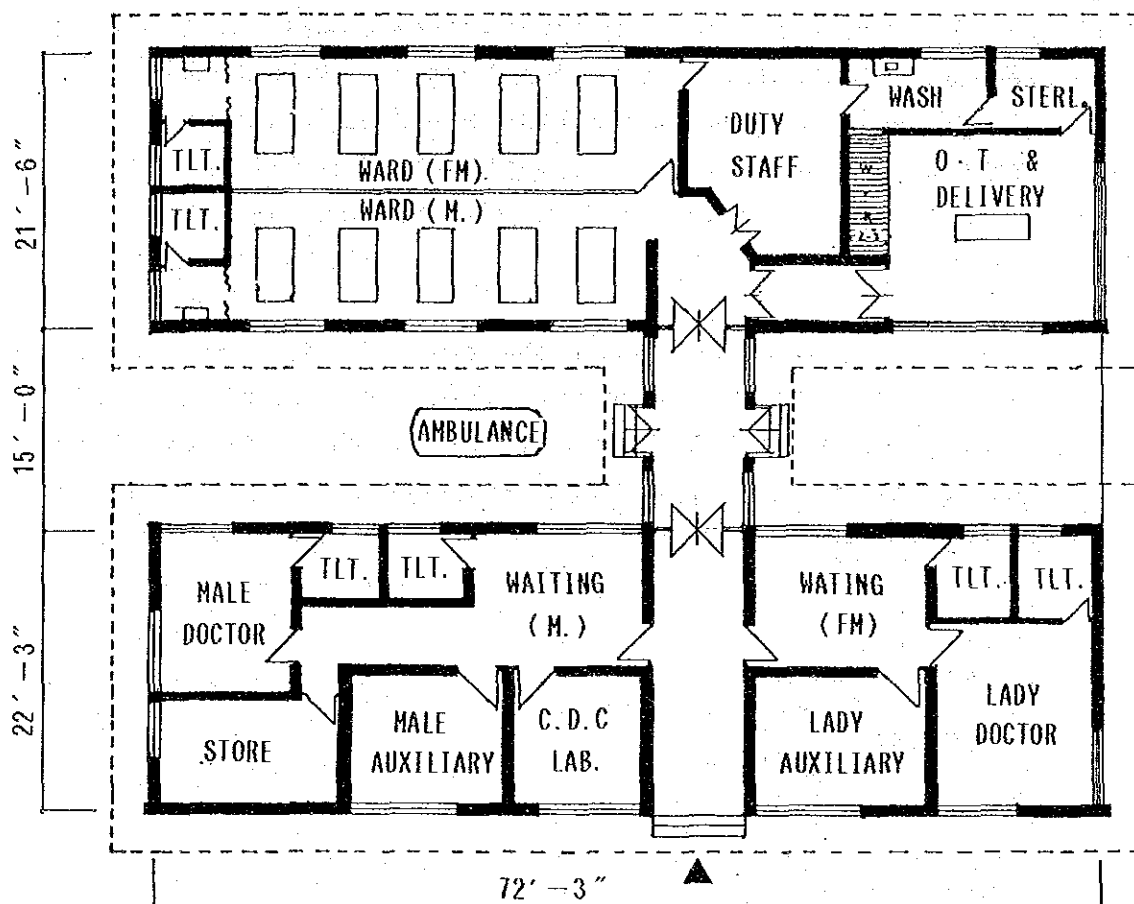
Available medical equipment varies by RHC, but in general, the following equipment is provided:

Table 2-13. Major Medical Equipment available in a RHC

Name of Equipment	Quantity	Remarks
Operation table	1	
Simple operation light	1	
Refrigerator	1	
Thermal sterilizer	1	
Stretcher	1	
X-ray film illuminator	1	
Portable sterilizer	1	
Hospital bed	8 - 10	
Oxygen cylinder	3 - 6	
Suction unit	1	Manual or electrical operation
Centrifuge	1	Manual or electrical operation
Monocular microscope	1	For Malaria detection

Besides the above, several RHCs have X-rays. Ambulances are provided to RHCs, which also function as a base of the Flying Squad. Due to implementation of the BHU/RHC Establishment Plan by the provincial government in recent years, there are many RHCs which have already been provided with steam or electric sterilizers and X-rays.

Fig. 2-9 Typical Floor Plan of Existing RHC



(3) Management of RHCs

1) Operating hours

An RHCs are as a rule, open from 8:00 AM to 2:30 PM, but, during periods of intensive immunization, they are open from 8:00 AM to 1:30 PM with immunization conducted from 2:30 to 4:30 PM.

