THE GOVERNMENT OF BALOCHISTAN
DEPARTMENT OF HEALTH
THE ISLAMIC REPUBLIC OF PAKISTAN

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF MEDICAL EQUIPMENT FOR THE BOLAN MEDICAL COLLEGE AT QUETTA
IN
THE ISLAMIC REPUBLIC OF PAKISTAN

FEBRUARY 1996

JAPAN INTERNATIONAL COOPERATION AGENCY
UNICO INTERNATIONAL CORPORATION

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PREFACE

In response to a request from the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Medical Equipment for the Bolan Medical College at Quetta and entrusted the study to the Japan International Cooperation Agency (JICA).

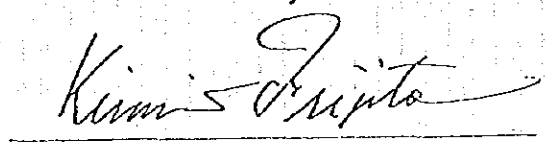
JICA sent to Pakistan a study team from October 3 to November 1, 1995.

The team held discussions with the officials concerned of the Government of Pakistan, and conducted a field study at the study area. After the team returned to Japan, further studies were made, and as this result, the present report was finalized.

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

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

February 1996



Kimio Fujita
President
Japan International Cooperation Agency

February 1996

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Medical Equipment for the Bolan Medical College at Quetta in the Islamic Republic of Pakistan.

This study was conducted by UNICO International Corporation, under a contract to JICA, during the period from September 28, 1995 to February 15, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Pakistan and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

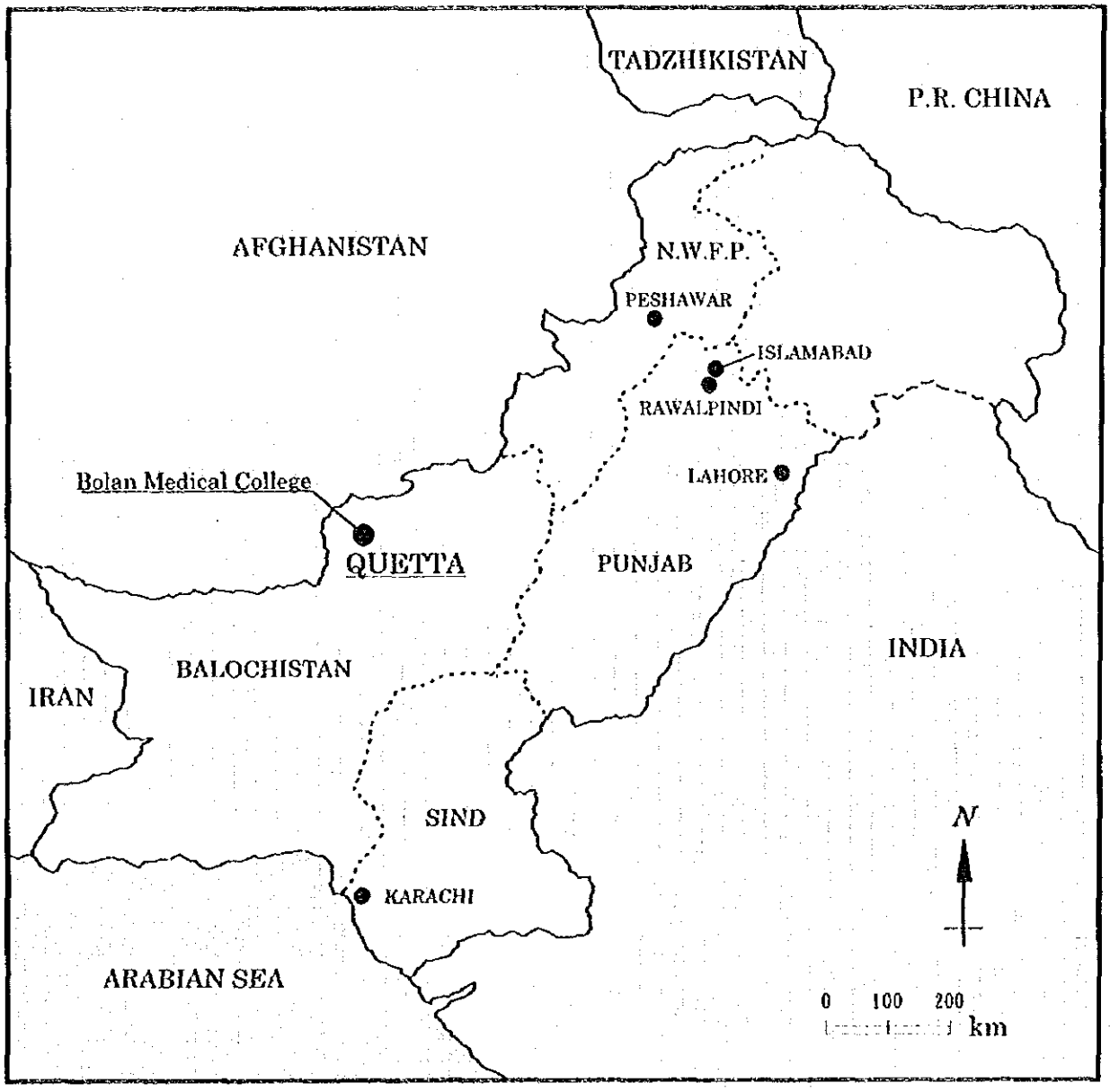
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

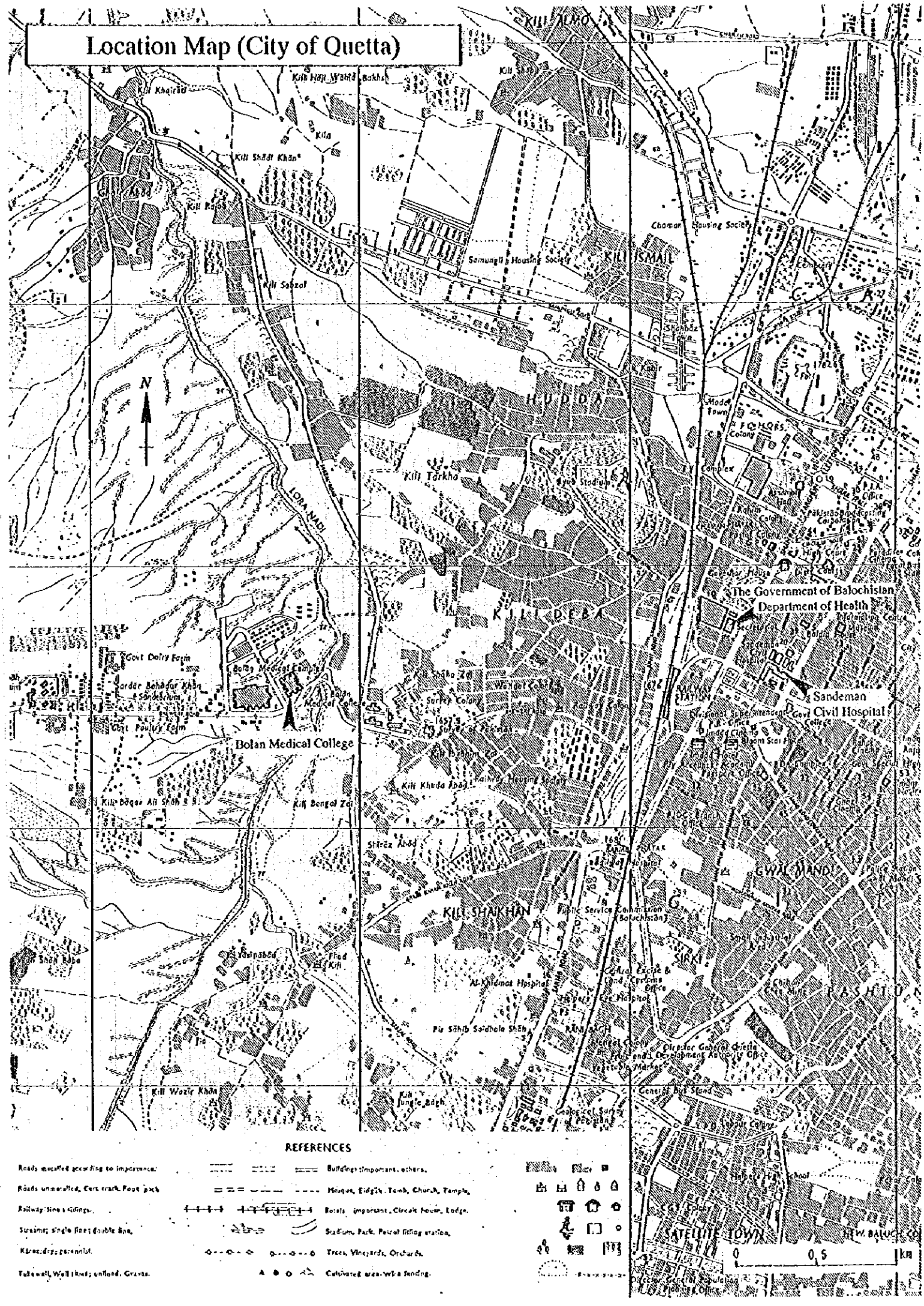
Kazuo Sekiguchi

Kazuo Sekiguchi, Project manager
Basic design study team on the Project
for Improvement of Medical Equipment
for the Bolan Medical College at Quetta
UNICO International Corporation

THE ISLAMIC REPUBLIC OF PAKISTAN



Location Map (City of Quetta)



REFERENCES

Roads metalled according to importance; Buildings (important, others).

Roads unmetalled, Cart track, Foot path; Mosque, Eidgah, Tomb, Church, Temple.

Railway line & sidings; Roads (important), Circuit house, Lodge.

Streams; single line, double line; Stadium, Park, Petrol filling station.

Karez, dry, perennial; Trees, Vineyards, Orchards.

Tube well, Well lined, unlined, Graves; Cultivated area-with fencing.

ABBREVIATIONS

ADB	:	ASIAN DEVELOPMENT BANK
A/P	:	AUTHORIZATION TO PAY
AVR	:	AUTOMATIC VOLTAGE REGULATOR
B/A	:	BANKING ARRANGEMENT
B.D.S.	:	BACHELOR OF DENTAL SURGERY
BHN	:	BASIC HUMAN NEEDS
BHU	:	BASIC HEALTH UNIT
EAD	:	ECONOMIC AFFAIRS DIVISION
ICU	:	INTENSIVE CARE UNIT
JICA	:	JAPAN INTERNATIONAL COOPERATION AGENCY
KfW	:	KREDITANSTALT f r WIEDERAUFBAU
L/C	:	LETTER OF CREDIT
M.B.B.S.	:	BACHELOR OF MEDICINE AND BACHELOR OF SURGERY
M.C.H. Center	:	MOTHER AND CHILD HEALTH- CARE CENTER
N.W.F.P.	:	NORTHWEST FRONTIER PROVINCE
PIMS	:	PAKISTAN INSTITUTE OF MEDICAL SCIENCE
SAP	:	SOCIAL ACTION PROGRAMME
UPS	:	UNINTERRUPTIBLE POWER SOURCE
WHO	:	WORLD HEALTH ORGANIZATION
WID	:	WOMEN IN DEVELOPMENT

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Chapter 1 Background of the Project

Chapter 1 Background of the Project

The Islamic Republic of Pakistan, ever since its independence in August 1947, has implemented a series of development projects for the industrialization of the country. Between 1955 and 1960 emphasis was placed on the maintenance and improvement of social infrastructures, however, this changed to an actual, full- fledged industrialization project, with its focus on consumer goods industries substituting for imports, from the 1960's. Though temporary stagnancy was viewed in the industrial growth during the 1970's, positive measures were taken towards private foreign capital, promotion of industry of exports, and improvement of the domestic resource utilizing industry and basic industry with reinforced development of the private sector beginning of the 1980's, whereupon the industrialization of Pakistan has gained momentum. Industry of Pakistan which is led by light industry such as textile and food processing covers 18.3% of GDP in the fiscal year 1992- 1993. In pursuant to this, the essential growth rate of Pakistan during the 1980's stands at a considerably high level of an average 6.4% based on the GDP, and this figure has been growing stably at a 5% range for the last few years. On the other hand, the economic infrastructure of Pakistan is agriculture showing 23.9% of GDP and 47.5% of working population in the year 1993- 94, proving to be the most significant, however, the harvest is dependent upon the weather. Pakistan needs foreign aid due to its deficits in trade and finance and its high population growth rate (annual approximate 3.1%: average of 1972- 1981).

In Pakistan, a lack of hygienic knowledge among peoples causes a high rate of disease contraction and low average life span (57.11 years). In particular, the mortality rate of infants under age 5 is extremely high, being 103.6 per 1000 persons (1993), due to insufficient education among females and midwives, lack of medical education, and so on. Major diseases are helminthiasis (vermination) and contagious diseases, and the major contractions are tuberculosis among adults and bacterial diarrhea and acute respiratory diseases among children. The prevalence of drugs is also provoking a serious social problem.

The numbers of public medical service facilities and medical staff in Pakistan are shown in Table 1- 1. 774 hospitals (general hospitals, affiliated hospitals to medical colleges, community hospitals) (as of 1992; figures mentioned hereafter also refer to the same year), 4,007 dispensaries, 464 rural health centers (2- 3 doctors of internal medicine), 4,384 BHUs (1 doctor of internal medicine) and 1,057 M.C.H. Centers (1 doctor of each obstetrics/gynecology and pediatrics) all carry out medical service in different localities; however, the medical services are especially impoverished in the rural areas, with lack of medical equipment and pharmaceuticals, and furthermore, there is also a lack of medical facilities per population even in the urban areas as well.

Table 1- 1 Public Medical Service Facilities and Medical Staff in Pakistan

	1988	1989	1990	1991	1992
1. Medical Facilities					
1) Hospital	710	719	756	774	774
Number of Beds	57,337	57,931	60,973	63,540	63,540
2) Dispensary	3,616	3,659	3,795	4,007	4,007
Number of Beds	2,866	2,843	2,851	2,811	2,811
3) Rural Health Center	417	448	459	464	464
Number of Beds	3,502	3,568	5,226	5,669	5,669
4) BHU	3,454	3,818	4,213	4,384	4,384
Number of Beds	510	684	2,530	3,268	3,268
5) M.C.H. Center	998	1,027	1,050	1,057	1,057
Number of Beds	150	146	152	150	150
2. Doctor	42,862	47,289	51,883	55,572	60,223
3. Dentist	1,772	1,918	2,077	2,193	2,279
4. Lady Health Visitor	2,697	2,917	3,106	3,463	3,796
5. Midwife	12,866	13,799	15,009	16,299	17,678
6. Nurse	14,015	15,861	16,948	18,150	19,389
7. Pharmacist	3,262	3,484	3,718	3,601	3,772

(Source: Pakistan Statistical Year Book 1993)

The population per bed and medical staff in Pakistan is shown in Table 1- 2, i.e.

1,525 persons per bed (world average being 360), 2,111 persons per doctor (world average being 134), 6,051 persons per nurse (world average being 188), 53,497 persons per dentist, and numbers of hospitals of each province are shown in Table 1- 3. That is the case of a nation-wide deficiency, and such circumstances are even more critical in the rural areas since those are concentrated in the big cities of Punjab and Sindh provinces. In- service medical education opportunities are also insufficient, thus imposing the problem in terms of quality of medical services as well.

Table 1- 2 Population per bed and medical staff in Pakistan

	1988	1989	1990	1991	1992
1. Bed	1,610	1,636	1,535	1,506	1,525
2. Doctor	2,422	2,263	2,127	2,008	2,111
3. Dentist	58,589	55,808	53,134	51,789	52,497
4. Nurse	7,408	6,739	6,512	6,257	6,051

(Source: Pakistan Statistical Year Book 1993)

Table 1- 3 Numbers of Hospitals of Each Province (1991)

	Punjab	Sindh	N.W.F.P.	Balochistan	Federal
1. Hospital	280	272	154	58	10
2. Dispensary	1,283	1,687	581	397	59
3. M.C.H. Center	495	151	328	75	8
4. Bed	35,697	22,229	11,058	3,588	2,980

(Source: Pakistan Statistical Year Book 1993)

The lack in number of medical staff in Pakistan is nationwide, but particularly marked in Balochistan province, where the population is approximately 6.25 million (estimated as of 1993, since there has been no census conducted since 1981), so that the population per doctor exceeds 10,000. Resolution of such lack of doctors is made even more difficult with an extremely high rate of population growth, 7.08% in the past (average of 1972- 81; Source: Statistical Yearbook 1993) and presently 4.4% (estimate; Source: Concept Eighth Five- Year

Plan 1993- 98), compared to the approximate 3% among other provinces. Moreover, as opposed to the approximate 72% of the population of Punjab and 54% of Sindh living in rural areas (1993; Source: Statistical Yearbook 1993, the same for figures hereafter mentioned), the figures for Balochistan province and N.W.F.P. are higher than those, being approximately 84%, making it more difficult to extend medical and health services to peoples.

Bolan Medical College, subject of this project, is the only medical college in Balochistan province, which was established in 1972 for the purpose of resolving the lack of doctors and providing in- service medical education. It has sent out a total of 1,804 doctors up to the present. Bolan Medical College assumes an extremely significant responsibility towards improving the lack of doctors and lack of in- service medical education opportunities in Pakistan, particularly in Balochistan. Nevertheless, its equipment and materials for medical education are by no means sufficient due to lack of funds. Therefore, Japan has been requested to provide grant aid for the purchase of equipment and materials needed to upgrade and perfect the level of medical education at Bolan Medical College and its affiliated hospital.

Chapter 2 Contents of the Project

Chapter 2 Contents of the Project

2- 1 Objectives of the Project

Perspective Plan (1993- 2008) and Eighth Five- Year Plan (1993- 98) of Pakistan assume their efforts toward promoting the social and economic welfare of the people with improving the social sector as one of the first priority targets. In regards with the health and medical services in particular, priority is placed on improving these facilities in the rural areas, and further emphasis is placed on such issues as extending fundamental medical care among all citizens. Thus there shall be rising demands in future to place priority upon further development of doctors and other medical staff.

The objective of the Project is to provide Bolan Medical College with the equipment and materials necessary for medical education, and further try to resolve the lack of doctors, provide doctors with an appropriate opportunity of in- service medical education, and improve the overall medical services of Balochistan province by means of improving the quality and functions of the college.

2- 2 Basic Concept of the Project

The finalized scope of request upon field survey covers the seven departments of Bolan Medical College, i.e. physiology, biochemistry, pathology, anatomy, pharmacology and therapeutics, forensic medicine, and community medicine, corresponding to the fundamental medical science and social medical science of which the school building has already been completed, out of the total 25 departments of the College. It does not cover equipment and materials for the other departments of clinical medicine conducted at Sandeman Hospital nor those for the affiliated hospital which is still under construction.

At first, a total of 493 items of equipment and materials were requested for the seven departments in question. However, introduction of equipment requiring large cost in operation and maintenance as well as those being used only for research or clinical practices and those in which their functions overlap with the others have all been omitted. Furthermore, equipment and materials not included in the initial request but judged as necessary by field survey have been added. Then, the number of items was finally narrowed down to 269 items. A priority ranking in three stages (A, B, C) was placed for these 269 items during discussions with Pakistan side at the field survey. Narrowing down and priority ranking of the equipment and materials have been made under the following principles.

(1) The equipment to be given high priority in the Project is:

1) the equipment to be replaced with the existing equipment which has already deteriorated
2) the essential equipment for indispensable curricula of medical education is.

(2) The equipment to be given low priority in the Project is:

1) the simple equipment/furniture available locally
2) the most advanced equipment to be utilized for research or clinical activities only
3) the equipment with some difficulties on installation/infrastructure conditions
4) the expensive equipment less utilized because of small number of testing/less number of patients
5) the equipment hazardous to environmental control
6) the equipment only utilized with exclusive reagent kit available from the specific manufacturer, and
7) the equipment with financial/marketing difficulties on the procurement of consumable and spare parts etc.

As a result of the field survey, it was found that many kinds of equipment necessary

for medical education did not exist in the college, and items which were confirmed their necessity should not be omitted. Therefore, the majority of the equipment is new kinds of items although replacement of existing equipment is one of the principles of high priority.

Further analysis was made in Japan about necessity and propriety of the equipment taking account of particularity of Pakistan and compulsory curricula of medical education uniformly required in all medical colleges in Pakistan, and the priority was reviewed. In accordance with the priority placed finally, items of priority "A" shall be included in planned equipment of the Project, which are essential to medical education. However, items of priority "B" or "C" shall be omitted from the planned equipment in consideration of incompletion of necessity or propriety. Results of the analysis for the individual equipment of the 269 items are shown in Table 2- 1.

