

MINISTRY OF EDUCATION
THE KINGDOM OF NEPAL

BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
CONSTRUCTION OF PRIMARY SCHOOLS
UNDER
BASIC AND PRIMARY EDUCATION PROGRAMME II
IN
THE KINGDOM OF NEPAL

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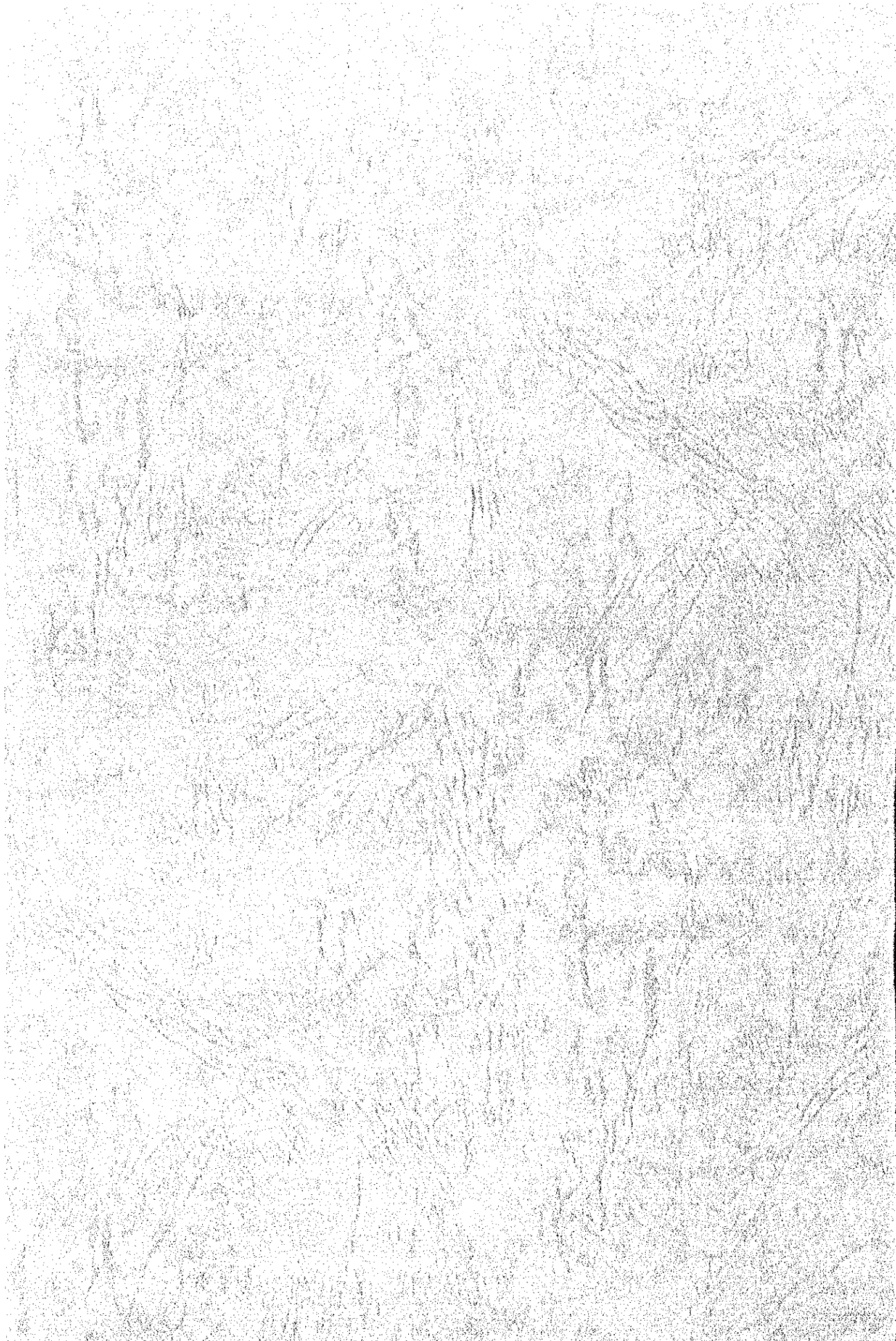
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PREFACE

In response to a request from His Majesty's Government of the Kingdom of Nepal, the Government of Japan decided to conduct a basic design study on the Project for Construction of Primary Schools under Basic and Primary Education Programme II, and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Nepal a study team from November 12 to December 26, 1998.

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

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 HMG of Nepal for their close co-operation extended to the team.