2) Staff

Staffing varies with the actual activities of the particular RHC. For example, there are eight RHCs with four doctors, but 2 RHCs have none. The size of staff varies from 6 - 36, with an average of 26. A typical staff is as follows:

Male doctor	1
Female doctor	1
Dental surgeon	0
Lady health visitor	1
Dispenser	2
Laboratory assistant	1
X-ray assistant	0
Nurse	0
Dresser	1
Dental technician	0
Clerk	1
Midwife	4
Sanitary inspector	4
Tube well operator	1
Servant	1
Ward attendant	2
Sweeper	2
Janitor	1
Gardener	1
Water carrier	1
Cook	1
Driver	0

3) Management Expenses

At present, budgets are allocated each fiscal year on the basis of expenditures during the preceding year. Management expenses depend on the scale and activities of the RHCs. The annual budget per RHC ranges from 285,000 rupees to 1,000,000 rupees. Medicine is provided to RHCs by the Central Medical Deposit of the Department of Health, Punjab through the district health offices.

2-3-3. Basic Health Units (BHUs)

A BHU is located in a union council with a population of 10,000 to 15,000. The major activities of BHU are providing simple medical care for outpatients, dispensing drugs, and midwife care.

(1) Facilities of BHUs

1) Building

The typical floor plan of BHU is designed in rectangular shape, as shown in Fig. 2-9. The building is simple, consisting of separate clinics with waiting halls, dispensary room, and storage rooms. The structure is single story brick masonry. Only half of all BHUs are provided with power and water supply.

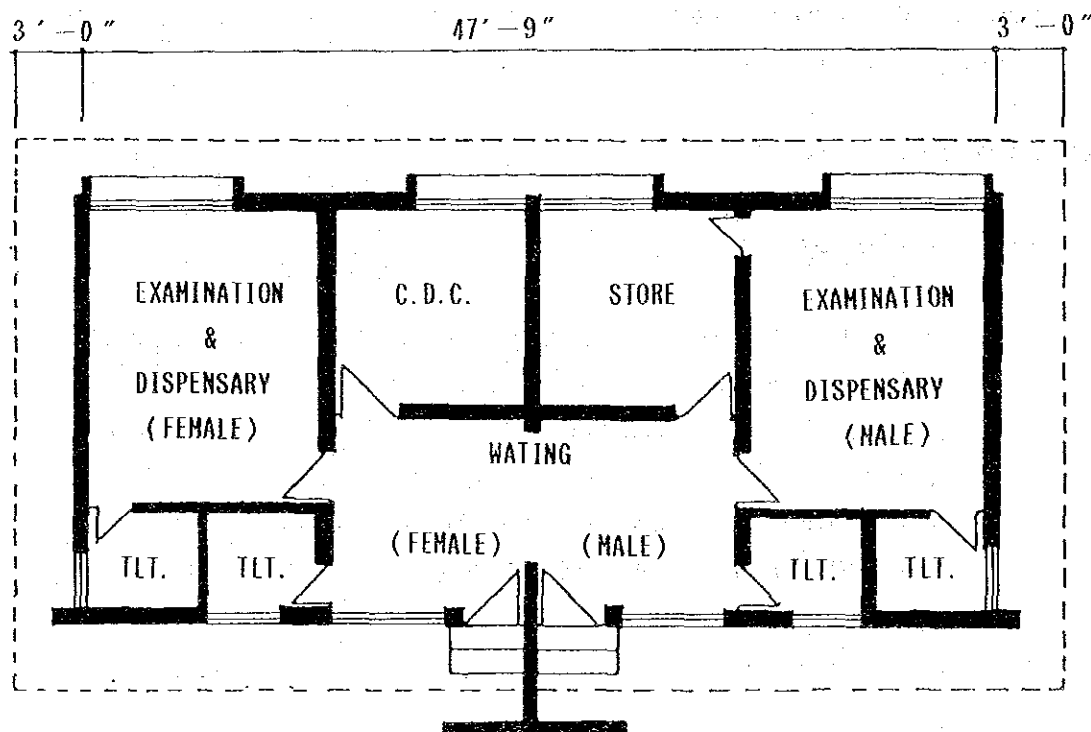
2) Equipment and furnishings

Examination beds, stethoscopes, thermal sterilizers, a drip-infusion hanger, and a small amount of medicine for ordinary use are normally provided.

(2) BHU Management

Like RHCs, BHUs are open from 8:00 AM to 2:30 PM daily except Friday. The staff usually comprises a doctor, a medical technician, a lady health visitor, a midwife and a dispenser. However, staffing of BHUs varies with the facility, except for midwives who are stationed at almost all units. About half of BHUs are staffed with all of the above personnel.