Table 2-1 Study of Necessity, Propriety and Quantities of Requested Equipment

Propriety
O : Proper
a : Not proper (curriculum)
b : Not proper (number of students)
c : Not proper (operation and maintenance cost)

Status
R : Renewal/Replace
A : Addition
N : New

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
A. Dept. of Physiology									
A-1	Table-Top Centrifuge	A	O	O	2	2	N	A	O
A-2	Electronic Analytical Balance	A	O	O	2	2	N	A	O
A-3	Hematocrit Centrifuge	A	O	O	2	2	N	A	O
A-4	Refrigerator	A	O	O	2	2	N	A	O
A-5	UV-VIS Spectrophotometer	A	O	O	2	2	N	A	O
A-6	Water Purification System with Deionized	A	O	O	1	1	N	A	O
A-7	Binocular Microscope	A	O	O	20	20	N	A	O
A-8	Computer Controlled Incubator	A	O	O	2	2	N	A	O
A-9	Cellulose Acetate Electrophoresis Apparatus	A	O	O	1	1	N	A	O
A-10	Blood Gas Analyzer	A	O	O	1	1	N	A	O
A-11	Sahli's Standard Hemometer	A	O	O	40	40	N	A	O
A-12	Thoma Hemacytometer	A	O	O	40	40	N	A	O
A-13	Test Tube Rack, Stainless Steel	A	O	O	30	30	N	A	O
A-14	Blood Sedimentation Apparatus	A	O	O	20	20	N	A	O
A-15	Vortex Mixer	A	O	O	5	5	N	A	O
A-16	Wintrobe Hematocrit Set	A	O	O	50	50	N	A	O
A-17	Stop Watch	A	O	O	25	25	N	A	O
A-18	Blood Cell Counter	A	O	O	10	1	N	A	O
A-19	Mercurial Sphygmomanometer (table top)	A	O	O	10	10	N	A	O
A-20	Stethoscope	A	O	O	50	50	N	A	O
A-21	Advanced Kymograph with Basic Stimulator	A	O	O	10	5	N	A	O
A-22	Spirometer with Thermal Paper	A	O	O	20	2	N	A	O
A-23	O2 Cylinder	A	O	O	20	2	N	A	O
A-24	Clinical Thermometer (Digital type)	A	O	O	50	50	N	A	O
A-25	Phonocardiograph with built-in Recorder	C	O	a	1	1	N	C	×
A-26	Steel Percussion Hammer	C	O	O	30	30	N	A	O
A-27	ISHIHARA Colour Test Chart with Stand	C	O	O	20	5	N	A	O
A-28	Test Type Object Chart Illuminating Cabinet with Stand	C	O	O	20	5	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
A-29	Microscope with Photo Micrographic Attachment	A	○	○	1	1	N	A	○
A-30	Animal Balance	A	○	○	2	2	N	A	○
A-31	Digital Storage Oscilloscope, consisting of:	A	○	○	1	1	N	A	○
	a) Rack Mount Kit				2	2	N	A	○
	b) Nerve Conduction Chamber				5	5	N	A	○
	c) Surface Electrode				5	5	N	A	○
A-32	Electroencephalograph, 18ch.	C	○	c	1	1	N	C	×
A-33	Electromyograph 2 amplifier Channels	C	○	○	1	1	N	A	○
A-34	Osmometer	A	○	○	2	1	N	A	○
A-35	Audiometer	B	○	○	2	1	N	A	○
A-36	Cardiac Stress Test System	B	○	a	2	2	N	B	×
A-37	1-ch Electrocardiograph	B	○	○	1	1	N	A	○
A-38	Blood Reaction Slide Glass	A	○	○	20	20	N	A	○
A-39	pH Meter	A	○	○	6	6	N	A	○
A-40	Top Loading Precision Balance	A	○	○	5	5	N	A	○
A-41	Resus Citation Unit	C	○	○	1	1	N	A	○
A-42	Evoked Response Unit, Neurology version	C	○	a	1	1	N	C	×
A-43	Constant Current Stimulator	C	○	a	1	1	N	C	×
A-44	Triple Beam Balance	C	○	a	1	1	N	C	×
A-45	Electric Oven	B	○	a	1	1	N	B	×
A-46	Comprehensive Physiological Unit	C	○	○	1	1	N	A	○
Teaching Video Program									
A-47	Clinical Electro-Cardiography	C	○	○	1	1	N	A	○
A-48	Intravenous Therapy Video Tape	C	○	○	1	1	N	A	○
A-49	Pediatric Procedures Modules 2 Interactive Laser Disc	C	○	○	1	1	N	A	○
A-50	Ogling and the elderly: A review course	C	○	○	1	1	N	A	○
A-51.a	Injections, 1 Tape, 17 Mins	C	○	○	1	1	N	A	○
A-51.b	Blood Transfusion Therapy, 1 Tape, 9 Mins	C	○	○	1	1	N	A	○
A-51.c	Injectable Medications, 1 Tape, 20 Mins.	C	○	○	1	1	N	A	○
A-52	Personal Computer System including Color Display, Color Printer and UPS	B	○	○	1	1	N	A	○
A-53	Software for Personal Computer System	B	○	○	1	1	N	A	○
A-54	Models for Physiology	A	○	○	1	1	N	A	○
A-55	Air Conditioner for Laboratory	A	○	○	3	3	N	A	○
A-56	Scientific Calculator	A	○	○	2	2	N	A	○
A-57	Electric Typewriter	A	○	○	1	1	N	A	○
A-58	Slide Projector	A	○	○	1	1	N	A	○

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
A-59	VHS Video Recorder	A	O	O	1	1	N	A	O
A-60	Color TV with stand	A	O	O	1	1	N	A	O
A-61	Opaque Projector	A	O	O	1	1	N	A	O
A-62	Gestetner Machine	A	O	O	1	1	N	A	O
A-63	Photostat Machine	A	O	O	1	1	N	A	O
A-64	Perimeter	A	O	O	1	1	N	A	O
A-65	Glassware Set	A	O	O	1	1	N	A	O
A-66	Micropipett Set with Disposable Tip	A	O	O	1	1	N	A	O
A-67	Glassware Washer with Rack	A	O	O	1	1	N	A	O
B. Dept. of Biochemistry									
B-1	Electrophoresis Apparatus (for Protein)	A	O	O	1	1	N	A	O
B-2	Flame Photometer (Na, K, Li)	A	O	O	2	2	N	A	O
B-3	UV-VIS Spectrophotometer	A	O	O	4	4	N	A	O
B-3.a	UV-VIS Double Beam Computerized	C	O	a	1	1	N	C	×
B-4	Platelet Analyzer	C	O	c	1	1	N	C	×
B-5	Microscope with Photo Micrographic Attachment	A	O	O	1	1	N	A	O
B-5.a	Phase Contrast Binocular Microscope	A	O	O	1	1	N	A	O
B-6	High-Performance Centrifuge (Ultra)	B	O	O	1	1	N	A	O
B-7	Hematocrit Centrifuge	A	O	O	2	2	N	A	O
B-8	Multipurpose Floor Refrigerated Centrifuge (8,000rpm)	A	O	O	1	1	N	A	O
B-9	pH Meter	A	O	O	6	6	N	A	O
B-10	Blood Gas Analyzer	A	O	O	1	1	N	A	O
B-11	Shaking Water Bath	A	O	O	6	6	N	A	O
B-12	Water Purification System with Deionizer	A	O	O	1	1	N	A	O
B-13	Ultra-Low Temperature Freezer	A	O	O	1	1	N	A	O
B-14	Reach-In Refrigerator with Freezer	C	O	O	3	2	N	A	O
B-15	Fourier Transform Infrared Spectrophotometer	C	O	a	1	1	N	C	×
B-16	Electronic Analytical Balance	A	O	O	2	2	N	A	O
B-17	Electronic Top Pan Balance	A	O	O	2	2	N	A	O
B-18	Gas Chromatography	A	O	O	1	1	N	A	O
B-19	Glassware Set	A	O	O	1	1	N	A	O
B-20	Micropipett Set with Disposable Tip	A	O	O	1	1	N	A	O
B-21	Glassware Washer with Rack	A	O	O	1	1	N	A	O
B-22	Personal Computer System	B	O	O	1	1	N	A	O
C. Dept. of Forensic Medicine									
C-1	Human Skeleton Painted	A	O	O	1	1	N	A	O
C-2	Calculator	A	O	O	1	1	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
C-3	Photostat Machine	B	○	○	1	1	N	A	○
C-4	High Pressure Liquid Chromatography System with Lamp	C	○	a	1	1	N	C	×
C-5	UV-VIS Spectrophotometer, Single Beam	C	○	a	1	1	N	C	×
C-6	Comparison Microscope	A	○	○	1	1	N	A	○
C-7	pH Meter	C	○	a	1	1	N	C	×
C-8	Electronic Analytical Balance	C	○	a	1	1	N	C	×
C-9	Top Loading Precision Balance	C	○	a	1	1	N	C	×
C-10	Ultraviolet Lamp, Long & Short Wavelength	A	○	○	1	1	N	A	○
C-11	Densitometer	C	○	a	1	1	N	C	×
C-12	Water Bath	C	○	a	1	1	N	C	×
C-13	Ultrasonic Cleaner	C	○	a	1	1	N	C	×
C-14	Hot Air Sterilizer	C	○	○	1	1	N	A	○
C-15	Personal Computer System with Color Printer and UPS	B	○	○	1	1	N	A	○
C-16	Video Program for Post Mortem Examination with Video System	A	○	○	1	1	N	A	○
C-17	Video Program for Post Forensic Examination	A	○	○	1	1	N	A	○
D. Dept. of Pathology									
D-1	Electronic Analytical Balance	A	○	○	6	4	N	A	○
D-2	Slide Warmer	A	○	○	1	1	N	A	○
D-3	Hematocrit Centrifuge	A	○	○	6	6	N	A	○
D-4	Autosmear Automatic Cytosedimentation Machine	C	○	a	1	1	N	C	×
D-5	Triple Beam Balance	C	○	a	4	4	N	C	×
D-6	Fume Hood	A	○	○	6	4	N	A	○
D-7	Electric Oven	A	○	○	6	6	N	A	○
D-8	Shaking Water Bath	A	○	○	6	4	N	A	○
D-9	Ultrasonic Cleaner	A	○	○	4	4	N	A	○
D-10	Laboratory Sterilizer	A	○	○	4	4	N	A	○
D-11	Binocular Microscope for Students	A	○	○	100	60	A	A	○
D-12	Trinocular Microscope with Camera, Photographic System	A	○	○	3	1	N	A	○
D-13	Research Microscope	C	○	a	1	1	N	C	×
D-14	Ultra-Low Temperature Freezer	A	○	○	1	1	N	A	○
D-15	Reach-in Refrigerator with freezer	A	○	○	4	4	N	A	○
D-16	Incubator	A	○	○	4	4	N	A	○
D-17	Small Rotary Extractor	A	○	○	4	2	N	A	○
D-18	pH Meter	A	○	○	4	4	N	A	○

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
D-19	View Box for Micro Plate	A	O	O	2	2	N	A	O
D-20	Multi-Teaching Microscope	A	O	O	3	3	N	A	O
D-21	Pipetter Controller	C	O	a	2	2	N	C	×
D-22	Vacuum Pump	C	O	a	2	2	N	C	×
D-23	CO2 Incubator	A	O	O	2	2	N	A	O
D-24	Mixer	A	O	O	2	2	N	A	O
D-25	Flame Photmeter	A	O	O	2	1	N	A	O
D-26	Electrophoresis Apparatus	A	O	O	2	2	N	A	O
D-27	Coldtome	A	O	O	2	1	N	A	O
D-28	Rotary Microtome with Disposable Knife	A	O	O	4	2	N	A	O
D-29	Automatic Tissue Processor	A	O	O	3	2	N	A	O
D-30	Tissue Embedding Console	A	O	O	2	2	N	A	O
D-31	Specimen Box A Type	A	O	O	20	20	N	A	O
D-32	Automatic Microtome Knife Sharpener with Knives	A	O	O	4	1	N	A	O
D-33	Water Purification System with Deionized	A	O	O	4	4	N	A	O
D-34	Computerized Ultra Centrifuge	A	O	O	1	1	N	A	O
D-35	Blood Cell Counter	A	O	O	1	1	N	A	O
D-36	Blood Chemistry Analyzer (Open System) with ISE Unit, UPS and Airconditioner	A	O	O	1	1	N	A	O
D-37	Blood Bank Refrigerator	A	O	O	1	1	N	A	O
D-38	Safety Cabinet	A	O	O	1	1	N	A	O
D-39	Automatic Stainer	A	O	O	2	2	N	A	O
D-40	Personal Computer System with Standard Software	B	O	O	2	2	N	A	O
D-41	Laser Beam Printer	B	O	O	1	1	N	A	O
D-42	Dot Matrix Printer	B	O	O	1	1	N	A	O
D-43	UPS	B	O	O	2	2	N	A	O
D-44	Anaerobic Jar	A	O	O	6	6	N	A	O
D-45	ELISA Test Apparatus (Open System, HIV, Hepatitis)	A	O	O	1	1	N	A	O
D-46	Teaching Microscope with Video TV System	A	O	O	2	2	N	A	O
D-47	Water Bath	A	O	O	4	4	N	A	O
D-48	Camera with Movement Stage, Microlens	A	O	O	1	1	N	A	O
D-49	Palette Aggricorder	A	O	O	1	1	N	A	O
D-50	Glassware Set	A	O	O	1	1	N	A	O
D-51	Micropipette Set with Disposable Tip	A	O	O	2	2	N	A	O
D-52	Petri Dish Set (1Lot)	A	O	O	1	1	N	A	O
D-53	Glassware Washer with Rack	A	O	O	1	1	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
E. Dept. of Community Medicine									
E-1	Personal Computer System	A	O	O	2	2	N	A	O
	1. Personal Computer	A	O	O	1	1	N	A	O
	2. Color Display SVGA	A	O	O	1	1	N	A	O
	3. Color Laser Printer	A	O	O	1	1	N	A	O
	4. Dot Matrix Printer	A	O	O	1	1	N	A	O
	5. UPS	A	O	O	1	1	N	A	O
E-2	Facsimile	A	O	O	1	1	N	A	O
E-3	OCR System	C	O	a	1	1	N	C	×
E-4	Video Tape Editor System	A	O	O	1	1	N	A	O
E-5	Video Camera	A	O	O	2	2	N	A	O
E-6	VHS Recorder/Player, Multi System	A	O	O	2	2	N	A	O
E-7	Video Projector with Screen	A	O	O	1	1	N	A	O
E-8	34-Inch Color TV Monitor	A	O	O	2	1	N	A	O
E-9	Wall Screen	A	O	O	1	1	N	A	O
E-10	Satellite Receiving System	C	O	a	1	1	N	C	×
E-11	Photostat Machine	A	O	O	1	1	N	A	O
E-12	Printing Press Set (B4-A3, Both Pages Off-set Printing)	A	O	O	1	1	N	A	O
E-13	Medical Education Equipment, consisting of:								
	Diesel Generator 15kVA	A	O	O	1	1	N	A	O
	Diesel Generator 10kVA	A	O	O	1	1	N	A	O
	Screen	A	O	O	1	1	N	A	O
	Screen	A	O	O	2	2	N	A	O
	Overhead Projector	A	O	O	2	2	N	A	O
	Slide Projector	A	O	O	2	2	N	A	O
	Opaque Projector	A	O	O	1	1	N	A	O
	P.A. System	A	O	O	2	2	N	A	O
	Sound System for Conferences and Meetings Hall	A	O	O	2	2	N	A	O
E-14	Microscope Slide-Medical Entomology	A	O	O	3	3	N	A	O
E-15	Projection Slide Set:								
	Projection Slides-Human Parasitology	A	O	O	1	1	N	A	O
	Projection Slides-Medical Report	A	O	O	1	1	N	A	O
	Projection Slides-Public Health	A	O	O	1	1	N	A	O
	Projection Slides-Environmental Health	A	O	O	1	1	N	A	O
E-16	Equipment for Family Health, consisting of:								
	Stethoscope	A	O	O	5	5	N	A	O
	Ophthalmo-Otoscope Set	A	O	O	3	3	N	A	O
	X-Ray Film Illuminator	A	O	O	2	2	N	A	O
	Vacuum Suction Unit	A	O	O	2	2	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
	1-ch. Electrocardiograph	A	O	O	2	2	N	A	O
E-17	Centrifugal Particle Size Analyzer	A	O	O	1	1	N	A	O
E-18	Auto Bomb Calorimeter	A	O	O	2	1	N	A	O
E-19	Water Testing System	A	O	O	2	1	N	A	O
E-20	Teaching Microscope (5 PAX Purpose)	A	O	O	5	2	N	A	O
E-21	Binocular Microscope	A	O	O	35	10	N	A	O
E-22	Resuscitation Aid Model	A	O	O	10	2	N	A	O
E-23	Resuscitator	A	O	O	20	2	N	A	O
E-24	Video Program, consisting of:								
	First Aid & Disaster Management, 26 Film set	A	O	O	1	1	N	A	O
	Health Education	A	O	O	1	1	N	A	O
	Environmental Health	A	O	O	1	1	N	A	O
	Sexual Medicine	A	O	O	1	1	N	A	O
E-25	Photostat Machine	A	O	O	1	1	N	A	O
E-26	Microbus	A	O	O	1	1	N	A	O
E-27	AV Van	A	O	O	1	1	N	A	O
E-28	Station Wagon (6 seats) 4x4WD	A	O	O	1	1	N	A	O
E-28.a	Station Wagon (6 seats) 4x4WD	A	O	O	1	1	N	A	O
E-29	Glassware Set	A	O	O	1	1	N	A	O
E-30	Micropipett Set with Disposable Tip	A	O	O	1	1	N	A	O
E-31	Still Camera with Lens Set	A	O	O	1	1	N	A	O
E-32	Refrigerator	A	O	O	1	1	N	A	O
E-33	Teaching Models for Human Parasites & Medical Entomology	A	O	O	1	1	N	A	O
F. Dept. of Anatomy									
F-1	Mortuary Refrigerator (2 PAX) with Cart	A	O	O	6	4	N	A	O
F-2	Slide Projector	A	O	O	1	1	N	A	O
F-3	Tissue Embedding Console with Trimming Knife	A	O	O	1	1	A	A	O
F-4	Multi-Teaching Microscope (5 PAX observed)	A	O	O	5	5	N	A	O
F-4.a	Eye Piece Micrometer Disc	A	O	O	10	10	N	A	O
F-4.b	Eye Piece Micrometer Disc	A	O	O	10	10	N	A	O
F-5	Microscope with Video Camera and TV Monitor 20"	B	O	a	1	1	N	B	×
F-6	Slide Warmer (Hot Plate)	A	O	O	2	2	A	A	O
F-7	Automatic Tissue Processor	A	O	O	1	1	N	A	O
F-8	Automatic Microtome Knife Sharpener	A	O	O	1	1	R	A	O
F-9	Diamond Pen & Glass Cutter	A	O	O	3	3	N	A	O
F-10	Illuminating Magnifier	A	O	O	2	2	R	A	O
F-11	Automatic Stainer	A	O	O	1	1	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
F-12	Stereoscopic Microscope with Illuminator	A	O	O	5	5	A	A	O
F-13	Rotary Microtome with D type Knife	A	O	O	1	1	R	A	O
F-14	Freezing Microtome	A	O	O	1	1	N	A	O
F-15	Syringe Pump (Manual Operation) for Fixation	A	O	O	4	4	N	A	O
F-16	Fume Food (Draft Chamber)	A	O	O	1	1	N	A	O
F-17	Metallic Molds (Cassette) Set	A	O	O	2	2	N	A	O
F-18	Screen for Projector (Tripod Type)	A	O	O	2	2	N	A	O
F-19	Screen for Projector (Large) wall mounted	A	O	O	2	2	N	A	O
F-20	Slide Cabinet Unit (25 drawers)	A	O	O	1	1	N	A	O
F-21	Laboratory Timer (60Min)	A	O	O	3	3	N	A	O
F-22	Alcoholmeter Set, 3 pcs.	A	O	O	5	5	A	A	O
F-23	Long Stem Thermometer	A	O	O	2	2	N	A	O
F-24	Programmable Calculator	A	O	O	2	2	N	A	O
F-25	Paraffin Dispenser	B	O	b	1	1	A	B	×
F-26	Staining Set	A	O	O	12	12	R	A	O
F-27	Bone Saw (Manual Type, with blade)	A	O	O	12	12	N	A	O
F-28	Tray Carrying Unit	A	O	O	2	2	N	A	O
F-29	Glass Dish with Tray & Cover for Manual Staining	A	O	O	26	24	R	A	O
F-30	Gestetner Machine	B	O	a	1	1	N	B	×
F-31	Electric Typewriter	A	O	O	1	1	N	A	O
F-32	Photostat Machine	B	O	O	1	1	N	A	O
F-33	X-Ray Film Illuminator	A	O	O	2	2	N	A	O
F-34	Slide Projector	C	O	O	1	1	N	A	O
F-35	O.H.P.	A	O	O	2	2	N	A	O
F-36	Computer System with Software	B	O	O	1	1	N	A	O
F-37	Video Program for Anatomy	C	O	a	1	1	N	C	×
F-38	Specimen Making Apparatus	C	O	c	1	1	N	C	×
F-39	Tools for Making Plaster of Paris Models	B	O	O	1	1	N	A	O
F-40	Human Histology Slides for Prepare Microscope	A	O	O	1	1	N	A	O
F-41	Lab Glassware Set	A	O	O	1	1	N	A	O
F-42	Plastic Models Set	A	O	O	1	1	N	A	O
F-43	Histological Model Set	A	O	O	1	1	N	A	O
F-44	Embryological Models	A	O	O	1	1	N	A	O
F-45	Micropipette Set with Disposable Tip	A	O	O	2	2	N	A	O
G. Dept. of Pharmacy and Therapeutics									
G-1	High Pressure Liquid Chromatography system	B	O	O	1	1	N	A	O
G-2	Electronic Analytical Balance 1 set, A,B,C	A	O	O	1	1	N	A	O
G-3	pH Meter	A	O	O	1	1	N	A	O
G-4	Multipurpose Floor Refrigerated Centrifuge	A	O	O	5	2	N	A	O

No.	Description	Priority (Field Survey)	Necessity	Propriety	Quantity		Status	Priority (Final)	Evaluation
					Request	Plan			
G-5	UV-VIS Spectrophotometer, Single Beam	A	O	O	2	2	N	A	O
G-6	Jacketed Organ Bath Set for smooth muscle & heart	A	O	O	5	5	N	A	O
G-7	Universal Jacked Organ Bath Set	A	O	O	5	5	N	A	O
G-8	Student Tissue Bath Set	A	O	O	10	10	N	A	O
G-9	Single Tissue Bath Set for Single & Double	A	O	O	5	5	N	A	O
G-10	Digital Thermometer	A	O	O	10	10	N	A	O
G-11	Hand Stop Watch	A	O	O	5	5	N	A	O
G-12	Dual Impedance Research Stimulator	A	O	O	2	2	N	A	O
G-13	Animal Operating Table, Bench Use, including	A	O	O	4	4	N	A	O
	Arterial Cannula "Y"	A	O	O	20	20	N	A	O
	Arterial Cannula "L"	A	O	O	20	20	N	A	O
	Venous Cannula, 1/2/3mm	A	O	O	10	10	N	A	O
	Mammalian Heart Cannula	A	O	O	10	10	N	A	O
G-14	Neuro Physiology Operating Table	A	O	O	4	4	N	A	O
G-15	Anaesthetizing Box Rat & Cat	A	O	O	5	5	N	A	O
G-16	Dog Holder, Small and Large	A	O	O	10	2	N	A	O
G-17	Cat Holder	A	O	O	10	2	N	A	O
G-18	Animal Head Holder, 25/35/50mm	A	O	O	10	2	N	A	O
G-19	Arterial Valve Dog, Incision Type & Clamp Type	A	O	O	10	10	N	A	O
G-20	Blank Kymograph Sheet Set	A	O	O	1	1	N	A	O
G-21	Glass Jar Bath set Different Size (4-Kind each)	A	O	O	5	5	N	A	O
G-22	Water Circulator Unit	A	O	O	3	3	N	A	O
G-23	Polygraph System for Animal	A	O	O	2	1	N	A	O
G-24	Water Distillation Apparatus with Deionizer	A	O	O	2	2	N	A	O
G-25	Automatic Blood Pressure Monitor for Animal	A	O	O	3	3	N	A	O
G-26	Personal Computer System with Color Printer & UPS	B	O	O	1	1	N	A	O
G-27	Injection, Education Tape for 17 Min. and 20 Min.	A	O	O	1	1	N	A	O
G-28	Ultrasonic Pipette Washer	A	O	O	2	2	N	A	O
G-29	Glassware Set	A	O	O	2	2	N	A	O
G-30	Glassware Washer with Rack	A	O	O	1	1	N	A	O
G-31	Micropipett Set with Disposable Tip	A	O	O	2	2	N	A	O
H. All Departments									
H-1	Automatic Voltage Regulator 220V (1Lot)	A	O	O	1	1	N	A	O
H-2	Incinerator (Small Size)	A	O	O	1	1	N	A	O

2- 3 Basic Design

2- 3- 1 Design Concept

Planned equipment for experiment and practice which has necessity and propriety includes a centrifuges, scales (balance), medical refrigerators, visual & ultraviolet spectrophotometers, blood gas analyzers, microscopes and microbuses (for field study and practice in Community Medicine) etc. Teaching aids include anatomical models of the human body, overhead projectors (OHP), microphones, video tape recorders, printing machines and personal computers etc. Diagnostic and therapeutical equipment and materials are not included since items for the affiliated hospitals are excluded. However, medical graduates in Pakistan, unlike those in Japan, are immediately required to commence their medical services due to the lack of doctors, and the curriculum under the fundamental medical departments includes practical application too. Therefore equipment and materials which are not used in fundamental medical departments in Japan such as training equipment for emergency treatment, though few in number, are included as well.