August 1999



Kimio Fujita
President

Japan International Cooperation Agency

August 20, 1999

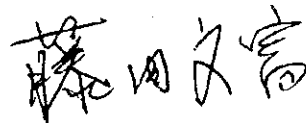
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Construction of Primary Schools under Basic and Primary Education Programme II in the Kingdom of Nepal.

This study was conducted by Fukuwatari & Architectural Consultants Ltd., under a contract to JICA, during the period from November 5, 1998 to July 28, 1999. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Nepal and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

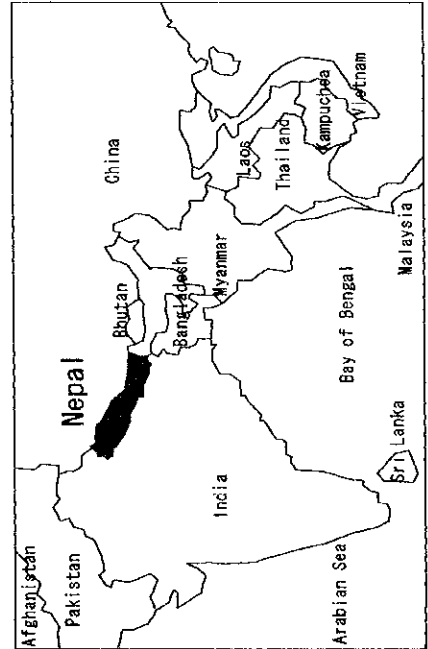
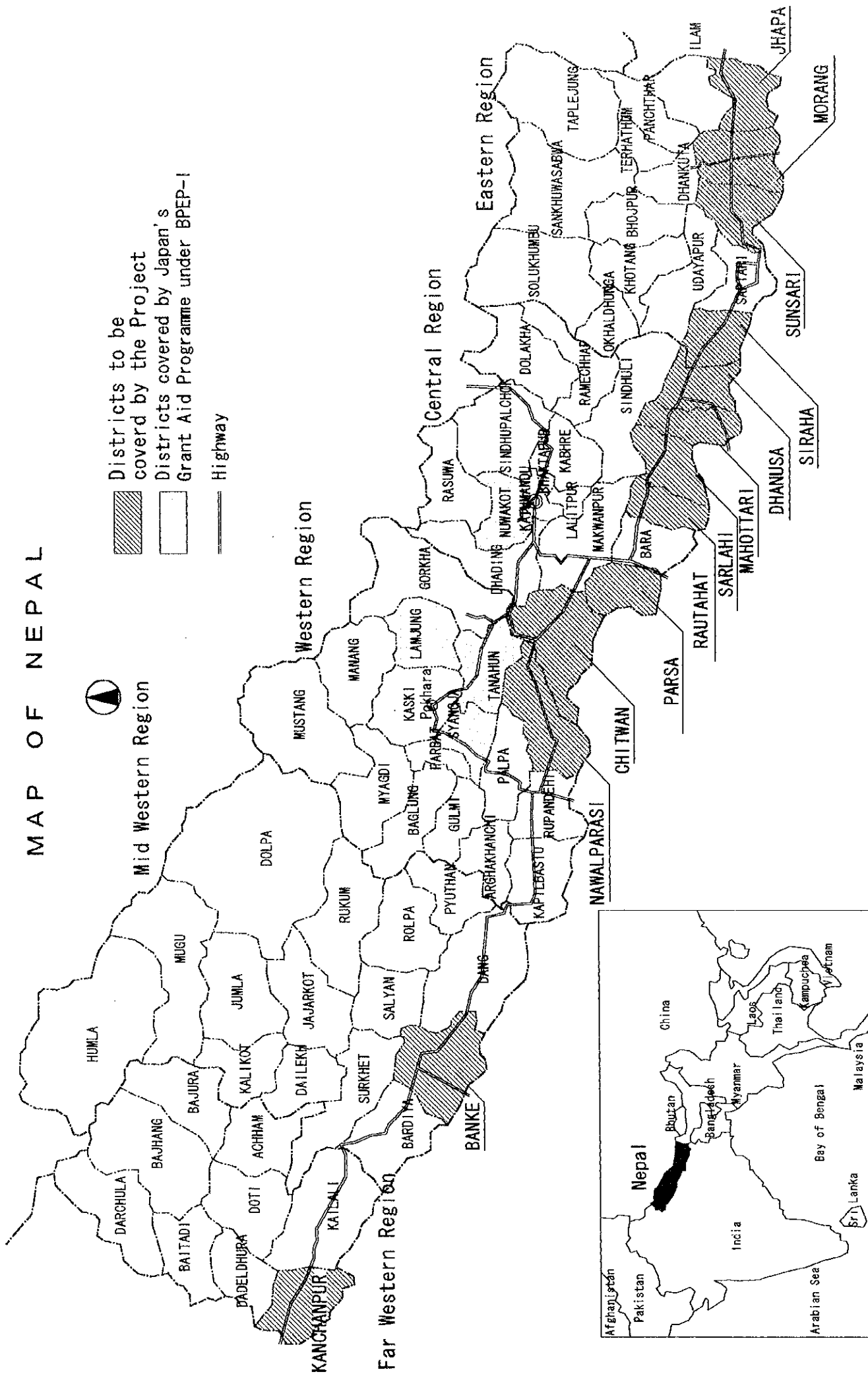
Finally, we hope that this report will contribute to further promotion of the project.