Fig. 2-10 Typical Floor Plan of Existing BHU



2-3-4. Achievement of the BHUs/RHCs Establishment Plan in Punjab Province

(1) Implementation agencies for the Plan

In Punjab Province, detailed programs for the BHU/RHC Establishment Plan are drafted by the Directorate Health Services (DHS). Construction or expansion work is carried out by private firms under the supervision of the Communication and Works Department and the Building and Construction Offices of the local government.

Monitoring and supervision of the Plan are carried out by the Planning and Development Department of the Punjab government together with the Planning Commission of the Federal Government.

(2) Progress of the Plan

1) Facilities Construction

The Punjab Government was already constructing RHCs and BHUs in accordance with the previous Rural Health Programme before fiscal 1986/87 when the BHU/RHC Establishment Plan started. Under the Programme, 1,744 Union Councils were furnished with RHC or BHU, which corresponds to 74% of the entire 2,367 Union councils. The time plan accelerated construction under the following schedule:

Table 2-15. Annual Phasing for the Construction of RHCs/BHUs

Facility	Description	Number of Facilities				Total
		1986-87	1987-88	1988-89	1989-90	
RHC	New construction	10				10
	Upgrading	50	70	70	78	268
BHU	New construction	300	323			623
	Upgrading	400	415	415	422	1,652

However, the Plan was partially modified, as shown in table 2-16, in accordance with the Annual Development Program in 1987/88, because land acquisition for construction was not too smooth, and the number of RHCs to be newly constructed was also reviewed.

Table 2-16. Revised Schedule for the Construction of RHC/BHU in 1987/88

Facility	Description	1986-87 (actual)	1987-88 (planned)
RHC	New construction	29	33
	Upgrading	50	80
BHU	New construction	48	300
	Upgrading	400	430

According to the field survey, 13 new RHCs out of 29 under construction have already been completed as of February 1988, and the remaining 16, on which construction started in fiscal 1986/87, are expected to be completed by June, 1988.

At present, 33 RHCs are under construction, including those started in the 1987/88. The upgrading of RHCs is one year behind schedule. 50 RHCs will be upgraded in the 1987/88, and 80 RHCs in the 1988/89. Based on the field survey, it may be estimated that the number of BHUs in operation is 1,522 and that under construction is 455.

Table 2-17. Construction Progress of RHCs/BHUs

Facilities	Number
Existing RHC	239
Completed since 1986/87	13
Completed before 1986/87	226
RHC Under Construction	33
Existing BHU	1,522
BHU Under Construction	455

2) Provision of Equipment

The Punjab Government has already procured approximately 170 X-ray units together with dental units and steam sterilizers under the Plan, which are allocated to RHCs.

The allocation of major pieces of medical equipment to RHCs, is as follows.

Table 2-18. Provision of Major Medical Equipment by Divisions

Equipment Division	Ambulances	Dental Units	Mobile Shadowless Lights	Binocular Microscopes	Standby Generators	Diagnostic Sets	Manual Resuscitators	Sphygmomanometers	Centrifuges	X-ray Units	Number of RHC
1. Faisalabad	1	6	5	19	1	28	5	31	14	26	31
2. Sargodha	0	5	4	12	0	25	7	26	11	21	32
3. Lahore	3	11	8	12	2	32	14	36	20	25	42
4. Multan	0	6	7	15	0	21	9	25	7	16	32
5. Bahawalpur	1	9	13	15	1	37	10	38	23	25	37
6. Rawalpindi	3	5	13	11	0	29	7	29	15	15	30
Sub-total	8	42	50	84	4	172	52	185	90	128	204
7. Gujranwala	(1)	(14)	(17)	(28)	(1)	(57)	(17)	(62)	(30)	(43)	41
8. Dera Ghazi Khan											27
Total	9	56	67	112	5	229	69	247	120	171	272

Note: 1. Figures indicate the number of RHCs to which the equipment has been provided. Figures in () are estimated and, as a result, the totals are also estimates.

2. All ambulance are exclusively used by the Flying Squad.

3. The number of RHCs including facilities under

2-4 Background and Contents of the Request

2-4-1. Background of the Request

As already mentioned, the Government of Pakistan is implementing the BHU/RHC Establishment Plan for the purpose of improving health and medical care services in the rural areas of the country.

6,418 million rupees are required for implementing the Plan, of which 1,259 million rupees are for providing essential medical equipment, which is to be imported from abroad. The Government of Pakistan anticipates assistance from foreign countries for the procurement of such essential equipment, which must be purchased with foreign currency. They, therefore, request that the Government of Japan provide a grant for this purpose.