Classes for experiments and practice are presently arranged in groups of 50 to 60 students, considering sizes of laboratories. Numbers of equipment and materials are designed, assuming the style and frequency of experiment and practice (demonstration by the instructor, experiment and practice by groups of 5- 10 students, or individual experiment and practice, etc.). Study results of quantities of the equipment and materials are shown in Table 2- 1.

Level and specifications of prospective equipment and materials shall be designed under the following policies.

1) They shall be of a norm level appropriate for medical education at medical colleges.
2) Costs required for operation and maintenance shall be minimized.

3) Local regulations and standards shall be observed.

4) Equipment shall be an open system, and shall not be a model which requires specific reagents made by only one manufacturer.

5) The surrounding environment shall not be contaminated.

6) Future functional expansions shall be accommodated, as long as the price gap is not overwhelming.

7) Purpose of the equipment and materials is medical education for students, and thus research and clinical application are excluded. However, it shall be considered to include equipment and materials which can be utilized for research too as long as the price is not overwhelming, since research is one of the most significant functions of colleges and universities, and the achievements help upgrade the status of the colleges and universities and further raise the level of education as well.

2- 3- 2 Basic Design

(1) Overall Design

The building of Bolan Medical College is a new one which was completed in 1990, its large space is capable of future functional expansion, hence it poses no problem whatsoever in terms of installation of planned equipment under the Project. Electricity, water and gas have already been serviced in the experiment and practice rooms. Heating systems are presently running in each individual room, but provision of a central heating system has been planned. There is hardly any sort of cooling system, and airconditioners are necessary for some of planned equipment depending on the location of installation in Site. Thus three airconditioners have been included thereupon.

(2) Equipment Design

The planned equipment is shown in Table 2- 2. For equipment requiring maintenance, repair or replacement of parts by the manufacturer such as electric or electronic appliances, the manufacturer shall have a branch office or maintenance agent in Pakistan which has been carrying out repair and maintenance services. In case that an item is made by only one manufacturer or two manufacturers in Japan, the third country products of the item are considered in order to make a fair price of budget. In addition, educational video programs are also considered as the third country products for the necessity of an English version. Personal computers and photocopy machines shall be procured locally to keep manufacturers' regular maintenance.

Table 2 - 2 Planned Equipment

No.	Description	Specification	Q'ty	Purpose
A. Dept. of Physiology				
A-1	Table-Top Centrifuge	Max. Speed: 6,000rpm, Rotor: 7mℓ, 15mℓ tubes	2	Separation of composition of blood etc.
A-2	Electronic Analytical Balance	Weight Capacity: 220g Max. Readability: 0.1mg	2	General experiment
A-3	Hematocrit Centrifuge	Speed: 12,000rpm/4,000rpm Rotor: 2 Kinds, Capillary & Tubes	2	Separation of blood plasma
A-4	Refrigerator	3-Door Type Capacity: 12 Cu, ft or equivalent Freezer: -25°C ~ -15°C	2	Preservation of resins etc.
A-5	UV-VIS Spectrophotometer	Filter Range: 200 ~ 1100nm, Photo Metric Mode: Abs, T, Conc. Light Source: Deuterium & Tungsten Lamp	2	Analysis of chemical composition of solution
A-6	Water Purification System with Deionized	Distilling Capacity: Approx. 1.8ℓ/h Deionized Water Producing Capacity: Approx. 1.0ℓ/min. Max. Tank Capacity: 20g	1	General experiment
A-7	Binocular Microscope	Blocular Eye Piece Tubes, Magnification Range: 20 x ~ 1,500 x, Objective 4 x ~ 100 x oil	20	General experiment
A-8	Computer Controlled Incubator	Temp. Range: Room Temp. ~ 80°C, Inter Capacity: 153ℓ, Temp. Fluctuation: ±0.5°C, Timer Equipped	2	Temperature control
A-9	Cellulose Acetate Electrophoresis Apparatus	Nucleic Acid Agarose Gel, Vertical Separation, Power Supply: 25V ~ 3,000V.DC, 0 ~ 400mA	1	Analysis of blood by Electrophoresis
A-10	Blood Gas Analyzer	Reported Results: PH, PO_2, PCO_2 Calculated Parameters: HCO_3, BE, TCO_2, O_2SAT	1	Analysis of oxygen pressure etc. in blood
A-11	Sahli's Standard Hemometer	Standard Type	40	Measurement of concentration of blood
A-12	Thoma Hemacytometer	Standard Type	40	Counting hematocyte
A-13	Test Tube Rack, Stainless Steel	About 12 Tubes	30	General experiment
A-14	Blood Sedimentation Apparatus	Standard Type	20	Measurement of blood sedimentation rate
A-15	Vortex Mixer	Vibration: 2,800rpmVibration Surface: 70mmϕ	5	General experiment

No.	Description	Specification	Q'ty	Purpose
A-16	Wintrobe Hematocrit Set	Wintrobe Type	50	Measurement of blood sedimentation rate
A-17	Stop Watch	Max. 60 min. with Timer	25	General experiment
A-18	Blood Cell Counter	Parameters: RBC, WBC, HCT, HGB, MCV, RDW, MCH, MCHC, MW&LW Treatment for KCN	1	Counting of blood cell
A-19	Mercurial Sphygmoniano-meter (table top)	*Dual Spring Type, 0 ~ 300Hg with Cuff.*	10	Measurement of blood pressure
A-20	Stethoscope	Output Voltage: 0 ~ 25V, DC, Frequency: 0.1 ~ 100Hz Output Impedance: Less than 25 ohms	50	Heart beat etc.
A-21	Advanced Kymograph with Basic Stimulator	Metal Cylinder 500 x 150mm equipped	5	Measurement of kymograph
A-22	Spirometer with Thermal Paper	Function: VC, FUC, PEF, FEF, Flow Rate: *15ℓ/min.* Max. Displayed: 8ℓ Volume, Flow Detection: FLEISCH Type	2	Measurement of lung potential
A-23	*O2 Cylinder*	*Capacity: 18 Cu.ft with Regulator*	2	For Comprehensive Physiological Unit
A-24	Clinical Thermometer (Digital type)	Digital Display	50	Measurement of bodily temperature
A-26	Steel Percussion Hammer	Made by Metal for Part of Head	30	Percussion
A-27	ISHIHARA Colour Test Chart with Stand	Ishihara Type	5	Checking color blindness
A-28	Test Type Object Chart Illuminating Cabinet with Stand	Electric Type Remote Control Function	5	*Eye checking*
A-29	Microscope with Photo Micrographic Attachment	Automatic Exposure Control: 0.01 ~ 3 min. Film Speed Setting: Automatic, Camera: 35mm Type	1	Making positive slide
A-30	Animal Balance	Capacity: Max. 6,201g, with Printer Provided.	2	Animal experiment
A-31	Digital Storage Oscilloscope, consisting of:	Function: 2 channel, 11MHz or More Specification a) Rack Mount Kit b) Nerve Conduction Chamber c) Surface Electrode	1	Measurement of nerve conduction
A-33	Electromyograph 2 amplifier Channels	For Animals Purpose, 32 Traces, Amp Gain: 1μV ~ 10μV Printer: 144mm, Data Storage: Floppy Disc	1	Measurement of electromyography of animals
A-34	Osmometer	Measurement Range: 0 ~ 25,000mOsm/kg Measurement Method: Freezing Point	1	Measurement of permeation pressure
A-35	Audiometer	125Hz - 8,000Hz	1	Checking ear potential
A-37	1-ch Electrocardiograph	*Standard 12-Leads, Rechargeable Battery Input Level: ±10m*	1	Measurement of electrocardiograph

No.	Description	Specification	Q'ty	Purpose
A-38	Blood Reaction Slide Glass	Standard Size Slide Glass with Slip Cover Glass	20	Measurement of blood reaction
A-39	pH Meter	Digital Indicating, Measuring Range: 0 ~ 14pH, 0 ~ 1.999m	6	General experiment
A-40	Top Loading Precision Balance	Weight Range: Max. 430g Readability: 0.001g	5	General experiment
A-41	Resus Citation Unit	Resuscitation Unit with O_2 Cylinder	1	Practice of resuscitation
A-46	Comprehensive Physiological Unit	6-channel, EEG/EKG Amplifier	1	Measurement of physiological data
Teaching Video Program				
A-47	Clinical Electro-Cardiography	15 ~ 20 min./pc x 12, PAL, English Version	1	Teaching aid
A-48	Intravenous Therapy Video Tape	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-49	Pediatric Procedures Modules 2 Interactive Laser Disc	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-50	Ogling and the elderly: A review course	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-51.a	Injections	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-51.b	Blood Transfusion Therapy	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-51.c	Injectable Medications	20 ~ 30 min., PAL, English Version	1	Teaching aid
A-52	Personal Computer System	IBM/AT Compatible, Color Printer, UPS, Color Monitor TV, 14"	1	General affairs of education, text making, etc.
A-53	Software for Personal Computer System	For Word Processor, Spread Sheet, etc.	1	ditto
A-54	Models for Physiology	Head Model, Kidney, Human Eye, etc.	1	Teaching aid
A-55	Air Conditioner for Laboratory	11,900BTU/h for Cooling, with Functions	3	Temperature control in laboratories
A-56	Scientific Calculator	with function keys	2	General experiment
A-57	Electric Typewriter	Display: 9 inches CRT, Print Speed: 23 CPS, Print Unit 17inches, Ribbon: 4-Kinds	1	General affairs of education, text making, etc.
A-58	Slide Projector	Projection Lamp: 24V - 250W Slide Size: 23 x 35mm Max.	1	Teaching aid
A-59	VHS Video Recorder	4-Head, Built-in Tuner	1	Teaching aid
A-60	Color TV with stand	29 inches Color CRT, 6W + 6W Amp. 15-system	1	Teaching aid
A-61	Opaque Projector	Specimen Direct Projection Type	1	Teaching aid
A-62	Gestetner Machine	Electrical Operative Stencil Duplicator Feed Board	1	Teaching aid
A-63	Photostat Machine	Size: A3 ~ B5 500 Sheets Capable Cassette Provided	1	Text making

No.	Description	Specification	Q'ty	Purpose
A-64	Perimeter	*With Automatic pointer & Printing Function* Provided	1	Measurement of strabismus
A-65	Glassware Set	Beaker, Flask, Test Tube, Funnel, Cylinder, etc. 1 Lot	1	General experiment
A-66	Micropipett Set with Disposable Tip	1ml ~ 200μℓ, 100μℓ ~ 5,000μℓ with Tips each 2 sets	1	General experiment
A-67	Glassware Washer with Rack	Ultrasonic Benchtop Cleaner Tank Capacity: 10.3l	1	Glassware washing
B. Dept. of Biochemistry				
B-1	Electrophoresis Apparatus (for Protein)	Vertical Type, Nucleic Acid Agarose Gels, Automatic Densitometer, Sample: Upto 16 Tubes, P/S 5,000V.DC, 200mA	1	Electrophoresis of protein
B-2	Flame Photometer (Na, K, Li)	Na, K, Li (Serum, Urine, Plasma) with Compressor, Dilator, Natural Gas, Ca is option.	2	Analysis of Na, K, and Li
B-3	UV-VIS Spectrophotometer	Single Beam, Wave Length: 200 ~ 1,100mm. Photometric Range: T, ABS, High Source: Deuterium, Tungsten	4	Analysis of chemical composition of solution
B-5	Microscope with Photo Micrographic Attachment	Main Frame, Photographic Auto Exposure Control Camera 35mm, Plan Objective: 4 x ~ 100 x oil	1	Making positive slide
B-5.a	Phase Contrast Binocular Microscope	Binocular Phase Contract Type Plan Objective: 4 x ~ 100 x oil	1	Practice of Phase Contrast Binocular Microscope
B-6	High-Performance Centrifuge (Ultra)	Max Speed: 100,000rpm. Main Unit with 4-Kinds Rotor	1	Separation of composition of blood etc.
B-7	Hematocrit Centrifuge	Speed: 12,000rpm, 4,000rpm, Capillary Tubes: 20, 15mℓ x 4 tubes	2	Separation of blood plasma
B-8	*Multipurpose Floor Refrigerated* Centrifuge (8,000rpm)	Max. Speed: More than 8,000rpm Rotor: Fixed Angle 2-Kind, Swing Bucket - 2 Kinds	1	Separation of composition of blood etc.
B-9	pH Meter	Range: 0 ~ 14.00pH, 0 ~ 1.999mV, Digital Display, Electrode: Combination Type	6	General experiment
B-10	Blood Gas Analyzer	*PH, PCO_2, PO_2 Na.K, Ca.HCO_3*	1	Analysis of oxygen pressure etc. in blood
B-11	Shaking Water Bath	Operating Temp. Range: Room Temp. ~ 80°C	6	General experiment
B-12	Water Purification System with Deionizer	Tank Capacity: 100ℓ, Di-ionized	1	General experiment

No.	Description	Specification	Q'ty	Purpose
B-13	Ultra-Low Temperature Freezer	Temp. -20°C ~ -90°C, Microprocessor Control Alarm, Recorder Provided	1	Preservation of blood etc.
B-14	Reach-In Refrigerator with Freezer	Capacity: 164ℓ for Freezer -25°C ~ 15°C545ℓ for Refrigerator -6°C ~ +12°C	2	Preservation of resins etc.
B-16	Electronic Analytical Balance	Weight Capacity: 80g Max. Readability: 0.01mg	2	General experiment
B-17	Electronic Top Pan Balance	Weight Capacity: 6,200g Readability: 0.1g	2	General experiment
B-18	Gas Chromatography	Column Oven, Injection Ports, Detector, Carrier Gas System Switching Unit, Chromatopac Data Processor, Auto Injector, Rack, FID Monitor for FPD, Mount for AOC-1400, Auto Sampler, Optical Link Interface	1	Analysis of chemical composition
B-19	Glassware Set	Beaker, Flask, Test Tubes, Funnel, Cylinder, etc.	1	General experiment
B-20	Micropipett Set with Disposable Tip	1μ ~ 200μℓ, 0.1mℓ ~ 5mℓ TTL: each 2 sets	1	General experiment
B-21	Glassware Washer with Rack	Ultrasonic Function, with Detergent	1	Glassware washing
B-22	Personal Computer System	IBM/AT Compatible, Color Printer, UPS, Color Monitor TV, 14"	1	General affairs of education, text making, etc.
C. Dept. of Forensic Medicine				
C-1	Human Skeleton Painted	Natural Size, 1 Pair including 32 Tooth Large Size	1	Teaching aid
C-2	Calculator	Scientific Calculator	1	General experiment
C-3	Photostat Machine	B/W Copy Machine B5 ~ A3 Size	1	Text making
C-6	Comparison Microscope	Objective N Plan: 2.5 x ~ 100 x oil TV-adapter for Phot-TV, 35mm Photographic System	1	Practice of identification
C-10	Ultraviolet Lamp, Long & Short Wavelength	Intensity: 150mm ~ 300μW/cm^2, Filter: 6 Kinds/UV, 240x240x73mm, Battery Operated, 150μWcm^2 for Short Wave, Power: 2.6V, Intensity: 230μWcm^2 at 150mm, Long Wave	1	Practice of collection of fingerprints
C-14	Hot Air Sterilizer	Temp. Range: +40 ~ 250°C, Capacity: 225ℓ, Timer: 1min. ~ 99hrs.	1	Sterilizing of glassware etc.
C-15	Personal Computer System with Color Printer and UPS	IBM/AT Compatible, Color Printer, UPS, Color Monitor TV, 14"	1	General affairs of education, text making, etc.

No.	Description	Specification	Q'ty	Purpose
C-16	Video Program for Post Mortem Examination with Video System	VCR&TV, Multisystem (VHS) Video Camera, Still Camera, OHP (Slide Projector) Teaching Video Cassette 20 - 30 min., VHS, PAL, English Version	1	Teaching aid
C-17	Video Program for Post Forensic Examination	20 - 30 min., PAL, English Version	1	Teaching aid
D. Dept. of Pathology				
D-1	Electronic Analytical Balance	3-Kinds/Set, Weight Capacity: 45g (0.01mg) 1 set, 320g (0.1mg) 1 set, 6,200 (0.1g) 1 set, 1 set	4	General experiment
D-2	Slide Warmer	Consisting of 2 pcs. 1 for Histopatho 300W, 1 for Path, with Plastic Cover Rotor: Swing Rotor	1	Temperature control of slides
D-3	Hematocrit Centrifuge	Consisting of 2-Sets for Heamtocrit, 4 sets for General Purpose, 5,000rpm	6	Separation of blood plasma
D-6	Fume Hood	Size: 1,500 x750x2,300 with Sterilizing U.V Lamp Provided	4	Gas exhausting
D-7	Electric Oven	Capacity: 4 sets (3.4 cu.ft), Temp Room Temp ~ 250°C 2 sets (more than 200ℓ)	6	General experiment
D-8	Shaking Water Bath	Temp. Control: Room Temp 80°C Size: 600x400x250mm, Sharking will be stop by Timer.	4	General experiment
D-9	Ultrasonic Cleaner	Consisting of Pipette Washer & Instrument, 2-Kinds Equipment. Capacity: 1mℓ & 10mℓ, 5.5 Gallon (10.2ℓ), each 2 sets	4	Equipment washing
D-10	Laboratory Sterilizer	Capacity: 316ϕ x 670mm (D) Pressure: 0 ~ 4kg/cm, Temp. 100°C ~ 123°C	4	Sterilizing of equipment
D-11	Binocular Microscope for Students	10 sets will be equipped for Phase Contract, Dark Filed, Polarizing, with Pointer Marker.46 Sets for Standard Model, 4 x ~ 100 x 4 sets for Fluororesence Attachment, if possible attached with Camera.	60	General experiment
D-12	Trinocular Microscope with Camera, Photographic System	With Fluorescence Attachment, Phase Contrast, Dark Filed, Polarizing, Automatic Expose, Control, Microphotometry System	1	General experiment
D-14	Ultra-Low Temperature Freezer	Capacity: 360ℓ Temp.: -20°C ~ 90°C	1	Preservation of blood etc.