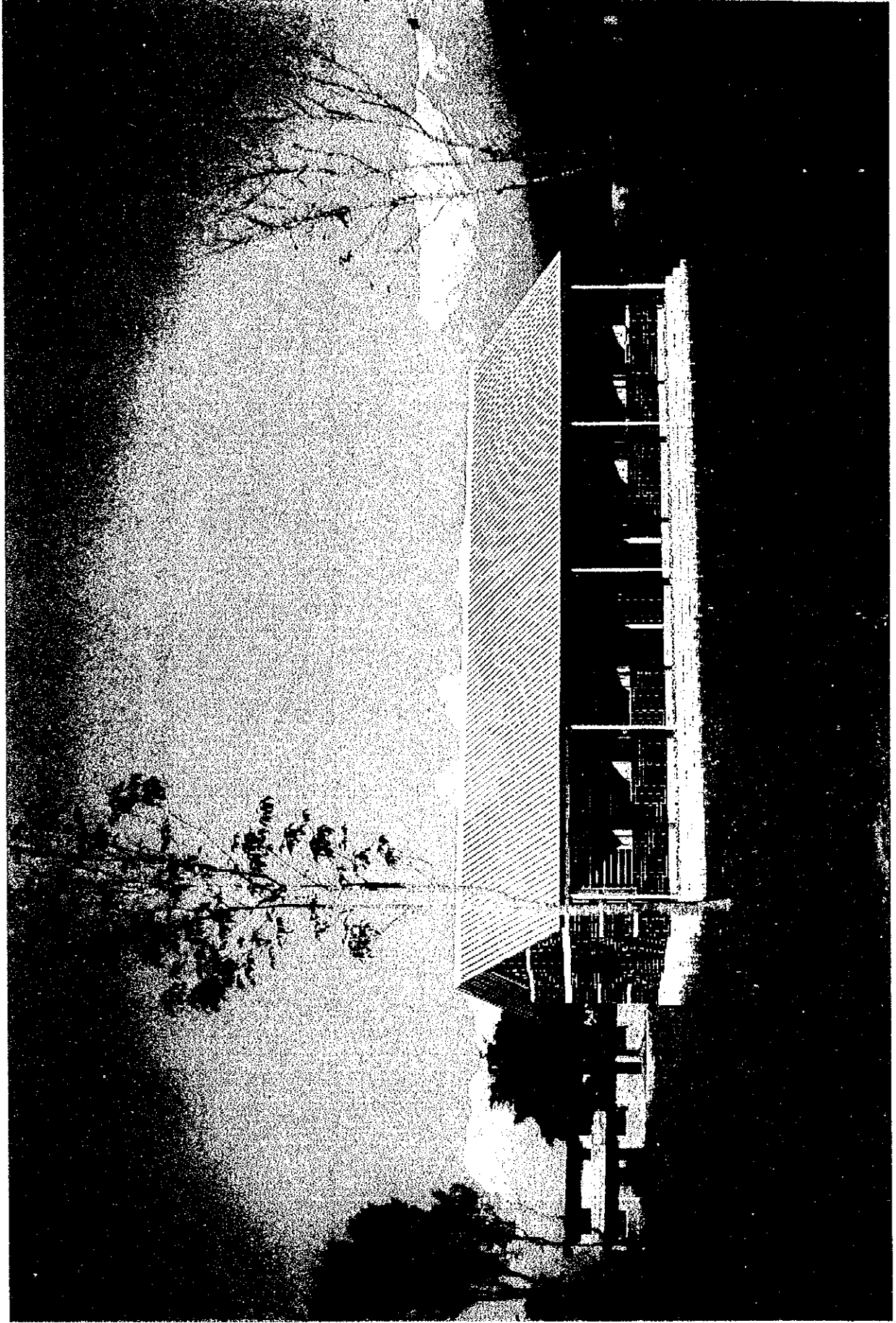
Very truly yours,



Fumitomi Fujita
Project manager,
Basic design study team on
Construction of Primary Schools under
Basic and Primary Education
Programme II
Fukuwatari & Architectural
Consultants Ltd.