In response to the request of the Government of Pakistan, the Government of Japan carried out a preliminary study in July, 1987. The preliminary study team investigated the outline of the Plan, including the implementing organization, and the present status of the existing RHCs and BHUs.

The results of the preliminary study suggested that, with the completion of the BHU/RHC Plan, rural inhabitants would have access to health and medical care services within their respective Union Councils, the gap in the standard of medical care between urban and rural areas would be reduced, and general health levels would be raised.

Under the Plan developed by the Government of Pakistan, however, five years will be required to furnish all the province with the necessary facilities and equipment. Thus, the study team found that it would not be feasible to extend assistance for the Plan in one year under the Japanese grant aid program, which requires the project to be completed within a single Japanese fiscal year. Responding to the advice of the team, the Government of Pakistan prioritized the different area of the country and chose Punjab Province as the region to be provided with the grant aid. Consequently, the Government of Japan decided to conduct a basic design study on this project for the Establishment of Basic Health Units and Rural Health Centers in Punjab Province.

In January 1988, they submitted to the Government of Japan a list of the equipment required to implement the Plan in Punjab Province.

Both Pakistan and Japan examined the items of requested equipment and made some revisions through discussions held at the field survey stage. These are covered in the Minutes of Discussions.

2-4-2. Contents of the Request

The request of the Government of Pakistan was confirmed by the both parties through the discussions held during the field survey. They are as follows:

(1) Objective of the Project

Under the BHU/RHC Establishment Plan, the Government of Pakistan continues to construct new RHCs and BHUs which provide primary health care to inhabitants of the rural areas. It also improves existing ones. The objective of the Project is to improve the health and medical activities of these RHCs and BHUs in Punjab Province by providing necessary equipment.

(2) Contents of the Project

The Project includes the provision of necessary equipment for the following functions of the RHCs and BHUs:

1) Role of the RHC

The RHC provides primary health care in a group of Union Councils and also functions as a midway facility between secondary medical care hospitals and BHUs.

2) Role of the BHU

The BHU provides primary health care to inhabitants of a Union Council.

The RHCs and BHUs to be included in the Project will be chosen among those in Punjab Province satisfying the conditions shown below in (3) and will be furnished with the equipment listed below in (4).

(3) Facilities to be furnished with Equipment

1) RHCs

The RHCs to be furnished with the requested equipment will be either existing RHCs with completed buildings or new RHCs currently under construction which should be completed by March 31, 1989. The RHCs being upgraded will be also included in the scope of the Project, provided that they are completed by March 31, 1989. All these RHCs must have enough space for the subject equipment.

2) BHUs

The BHUs to be furnished with the requested equipment will be either existing BHUs with completed buildings or new BHUs currently under construction.

(4) Items of Equipment

The items of equipment to be provided within the scope of the Project are listed below. They are the rest of all items required for RHCs and BHUs after excluding those to be supplied by Pakistan

1) Equipment for each RHC

- a) Ambulance with accessories for carrying patients
- b) Dental Unit with accessories (excluding an X-ray unit)
- c) Mobil Shadowless Light for Operating Theatre
- d) Binocular Microscope with allied laboratory tools
- e) Standby Generator for refrigerator and mobile shadowless light
- f) Diagnostic Set
- g) Manual Resuscitator (Ambu-Resuscitation Kit)
- h) Sphygmomanometer (Blood Pressure Apparatus)
- i) Centrifuge

Provided that the following shall be considered on the conditions for the provision of equipment:

- 1: Existing RHCs with completed buildings and those being upgraded, or new RHCs currently being constructed which are to be constructed/upgraded with adequate space room for the equipment, under the Prime Minister's five-point program by March 31, 1989.
 - 2: RHCs which are so far not equipped with the required items by the government of Punjab. The items provided under the grant aid by the Government of Japan should not duplicate the plan of procurement of various equipment by the Government of Pakistan.
 - 3: As for dental unit, the RHCs with completed room with necessary infrastructures such as water supply, drainage and electricity by June, 1988.
- 2) Equipment for each BHU
- a) Binocular Microscope (mirror type) with allied laboratory tools
 - b) Diagnostic Set
 - c) Sphygmomanometer (Blood Pressure Apparatus)

(5) Implementing Organization

The implementing authority for the Project is the Government of Pakistan. The Planning and Development Section of the Ministry of Health (the Federal Government) will take charge of administrative matters, including contracts for the Project. These matters will be executed in consultation with the Government of Punjab Province represented by the Additional Secretary (Technical) of the Health Department. All necessary documents will be signed by the Federal Government.