No.	Description	Specification	Q'ty	Purpose
D-15	Reach-in Refrigerator with freezer	Capacity: 709l (164ℓ for Freezer, 545ℓ for Refrigerator) Temp. Range: -25°C ~ -15°C for Freezer, -6°C ~ +12°C for Refrigerator	4	Preservation of resins etc.
D-16	Incubator	Capacity: 159ℓ, Temp. Range: Room Temp. ~ 80°C, with Stand	4	General experiment
D-17	Small Rotary Extractor	Revolution Speed: 50 ~ 50V/min. (high-speed) Holder: 1.5mℓ Microtube, No. of 24 Placecs.	2	General experiment
D-18	pH Meter	Ph. 0-14pH, Readability: 0.01pH Analog Digital Display Function, printer equipped	4	General experiment
D-19	View Box for Micro Plate	Capacity: 2 Palaces, Operating Position: 2.7° & 13° 230x220x35mm	2	Fixing of Micro-plate
D-20	Multi-Teaching Microscope	Multiviewing Attachment, 10 persons Phase Contract, Dark Field, Polarizing, with Pointer Marker	3	Simultaneous observation
D-23	CO2 Incubator	Capacity, Small Capacity 7.7ℓ & Large Capacity Approx.: 110ℓ	2	Cultivation
D-24	Mixer	Standard Size: Revolution: 600 ~ 3,000rpm	2	General experiment
D-25	Flame Photmeter	Range: Sodium 0-200mmol/ ℓ Potassium (Serum, Plasma) 0-10.0mmol/ ℓ Potassium (Urine) 0-200mmol/ ℓ Lithium 0-3.0mmol/ ℓ	1	Analysis of Na, K, and Li
D-26	Electrophoresis Apparatus	1 for Hb, 1 for Protein, Equipped, with Densitometer	2	Electrophoresis of Hb and protein
D-27	Coldtome	Temp: -5 ~ 30°C, Sectioning Range: 0 to 20 μ	1	Slicing organs for slide making
D-28	Rotary Microtome with Disposable Knife	With, Knife Holder, Black Handle & D Type Knife, 10 pcs. Disposable Knife Holder & Knife, (20 boxes), & Glass Cutter	2	Slicing organs for slide making
D-29	Automatic Tissue Processor	Cassette Capacity: 150 pcs., Program Memory: 9 Solution Reservoir: 10 pcs., Prafin Bath & Divider	2	Slide making
D-30	Tissue Embedding Console	Temp. Control: Heated Areas: 50 ~ 70°C Cryo Console: -5 ~ 0°C Forceps Holder: 50 ~ 80°C	2	Slide making
D-31	Specimen Box A Type	Paraffin Block Storage, Size: 20 Blocks Storage same time	20	For slides

No.	Description	Specification	Q'ty	Purpose
D-32	Automatic Microtome Knife Sharpener with Knives	Automatic with Programme Timer, Diamond Compound Provided	1	Sharpening of knifes
D-33	Water Purification System with Deionized	2 sets for 1.8ℓ/h, 2 sets for 5ℓ/h, with Deionized Water Exchange	4	General experiment
D-34	Computerized Ultra Centrifuge	Blood Bag Capacity Speedy more than 75,000rpm	1	Separation of composition of blood etc.
D-35	Blood Cell Counter	For Whole Blood, with Differential *more than 18 Parameter, Treatment for KCN*	1	Counting of blood cell
D-36	Blood Chemistry Analyzer (Open System) with ISE Unit, UPS and Airconditioner	Random Access, Open System	1	Analysis of blood
D-37	Blood Bank Refrigerator	Storage Capacity: 220 x 450mℓ Bags Operating Temp.: +4°C ± 1°C	1	Preservation of blood etc.
D-38	Safety Cabinet	With a Lock	1	Safekeeping of poisons and drugs
D-39	Automatic Stainer	Closed Type: Programmables Capacity: 110 Slide same time	2	Slide making
D-40	Personal Computer System	IBM/AT Compatible, with Color Display	2	General affairs of education, text making, etc.
D-41	Laser Beam Printer	Color Printer	1	ditto
D-42	Dot Matrix Printer	Dot Matrix	1	ditto
D-43	UPS	For Personal Computer	2	ditto
D-44	Anaerobic Jar	Standard Set with Gas Generated	6	General experiment
D-45	ELISA Test Apparatus (Open System, HIV, Hepatitis)	Open or Closed System: T3, T4, TSH, Production, FSH (Hosmones) also For HIV and Hehalitis, Random Access	1	Checking of HIV, Hepatitis, etc.
D-46	Teaching Microscope with Video TV System	Complete Basic System, CCD Camera, PAL System, VCR, Color TV Monitor 20" Resolution 460 Lines, Binocular Microscope	2	Teaching aid
D-47	Water Bath	Standard Type, Medium Type	4	General experiment
D-48	Camera with Movement Stage, Microlens	Zoom Lens, 35mm Camera, Complete Set	1	Slide making
D-49	Palette Aggricorder	Central by Fully Computer, 2 Channel	1	Measurement of palette agglomeration
D-50	Glassware Set	Beaker, Flash, Test Tube, Funnel, Cylinder, etc.	1	General experiment
D-51	Micropipette Set with Disposable Tip	*1μ ~ 200μℓ, 0.1mℓ ~ 5mℓ each 2 sets*	2	*General experiment*
D-52	Petri Dish Set (1Lot)	1,000 pcs.	1	General experiment
D-53	Glassware Washer with Rack	*Ultrasonic Function, with Detergent*	1	Glassware washing

No.	Description	Specification	Q'ty	Purpose
E. Dept. of Community Medicine				
E-1	Personal Computer System	Color Display SVGA Color Laser Printer Dot Matrix Printer UPS, IBM/AT Compatible	2	General affairs of education, text making, etc.
E-2	Facsimile	Thermal Paper including Memory	1	Collection of medical information etc.
E-4	Video Tape Editor System	VCR, Multisystem	1	Teaching aid
E-5	Video Camera	CCD Camera with Small Torpid Stand. VHS, with Carrying Case One Handy Type, One for Professional Type	2	Recording of environment, teaching aid making, etc.
E-6	VHS Recorder/Player, Multi System	VHS, Professional Type, Digital Noise Reduction Board, RS-232C Part P.C.B. Equipped.	2	Teaching aid making
E-7	Video Projector with Screen	LCD, 120 inch Screen	1	Teaching aid
E-8	34-Inch Color TV Monitor	38 inches Available, Multi-System (LCD or CTR)	1	Teaching aid
E-9	Wall Screen	Size: Standard Size	1	Teaching aid
E-11	Photostat Machine	With ADF, 20 Sorter, A4 - 5 boxes, 500 pcs/box, A3 - 2 boxes, B4 - 2 boxes, FLS/B4, A4, A3, Function Cutting Mac., 2-drum required	1	Text making
E-12	Printing Press Set (B4-A3, Both Pages Off-set Printing)	15,000 page/day useful, Composition: Printing, Electric Platemaker, Binder & (Stetting, Mini Size)	1	Text printing
E-13	Medical Education Equipment, consisting of:			
	Diesel Generator 15kVA	Fuel: Petrol 3ϕ 440V/1ϕ220V 50Hz	1	Mainly for refrigerators at power failure
	Diesel Generator 10kVA	Fuel: Petrol 3ϕ 440V/1ϕ220V 50Hz	1	ditto
	Screen	Tripod, Size: approx. 1,500 x 1,500 mm	1	Teaching aid
	Screen	Size: approx. 1,200 x 1,200 mm	2	Teaching aid
	Overhead Projector	Standard Size	2	Teaching aid
	Slide Projector	Standard Size	2	Teaching aid
	Opaque Projector	Standard Size	1	Teaching aid
	P.A. System	For 2-Hall Large (400 Persons, Capa.)	2	Teaching aid
	Sound System for Conferences and Meetings Hall	2-wireless Mic. Tie-pin Type, 28 Microphone for Table (Wired Type) To be combined system between 1+1 system	2	Teaching aid
E-14	Microscope Slide-Medical Entomology	Incecte-model Slide Set, including Tropical Slide	3	Teaching aid

No.	Description	Specification	Q'ty	Purpose
E-15	Projection Slide Set:	Human Parasitology Medical Report Public Health Environmental Health	1	Teaching aid
E-16	Equipment for Family Health, consisting of:			
	Stethoscope	Doctors, Blood Pressure Operates, Cuff.	5	Practice of primary health care
	Ophthalmo-Otoscope Set	With Accessories	3	Practice of primary health care
	X-Ray Film Illuminator	One for Single Film, One for Double, Table Top Type	2	Practice of primary health care
	Vacuum Suction Unit	Portable Type (Available, Battery Operation)	2	Practice of primary health care
	1-ch. Electrocardiograph	Standard 12 Leads Rechargeable Battery with Charger, S/P Battery	2	Practice of primary health care
E-17	Centrifugal Particle Size Analyzer	Air Pollution Analyzed Purpose	1	Analysis of atmospheric practice
E-18	Auto Bomb Calorieneter	For Food Calories, Single Type (Small Type)	1	Measurenent of calorie
E-19	Water Testing System	Standard Set with Option (Reagent including)	1	Analysis of water
E-20	Teaching Microscope (5 PAX Purpose)	Multi-viewing Attachment (5 Persons Observing)	2	Simultaneous observation
E-21	Binocular Microscope	Standard Model	10	General experiment
E-22	Resuscitation Aid Model	For Training Mode with Electronic	2	Practice of resuscitation
E-23	Resuscitator	For Training Model Manual Type, with Laryngoscope Large, Small Size	2	Practice of resuscitation
E-24	Video Program, consisting of:			
	First Aid & Disaster Management, 26 Film set	20 ~ 30 min. PAL, English Version	1	Teaching aid
	Health Education	20 ~ 30 min. PAL, English Version	1	Teaching aid
	Environmental Health	20 ~ 30 min. PAL, English Version	1	Teaching aid
	Sexual Medicine	20 ~ 30 min. PAL, English Version	1	Teaching aid
E-25	Photostat Machine	Excluding ADF, Auto Sorter, Manual Type	1	General use
E-26	Microbus	Diesel Type 30 seats	1	Field practice of community medicine
E-27	AV Van	Diesel Type VTR, TV Monitor, Rack	1	Enlightenment of public health to peoples
E-28	Station Wagon (6 seats) 4x4WD	Station Wagon (Long Body), Diesel Type	1	Survey of environment, collection of samples, enlightenment of public health

No.	Description	Specification	Q'ty	Purpose
E-28.a	Station Wagon (6 seats) 4x4WD	Double Cabin Truck, Diesel with Front Type	1	ditto
E-29	Glassware Set	Beaker, Flash, Test Tube, Funnel, Cylinder, etc.	1	General experiment
E-30	Micropipett Set with Disposable Tip	Beaker, Flash, Test Tube, Funnel, Cylinder, etc.	1	General experiment
E-31	Still Camera with Lens Set	Auto Focus & Manual Focus Zoom Lens 28-125mm Flush, Carrying Case, Filter, 35mm, with Lens set, Printed Date, Maintenance Kit	1	Teaching aid making
E-32	Refrigerator	2 doors, 30ℓ, Capacity Refrigeration, Freezer, 2-compartment	1	Preservation of resin etc.
E-33	Teaching Models for Human Parasites & Medical Entomology	Human Parasites & Medical Entomology	1	Teaching aid
F. Dept. of Anatomy				
F-1	Mortuary Refrigerator (2 PAX) with Cart	Single End, 3ϕ415V type, with Trolley2-bodies Capability, U.V & Sterilizing Lamp Equipped	4	Preservation of human body
F-2	Slide Projector	Max Image Size: 23x35mm with Light-pointer 24V-250W Illuminating Lamp, more than 60 slides	1	Teaching aid
F-3	Tissue Embedding Console with Trimming Knife	Temp. Control: Heated areas 50 ~ 70°C Forceps Holder 50 ~ 80°C Cryo Console Plate -5 ~ 0°C	1	Slide making
F-4	Multi-Teaching Microscope (5 PAX observed)	Photo-Graphic Attachment, 35mm Camera Equipped, Eye Piece Micrometer Disc	5	Simultaneous observation
F-6	Slide Warmer (Hot Plate)	With Plastic Cover	2	Temperature control of slide
F-7	Automatic Tissue Processor	Cassette Capacity: 150 Pcs., Program Memory: 9, Solution Reservoir: 10 pcs., Paraffin Bath & Divider	1	Slide making
F-8	Automatic Microtome Knife Sharpener	Automatic with Programme Timer Lubricating Oil & Diamond Compound	1	Sharpening of knife
F-9	Diamond Pen & Glass Cutter	Standard Type	3	Writing on slide glass
F-10	Illuminating Magnifier	Histo-Lab Lamp (UP Show)	2	General experiment, observation
F-11	Automatic Stainer	Slide Capacity: 60 Slides (3-baskets), 16-programme into Memory, No. of Station: 19 Staining & 2 Washing	1	Slide making
F-12	Stereoscopic Microscope with Illuminator	Fiber-optic, with Plain Focusing Stand Total Magnification: 4 x ~ 330 x	5	Stereoscopic observation
F-13	Rotary Microtome with D type Knife	Sectioning Range 1 ~ 30μ, Equipped with D Type Knife (5 pcs) & Knives, Back Handle	1	Slicing organs for slide making

No.	Description	Specification	Q'ty	Purpose
F-14	Freezing Microtome	Temp. Range: -5 ~ -30°C Sectioning Range: 0 ~ 20μ, 0.5μ increments	1	Slicing organs for slide making
F-15	Syringe Pump (Manual Operation) for Fixation	Manual Type, Capacity: 100mℓ Syringe: 3 Kinds, Made by Metal	4	Injection to human body
F-16	Fume Food (Draft Chamber)	Wide: 1200mm, Air Volume: 19ℓ/min. with Exhaust Duct: 250ϕ	1	Gas exhausting
F-17	Metallic Molds (Cassette) Set	Size: 5-Kinds each set, 24 sets	2	Fixation of organs
F-18	Screen for Projector (Tripod Type)	Size: 100 x 100cm with Folding Tripod Stand	2	Teaching aid
F-19	Screen for Projector (Large) wall mounted	Size: Approx. 3.0 1.8m	2	Teaching aid
F-20	Slide Cabinet Unit (25 drawers)	Capacity: 500 slides Drawer: 25	1	For slides
F-21	Laboratory Timer (60Min)	With Alarm, Timer: 0 ~ 60 min.	3	General experiment
F-22	Alcoholmeter Set, 3 pcs.	Conventional Type	5	General experiment
F-23	Long Stem Thermometer	Temp. Indication 0 ~ 100°C	2	General experiment
F-24	Programmable Calculator	Program Type	2	General experiment
F-26	Staining Set	Capacity: 60mℓ	12	Organ staining
F-27	Bone Saw (Manual Type, with blade)	Small & Large Size, Each 6 pcs.	12	Bone cutting
F-28	Tray Carrying Unit	Stainless, 60kg	2	Equipment carrying
F-29	Glass Dish with Tray & Cover for Manual Staining	Capacity: 100 slides	24	Organ staining
F-31	Electric Typewriter	Display: 9" CRT, Print Speed: 23PS, Print Limit: 17 inches, Ribbon: 4-kinds	1	Teaching aid
F-32	Photostat Machine	Disk Top Type, Copy Size: A6, A3, A4, B5, B4, Manual B/W Function	1	Text making
F-33	X-Ray Film Illuminator	2-Films Table Top Type	2	Practice of observation of X-Ray Films
F-34	Slide Projector	For Slide Specimen Glass Purpose, Projection Microscope	1	Teaching aid
F-35	O.H.P.	Standard Mode with Pointer, IR Controller & Pencil etc. Equipped	2	Teaching aid
F-36	Computer System with Software	IBM/AT Compatible, Color Printer, UPS, Color Monitor TV, 14"	1	General affairs of education, text making, etc.
F-39	Tools for Making Plaster of Paris Models	General Purpose for Anatomy	1	Teaching aid
F-40	Human Histology Slides for Prepare Microscope	Histology Slides Set & Embryology Slides Set	1	Teaching aid
F-41	Lab Glassware Set	Beaker, Flask, Test Tube, Funnel, Cylinder, etc.	1	General experiment
F-42	Plastic Models Set	Whole Body, Parts, Organs	1	Teaching aid

No.	Description	Specification	Q'ty	Purpose
F-43	Histological Model Set	Each Organ	1	Teaching aid
F-44	Embryological Models	Embryological Models	1	Teaching aid
F-45	Micropipette Set with Disposable Tip	1μ ~ 200μℓ, 100mℓ ~ 500mℓ with Tips each 2 sets	2	General experiment
G. Dept. of Pharmacy and Therapeutics				
G-1	High Pressure Liquid Chromatography system	Drug Analyzed, Main System with Data Processing Computer Equipped	1	Separation and analysis of chemical composition
G-2	Electronic Analytical Balance 1 set, A,B,C	Weight Capacity: A. 120g, 0.1mg/B. 620g, 0.01g/C. 4,000g, 0.01g	1	General experiment
G-3	pH Meter	pH.0 ~ 14pH, Readability: 0.01pH Analog & Digital Function, Printer Equipped	1	General experiment
G-4	Multipurpose Floor Refrigerated Centrifuge	Max. Speed: 8,000rpm, Swing Rotor, Angle Rotor	2	Separation of composition of blood etc.
G-5	UV-VIS Spectrophotometer, Single Beam	Wave Length: 200 ~ 1,100mm, Program Pack: Drug, etc. 5-kindsWale Accuracy: ±1.0nm, with Printer	2	Analysis of chemical composition of solution
G-6	Jacketed Organ Bath Set for smooth muscle & heart	Constant Head Reservoir, 1ℓ, Equipped: Amplifier, Printer, Holder for jacketed Glass Fluid Warning Coil, etc.	5	Temperature control for organs
G-7	Universal Jacked Organ Bath Set	Jacketed General Tissue Bath 20mℓ	5	Temperature control for organs
G-8	Student Tissue Bath Set	Heated Water Bath, 230V	10	Temperature control for organs
G-9	Single Tissue Bath Set for Single & Double	Tissure Bath: Fixed Stem. 50 mℓ	5	Temperature control for organs
G-10	Digital Thermometer	Temp. Range: 0 ~ 100°C	10	General experiment
G-11	Hand Stop Watch	Second, Minute, Function 60 min. Max.	5	General experiment
G-12	Dual Impedance Research Stimulator	0 ~ 100V Type (2 sets), 0 ~ 150V Type (1 set), Equipped: Printer Frequency: Variable from 1 Pulse in 10 sec. to 1,000 Pulse per second	2	Measurement of physiological data
G-13	Animal Operating Table	Size: 440 x 775mm, for Multipurpose Type of Top: Flat, Heating Mat: 250 Watts Arterial Cannula "Y" Arterial Cannula "L" Venous Cannula, 1/2/3mm Mammalian Heart Cannula	4	Animal experiment, anatomical

No.	Description	Specification	Q'ty	Purpose
G-14	Neuro Physiology Operating Table	Size: 470 x 1,070mm for Large Neuropysiology Animal Type of Top: Flat or Grooved, Heating Mat: 250 watts	4	Animal experiment, anatomical (Brain)
G-15	Anaesthetizing Box Rat & Cat	Small (257x110x107mm) 5 sets Large (490x290x290mm) 5 sets	5	Anaesthetizing of Rat and Cat
G-16	Dog Holder, Small and Large	Diameter: 75mm - 1 set, 100mm - 1 set	2	Animal experiment
G-17	Cat Holder	Diameter: 50mm	2	Animal experiment
G-18	Animal Head Holder, 25/35/50mm	Shank: 9.5mm Each 3-kinds	2	Animal experiment
G-19	Arterial Valve Dog, Incision Type & Clamp Type	Valves: 5g for Cat, 3-kinds/set, 5 sets 12g for Dog, 3-kinds/set, 5 sets	10	Animal experiment
G-20	Blank Kymograph Sheet Set	For Item 6 ~ 9, Blank Paper 45m long x 150mm, 45m long x200mm high Sheet: 2-kinds (Thermal paper use, Ink paper use, 100 sheets/box) Cylinder Circumference: 500, 1000, 1000 (300mm height)mm	1	Animal experiment
G-21	Glass Jar Bath set Different Size (4-Kind each)	For Animals, 4-kinds/set with lid.	5	General experiment
G-22	Water Circulator Unit	Thermocirculator, 650 watts of Heating, Delivery Water 0 ~ 60°C, Chamber Capacity: Approx. 2ℓ	3	General experiment
G-23	Polygraph System for Animal	Biosignal: BP, Isolated Tissue, HR, Drug Response, Muscle Response Recorder: 8 channel, with Completed Accessories	1	Animal experiment
G-24	Water Distillation Apparatus with Deionizer	Tank Capacity: 20ℓ & 100ℓ each 1 set Distilling Capacity: 1.8ℓ/h & 10ℓ/h with Delonayzed Exchange	2	General experiment
G-25	Automatic Blood Pressure Monitor for Animal	Display Range, Pressure 10 - 300 mmHg/5 - 150mmHg with Printer Pulse Rate 40 - 200bpm/30 - 240bpm	3	Animal experiment
G-26	Personal Computer System with Color Printer & UPS	IBM/AT Compatible, Color Printer, UPS, Color Monitor TV, 14"	1	General affairs of education, text making, etc.
G-27	Injection, Education Tape for 17 Min. and 20 Min.	Education for Pharmacology VCR & TV, 20' Color Monitor Equipped with Multi-system	1	Teaching aid
G-28	Ultrasonic Pipette Washer	Frequency: 28kHz, Water Required: 1 ~ 3ℓ/min Max Length: 500mm	2	Pipette washing
G-29	Glassware Set	Beaker, Flask, Test Tubes, Funnel, Cylinder, etc.	2	General experiment
G-30	Glassware Washer with Rack	Ultrasonic Function, with Detergents	1	Glassware washing

No.	Description	Specification	Q'ty	Purpose
G-31	Micropipett Set with Disposable Tip	1μℓ ~ 200μℓ, 0.1mℓ ~ 5mℓ, each 2 sets	2	General experiment
II. All Departments				
H-1	Automatic Voltage Regulator 220V (1Lot)	1kVA 10A 500VA 2kVA 10A 3kVA 20A	1	Voltage stabilizing for electrical equipment
H-2	Incinerator	Small Size, Fuel: Kerosene	1	Incineration of organs

(3) Arrangement Plan of Major Equipment

A) Department of Physiology (College Building 1st Floor)

The department is located in the northwest portion of the 1st floor, and has two main laboratories (Figure 2-1, Room Nos. ① and ②). Size of the each room is 13.2m x 9.9m (130m^2), furnished with experiment tables where 50-60 students could work at the same time. Table 2-3 indicates the prospective arrangement of major equipment.