MAP OF NEPAL





Primary School Building (Terai type)



Existing Classrooms (Terai)

Shree P.S. Sapgadha
Cluster No. 1, Rautahat
Gaur Municipality



Shree P.S. Sapgadha
Cluster No. 1, Rautahat
Gaur Municipality



Shree P.S. Sapgadha
Cluster No. 1, Rautahat
Gaur Municipality



Existing Classrooms (Terai)

Shree Utpidit Uthan P. S.
Cluster No. 4, Sarlahi
Bramhapuri



Shree Utpidit Uthan P. S.
Cluster No. 4, Sarlahi
Bramhapuri



Shree Utpidit Uthan P. S.
Cluster No. 4, Sarlahi
Bramhapuri

ABBREVIATIONS

ADB	Asian Development Bank
BPEP	Basic and Primary Education Programme
BPEDU	Basic and Primary Education Development Unit
CIP	Core Investment Programme
CPE	Compulsory Primary Education
DANIDA	Danish International Development Agency
DEO	District Education Officer (Office)
DOE	Department of Education
GER	Gross Enrolment Ratio
H.M.G.	His Majesty's Government
IDA	International Development Association
MOF	Ministry of Finance
MOE	Ministry of Education
NNBC	Nepal National Building Code
NER	Net Enrolment Ratio
PC	Program Co-ordinator
PPSMU	Physical Planning & School Mapping Unit
PEDP	Primary Education Development Project (under ADB)
PEP	Primary Education Project
PIP	Project Implementation Plan
RC	Resource Centre
RP	Resource Person
SMC	School Management Committee
SPIP	School Physical Improvement Plan
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund

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Chapter 1 Background of the Project

Chapter 1 Background of the Project

1-1 Background of the Project

The Kingdom of Nepal, with a total population of about 22 million (in 1996), is a laterally narrow country with an area of about 147,188 km². It extends approximately 220 km from north to south and approximately 880 km from east to west, and is located between 26°20' N. Lat. and 30°10' N. Lat. and between 80°15' E. Long. and 88°05' E. Long. The country consists of a southern region with a subtropical monsoon climate, an upland region with a warm climate to the north, and the Himalayan mountain region with a cold climate to the extreme north. Thus, geographically, the country has three distinct belts running east to west. The lower southern region called the Terai Plain is adjacent to India. Historically, the intermediate upland region, which is called the Hill, has been the core of Nepal, with the mountain region forming the third belt to the north. HMG of Nepal divided the land into five development regions with border lines running north to south, i.e., Far Western, Mid-Western, Western, Central and East Development Regions. The five development regions consist of 14 zones, which are subdivided into 75 districts.

While the Eighth Plan (1992-1997) targeted an average annual GDP growth rate of 5.1% in real terms, the actual annual growth rate of GDP was estimated to be 4.7%. The rapid growth in population has neutralised the growth in GDP, resulting in little improvement in the per capita income of the people, which is estimated to be around US\$210. It is estimated that 42% of the population lives in absolute poverty and that the Human Development Index (HDI) by UNDP for Nepal computed as an

un-weighted average of values achieved in level of living, knowledge and health is 0.347 (in 1994).

In the educational sector, the Eighth Plan identified the development of science and technology, and the preparation of trained manpower with the technical skills and the competencies needed for economic development as major objectives of education. According to MOE statistics, however, the literacy ratio in 1996 was 48%, and the Net Enrolment Ratio to primary school was 70%, which means 30% of school-age children are still outside the primary school education. Furthermore, the internal efficiency of the primary education system, which takes account of grade repetition, dropouts, and promotion rates was estimated to be 46% in 1995 (40 % in the case of girls). To cope with these problems, the Ninth Plan (1997-2002) emphasises the gradual introduction of Compulsory Primary Education (CPE) and the launching of National Literacy Campaigns as a strategy for achieving the Education for All goals. It stresses the need to improve the quality of education, as well as enhance internal and external efficiency by reducing educational wastage.

Following the Basic and Primary Education Master Plan prepared in July 1991, Basic and Primary Education Project (BPEP) was initiated in July 1992, with the objectives of increasing access to basic and primary education, improving the quality of primary education and enhancing management efficiency. The first phase of the Basic and Primary Education Project (BPEP-I), which has been implemented with multi-donor funds including IDA and DANIDA, was completed in 1997. In the field of primary school construction, a total 14,207 classrooms were constructed and 7,537 classrooms were rehabilitated. To support BPEP-I,

the "Project for Providing Materials and Equipment for the Construction of Primary Schools (First and Second Phases)" has been carried out under Japan's Grant Aid starting from 1994, being divided into four sub-phases, in a total 2,958 classrooms having been constructed.