(6) Additional Notes

The Government of Pakistan strongly feel that, in addition to the equipment listed above, general x-ray units and dental x-ray units should also be provided. The team agreed to convey this message to the Government of Japan, although the team did not agree to include them in the Project due to restrictions of Japanese law on radiation hazards. This subject will be examined further in Chapter 3.

CHAPTER 3. CONTENTS OF THE PROJECT

CHAPTER 3. CONTENTS OF THE PROJECT

3-1 Objectives of the Project

The objective of the Project is to strengthen the activities of the RHCs and BHUs in the Punjab Province, which are being established by the federal and provincial governments under the BHU/RHC Establishment Plan. This will enable them to provide adequate health and medical services, mainly to provide primary health care to rural inhabitants. The federal and provincial governments have implemented the plan with a view to improving health and medical services. The essential medical equipment required for implementation of the Plan is not fabricated in the country, and to the Government of Pakistan must secure the foreign currency to purchase it from foreign countries. Thus, the Project will enable the Government of Pakistan to procure such essential equipment by extending a grant from the Government of Japan which will accelerate the implementation of above plan in Punjab Province.

3-2 Appraisal of the Request

3-2-1. Review of the Project

(1) Project Objective

Various programs related to the primary health care are being implemented in Pakistan, and all are effective in their own way. However, there still exist many union councils which have no facilities for health and medical services. Inhabitants in such areas cannot receive any public medical care within their respective Union Councils.

Considering these circumstances, early realization of the Plan implemented by the Government of Pakistan is an urgent issue for them. Therefore, the Project objective, as confirmed in 3-1 above by the governments of both Japan and Pakistan, is appropriate.

(2) Function of RHC and BHU

The function of RHC and BHU is to provide primary health care to inhabitants in the rural areas. Improvement of primary health care will not be achieved only through the establishment of better medical facilities with adequate equipment. Eliminating malnutritions and improving the living environment are also vital. As these affairs are controlled by other departments or governmental organizations, cooperation with them is required to effectively promote primary health care.

Early establishment of a referral system is required so that the RHC can function efficiently as an intermediate facility between BHUs and upper-grade hospitals.

(3) Implementing Organization

The Project will be implemented by the Planning and Development Section of the Ministry of Special Education, Health and Social Welfare as the main agency in consultation with the Government of Punjab Province, represented by the Additional Secretary Technical. However, details of the organization have not yet been settled. Upon implementation of the Project, the following staff will be required.

- 1) Person in charge of the technical aspects of equipment
- 2) Person in charge of inspection and take-over
- 3) Parson in charge of planning a providing schedule of equipment.

(4) X-ray Unit

The need for providing X-ray units to RHCs can not be denied, considering the role of RHCs in rural areas. However, X-ray unit should be excluded from the Project for the following reasons:

Structure and space for installing an X-ray unit and method of use as well should be regulated by technical standards against radiation hazards. The International Committee of Radiation Protection (ICRP) recommends detailed method of protection which many countries follow in establishing their own regulations. The Medical Law of Japan also includes relevant regulations. According to the Japanese regulations, the X-ray unit shall be installed in a room where structure insures that radiation leakage will be below a safety level and shall be operated remotely in another room.

The structure of the X-ray unit room, existing or planned, for the RHCs does not satisfy the standards of the Japanese regulations. Therefore, X-ray units would be inappropriate under a grant from the Government of Japan.

3-2-2. Requested Equipment

The Government of Pakistan requests necessary equipment for implementation of the BHU/RHC Establishment Plan, excluding equipment obtainable in Pakistan.

The requested equipment is judged to be indispensable for primary health care.

The RHC is planned to function as an intermediate medical facility between the BHU and secondary health care hospitals.

Dental units have been excluded from the Project for the following reasons;

- 1) In general, medical apparatus such as dental units is prone to breakage, if it is connected to a newly constructed water supply system. This is caused by sand in the water which blocks the valves. If the apparatus is kept unused for a long time after being installed, the probability of trouble will increase. Therefore, to provide dental units, the following conditions must be met: prior to installation, use a newly constructed water supply system for a period long enough to wash out the sand in the pipes; continue operation after installation; the unit should be installed by a skilled technician under the supervision of the Japanese manufacturer (if provided under the Project).
- 2) The field survey clarified that 50 dental units were purchased in 1987 by the Punjab Government, but are still unused due to delay in expanding facilities and securing staff.
- 3) Since the grant should be extended under the fiscal system of the Government of Japan, the installation and turning over of dental units should, in principle, be completed within one fiscal year.
- 4) Considering the possibility of providing dental units from the standpoint of 1), 2) and 3) above, there is no RHC which could complete sufficient preparation of the water supply system prior to the installation of dental unit or secure the necessary staff for the immediate operation of the dental unit after installation, although buildings and electrical and sanitary facilities necessary for the installation of dental unit may be completed in time for the installation.