Figure 2-1 Prospective Drawing for Equipment Arrangement (Dept. of Physiology)

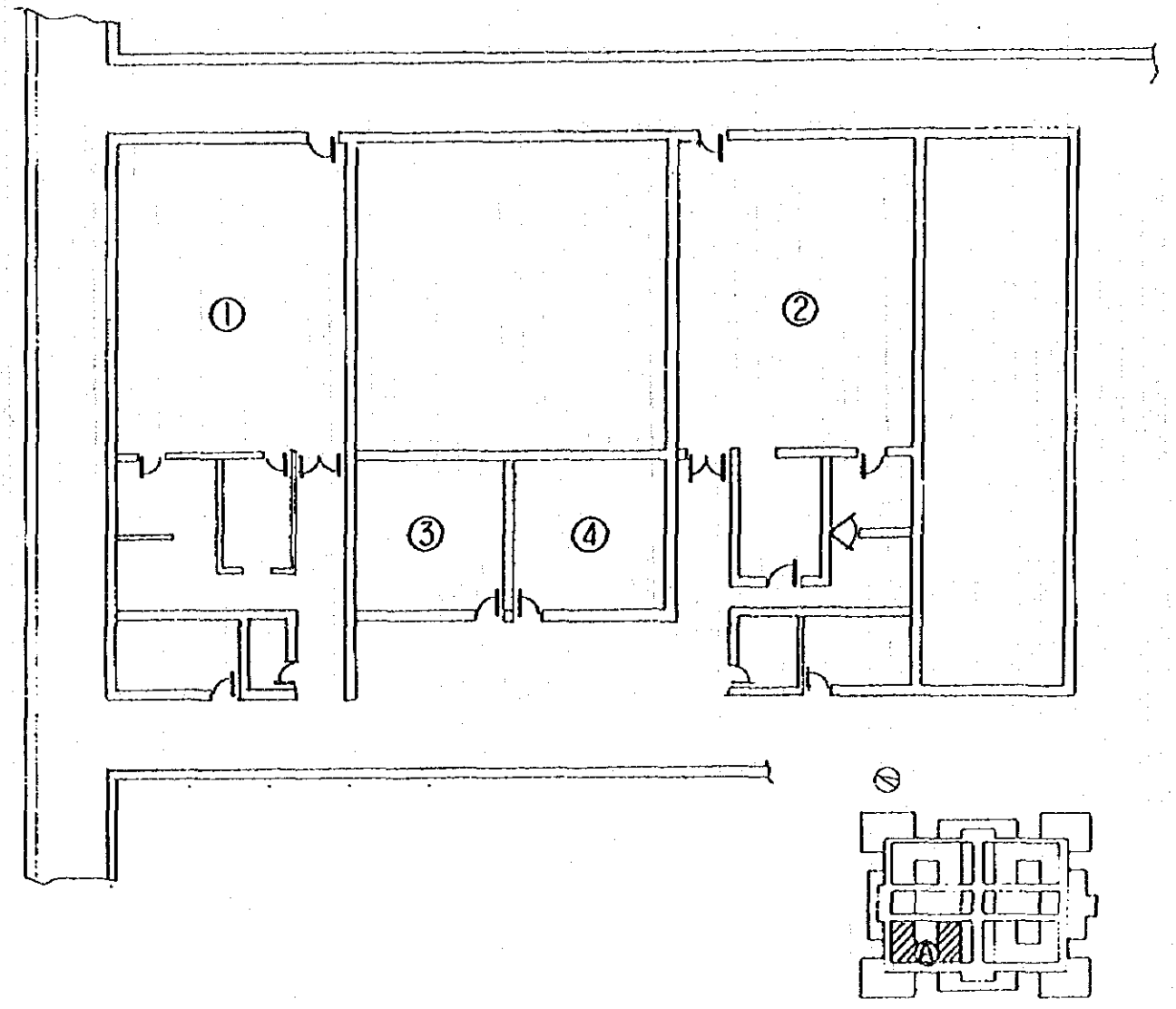


Table 2-3 Prospective Arrangement of Major Equipment (Dept. of Physiology)

Room No.	Room	Description	Q'ty
① ②	Laboratory	Table-Top Centrifuge	2
① ②	〃	UV-VIS Spectrophotometer	2
① ②	〃	Hematocrit Centrifuge	2
① ②	〃	Refrigerator	2
① ②	〃	Binocular Microscope	20
①	〃	Water Purification System with Deionized	1
① ②	〃	Computer Controlled Incubator	2
②	〃	Celluloseacetate Electrophoresis Apparatus	1
①	〃	Blood Gas Analyzer	1
①	〃	Blood Cell Counter	1
①	〃	Microscope w/ Photographic Attachment	1
① ②	〃	Spirometer with Thermal Paper	2
②	〃	Electromyograph 2 amplifier Channels	1
②	〃	Osmometer	1
②	〃	Comprehensive Physiological Unit	1
③	Office	Personal Computer System	1
④	Laboratory	Models for Physiology	1
②	Laboratory	Slide Projector	1
① ② ③	Laboratory	Air Conditioner for Laboratory	3
③	Office	Electric Typewriter	1
④	Laboratory	Photostat Machine	1
②	Laboratory	Perimeter	1
①	Laboratory	Glassware Washer with Rack	1

B) Department of Biochemistry (College Building 1st Floor)

The department is located in the northeast portion of the 1st floor, and has two main laboratories (Figure 2-2, Room Nos. ① and②). Size of each room is 13.2m x 9.9m (130m^2), furnished with experiment tables where 50-60 students could work at the same time. Table 2-4 indicates the prospective arrangement of major equipment.

Figure 2-2 Prospective Drawing for Equipment Arrangement (Dept. of Biochemistry)

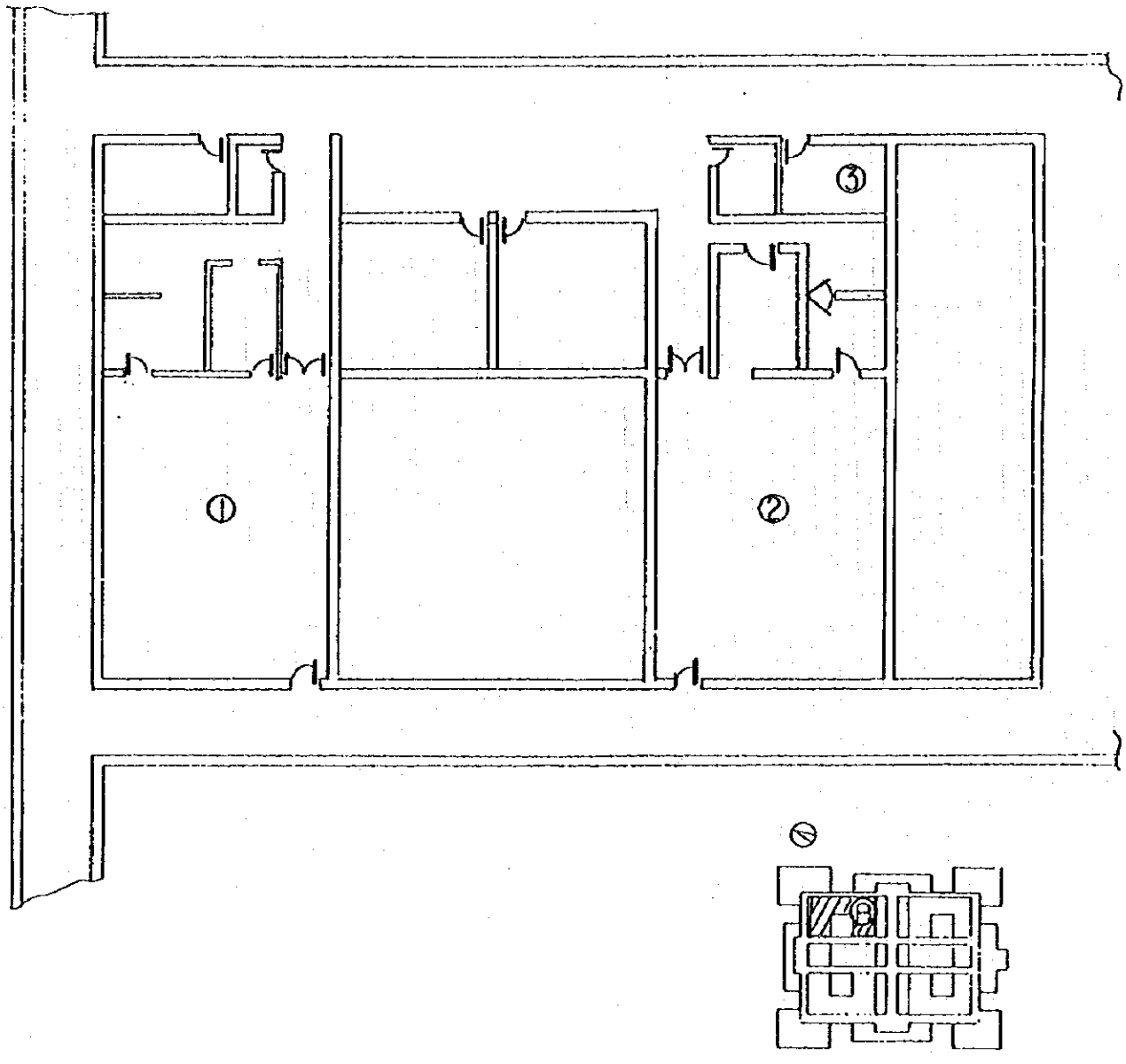


Table 2- 4 Prospective Arrangement of Major Equipment (Dept. of Biochemistry)

Room No.	Room	Description	Q'ty
① ②	Laboratory	Electrophoresis Apparatus (for Protein)	1
① ②	〃	Flame Photometer (Na, K, Li)	2
① ②	〃	UV-VIS Spectrophotometer	4
②	〃	Microscope w/ Photographic Attachment	1
①	〃	High-Performance Centrifuge (Ultra)	1
① ②	〃	Hematocrit Centrifuge	2
②	〃	Multipurpose Floor Refrigerated Centrifuge	1
①	〃	Blood Gas Analyzer	1
①	〃	Water Purification System with Deionizer	1
①	〃	Shaking Water Bath	6
①	〃	Ultra-Low Temperature Freezer	1
① ②	〃	Reach-In Refrigerator with Freezer	2
②	〃	Gas Chromatography	1
①	〃	Glassware Washer with Rack	1
③	Office	Personal Computer System	1

C) Department of Forensic Medicine (College Building Ground Floor)

The department is located in the northwest portion of the ground floor, and has two laboratories (Figure 2-3, Room Nos. ① and ②) for use by smaller groups of students. Special care must be paid in order to minimize the dust entering the room (Room No. ②) where the comparison microscope, an equipment vital in the area of forensic medicine, is to be installed. Table 2-5 indicates the prospective arrangement of major equipment.

Figure 2-3 Prospective Drawing for Equipment Arrangement (Dept. of Forensic Medicine)

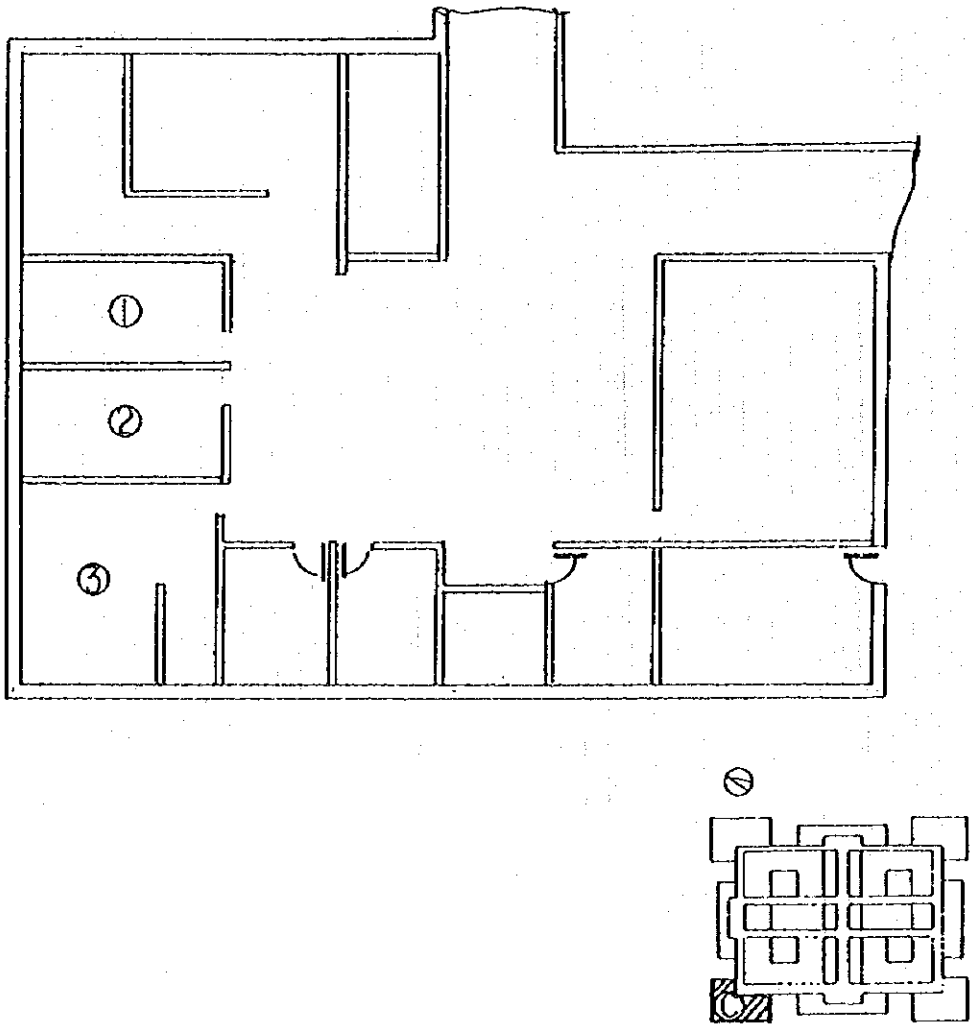


Table 2- 5 Prospective Arrangement of Major Equipment (Dept. of Forensic Medicine)

Room No.	Room	Description	Q'ty
①	Laboratory	Human Skeleton Painted	1
③	Office	Photostat Machine	1
②	Laboratory	Comparison Microscope	1
②	〃	Ultraviolet Lamp	1
②	〃	Hot Air Sterilizer	1
③	Office	Personal Computer System	1

D) Department of Pathology (College Building Ground Floor)

The department extends from the west to south of the ground floor, and has four main laboratories (Figure 2-4, Room Nos. ①, ②, ③ and ④). Size of each room is 13.2m x 9.9m (130m^2), furnished with experiment tables where 40-50 students could work at the same time. Table 2-6 indicates the prospective arrangement of major equipment.

Figure 2-4 Prospective Drawing for Equipment Arrangement (Dept. of Pathology)

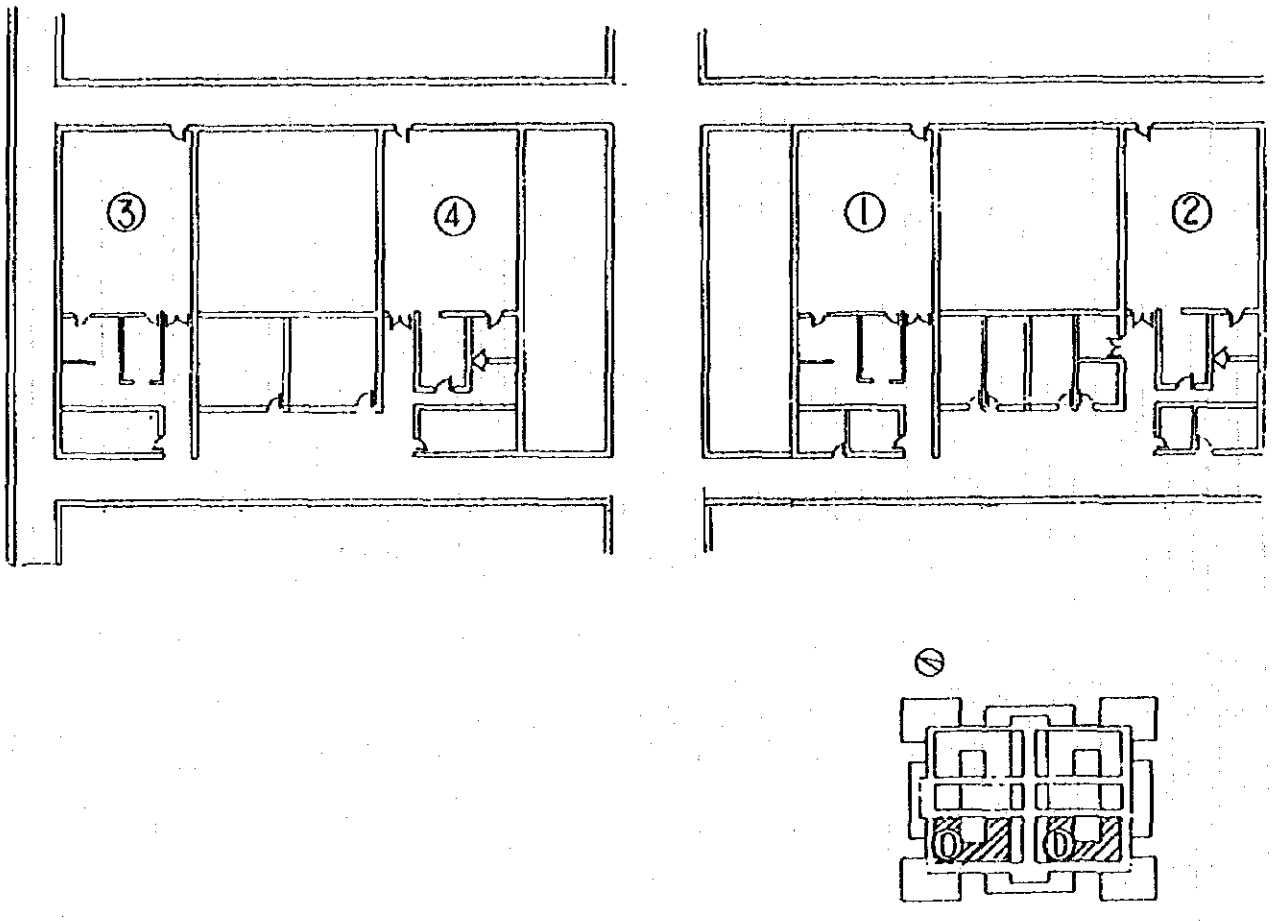


Table 2- 6 Prospective Arrangement of Major Equipment (Dept. of Pathology)

Room No.	Room	Description	Q'ty
① ② ③ ④	Laboratory	Hematocrit Centrifuge	6
① ② ③ ④	〃	Fume Hood	4
① ② ③ ④	〃	Electric Oven	6
① ② ③ ④	〃	Ultrasonic Cleaner	4
① ② ③ ④	〃	Laboratory Sterilizer	4
① ② ③ ④	〃	Binocular Microscope for Students	60
① ② ③ ④	〃	Reach-in Refrigerator with freezer	4
① ② ③ ④	〃	Incubator	4
② ③	〃	Flame Photmeter	1
② ③	〃	Electrophoresis Apparatus	2
①	〃	Coldtome	1
①	〃	Automatic Tissue Processor	2
①	〃	Tissue Embedding Console	2
① ② ③ ④	〃	Water Purification System with Deionized	4
③	〃	Computerized Ultra Centrifuge	1
②	〃	Blood Cell Counter	1
③	〃	Blood Chemistry Analyzer	1
②	〃	Blood Bank Refrigerator	1
①	〃	Automatic Stainer	2
⑤	Office	Personal Computer System	2
③	Laboratory	ELISA Test Apparatus	1
① ③	〃	Teaching Microscope with Video System	2
②	〃	Palette Aggricorder	1
②	〃	Glassware Washer with Rack	1

E) Department of Community Medicine (College Building Ground Floor)

The department is located in the northwest portion, and has two laboratories (Figure 2-5, Room No. ① and ②) and a sub-room (Figure 2-5, Room No. ③). Table 2-7 indicates the prospective arrangement of major equipment.

Figure 2-5 Prospective Drawing for Equipment Arrangement (Dept. of Community Medicine)

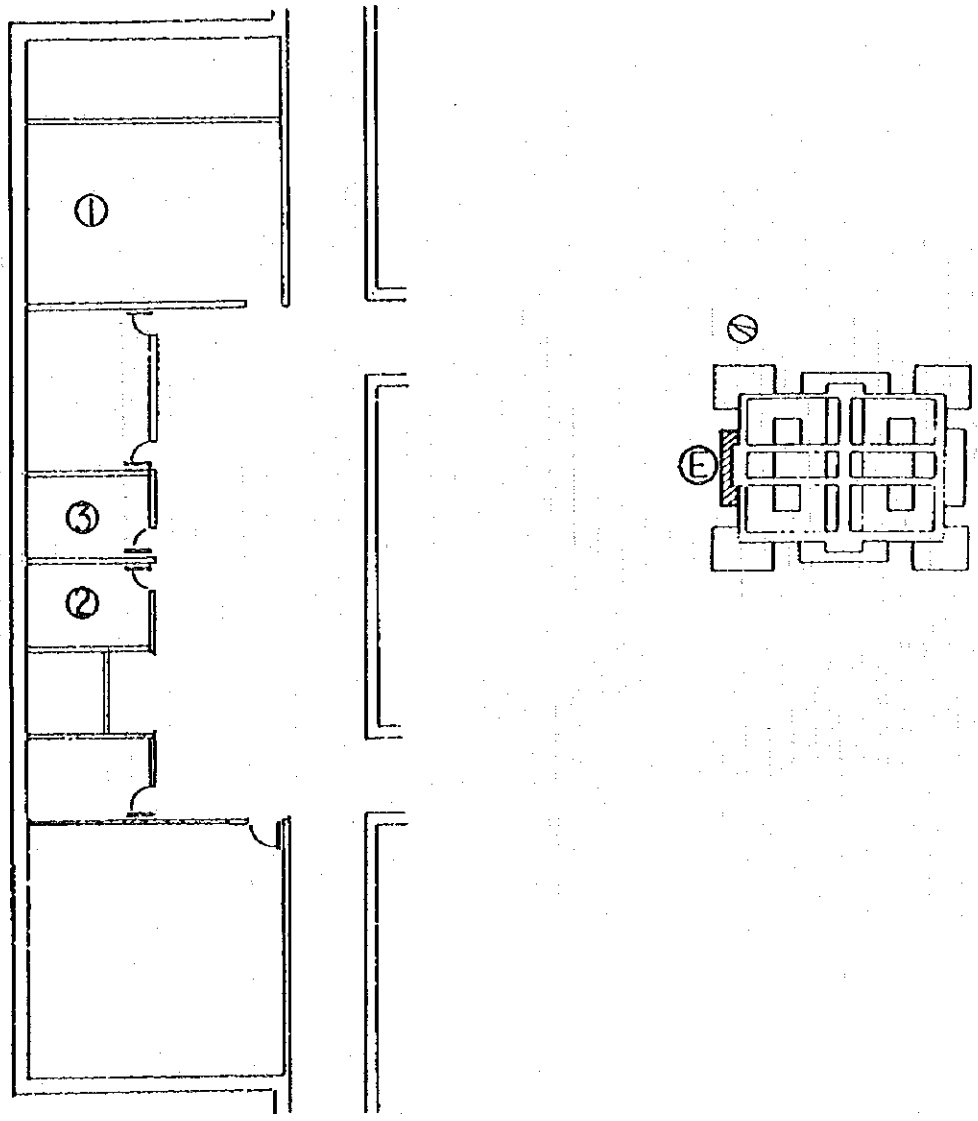


Table 2- 7 Prospective Arrangement of Major Equipment

(Dept. of Community Medicine)

Room No.	Room	Description	Q'ty
②	Laboratory	Personal Computer System	2
②	〃	Video Tape Editor System	1
②	〃	Video Projector with Screen	1
②	〃	34-Inch Color TV Monitor	1
③	Sub-room	Printing Press Set	1
①	Laboratory	Centrifugal Particle Size Analyzer	1
①	〃	Auto Bomb Calorimeter	1
①	〃	Water Testing System	1
①	〃	Teaching Microscope (5 PAX Purpose)	2
①	〃	Binocular Microscope	10
①	〃	Refrigerator	1

F) Department of Anatomy (College Building Ground Floor)

The department is located in the northern portion of the ground floor, and has an autopsy room (Figure 2-6, Room No. ①), a dissection room (Figure 2-6, Room No. ②), and a histology and autopsy room (Figure Room No. ③). Table 2-8 indicates the prospective arrangement of major equipment.