In the next five years (1999-2003), the second phase of the Basic and Primary Education Programme (BPEP-II) will be implemented with the following three major objectives: (a)Expanding Access and Improving Retention, (b)Improving Learning Achievement, (c)Strengthening Institutional Capacity, the objectives being divided into 8 components and 17 sub-components which cover most of the key issues in the sub-sector.

The estimated need in 2002 of the primary schools and classrooms are 27,704 and 121,582 respectively, more than 130% of the present stock (assessed in 1994). To achieve the target that the Net Enrolment Ratio should 90% at the end of BPEP-II, an enormous investment in school construction will still be necessary.

The Project is to be carried out to support the sub-component of School Physical Facilities of the component Expanding Access and Improving Retention of BPEP-II, under which construction of 9,400 classrooms and rehabilitation of 10,800 classrooms are proposed in all 75 districts, adding 35 to the 40 districts covered by BPEP-I.

In June 1997, HMG of Nepal made a request to the Government of Japan for grant aid assistance for the continued implementation of the Project for the Construction of Primary Schools under Basic and Primary Education Programme Second Phase (BPEP-II). The items requested are listed below:

1) Project Sites: 22 BPEP-I Districts

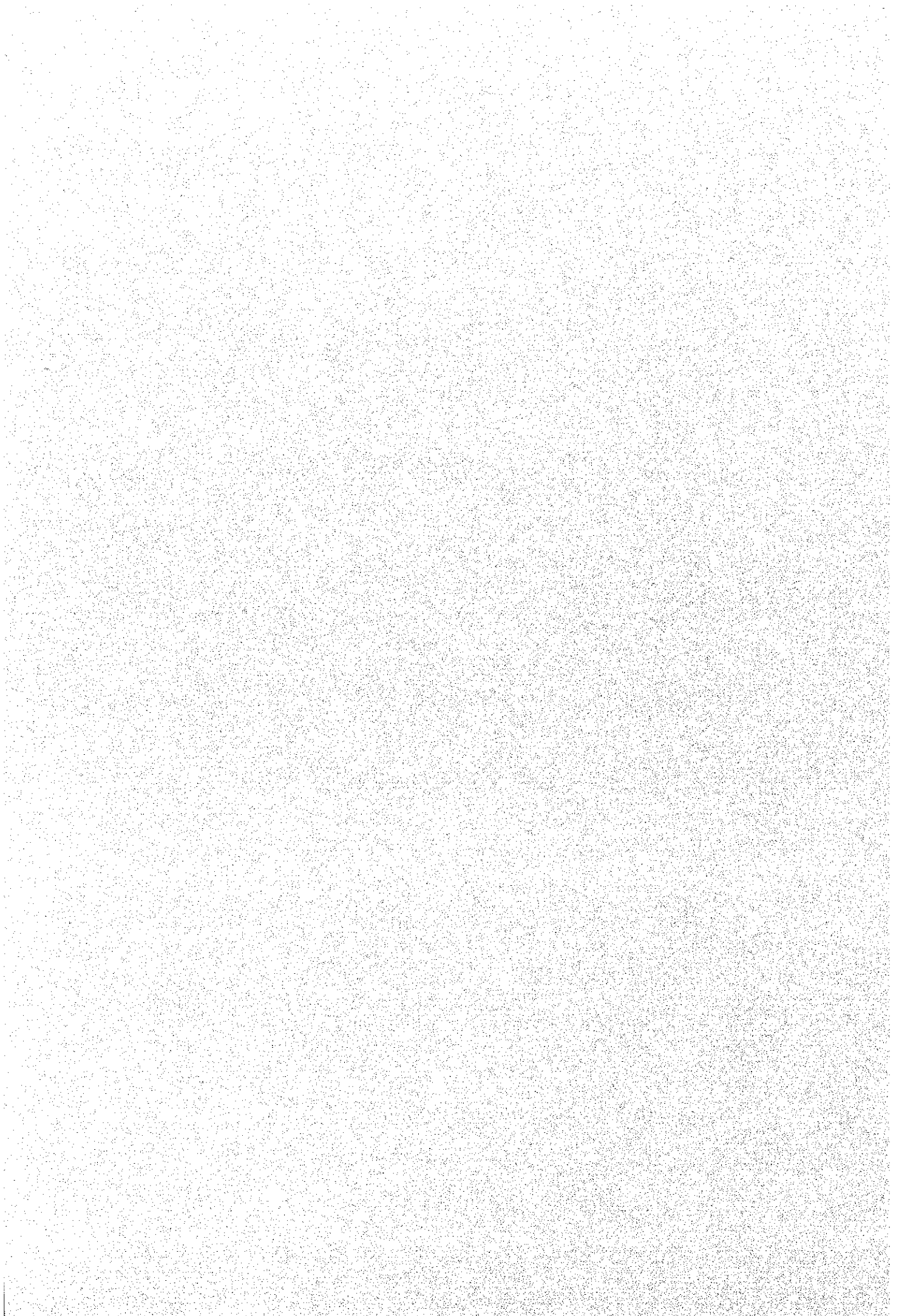
2) Construction Materials	Nos.	Unit
a) Construction of classrooms	6,000	room
b) Toilet blocks	1,500	block
c) Water supply	1,500	set
d) Construction of Resource Centres	146	block