- 5) It is highly unlikely, therefore, that the dental units will be used efficiently if they are included in the Project.

Upon determining the details of equipment and selecting the RHCs and BHUs to be furnished with the equipment, the following points will be considered:

- 1) Whether or not the function of equipment conforms to the activities of the RHCs or BHUs.
- 2) Whether or not the quantities of equipment are appropriate.
- 3) Whether or not the staff for operating the equipment is appropriate.
- 4) Whether or not the spaces and electrical and sanitary facilities necessary for installing the equipment have been prepared.
- 5) Whether or not there is any duplication of the items of equipment with those to be provided by Pakistan.

3-2.3. Facilities to be Provided with the Equipment

(1) RHC

The RHCs to be covered by the Project are the existing RHCs with completed buildings and those being upgraded or newly constructed with adequate space or rooms for the equipment and schedule to be completed by the end of March, 1989.

According to the result of the field survey, there are presently 239 RHCs, including 50 RHCs being upgraded. The number of RHCs being under construction is 33. All of these being upgraded and constructed will be completed by the end of March, 1989. Therefore, the number of RHCs to be covered by the Project is 272 at the maximum. Numbers of the respective items of the equipment vary according to the number of eligible RHCs for each item. Whether or not a RHC is eligible for an item will be determined based on the requirements of the respective items.

(2) BHU

The Project covers the existing BHUs with completed buildings and those being constructed.

The field survey showed that the number of BHUs in operation is 1522, with 445 under construction. Therefore, at the maximum 1977 BHUs are to be covered by the Project. As stated above, the BHUs to be provided with the equipment will be determined according to the requirements of the respective items.

3-3 The Project

3-3-1. Project Area and Facilities

The Project area is Punjab Province and the project facilities are the RHCs and BHUs in this province.

3-3-2. Contents of the Project and Implementing Bodies

The Project will be implemented by the Ministry of Special Education, Health and Social Welfare of the Federal Government in consultation with the Government of Punjab. The Project includes the provision of the following items of equipment;

(1) Equipment for RHC

- 1) Ambulance
- 2) Mobile Shadowless Light
- 3) Binocular Microscope
- 4) Standby Generator
- 5) Diagnostic Set
- 6) Manual Resuscitator
- 7) Sphygmomanometer
- 8) Centrifuge

(2) Equipment for BHU

- 1) Binocular Microscope
- 2) Diagnostic Set
- 3) Sphygmomanometer

3-3-3. Gist of the Equipment

(1) Ambulance

An Ambulance is fully an indispensable to a RHC as a telephone system for a health and medical care network in a rural area.

Ambulances will be supplied to RHCs for the following purposes;

- 1) Transporting patients with advanced diseases to the referral RHC when the BHU cannot treat them.
- 2) Transporting patients with advanced diseases to the referral hospital, when the RHC cannot treat them.
- 3) Transporting emergency patients to the RHC or the referral hospital.

Ambulances need to be equipped with devices necessary for the transportation of patients with advanced illnesses and those for first aid.

(2) Mobile Shadowless Light

Shadowless light is essential for safe surgical operations, although many of the existing RHCs are not provided with it. In such RHC, surgical operations are carried out only with room light. The operations currently implemented at RHCs include light operations such as surgical treatment and abdominal operations. Therefore, the shadowless light to be provided must be of a mobile type.

(3) Binocular Microscope

The RHC clears up the pathogenic bacteria of infectious disease, such as tuberculosis, for adequate treatment for patients and health control of the inhabitants. For this purpose, the RHC must conduct various laboratory tests, such as a blood test, urine test, stool test and phlegm test. The microscope to be provided to RHCs must function for the following purposes;

- 1) Counting blood cells
- 2) Discriminating parasite eggs
- 3) Discriminating uric sediments
- 4) Detecting bacteria such as tuberculous bacilli

(4) Standby Generator

The RHCs is provided with vaccines stored in a refrigerator. The refrigerator needs a continued power supply. Power is also needed during a surgical operation. But, since the power supply is not always reliable in the rural areas of Punjab Province, a counter measure against power failure is needed.

For this purpose, a standby generator for the refrigerator to preserve vaccines and for the devices necessary for operations, such as shadowless light, is indispensable for the RHC.