Figure 2-6 Prospective Drawing for Equipment Arrangement (Dept. of Anatomy)

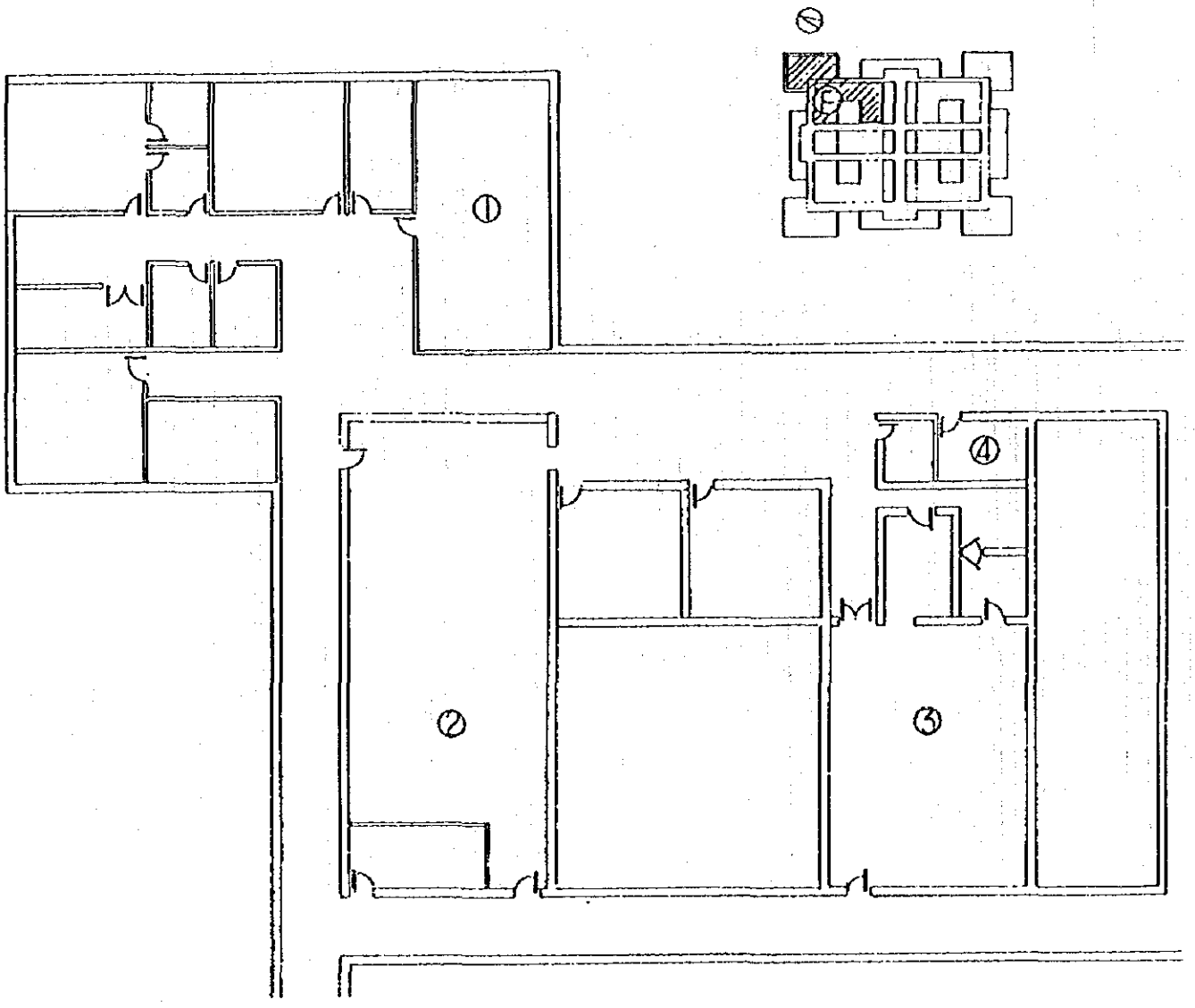


Table 2- 8 Prospective Arrangement of Major Equipment (Dept. of Anatomy)

Room No.	Room	Description	Q'ty
①	Autopsy	Mortuary Refrigerator (2 PAX) with Cart	4
③	Histology & Autopsy	Tissue Embedding Console	1
③	〃	Automatic Tissue Processor	1
③	〃	Automatic Microtome Knife Sharpener	1
③	〃	Freezing Microtome	1
③	〃	Fume Food (Draft Chamber)	1
②	Dissection	Syringe Pump for Fixation	4
②	〃	Bone Saw (Manual Type, with blade)	12
②	〃	Tools for Making Plaster of Paris Models	1
④	Histology & Autopsy	Computer System with Software	1

G) Department of Pharmacology and Therapeutics (College Building 1st Floor)

The department is located in the southeast portion of the 1st floor, and has two main laboratories (Figure 2-7, Rooms No. ① and ②). Size of each room is 13.2m x 9.9m (130 m^2). Table 2-9 indicates the prospective arrangement of major equipment.

Figure 2-7 Prospective Drawing for Equipment Arrangement (Dept. of Pharmacology and Therapeutics)

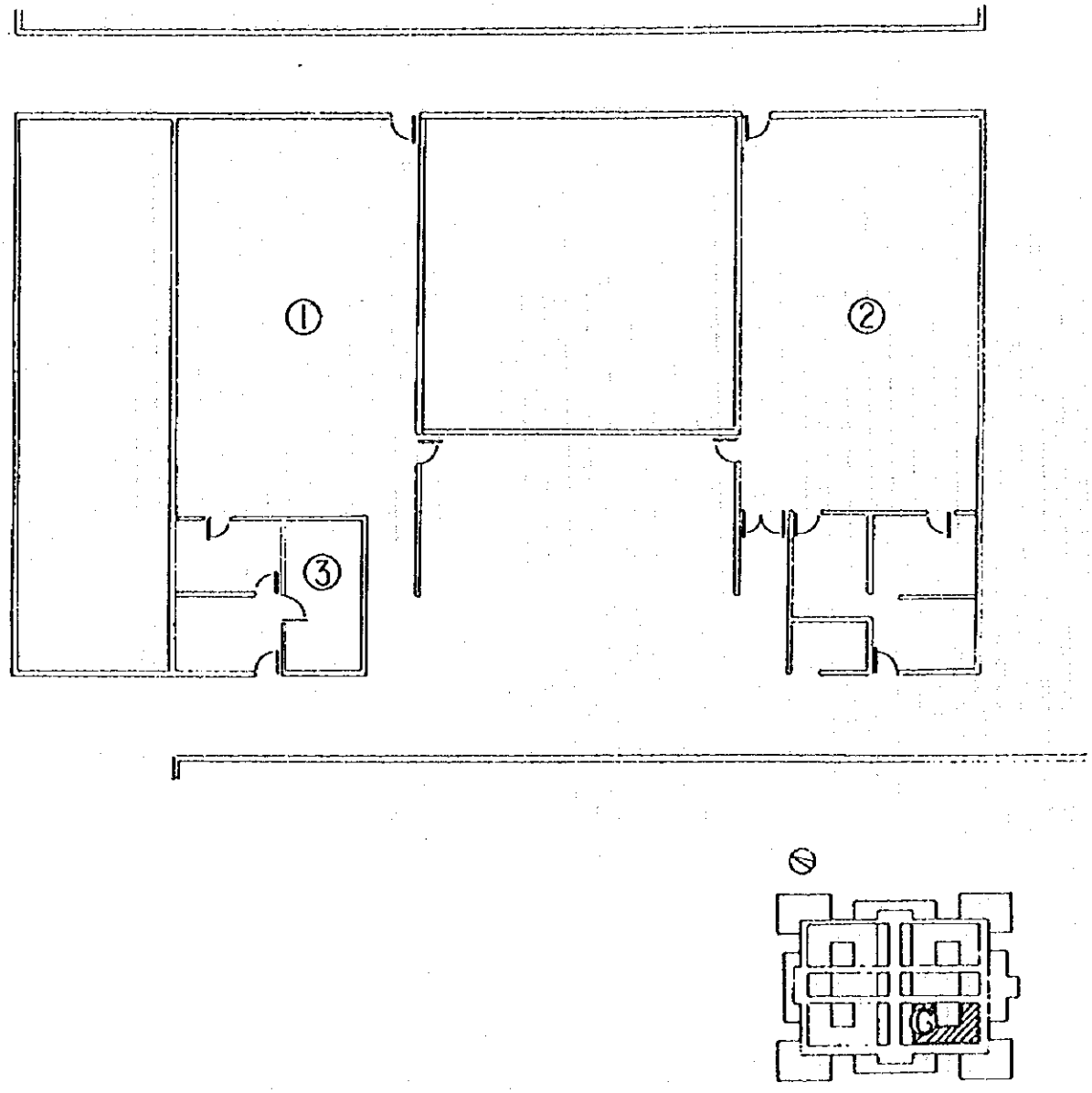


Table 2- 9 Prospective Arrangement of Major Equipment

(Dept. of Pharmacology and Therapeutics)

Room No.	Room	Description	Q'ty
①	Laboratory	High Pressure Liquid Chromatography	1
①	〃	UV-VIS Spectrophotometer	2
②	〃	Dual Impedance Research Stimulator	2
①	〃	Water Circulator Unit	3
②	〃	Polygraph System for Animal	1
①	〃	Water Distillation Apparatus with Deionizer	2
③	Office	Personal Computer System	1
①	Laboratory	Glassware Washer with Rack	1

Chapter 3 Implementation Plan

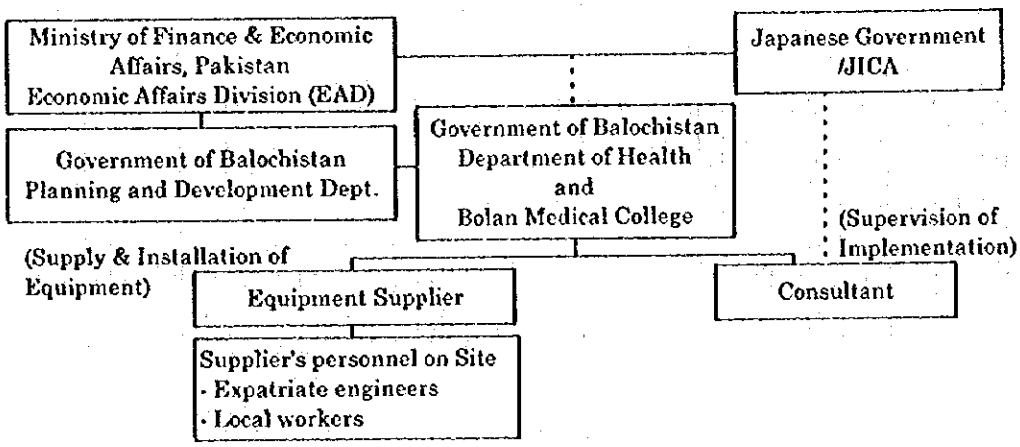
Chapter 3 Implementation Plan

3- 1 Implementation Plan

3- 1- 1 Implementation Concept

This Project is meant to procure equipment and materials for medical education of Bolan Medical College in Balochistan province through a grant aid of the Government of Japan. The Government of Balochistan, Department of Health and Bolan Medical College, the executing agency of this Project, will conclude an agreement with a Japanese consultant which will render detailed design, preparation and distribution of tender documents, tender evaluation, and supervision of installation work. The said executing agency will conclude a contract with (a) Japanese supplier(s) of equipment and materials too, which will then be responsible for procurement, transportation and installation of the equipment and materials, as well as instruction on operation and maintenance. Upon installation, unpacking and setting up will be done by the supplier(s) with local workers under supervision of supplier's engineers, and the engineers will be responsible for further wiring, assembly of small parts, test running, adjustments, etc. Engineers professed in fields of medical equipment, electric and electronics are assumed as desirable. Implementation system of execution of the Project is shown in Figure 3- 1.

Figure 3- 1 Project Implementation System



3- 1- 2 Implementation Conditions

Research and educational activities are in effect being conducted at Bolan Medical College presently. Thus it is necessary to make previous arrangements on their schedule with a responsible personnel at the college prior to commencing the work in the laboratories and lecture theaters so that the installation, test run and adjustment of the equipment will minimally affect their lectures, experiments and research.

Lunch time is generally later there than in Japan, according to local custom, being from around 2:00 - 3:00 p.m., and the day's work is finished before lunch. Moreover, Ramadan is scheduled to be between mid- January and mid- February in 1997, which would be followed by several days of vacation. Special attention should be paid in that respect when hiring local workers since the work efficiency will diminish during Ramadan.

3- 1- 3 Scope of Works

Japan Side

1) Procurement of equipment and materials, and transportation and installation related thereto;
2) Electric wiring work between installed equipment and plug sockets;
3) Execution of trial operation and adjustment of equipment, instruction on operation and maintenance; and
4) Consulting services including preparation of tender documents, management of tendering and supervision of implementation of the Project

3- 1- 4 Consultant Supervision

The consultant must arrange a consistent project implementation team responsible for detailed design and supervision of execution in order to successfully carry out the project until completion without delay, based on policies of grant aid of the Government of Japan and in accordance with the consultancy agreement. Four consultant engineers, responsible for general management, medical equipment, medical education equipment, cost estimation and preparation of tender documents respectively, are assumed. At the stage of supervision of execution, technical assistance shall be given to Pakistan side at the time of a kick- off meeting and approval of supplier's drawing. For the smooth and sound enactment, one of the engineers shall witness and check the pre- shipment inspection, installation and delivery. Spot supervision will be made by each responsible engineer for general management, medical equipment and medical education equipment, respectively, at beginning and finishing of installation.

3- 1- 5 Procurement Plan

(1) Method of Procurement

For equipment requiring maintenance, repair or replacement of parts by the manufacturer such as electric or electronic appliances, the manufacturer shall have a branch office or maintenance agent in Pakistan which has been carrying out repair and maintenance services, whether the origin is Japan or third country. Moreover local procurement is considered desirable for the following equipment in particular.

- Personal Computer -

Keyboards and ROM of personal computers manufactured and sold in Japan are furnished with Japanese language as a standard specification, but those are superfluous functions. Though personal computers have not been produced in Pakistan, local procurement

through a local agent would be most desirable when considering the future potentials for upgrading of RAM, hard disc capacity, etc. Furthermore, software in Urdu, the standard language of Pakistan, is only available locally.

- Photocopy Machine -

Regular maintenance is especially important for the photocopy machine, and is most desirable to procure through a local agent and receive local maintenance service there, although they are not locally manufactured. Local procurement has more merits in terms of the demand for legal size duplication which is not as common in Japan in addition to the A-size copies.

When the above items are locally procured, import duties, provincial taxes (Octroi) and federal government taxes totaling 35- 40% are imposed (taxation rates fluctuate annually). Tax reimbursement is extremely difficult in the case of purchasing an item which has been already existing in the market, and no method of reimbursement is available either. The best procedure to receive tax exemption would be to obtain a tax exemption certificate from the local tax office and obtain the item in bonded areas.

Transportation costs of a human models will not be small in terms of its size and shape, which are making local manufactured products more cost- efficient. Further, a portion of the human models included in the project is actually manufactured in Pakistan too. However, it is important that the structure of the human body is faithfully reproduced to detail for the purpose of medical education at medical colleges, thus it shall be considered to adopt responsible products from a technical point of view.

(2) Method of Transportation

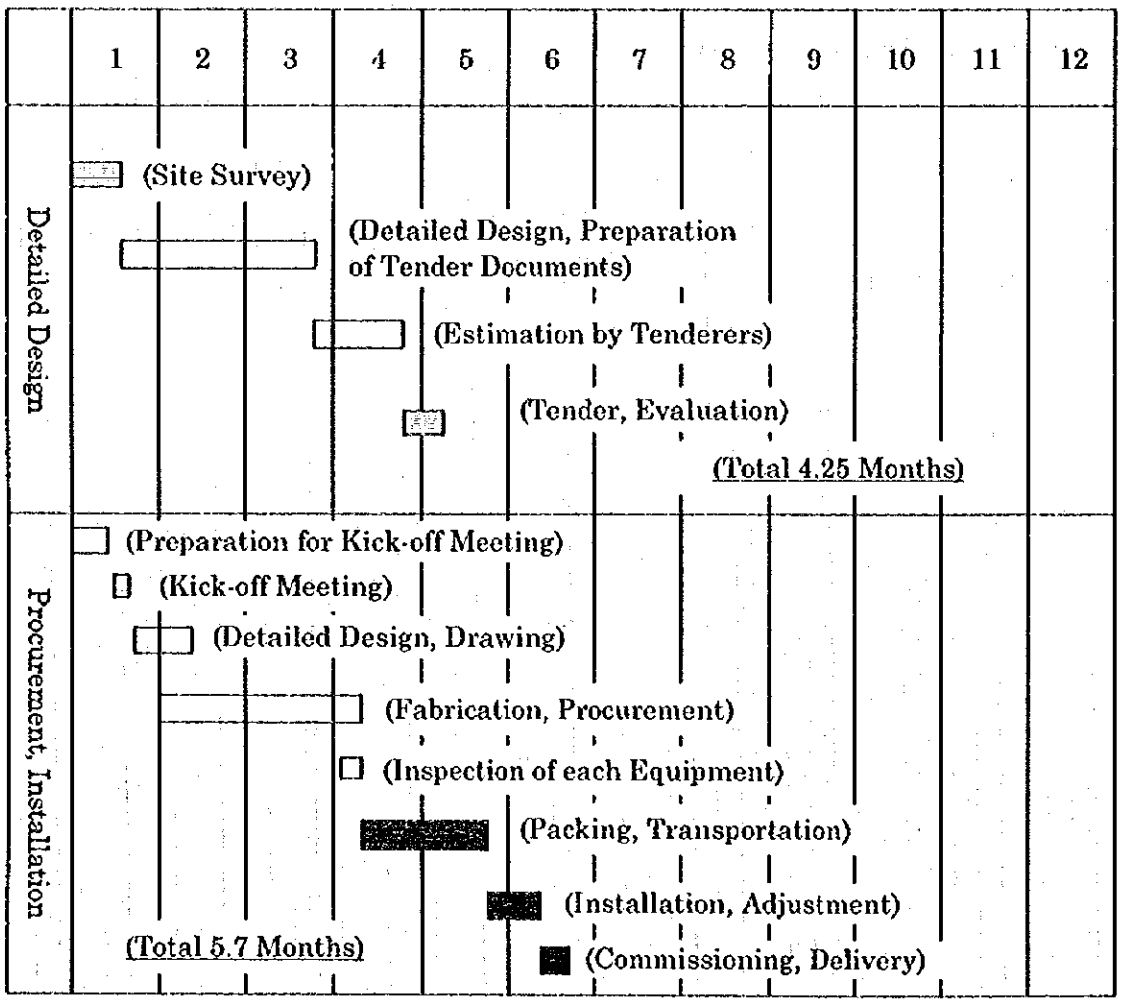
Container transportation will be used in order to shorten the length of maritime and

inland transport as well as to protect the cargoes. The cargoes will be unloaded at Karachi Port, but since customs clearance is also available at Quetta, this is most desirable for the purpose of saving time required for customs clearance.

3- 1- 6 Implementation Schedule

Implementation schedule of the Project is shown in Figure 3- 2.

Figure 3-2 Implementation Schedule



3-1-7 Obligation of recipient country

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction

(2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites

(3) To secure buildings prior to the procurement in case the installation of the equipment

(4) To ensure prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts

(6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work

(7) Proper Use

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) Re- export

The products purchased under the Grant Aid should not be re- exported from the recipient country.

(9) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized

foreign exchange bank in Japan (hereinafter referred to as the Bank). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

3- 2 Operation and Maintenance Plan

In Pakistan, there are two incremental methods for the financial administration system. One method is adding up a rate in the previous year's budget, and the other is apportioning against demands in case of newly installed equipment. Provincial governments are responsible for providing operation and maintenance costs for such equipment especially those provided by grant aid like this project. Therefore, the necessary operation and maintenance costs shall be provided by the Government of Balochistan when the equipment and materials are procured.

Taking a look at the increased amount in liable charges, a total Rs1,120,000 is estimated, broken down into approximately Rs 300,000 for annual maintenance costs (details as per Table 3- 2), approximately Rs730,000 for consumables (details as per Table 3- 2), approximately Rs90,000 for electricity (assuming refrigerators and freezers (a total about 4kW) are to run 24 hours a day for the whole year, and the compressors are to run 4 hours a day, and other equipment (a total about 65kW) is to run for an hour in the two hours experiment and practice curriculum a day for a total 240 days per annum, excluding a winter vacation and Fridays), hardly any charges for gas, and zero charges for water. This is approximately 0.6% of the overall budget of the college for fiscal year 1994 which was Rs173,640,000, and 1.9% of its ordinary budget which is Rs 60,400,000, making us believe that the project shall pose no

significant problem.