3) Equipment

- a) Trucks/Tractors
- b) Motorcycles
- c) 4WD vehicles
- d) Personal Computer Sets
- e) Facsimile Machines

4) Classroom Furniture 6,000 class

Chapter 2 Contents of the Project



Chapter 2 Contents of the Project

2-1 Objectives of the Project

Following the BPEP-I completed in 1997, HMG is commencing BPEP-II from FY1999/2000 for five (5) years aiming at three major objectives; (1) Improving Learning Achievement, (2) Expanding Access and Participation to Primary Education, and (3) Institutional Capacity Building. The Expanding Access and Participation objective has the following goals:

- 1) Overall GER to be reduced from 117% to 106%
- 2) Girls GER to be retained at the level of 100%
- 3) Overall NER to be increased from 79%(boys) and 58%(girls) to 90% for both
- 4) The difference between GER and NER to be reduced from 47% to 16%

To achieve these goals, the following components are to be implemented:

- 1) School Physical Facilities
- 2) Special Needs Education
- 3) Early Childhood Development
- 4) Community Mobilisation and Literacy

The major focus of (a) School Physical Facilities component will be to: (1) rectify unbalanced geographical distribution of facilities, and (2) improve educational environment, constructing 9,400 classrooms and rehabilitating 10,800 under the School Physical Improvement Project.(SPIP).

The objective of the Project is to procure construction materials and equipment for the construction of primary schools and other related facilities to be carried out with community participation as a part of the SPIP.

2-2 Basic Concept of the Project

BPEP-I has made an important contribution to the development of basic and primary education in Nepal, and the previous projects under Japan's Grant Aid have been carried out successfully to support one of the components of BPEP -- Construction of Primary Schools.

Construction of primary schools under BPEP is carried out with community participation. In the case of school construction under the Basket fund, the government supplies seed money to communities, which generate the necessary community support and participation. The funds provided by MOE are to be used to procure the major construction materials and labour such as:

- 1) Bricks
- 2) Cement
- 3) CGI sheets
- 4) GI plain sheets
- 5) Reinforcement
- 6) Hold fast, hinges, J-hooks, and other fittings
- 7) Skilled labour

The communities are to share the cost of the new buildings in terms of unskilled labour, supply of local materials, and local transportation costs. The community would either contribute cash or provide the following materials and labour:

- 1) Sand
- 2) Aggregate
- 3) Wood
- 4) Unskilled labour
- 5) Local transportation of construction materials

In the case of the Project under Japan's Grant Aid, the principle is to provide communities, instead of money, with materials for the construction of schools under the framework of Japan's Grant Aid. Accordingly, BPEP has introduced a sub-system to the construction management system to handle materials delivered at depot centres from the Japanese side. Through experience in the previous Grant Aid projects, it has been confirmed that the sub-system worked well in general, having achieved better quality control and giving more incentives to the community, especially in taking advantage of the central management system of procurement and delivery of construction materials.

Thus, recognising that Japan's Grant Aid should make further contributions in the field of expanding access to basic and primary education in Nepal, the Project for the Construction of Primary Schools should be implemented to support BPEP-II.