(5) Diagnostic Set

Diagnostic sets include basic appliances used by the doctor for temperature checks, and ocular inspections of ears, nose, throat and eyes.

(6) Manual Resuscitator

Manual resuscitators are used for patients who have ceased to breathe or find it difficult to breathe. That are hand-operated. There are two kinds of manual resuscitators, for adults and children. This equipment is indispensable for surgical operation and ambulances at the RHCs.

(7) Sphygmomanometer

No sphygmomanometer is provided to the majority of the existing BHUs though it is indispensable for diagnosis of internal diseases and operation.

(8) Centrifuge

Centrifuges are used for to extract the required test object from blood or urine after separating the ingredients by specific gravity.

CHAPTER 4. BASIC DESIGN

CHAPTER 4. BASIC DESIGN

4-1 Policies for the Basic Design

The types and number of equipment items to be supplied under the Project shall be decided in compliance with the following policies:

(1) Criteria for the Selection of Equipment

The equipment shall conform to the function of RHCs or BHUs which perform primary health care.

The basic specifications of the equipment are to be decided considering the following points:

- 1) It must function suitably for the intended purpose and be easy to handle
- 2) It must be easy to maintain and obtain spare parts and expendable articles.

(2) Criteria for Deciding the Number of Equipment Items

The equipment shall be used effectively and must be in operation immediately after delivered. For this purpose, the buildings and staff shall be insured. The quantity of equipment will be determined for each item from the number of RHCs or BHUs.

The RHC or BHU to be provided with the equipment will be selected among the 272 RHCs or 1977 BHUs mentioned in section 3-2-3 of the previous chapter. The number of the respective items will be determined as follows:

- 1) Deducting the existing number from the required number to avoid duplication with equipment provided by Pakistan.

- 2) The required number of the respective items of equipment will be determined taking the staff sufficiency rate into consideration.

The RHCs or BHUs to be provided with the equipment vary with the items of equipment.

Only the specifications and quantity of the equipment are specified in this Report. The particular facility to be provided with each item is not specified. This will be determined by the Government of Pakistan in accordance with the conditions of the respective facilities.

4-2 Equipment Plan

4-2-1. Items of Equipment

In accordance with the outline of the equipment stated in section 3-3-3 of the previous chapter and the criteria mentioned above, the equipment specifications are proposed as follows:

(1) Ambulance

- 1) Modified 2200cc class van equipped with the following accessories:
 - . Equipment to indicate an emergency (red, lamp, siren, and other)
 - . Main and sub stretcher
 - . Medicine box for first aid treatment
- 2) Diesel engine for ease of maintenance.
- 3) Bench sheet installed to cope with carrying attendants or multiple patients in case of mass outbreak of disease, such as diarrhea.
- 4) Spare parts for one year.

(2) Mobile Shadowless Light

- 1) Auto-charge battery-equipped type against power failure.
- 2) Easy handling type equipped with 4 halogen lamp equipped light. Krypton lamp, sealed beam lamp and halogen lamp are normally used for shadowless light but halogen lamps have become popular in recent years. Halogen lamps have the advantage of long-lasting, homogenized performance and excellent color response, despite the higher price.
- 3) Spare halogen lamps are included.

(3) Binocular Microscope

- 1) The microscope shall be suitable for uric sediment test, parasite test, morphological blood examination, and bacteriological examination .
The lens component is as follows
 . Eyepiece : 10 magnifications
 . Objective : 4, 10, 40, 100 magnifications
- 2) Slide glass, cover glass and hemacytometer are included as accessories.
- 3) Microscope supplied to RHC are built-in type, and, to BHU, mirror type, considering the electricity supply situation.
- 4) Halogen lamps for one year's use are included, but no spare parts are included for the microscope.

(4) Stand-by Generator

- 1) The rated output is A.C. 3.0 KVA, 50 Hz, sufficient for 3 refrigerators, shadowless light in operation theater, electric suction unit and electric sterilizer.
- 2) Open frame mobile type with wheels.
- 3) 2 pieces of 30m and 1 piece of 50m extension cords with cord-reels for power supply to the EPI room, laboratory and operating theater.
- 4) Spare parts for one year.

(5) Diagnostic Set

The set consists of mercury clinical thermometer, tongue depressor, ear speculum, head mirror, nasal speculum, laryngeal cotton applicator, ear and nasal cotton applicator, pocket light and laryngeal mirror in a stainless steel case.

(6) Manual Resuscitator (Ambu-Resuscitation Kit)

- 1) Manual resuscitator connectable to an oxygen cylinder.
- 2) A kit consists of a set for adults and for children

For adults : air and storage bag, masks for adult, oxygen supply hose.