The estimated working balance of the college for the next three years in the event this project is implemented in this year is shown in Table 3- 1. The balance for 1994- 95 is used as a basis, and 173 students (M.B.B.S. 163 students; B.D.S. 10 students) are annually admitted, and they are all assumed to graduate properly. And since the engineers of the workshop in the Sandeman Hospital have been assigned as repair and maintenance staff, increase in personnel is not accounted. The question of inflation is omitted for both income and expenditures, so as to allow comparison using the present currency value. Hence, rises in tuition (first year Rs515 (not including redeemable reserve funds), 2nd to 5th years Rs375. The drop in total tuition accounts for the special case where students who entered for two consecutive years graduate.), wages, maintenance cost, consumables cost, electricity (Rs4.25 per kWh), gas (Rs4.42 per m^2 for 400m^2 or more), and water (free of charge) are not accounted for in the table even in terms of unit price. This estimate has been prepared on the basis of a number of assumptions as given above, in order to calculate the effects of the Project on the balance of revenue and expenditures for Bolan Medical College, not to forecast the actual balance in the future.

Table 3- 1 Balance of Revenue and Expenditures for Bolan Medical College

(thousand Rupees)

	1994- 95	95- 96	96- 97	97- 98	98- 99	Increase
Tuition	850	850	860	810	750	- 11.7%
Subsidy	60,396	59,546	61,573	60,566	60,778	0.6%
Total Revenue	61,246	60,396	62,433	61,376	61,526	0.5%
Personnel;	42,948	42,948	42,948	42,948	42,948	0.0%
O & M Cost	124	124	124	274	424	241.9%
Consumables	960	960	1,325	1,700	1,700	77.1%
Electricity, Gas	2,200	2,200	2,245	2,290	2,290	4.1%
Banking Charge	-	-	1,627	-	-	-
Others	14,164	14,164	14,164	14,164	14,164	0.0%
Total Expenditure	60,396	60,396	62,433	61,376	61,526	1.9%

Table 3-2 Cost of Maintenance and Consumables (Detail)

Equipment	Q'ty	Durable Years	Maintenance Items	Cost(Rs)	Consumables	Quantities of Consumables	Cost(Rs)
Water Purification System with Deionizer	8	5 years	Checking parts Cleansing Consumables	44,444	Cartridge Filter	1set/6monthsx12months = 2sets	83,556
Blood Gas Analyzer	2	7 years	Checking parts Checking functions Consumables	13,333	Standard solution	3itemsx150p(persons) x260days	100,222
Blood Cell Counter	2	7 years	Checking parts Checking functions	11,111	Reagents Bottles	10,000times/year	88,889
Polygraph System for Animal	1	5 years	Checking parts Checking functions	14,444	Electrod	10pc x250p=2500pcs	8,333
					Recording paper, 150m/roll	30m/p x250p=7500m(=50rolls)	20,139
					Blood pressure monitoring kit	2pcs/month x12months=24pcs	8,667
					ECG paste, 100g/pc	10g/p x250p=2500g(=25pcs)	694
					Sample tube	1pc/month x12months=12pcs	400
					Teflon filter	1pc/month x12months=12pcs	67
					Standard gas	2pcs/year x2kinds=4pcs	1,667
					Tape for heartbeat	1pc/p x250p =250pcs	211
						Total	40,178

Equipment	Q'ty	Durable Years	Maintenance Items	Cost(Rs)	Consumables	Quantities of Consumables	Cost(Rs)
Spirometer	2	7 years	Checking parts Checking functions	26,667	Recording paper, 25m/roll Mouth piece	25m/p x 100p=2,500m 1pc/p x 100p=100pcs Total	17,778 15,556 33,333
Flame Photometer	3	5 years	Checking parts	16,667	Standard solution	60times/month x12months	27,600
UV-VIS Spectrophotometer	8	7 years	Checking parts	35,556	Halogen lamp D2 lamp Recording paper	1pcs/6months x12months=2pcs 1pc/12months x12months=1pc 0.8roll/month x12months =9.6rolls Total	3,111 15,111 3,111 21,333
Comparison Microscope	1	8 years	Checking parts	13,333	Halogen lamp Quoze lamp	4hours/day x20days/month x12months=10pcs 1pc/192hours=5pcs Total	1,944 8,889 10,833
High Pressure Liquid Chromatograph System	1	7 years	Checking parts Checking functions	10,000	Recording paper Floppy disk Sample bial	1sheet/time x5times/day x240days=1,200sheets 1pc/month x12months=12pcs 100pcs/year Total	4,611 1,250 778 6,639

Equipment	Q'ty	Durable Years	Maintenance Items	Cost(Rs)	Consumables	Quantities of Consumables	Cost(Rs)
Coldtome	2	7 years	Checking parts	11,111	Disposable knife, 20pcs/box	2pcs/day x260day=500pcs	8,667
Automatic Tissue Processor	3	7 years	Checking parts	16,667	Paraphin, 10kg/box	2kg/week x52weeks=104kg (10.4boxies	32,933
High-Performance Centrifuge (Ultra)	2	7 years	Checking parts	33,333	Oil for pump	Once a year, 2litter	1,333
Blood Chemistry Analyzer with ISE Unit,	1	7 years	Checking parts Checking functions Adjustment	33,333	Reagents	10tests/day x100days =1,000tests	244,444
Osmometer	1	7 years	Checking parts Checking functions	4,000	Recording paper Standard solution	1roll/month x12m=12rolls 1pc/year x5kinds=5pcs Total	744 1,111 1,856
Auto Bomb Calorimeter	1	7 years	Checking parts	5,556	Benzoic acid Recording paper Fuse Sample pan	40bottles/year 8sets/year 40sets/year 10sets/year Total	3,000 356 2,778 611 6,744

Equipment	Q'ty	Durable Years	Maintenance Items	Cost(Rs)	Consumables	Quantities of Consumables	Cost(Rs)
Water Testing System	1	7 years	Checking parts Calibration	6,667	Reagent kit (27tests)	100times/year	8,889
Trinocular Microscope	1	7 years	Checking parts Cleansing	4,444	Lamps (Halogen, Mercury) Emersion oil	1pc/2months	14,028

Total (Rs) : 300,667

Total (Rs) : 731,478

Chapter 4 Project Evaluation and Recommendation

Chapter 4 Project Evaluation and Recommendation

4- 1 Project Effect

Expected roles of the graduates of Bolan Medical College, in the Balochistan province where there is a serious lack of medical practitioners, are their health and medical services at various local medical institutions such as hospitals and dispensaries, bringing good and benefit for a wide range of local citizens. Under public medicine of Balochistan, doctors are employed as one whole unit by the Government of Balochistan, Department of Health, and thereupon assigned to respective medical institutions in different localities. Most of the graduates from Bolan Medical College who entered from Balochistan have all been employed by the Department of Health, and are assigned to various medical institutions in the area. Moreover, from the fiscal year 1996, the opening of hospitals in the province shall be encouraged under the fund loan system by the Department of Health, so that more and more graduates may work at private medical facilities. Henceforth, upgrading of Bolan Medical College through the Project shall surely bring good to the approximately 6 million people of Balochistan by way of improving the medical services. Furthermore, students of Bolan Medical College come from various backgrounds too, i.e. minority ethnic groups, Afghanistan refugees, Azad- Kashmir, Iran, Saudi Arabia, India, Tadzhikistan, Uzubekistan, Kazakhstan, Azerbaidjan, Turkmenistan and other administrative districts outside of Balochistan and surrounding countries. Most of these graduates return to their home countries, and work as doctors at their local medical institutions. Thus, this project will also bring good to a wide range of people in the surrounding regions outside of Balochistan as well.

Taking a look at the intermediate and long- term development plans of Pakistan, the priority targets for the Perspective Plan (1993- 2008) and the Eighth Five- Year Plan (1993- 98) are to improve the social and economic status of the people by way of improving and perfecting the social sector. In particular, in order to lower the infant mortality rate, which is a specific

target of the plans, obstetrics and gynecological practitioners who received formal medical education need to be sent to each region, either replacing them with the traditional midwives or providing the midwives with proper hygienic knowledge; and in order to control the rate of population growth as well as control the spread of contagions such as AIDS etc., doctors of community medicine need to be sent to each region to carry out educational activities to the public. Bolan Medical College is directly responsible for both of these issues, and hence, improvement of functions of the college is judged to be of high priority among all development projects under the Government of Pakistan.

Also as aforementioned, the Project is urgently demanded for the improvement of people's lives and its purpose conforms with the development of manpower; the Government of Balochistan is also capable of carrying out its maintenance, administration and management using its own funds, manpower and technologies.

Furthermore, the project can be executed with no particular difficulties or obstacles by applying the grant aid system of Japan.

Upon an overall Judgement of the above, along with the fact that Bolan Medical College is the only medical college in Balochistan, we find it most proper and relevant to carry out the project under Japan's grant aid.

Specific beneficial effects of the Project are as follows.

(1) Betterment of Fundamental Medical Knowledge of Students

The existing equipment of Bolan Medical College is not sufficient and limited in number, hence the style of almost experiment and practice involves only the instructor performing them while the students merely observe. Such a state where students have no

chance to have an experience of fundamental experiment and practice before becoming a doctor is a serious problem. By providing the students with equipment and materials for experiment and practice, we can expect their fundamental knowledge and ability in medicine greatly improve by the time they graduate.

(2) Providing Opportunity of In- service Education

In- service education is necessary for doctors, since medical science is in constant progress. By providing Bolan Medical College with supplementary materials for education as well as experiment and practice equipment, its level of medical education will be raised, and the college can hope to offer the space and opportunity of the in- service medical education.

(3) Increment of Number of Students

The new campus building of Bolan Medical College is very large and capable of accommodating a much greater number of incoming students in terms of building size, however, the current number of students turns out to be the maximum capacity in terms of its deficient equipment. The grant of equipment and materials for medical educational shall resolve such problems, and with future replenishment of faculty staff, a greater number of students can be admitted and graduated, thus ultimately resolving the problem of deficient doctors.

(4) Improvement of Welfare and Living Environment of Local Residents

The living environment in Quetta and other cities in Balochistan province can be improved. Moreover, public hygiene in the Balochistan province assumes great responsibility in terms of the extremely high population growth rate, the prevalence of drugs and spread of AIDS in its pursuance, diseases caused by unsanitary drinking water, and so on. Bolan

Medical College has taken up preventive medicine in its Department of Community Medicine, and its improvement and perfection shall greatly contribute towards the welfare of approximately 6 millions Balochistan residents by way of improving the medical services, and hence would also lead to an improved living environment as well.

4- 2 Recommendation

The Project would produce tremendous positive results as mentioned above, and it would also widely contribute towards improvement of the BHN of the residents. Thus we have affirmed the relevance and significance in carrying out the Project by means of grant aid. It is further believed that the structure of Pakistan side is capable of management and administration of this project, with adequate capital and manpower. Nevertheless, it may be carried out even more smoothly and effectively with the following improvements.

(1) Technical Guidance, Training

Since the technical level of professors and other staff at Bolan Medical College is very high, and there seems to be no particular equipment in the Project requiring special technical guidance or training, and they would manage the equipment perfectly well on their own. Yet, in order to have them apply the equipment most effectively for a long period, such equipment with relatively high level, like a blood chemistry analyzer, would be better operated if a short- term operation and maintenance guidance or training is conducted on- site or at the factory of the equipment manufacturer.

2) Maintenance and Repair

Maintenance and repair of the equipment are planned to be done at the workshop in the Sandeman Hospital by the engineering staff assigned there. However, it is useful to equip

Bolan Medical College with tools and inspection devices for maintenance and repair.

(3) Bank Charges

As far as a major external factor is concerned, all banks in Pakistan simultaneously raised the charges of opening an A/P for grant aid. In Pakistan, the charges had been higher, being about 0.3%, than the ordinary rate (about 0.1%), thus 1% is an irrationally high figure, considering the lack of any risk on the part of the bank in regards to the A/P for grant aid, which is quite different from L/Cs in contracts between private firms. This is due to the fact that competition among banks are restricted under the system where the central bank assign a bank to open A/Ps, but this consequently forces extraordinary burden on the part of the executing agency. At this time, the Department of Health and Bolan Medical College will secure the 1% from their budget for the time being, however, this is a problem for the other grant aid projects too in Pakistan, which shall be solved promptly.

Appendices

Appendix-1 Member List of the Survey Team

Mr. Mutsuharu NAKAJIMA	Team Leader	Grant Aid DivisionEconomic Cooperation BureauMinistry of Foreign Affairs
Dr. Takao SENDA (M.D.)	Medical Education Planning	Associate Professor, School of Medicine, Nagoya University
Mr. Kazuo SEKIGUCHI	Project manager of the Consultants	UNICO International Corporation
Mr. Yukihisa TAKAHASHI	Equipment Planning	UNICO International Corporation
Mr. Wataru SHIGA	Market Researcher	UNICO International Corporation
Mr. Katsuhiko HIGUCHI	Cost Estimation	UNICO International Corporation

Appendix-2 Survey Schedule

No.	Date		Itinerary		
			Mr. Nakajima	Dr. Senda	Consultants
1	Oct. 3	Tue		Lv. Tokyo	
2	4	Wed		04:55 Ar. Islamabad Courtesy call on the Japanese Embassy and JICA Courtesy call on the Ministry of Health (MOH) and Economic Affairs Div. (EAD)	
3	5	Thu		Survey of Islamabad Chirdren Hospital Islamabad → Quetta 16:00	
4	6	Fri		Internal Meeting and Data Arrangement	
5	7	Sat		Meeting with BMC (General discussion)	
6	8	Sun		Courtesy call on Balochistan Health Department Meeting with BMC (Physiology, Biochimistry)	
7	9	Mon		Meeting with BMC (Anatomy, Forensic Medicine)	
8	10	Tue		Survey of Fatima Jinnah General & Chest Hospital Meeting with BMC (Pathology)	
9	11	Wed	Lv. Tokyo	Meeting with BMC (Pharmacology & Therapeutics, Community Medicine)	
10	12	Thu	Ar. Islamabad 23:10	Survey of Sandeman Civil Hospital Courtesy call on Balochistan, Planning & Development Department Survey of BHU, Killi Rahem Gul Survey of BHU, Kachi Baig	
11	13	Fri	Islamabad → Quetta	Internal Meeting and Data Arrangement	
12	14	Sat	Meeting with BMC (General discussion)		
13	15	Sun	Meeting with BMC (Discussion on Minutes)		
14	16	Mon	Conclusion of Minutes of Discussions (at Health Department)		
15	17	Tue	Quetta→Islamabad Reporting to Embassy/JICA Islamabad→Karachi	Quetta→Lahore	Meeting with BMC (Anatomy)
16	18	Wed	Lv. Karachi	Lv. Lahore Ar. Nagoya	Meeting with BMC (Physiology)
17	19	Thu			Meeting with BMC (Biochemistry, Forensic Med.)
18	20	Fri	Ar. Tokyo		Data Arrangement
19	21	Sat			Meeting with BMC (Pharmacology & Therapeutics)
20	22	Sun			Meeting with BMC (Pathology)
21	23	Mon			Meeting with BMC (Community Medicine)
22	24	Tue			Survey of Sandeman Civil Hospital, Work Shop
23	25	Wed			Meeting with BMC (General discussion)
24	26	Thu			Reporting to Health Dept.
25	27	Fri			Data Arrangement
26	28	Sat			Meeting with BMC (General discussion)
27	29	Sun			Quetta→Islamabad Reporting to Embassy/JICA
28	30	Mon			Discussion with Suppliers Islamabad→Karachi, Lv. Karachi
29	31	Tue			
30	Nov. 1	Wed			Ar. Tokyo

Appendix-3 List of Party Concerned in the Recipient Country

The Government of the Islamic Republic of Pakistan, Economic Affairs Division

Mr. Shahid Humayun	Deputy Secretary

The Government of Balochistan, Planning & Development Department

Mr. Ata Mohammad Jafer	Additional Chief Secretary
Mr. Mohammad Shafique Dar	Chief of Section (Health)

The Government of Balochistan, Health Department

Mr. Mohammad Irfan Kasi	Secretary Health
Dr. Akhtar Hameed Khan	Chief Planning Officer
Mr. Ejaz Ahmed Buzdar	Deputy Secretary

Bolan Medical College

Prof. Mahmood Raza	Principal, and Head of Dept. of E.N.T.
Dr. Sajid Raza	Act. Head of Dept. of Biochemistry
Dr. Muhammad Masoom Kasi	Assistant Professor Dept of Biochemistry
Dr. S. Hasnain Naqvi	Assistant Professor Dept of Biochemistry
Prof. Sikandar Ali Sheikh	Head of Dept. of Physioloy
Dr. Abdul Sattar Baloch	Assistant Professor Dept. of Physiology
Dr. Asghar Hussain	Assistant Professor Dept. of Physiology
Dr. Mumtaz Hyder	Assistant Professor Dept. of Physiology
Prof. Ghulam Sarwar Garrani	Head of Dept. of Anatomy
Dr. Muhammad Afzar Butt	Associate Professor Dept. of Anatomy
Dr. Arbab Abdul Wadood	Assistant Professor Dept. of Anatomy
Dr. Jamil Ahmed Mirza	Associate Professor Dept. of Pathology
Dr. Edgar Nathaniel	Associate Professor Dept. of Pathology
Dr. Arbab Muhammad Yousuf Kasi	Head of Dept. of Forensic Medicine
Dr. Abdul Sattar Baloch	Assistant Professor Dept. of Forensic Medicine
Dr. Zain ul Abidin	Demonstrator Dept. of Forensic Medicine
Prof. Arbab Sikander Khan	Head of Dept. of Pharmacology & Therapeutics
Dr. Nirmal Das	Assistant Professor Dept. of Pharmacology & Therapeutics
Dr. Habibullah	Assistant Professor Dept. of Pharmacology & Therapeutics
Dr. Abdul Salam	Assistant Professor Dept. of Pharmacology & Therapeutics
Dr. A.Q. Sikander Riaz	Head of Dept. of Community Medicine
Dr. Rukasana Majid	Assistant Professor Dept. of Community Medicine
Dr. Rashida Panezai	incharge RH Wing, Dept. of Community Medicine
Dr. Shahab Seqib	Demonstrator Dept. of Community Medicine

Bolan Medical College Hospital

Mr. Rahim Khan Zarkun	Project Director Works

Sandeman Civil Hospital

Dr. Shafi Mohammad Zehri	Medical Superintendant
Dr. Zafer Iqbal	

Sandeman Civil Hospital Work Shop

Mr. M. Ilyas Lashari	Chief Electro Medical Engineer
Mr. Amir Waseem	Electro Medical Engineer
Mr. Muhammad Akram	Electro Medical Technician
Mr. Muhammad Siddiq	Electro Medical Technician
Mr. Alasood Ahmed	Electro Medical Technician
Mr. Javad Ahmed	Electro Medical Technician
Mr. Shabbir Ahmed	Electro Medical Technician
Mr. Hussain Ahmed	Electro Medical Technician
Mr. Abdul Lalif	Electro Medical Technician

Fatima Jinnah General & Chest Hospital

Dr. Abdul Rashid Tareen	Medical Superintendant

Basic Health Unit, Killi Rahem Gul

Dr. Abdul Nasir Kasi	Medical Officer

Basic Health Unit, Kachi Baig

Dr. Abdul Malik	Medical Officer
Ms. Fuheieta Khanim	

Islamabad Children Hospital

Dr. S. Hashim Raza	Medical Superintendant

Naqvi & Siddiquie Associates (Consultant of Bolan Medical College Hospital)

Mr. Pirzada Shujauddin A. Siddiquie	Chief Engineer Coordination & Design

The Embassy of Japan

Mr. Hiroshi Fukada	Minister
Mr. Koushi Yamada	First Secretary
Mr. Mitsuyoshi Nakata	First Secretary

JICA Pakistan Office

Mr. Akira Murata	Resident Representative
Mr. Kazushige Aragaki	Deputy Resident Representative
Mr. Noriaki Nishimiya	Deputy Resident Representative
Mr. Mahmood A. Jilani	Chief Programme Officer

Appendix-4

Minutes of Discussions
on
the Basic Design Study
on
the Project for Improvement of Medical Equipment
for Bolan Medical College at Quetta
in
The Islamic Republic of Pakistan

In response to the request made by the Government of the Islamic Republic of Pakistan, the Government of Japan has decided to conduct a Basic Design Study on the Project for Improvement of Medical Equipment for Bolan Medical College in the Islamic Republic of Pakistan (hereinafter referred to as "the Project"), and Japan International Cooperation Agency (JICA) has sent the Basic Design Study Team headed by Mr. Mutsuharu NAKAJIMA, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, from the 3rd October to the 1st November, 1995.

The Team had a series of discussions with the authorities concerned of the Government of the Islamic Republic of Pakistan and conducted a field survey.

As the result of the discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to the work and prepare the Basic Design Study Report on the Project based on the items.

Quetta, the 16th October, 1995

中島睦晴

Mr. Mutsuharu NAKAJIMA
Leader
Basic Design Study Team

Prof. Mahmood RAZA
Principal
Bolan Medical College

Mr. Ata Mohammad JAFFER
Additional Chief Secretary
The Government of Balochistan
Planning and Development Department

Mr. Mohammad Irfan KASI
Secretary Health
The Government of Balochistan
Department of Health

Mr. Shahid HUMAYUN
Deputy Secretary
The Islamic Republic of Pakistan
Economic Affairs Division

ATTACHMENT

1. OBJECTIVE OF THE PROJECT

The objective of the Project is to improve the essential function at Bolan Medical College through provision of essential educational equipment.

2. PROJECT SITES

Bolan Medical College at Quetta

3. EXECUTING AGENCY

The Government of Balochistan, Department of Health is responsible for the administration and execution of the Project.

4. ITEMS REQUESTED BY THE GOVERNMENT OF THE ISLAMIC REPUBLIC OF PAKISTAN

After the discussions with the Basic Design Study Team, equipment described in Annex-I with priority A (1st priority), B (2nd priority) and C (3rd priority) which would be necessary for medical education in the college was finally requested by the Pakistan side.

The final components of the Project will be decided by the Basic Design Study Team after further studies in Japan in accordance with the following criteria (article 5).

5. COMMENTS BY THE JAPANESE SIDE ON THE ITEMS IN 4 ABOVE

The equipment to be given high priority in the Project are:

1) the equipment to be replaced with the existing equipment which is already deteriorated

2) the essential equipment for indispensable curricula of medical education.

While, the equipment to be given low priority in the Project are:

1) the simple equipment/furniture available locally

2) the most advanced equipment to be utilized for research or clinical activities only

3) the equipment with some difficulties on installation/infrastructure conditions

4) the expensive equipment less utilized because of small number of testing/less number of patients

5) the equipment hazardous to environmental control

6) the equipment only utilized with exclusive reagent kit available from the specific manufacturer, and

7) the equipment with financial/marketing difficulties on the procurement of consumable and spare parts etc.