2-2-1 Contents of the Project

1) Facilities to be Covered by the Project

a) Classrooms

Many of the primary school classrooms in the proposed areas are in poor condition, and the need for new classrooms is high. The main item to be covered by the Project should be the procurement of materials for the construction of primary school classrooms, so that any target school of the Project includes the provision of at least one block of classrooms.

b) Offices for Teachers

Offices for teachers are not to be covered by the Project because it would be difficult to access the quantity based on the data available at present.

c) Toilets and Water supply

A toilet block is to be provided for each of the schools that have no toilet. In case a water supply facility does not exist in such a school in the Terai area, a set of water supply facilities is also to be provided. For the schools in hilly area that have no water supply system, however, water supply systems are to be covered by the Nepalese side and the materials for toilet blocks by the Japanese side.

d) Classroom Furniture

In order to give the highest priority to classroom construction,

classroom furniture is not to be covered by the Project

e) Resource Centres

The geographical diversity of the country has become a barrier to communication and there is a limited possibility of a DEO office providing regular classroom supervision and educational support to school teachers and SMC members. Hence, under the BPEP structure, resource centres should be used for teacher and student support activities. Being focal points of clusters, they are supposed to be equipped with materials and resources that could be used by cluster schools for common purposes.

Altogether 669 RCs are in operation in 40 districts, and the Resource Centre development Unit (RCDU) co-ordinates and monitors the activities of RC's, which include professional support to teachers and SMCs including:

- Seminar for DEOs, PCs, and RPs
- Training of Headmasters
- Selection of Model Schools and RCs
- Community Participation Campaign
- RC Matching Fund to support disadvantaged RCs
- Lead Resource Centre Programmes

Recent investments for the activities are as shown in Table 2-1.

Table2-1 Resource Centre Development Expenditure Unit: 1,000NRs.

FY	H.M.G	IDA	DANIDA	UNICEF	Total
1997/98	0	0	19,655	0	19,655
1996/97	0	0	19,639	2,400	22,039
1995/96	0	70	4,960	0	5,030
1994/95	0	0	10,459	0	10,459

Most RCs are located in a school used for organising meetings and training events, but the centres have not been developed into the concept of a resource centre in the true sense of the word, because of the lack of infrastructure and the shortage of professional development. They should have their own spaces for library, storage for teaching learning materials, a seminar hall, and RP's Office. Therefore, the RCs proposed for constructions in the clusters where construction of classrooms are to be done under the Project also are to be carried out by the Project.

2) Selection of Target Districts and Schools

a) Needs forecasted

Table 2-2 shows the need for new classrooms in each of the candidate districts forecasted on the basis of school age population times target GER (106%) at the year 2002. In Ilam, Syangja, Surkhet, Kaski, and Dangkuta, the need for constructing new classrooms is relatively low and efforts should be focused on improving internal efficiency. These five districts, therefore, are not to be covered by the Project.

Table 2-2 Physical Facilities Projection

District Name	Age 6-10 population projection in 2002	Enrolment projection In 2002	Existing classrooms	Capacity of existing classrooms	Classrooms covered by the Projects	Capacity of the Project classrooms	No. of children without classrooms	No. of Insufficient Classrooms	Target District
Ilam	41,599	44,095	1,488	37,200	294	8,820	-	Sufficient	-
Chitwan	64,972	68,870	1,144	40,040	664	19,920	8,910	162	○
Syangja	49,498	52,468	2,037	50,925	516	15,480	-	Sufficient	-
Surkhet	44,540	47,212	1,550	38,750	287	8,610	-	Sufficient	-
Khanchanpur	53,542	56,755	966	33,810	304	12,160	10,785	196	○
Jhapa	105,596	111,932	1,569	54,915	603	24,120	32,897	598	○
Morang	123,807	131,235	1,682	58,870	1,106	44,240	28,125	511	○
Kaski	51,245	54,320	2,163	54,075	149	4,470	-	Sufficient	-
Nawalparasi	87,721	92,984	1,084	37,940	510	20,400	34,644	630	○
Banke	55,536	58,868	192	6,720	416	16,640	35,508	646	○
Dhankuta	23,838	25,268	219	5,475	610	18,300	1,493	33	-
Sunsari	86,133	91,301	500	17,500	986	39,440	34,361	625	○
Saptari	86,584	91,779	350	12,250	662	26,480	53,049	965	○
Siraha	86,824	92,033	148	5,180	986	39,440	47,413	862	○
Dhanusha	100,667	106,707	760	26,600	664	26,560	53,547	974	○
Mahottari	82,702	87,664	335	11,725	606	24,240	51,699	940	○
Sarlahi	91,773	97,279	250	8,750	908	36,320	52,209	949	○
Rautahat	76,846	81,457	548	19,180	388	15,520	46,757	850	○
Parsa	71,190	75,461	464	16,240	448	17,920	41,301	751	○
Rupandehi	101,051	107,114	972	34,020	342	13,680	59,414	1,080	○
Total 20 districts	1,485,664	1,574,804	18,421	570,165	11,449	432,760	592,114	10,772	
Total Nepal	3,317,289	3,516,326	67,342	1,768,919	26,788	877,160	1,059,558	20,672	

Note: data of "Age 6-10 population projection in 2002" is based on BPEP Master Plan 1997-2000. Number of classrooms is based on the school mapping survey in 1991-92

"No of children without classrooms" = "enrolment projection in 2002" - "Capacity of existing classrooms" - "Capacity of the Project classrooms"

Existing classrooms exclude the temporary and deteriorated classrooms

"No of Classrooms covered by the Projects" means no of classrooms constructed by PEDP, ERSP, PEP, and BPEP.