For children: air bag (small), masks for infant and for new born baby, oxygen supply hose, and storage case.
- 3) No spare parts.

(7) Sphygmomanometer (Blood Pressure Apparatus)

- 1) Desk model mercurial sphygmomanometer
- 2) Scale indication shall be 0 - 300 mmHg.
- 3) No spare parts.

(8) Centrifuge

- 1) Portable desk centrifuge having a rotor with capacity of 8 centrifuge tubes of 15 ml.
- 2) Maximum revolving speed is 4,000 rpm.
- 3) Centrifuge tubes for one year as spare parts.

4-2-2. Numbers of Items and Facilities to be Delivered

(1) Ambulance

An ambulance shall be provided to every RHC in the near future. However, in accordance with the basic policies stated in paragraph 4-1, ambulances are, at present, to be provided one each to the following RHCs only:

RHC... newly constructed (Completed)	: 13
RHC... under construction	: 33
<u>RHC... being upgraded</u>	<u>: 50</u>
Total	96

Therefore, the total number of ambulances to be supplied under the Project is 96.

(2) Mobil Shadowless Light

- 1) 1 (one) mobile shadowless light will be provided to each RHC in which no such light is available.
- 2) 205 mobile shadowless lights shall be provided, after deducting 67 RHCs in which mobile shadowless light is available, from the 272 RHCs included in the Project.
($272 - 67 = 205$ units)

(3) Binocular Microscope

- 1) 1 (one) Binocular microscope shall be provided to each RHC and BHU in which no binocular microscope is available for laboratory tests, but a laboratory technician will be available.
- 2) The number of units supplied to RHC is 89 units in total.

Number of the RHCs : 272

Sufficiency rate of staff recruitment : 0.74
(lab technician)

Number of existing microscopes : 112

Required number = 272×0.74 : 201

Therefore, $201 - 112 = 89$

- 3) No binocular microscope is available in BHU at present. Therefore, 1463 units shall be provided to BHU as follows;
 $1977 \times 0.74 = 1463$ units.

(4) Standby Generator

- 1) 1 (one) standby generator shall be provided to each RHC in which no standby generator is available.
- 2) 267 standby generators shall be provided, after deducting 5 RHCs in which standby generator is available from the 272 RHCs.
 $272 - 5 = 267$ units.

(5) Diagnostic Set

- 1) Diagnostic sets shall be provided to all the RHCs and BHUs in which a doctor is available, but the number of sets will vary with the number of doctors available for each RHC or BHU.
3 sets shall be supplied to newly constructed or upgraded RHCs, and 2 sets to the other existing RHCs. One set shall be provided to every BHU.
- 2) The total number of sets are to be provided to RHCs is 283 sets, calculated as follows;
 $(272 \times 2 + 96) \times 0.8 = 229 = 283$ sets
where,
Sufficiency rate of staff recruitment : 0.80
Number of the existing sets : 229
- 3) 1,582 sets shall be supplied to BHUs, as follows;
 $1,977 \times 0.8 = 1,582$ sets

(6) Manual Resuscitator (Ambu-Resuscitation Kit)

- 1) Manual Resuscitator shall be supplied to each RHC in which no Manual Resuscitator is available.

- 2) 203 sets shall be provided, after deducting 69 RHCs in which a Manual Resuscitator is available from the 272 RHCs, as follows:
 $272 - 69 = 203$ sets

(7) Sphygmomanometer (Blood Pressure Apparatus)

- 1) Sphygmomanometers shall be provided to all the RHCs and BHUs in which a doctor is available, but the number of sets will vary with the number of doctors available for at RHC or BHU.
 3 sets shall be supplied to newly constructed or upgraded RHCs, and 2 sets to the other existing RHCs.
 One set shall be provided to every BHU.
- 2) The Number of Sphygmomanometers to be provided to RHCs is 265 sets, calculated as follows;
 $(272 \times 2 + 96) \times 0.8 - 247 = 265$ sets
 where,
 Sufficiency rate of doctor recruitment : 0.80
 Number of existing units : 247
- 3) 1,582 sets will be provided to all BHUs, as follows;
 $1977 \times 0.8 = 1,582$ sets

(8) Centrifuge

- 1) A centrifuge shall be supplied to each RHC in which a centrifuge is not available but a laboratory technician is.
- 2) 81 Centrifuges shall be provided, as follows;
 $272 \times 0.74 - 120 = 81$ sets
 where,
 Sufficiency rate of staff recruit : 0.74
 Number of existing units : 120