6. JAPAN'S GRANT AID PROGRAMME

(1) The Government of the Islamic Republic of Pakistan and the Government of Balochistan have understood the system of Japanese Grant Aid explained by the Team . (see Annex-III.)

(2) The Government of the Islamic Republic of Pakistan and the Government of Balochistan will take necessary measures described in Annex-II for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

7. SCHEDULE OF THE STUDY

(1) The Consultants will proceed to further studies in the Project site until the 26th of October 1995.

(2) JICA will complete the Basic Design report and send it to the Government of the Islamic Republic of Pakistan by March 1996.

8. AVOID DUPLICATION OF THE EQUIPMENT

To avoid duplication, the College will submit the list of existing equipment and plan of new equipment which will be purchased by themselves and other donors to the Study Team by the 26th October 1995.

9. REPLY TO THE QUESTIONNAIRE

Pakistan side will submit the reply to the questionnaire to the Study Team one by one as soon as possible by 26th October 1995 at the latest.

10. MONITORING

Health Department of the Government of Balochistan and Bolan Medical College have the responsibility of monitoring progress of all phases of the Project such as allocation of funds and utilization of equipment purchased in the Project and equipment purchased by Pakistan side, quality control, maintenance and utilization of equipment, manpower development, training based upon the indicators given in Annex-IV and reporting it to the Embassy of Japan and JICA Pakistan Office annually through Economic Affairs Division.

11. COUNTERPART COMMITTEE

In case the Project is implemented, Pakistan side shall promptly organize a counterpart committee. All contact with Japanese side for implementation of the Project will be made through the committee.

Annex-I LIST OF REQUESTED EQUIPMENT

( ): common use

No.	Description	Qty	Priority A	B	C
Department of Physiology					
1	Table-Top Centrifuge	2	2		
2	Electronic Analytical Balance	2	2		
3	Hematocrit Centrifuge	2	2		
4	Refrigerator	2	2		
5	UV-VIS Spectrophotometer	2	2		
6	Water Purification System with Deionized	1	(1)		
7	Binocular Microscope	20	20		
8	Computer Controlled Incubator	2	2		
9	Cellulose Acetate Electrophoresis Apparatus	1	1		
10	Blood Gas Analyzer	1	(1)		
11	Sahli's Standard Hemometer	40	40		
12	Thoma Hemacytometer	40	40		
13	Test Tube Rack, Stainless Steel	30	30		
14	Blood Sedimentation Apparatus	20	20		
15	Vortex Mixer	5	5		
16	Wintrobe Hematocrit Set	50	50		
17	Stop Watch	25	25		
18	Particle Counter (14-Parameter)	1	1		
19	Mercurial Sphygmomanometer (table top)	10	10		
20	Stethoscope	50	50		
21	Advanced Kymograph with Basic Stimulator and Metal Cylinder	10	5	5	
22	Spirometer with Thermal Paper	2	2		
23	O2 Cylinder	2	2		
24	Clinical Thermometer (Digital type)	50	50		
25	Phonocardiograph with built-in Recordor	1			1
26	Steel Percussion Hammer	30			30
27	ISHIHARA Colour Test Chart with Stand	20			20
28	Test Type Object Chart Illuminating Cabinet with Stand	20			20
29	Microscope with Photo Micrographic Attachment	1	(1)		
30	Animal Balance	2	2		
31	Digital Storage Osciloscope, consisting of:	1	1		
	a) Rack Mount Kit	2			
	b) Nerve Conduction Chamber	5			
	c) Surface Electrode	5			
32	Electoencephalograph, 18ch.	1			1
33	Electromograph, 2 amplifier channels	1			1
34	Osmometer	1	1		
35	Audiometer	1		1	
36	Cardiac Stress Test System	2		2	
37	1-ch Electrocardiograph	1		1	
38	Blood Reaction Slide Glass	20	20		
39	pH Meter	6	6		
40	Top Loading Precision Balance	5	5		
41	Cardiopulmonery Resus Citation Unit	1			1
42	Evoked Response Unit, Neurology version	1			1
43	Constant Current Stimulator	1			1
44	Triple Beam Balance	1			1
45	Electric Oven	1		1	
46	Comprihensive Physiological Unit	1			1

( ): common use

No.	Description	Q'ty	Priority A	B	C
Department of Physiology [Video Tapes All Type VHS/PAL SYSTEM]					
47	Clinical Electro-Cardiography Basic Concepts and Interpretation, Set of 12	1			1
48	Intravenous Therapy Video Tape	1			1
49	Paediatric Procedures Modules 2 Intractive Laser Disc	1			1
50	Olging and the elderly: A review course of geriatric medicine, 18 video tapes	1			1
51.a	Injections, 1 Tape, 17 Mins	1			1
51.b	Blood Transfusion Therapy, 1 Tape, 9 Mins	1			1
51.c	Injectable Medications, 1 Tape, 20 Mins.	1			1
Department of Physiology [Computer Room]					
52	Personal Computer System including Color Display, Color Printer and UPS	1		1	
53	Software for Personal Computer System	1		1	
Department of Physiology [General Requirements]					
54	Models for Physiology	1	1		
55	Air Conditioner for Laboratory	3	3		
56	Scientific Calculator	2	2		
57	Electric Typewriter	1	1		
58	Slide Projector	1	1		
59	VHS Video Recorder	1	1		
60	Color TV	1	1		
61	Opaque Projector	1	1		
62	Gestetner Machine	1	1		
63	Photostate Machine	1	1		
64	Perimeter	1	1		
65	Glassware Set	1	1		
66	Micropipett Set with Disposable Tip	1	1		
67	Glassware Washer with Rack	1	1		

Prof. Sikandar Ali Sheikh 15/10/95
Head of Dept. of Physiology

( ): common use

No.	Description	Qty	Priority A	B	C
Department of Biochemistry					
1	Electrophoresis Apparatus (for Protein) with Densitometer	1	1		
2	Flame Photometer (Na, K, Li)	2	2		
3	UV-VIS Spectrophotometer	1	1		
3.a	UV-VIS Double Beam Computerised Spectrophotometer (GLUC, UA, CHOL)	1			1
4	Platelet Analyzer	1			1
5	Microscope with Photo Micrographic Attachment	1	(1)		
5.a	Phase Contact Binocular Microscope - 1 set				
6	High-Performance Centrifuge (Ultra)	1		1	
7	Hematocrit Centrifuge	2	2		
8	Multipurpose Floor Refrigerated Centrifuge (8,000rpm)	1	1		
9	pH Meter	6	6		
10	Blood Gas Analyzer	1	(1)		
11	Shaking Water Bath	6	6		
12	Water Purification System with Deionizer	1	(1)		
13	Ultra-Low Temperature Freezer	1	(1)		
14	Reach-In Refrigerator with Freezer	3			3
15	Fourier Transform Infrared Spectrophotometer	1			1
16	Electronic Analytical Balance	2	2		
17	Electronic Top Pan Balance	2	2		
18	Gas Chromatography	1	1		
19	Glassware Set	1	1		
20	Micropipett Set with Disposable Tip	1	1		
21	Glassware Washer with Rack	1	1		

Dr. Sajid Raza
Act. Head of Dept. of Biochemistry

( ): common use

No.	Description	Q'ty	Priority A	B	C
Department of Forensic Medicine					
1	Human Skeleton Painted	1	1		
2	Calculator	1	1		
3	Photostato Machine	1		(1)	
4	High Pressure Liquid Chromatograph System with Lamp	1			1
5	UV-VIS Spectrophotometer, Single Beam	1			1
6	Comparison Microscope	1	1		
7	pH Meter	1			1
8	Electronic Analytical Balance	1			1
9	Top Loading Precision Balance	1			1
10	Ultraviolet Lamp, Long & Short Wavelength for Stain Examinator	1	1		1
11	Densitometer	1			1
12	Water Bath	1			1
13	Ultrasonic Cleaner	1			1
14	Hot Air Sterilizer	1			1
15	Personal Computer System with Color Printer and UPS	1		1	
16	Video Program for Post Mortem Examination with Video System	1	1		
17	Video Program for Post Forensic Examination	1	1		

Dr. Arbab Muhammad Yousuf Kasi
Head of Dept. of Forensic Medicine

( ): common use

No.	Description	Q'ty	Priority A	B	C
Department of Pathology					
1	Electronic Analytical Balance	4	4		
2	Slide Warmer	1	1		
3	Hematocrit Centrifuge	6	6		
4	Autosmear Automatic Cytosedimentation Machine	1			1
5	Triple Beam Balance	4			4
6	Fume Hood	4	4		
7	Electric Oven	6	6		
8	Shaking Water Bath	4	4		
9	Ultrasonic Cleaner	4	4		
10	Laboratory Sterilizier	4	4		
11	Binocular Microscope for Students	60	60		
12	Trinocular Microscope with Camera, Photographic System	1	1		
13	Research Microscope	1			1
14	Ultra-Low Temperature Freezer	1	1		
15	Reach-in Refrigerator with freezer	4	4		
16	Incubator	4	4		
17	Small Rotary Extractor	2	2		
18	pH Meter	4	4		
19	View Box for Micro Plate	2	2		
20	Multi-Teaching Microscope	3	3		
21	Pipetter Controller	2			2
22	Vacuum Pump	2			2
23	CO2 Incubator	2	2		
24	Mixer	2	2		
25	Flame Photmeter	1	1		
26	Electrophoresis Apparatus	2	2		
27	Coldtome	1	1		
28	Rotary Microtome with Disposable Knife	2	2		
29	Automatic Tissue Processor	2	2		
30	Tissue Embedding Console	2	2		
31	Specimen Box A Type	20	20		
32	Automatic Microtome Knife Sharpner with Knives	1	1		
33	Water Purification System with Deionized	4	4		
34	Computerized Ultra Centrifuge	1	1		
35	Particle Counter (18-Parameter)	1	1		
36	Blood Chemistry Analyzer (Open System) with ISE Unit, UPS and Airconditioner	1	1		
37	Blood Bank Refrigerator	1	1		
38	Safety Cabinet	1	1		
39	Automatic Stainer	2	2		
40	Personal Computer System with Standard Software	2		2	
41	Laser Beam Printer	1		1	
42	Dot Matrix Printer	1		1	
43	UPS	2		2	
44	Anaerobic Jaw	6	6		
45	ELISA Test Apparatus (Open System, HIV, Heapatitis)	1	1		
46	Teaching Microscope with Video TV System	2	2		
47	Water Bath	4	4		
48	Camera with Movement Stage, Microlense (taking Photograph Apparatus)	1	1		
49	Paleto Aggricorder	1	1		
50	Glassware Set	1	1		
51	Micropipette Set with Disposable Tip	2	2		
52	Petri Dish Set (Hot)	1	1		
53	Glassware Washer with Rack	1	1		

Dr. Jamil Ahmed Mirza
Associate Professor Dept. of Pathology

( ): common use

No.	Description	Qty	Priority A	B	C
Department of Community Medicine					
1	Personal Computer System	2	2		
	consisting of:				
	1. Personal Computer	1	1		
	2. Color Display SVGA	1	1		
	3. Color Laser Printer	1	1		
	4. Dot Matrix Printer	1	1		
	5. UPS	1	1		
2	Facimile	1	1		
3	Card Reader (Multiple Choice Question)	1			1
4	Video Tape Editor System	1	1		
5	Video Camera	2	2		
6	VHS Recorder/Player, Multi System	2	2		
7	Video Projector with Screen	1	1		
8	34-Inch Color TV Monitor	2	1	1	
9	Wall Screen	1	1		
10	Satellite Receiving System	1			1
11	Photostato Machine	1	1		
12	Printing Press Set (B4-A3, Both Pages Off-set Printing)	1	1		
13	Medical Education Equipment, consisting of:				
	Diesel Generator 15KVA	1	1		
	Diesel Generator 10KVA	1	1		
	Screen	1	1		
	Screen	2	2		
	Overhead Projector	2	2		
	Slide Projector	2	2		
	Opaque Projector	1	1		
	P.A. System	2	2		
	Sound System for Conferences and Meetings Hall	2	2		
14	Microscope Slide-Medical Entamology	3	3		
15	Projection Slide Set:				
	Projection Slides-Human Parasitology	1	1		
	Projection Slides-Medical Report	1	1		
	Projection Slides-Public Health	1	1		
	Projection Slides-Environmental Health	1	1		
16	Equipment for Family Health, consisting of:				
	Stethoscope	5	5		
	Ophthalmo-Otoscope Set	3	3		
	X-Ray Film Illuminator	2	2		
	Vacuum Suction Unit	2	2		
	1-ch. Electrocardiograph	2	2		
17	Centrifugal Particle Size Analyzer	1	1		
18	Auto Bomb Calorimeter	2	1	1	
19	Water Testing System	1	1		
20	Teaching Microscope (5 PAX Purpose)	2	2		
21	Binocular Microscope	10	10		
22	Resuscitation Aid Model	2	2		
23	Resuscitator	2	2		
24	Video Program, consisting of:				
	First Aid & Disaster Management, 26 Film set	1	1		
	Health Education	1	1		
	Environmental Health	1	1		
	Sexual Medicine	1	1		
25	Equipment for Student Tool				
	Photostato Machine	1	1		
26	Microbus	1	1		
27	AV Van	1	1		
28	Station Wagon (6 seats) 4x4WD	2	2		

( ): common use

No.	Description	Qty	Priority		
			A	B	C
29	Glassware Set	1	1		
30	Micropipett Set with Disposable Tip	1	1		
31	Still Camera with Lenso Set	1	1		
32	*Refrigerator*	1	1		
33	Teaching Models for Human Parasites & Medical Entamology	1	1		

Dr. A. Q. Sikander Riaz
Head of Dept. of Community Medicine

( ): common use

No.	Description	Qty	Priority A	B	C
Department of Anatomy					
1	Mortuary Refrigerator (2 PAX) with Cart	4	4		
2	Slide Projector	1	1		
3	Tissue Embedding Console with Trimming Knife	1	1		
4	Muti-Teaching Microscope (5 PAX observed)	5	5		
4.a	Eye Piece Micrometer Disc 21mm dia., 10mm/200div	10	10		
4.b	Eye Piece Micrometer Disc 21mm dia., 100mm/100div	10	10		
5	Microscope with Video Camera and TV Monitor 20"	1		1	
6	Slide Warmer (Hot Plate)	2	2		
7	Automatic Tissue Processor	1	1		
8	Automatic Microtome Knife Sharpner	1	1		
9	Diamond Pen & Glass Cutter	3	3		
10	Illuminating Magnifier	2	2		
11	Automatic Stainer	1	1		
12	Storeoscopic Microscope with Illuminator	5	5		
13	Rotary Microtome with D type Knife	1	1		
14	Freezing Microtome	1	1		
15	Syringe Pump (Manual Operation) for Fixition	4	4		
16	Fume Food (Draft Chamber)	1	1		
17	Metalic Molds (Cassette) Set	1	1		
18	Screen for Projector (Tripod Type)	2	2		
19	Screen for Projector (Large) wall mounted	2	2		
20	Slide Cabinet Unit (25 drawers)	1	1		
21	Laboratory Timer (60Min)	3	3		
22	Alcoholometer Set, 3 pcs.	5	5		
23	Long Stem Thermometer	2	2		
24	Programmable Calculator	2	2		
25	Paraffin Dispenser	1		1	
26	Staining Set	12	12		
27	Bone Saw (Manual Type, with blade)	12	12		
28	Tray Carrying Unit	2	2		
29	Glass Dish with Tray & Cover for Manual Staining	24	24		
30	Gestetner Machine	1		1	
31	Electric Typewriter	1	1		
32	Photostato Machine	1		1	
33	X-Ray Film Illuminator	2	2		
34	Slide Projector	1			1
35	O.H.P.	2	2		
36	Computer System with Software	1		1	
37	Video Program for Anatomy	1			1
38	Specimen Making Apparatus	1			1
39	Tools for Making Plaster of Paris Models	1		1	
40	Human Histology Slides for Prepare Microscope	1	1		
41	Lab Glassware Set	1	1		
42	Plastic Models Set	1	1		
43	Histological Model Set	1	1		
44	Embryological Models	1	1		
45	Micropipette Set with Disposable Tip	2	2		

Prof. Ghulam Sarwar Garrani
Head of Dept. of Anatomy

( ): common use

No.	Description	Qty	Priority A	B	C
Department of Pharmacology and Therapeutics					
1	High Pressure Liquid Chromatograph system	1		1	
2	Electronic Analytical Balance 1 set, A,B,C	1	1		
3	pH Meter	1	1		
4	Multipurpose Floor Refrigerated Centrifuge	2	2		
5	UV-VIS Spectrophotometer, Single Beam	2	2		
6	Jacketed Organ Bath Set for smooth muscle & heart	5	5		
7	Universal Jacked Organ Bath Set	5	5		
8	Student Tissue Bath Set	10	10		
9	Single Tissue Bath Set for Single & Double	5	5		
10	Digital Thermometer	10	10		
11	Hand Stop Watch	5	5		
12	Dual Impedance Research Stimulator	2	2		
13	Animal Operating Table, Bench Use, including	4	4		
	Arterial Cannula "Y"	20	20		
	Arterial Cannula "L"	20	20		
	Venous Cannula, 1/2/3mm	10	10		
	Mammalian Heart Cannula	10	10		
14	Neuro Physiology Operating Table	4	4		
15	Anaesthetising Box Rat & Cat	5	5		
16	Dog Holder, Small and Large	2	2		
17	Cat Holder	2	2		
18	Animal Head Holder, 25/35/50mm	2	2		
19	Arterial Valve Dog, Incision Type & Clamp Type	10	10		
20	Blank Kymograph Sheet Set	1	1		
21	Glass Jar Bath set Different Size (4-Kind each)	5	5		
22	Water Circulator Unit	3	3		
23	Polygraph System for Animal	2	1	1	
24	Water Distillation Apparatus with Deionizor	2	2		
25	Automatic Blood Pressure Monitor for Animal	3	3		
26	Personal Computer System with Color Printer & UPS	1		1	
27	Injection, Education Tape for 17 Min. and 20 Min.	1	1		
28	Ultrasonic Pipette Washer	2	2		
29	Glassware Set	2	2		
30	Glassware Washer with Rack	1	1		
31	Micropipett Set with Disposable Tip	2	2		

Prof. Arbab Sikander Khan
Head of Dept. of Pharmacology & Therapeutics

( ): common use

No.	Description	Q'ty	Priority		
			A	B	C
All Department					
1	Automatic Voltage Regulator 220V (1Lot)	1	1		
2	Incinerator (Small Size)	1	1		

Annex- II

NECESSARY MEASURES TO BE TAKEN BY PAKISTAN SIDE

The following items of work related to the realization of the Project shall be executed by the Pakistan side whenever required.

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction

(2) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites

(3) To secure buildings prior to the procurement in case the installation of the equipment

(4) To ensure prompt execution for unloding, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts

(6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work

(7) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(9) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Annex-III

MEMBERS OF THE SURVEY TEAM

Mr. Mutsuharu NAKAJIMA	Team Leader	Grant Aid Division Economic Cooperation Bureau Ministry of Foreign Affairs
Dr. Takao SENDA (M.D.)	Medical Education Planning	Associate Professor School of Medicine Nagoya University
Mr. Kazuo SEKIGUCHI	Project manager of the Consultants	UNICO International Corporation
Mr. Yukihisa TAKAHASHI	Equipment Planning	UNICO International Corporation
Mr. Wataru SHIGA	Market Researcher	UNICO International Corporation
Mr. Katsuhiko HIGUCHI	Cost Estimation	UNICO International Corporation

Annex-IV

INDICATORS FOR MONITORING

Item	Indicator
Allocation of funds and utilization of equipment purchased in the Project and by Pakistan side	Comparison between plan of allocated funds and actual expenditure with the following breakdown. Income: tuition fee, subsidy (federal, provincial), hostel charge, meal charge etc. Expenditure: salary, study and development costs, utility costs etc.
Quality control	MTBF: Mean Time Between Failures (from trouble to next trouble) of the main equipment
Maintenance and utilization of equipment	Cost for maintaining the equipment
Manpower development	Number of intake and output of students Rate of dropout
Training	Number of training courses and attendants

Appendix-5 Cost Estimation Borne by the Recipient Country

Costs to be borne by Pakistan side in relation to the Project, other than the bank charges, will be negligible.

Appendix-6 References

No.	Books / Reports	Author/Publisher
1	Economic Survey 1994-95	Government of Pakistan
2	Eighth Five Year Plan (1993-98)	Government of Pakistan
3	Concept Eighth Five Year Plan 1993-1998	Government of Balochistan
4	Health Sector Plan for Balochistan 1994-1997	Government of Balochistan Health Dept.
5	Ready Reckoner on Health Statistics in Balochistan as on 1st January 1995	- ditto -
6	Notification No. S.O.(Dev).94/9437-40	- ditto -
7	Brief on Children's Hospital Quetta	- ditto -
8	Progress Report of 3rd Health Project	- ditto -
9	Progress Report of Pakistan Health Care Development Project	- ditto -
10	Regulations for The Degree of Bachelor of Medicine and Bachelor of Surgery (M.B.B.S.)	Pakistan Medical & Dental Council
11	3rd Convocation of Bolan Medical College Quetta	Bolan Medical College
12	Prospectus 1994-1995	- ditto -
13	Master Time Table	- ditto -
14	Syllabus of Physiology	- ditto -
15	Syllabus of Forensic Medicine	- ditto -
16	Syllabus Anatomy for M.B.B.S & B.D.S. Classes	- ditto -
17	Topics Distribution M.B.B.S. 1995 Pharmacology and Therapeutic Department	- ditto -
18	Form of Progress Report	- ditto -
19	Concept Paper on Department of Community Medicine	- ditto -

20	Community Medicine	Nadir Traders
21	Teaching of Community Medicine in Undergraduate Medical Education	WHO
22	Pakistan Institute of Medical Sciences Islamabad	Institute of Medical Sciences
23	Map of Quetta	J.S. Products
24	Map of Balochistan Province	- ditto -
25	Balochistan	Haqqi & Sons

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