Capacity of the classrooms covered by the Projects... Terai: 40, Hill: 30, Mountain: 20

Capacity of the existing classrooms... Terai: 35, Hill: 25, Mountain: 18

Capacity of the classrooms to be newly constructed under BPEP-II... Terai: 55, Hill: 45

b) Districts to be covered by the Project

At the initial discussion with BPEP, Dhading and Dang, where terroristic activities by Maoist were heavily effective, were excluded from the 22 districts initially requested as candidates. Then, in April 1999, the Nepalese side withdrew Rupandehi and Saptari because of the budget allocation under BPEP-II. Considering the situations stated above in 1) and 2), the remaining thirteen (13)

districts as listed below have been selected as target districts:

- 1) Chitwan 2) Kanchanpur 3) Jhapa 4) Morang 5) Nawalparasi
- 6) Banke 7) Sunsari 8) Siraha 9) Dhanusha 10) Mahottari
- 11) Sarlahi 12) Rautahat 13) Parsa

The number of classrooms in each of the districts shall not exceed the numbers assessed in Table 2-2.

c) Selection of Candidate Schools to be Covered by the Project

The candidate schools to be covered by the Project have been selected according to the criteria proposed in BPEP-II Preparation Group Report, which are summarised as follows:

- Each primary should have at least 1,500 sq.m of land (1,000 sq.m in Hill)
- The net enrolment growth has increased by more than 20% over the last five years
- Presence of a functional School Management Committee/School Construction Committee
- Classroom coverage (no. of classrooms/ no. of classes) <1
- Teacher coverage (no. of teachers/ no. of classes) >1
- Classroom load (no. of students/ no. of classrooms)>MOE norms (Terai 55, Hill 45 and Mountain 35)
- A secondary school should have at least four classrooms devoted to primary sections.
- A lower secondary school should have at least three classrooms devoted to primary sections
- Schools not ensuring a strong commitment to the regular maintenance of physical facilities will not receive any physical input from the project

- No new construction if any project constructed buildings exist in an incomplete form

A primary school having more than one section in any primary grade should meet the following criteria to have additional classrooms:

- Enrolment in each additional section should be at a par with the government student-teacher norm
- Enough space for construction of additional classrooms. (minimum area for classroom 44sq.m for terai, 36sq.m for hill)

The need for facilities in the thirteen (13) districts obtained from the results of a recent physical survey by BPEP is shown in Table 2-3. The target schools for the Project are to be selected from the candidate schools listed in the physical survey.

Table 2-3 Need of Facilities by BPEP Physical Survey

District	Number of Classrooms(per school)										No. of school	Classroom Total			Number of sites needing toilet			Number of sites needing Water supply			RC
	1	2	3	4	5	6	7	8	9	10		T	H	Total	T	H	Total	T	H	Total	
Chitwan(T)	0	118	9	44	0	6	7	0	0	0	75	184		276	65		100	55		85	
Chitwan(H)	0	64	12	16	0	0	0	0	0	0	40	92			35			30			
Kanchanpur	0	130	0	48	0	0	0	0	0	0	77	178		178	62		62	30		30	
Jhapa	12	424	24	184	10	0	0	0	0	0	280	654		654	266		266	234		234	
Morang(T)	4	174	9	140	10	6	0	0	0	0	132	343		384	107		120	17		22	
Morang(H)	0	26	3	12	0	0	0	0	0	0	17	41			13			5			
Nawalparasi(T)	0	254	3	24	0	0	0	0	0	0	134	281		338	89		104	31		31	
Nawalparasi(H)	0	50	3	4	0	0	0	0	0	0	27	57			15			0			
Banke	11	182	12	44	0	6	0	0	0	0	118	255		255	101		101	62		62	
Sunsari	0	182	0	28	0	0	0	0	0	0	98	210		210	49		49	23		23	
Siraha	0	98	0	108	0	0	0	0	0	0	76	206		206	76		76	76		76	
Dhanusha	0	114	0	64	0	12	0	0	0	0	75	190		190	59		59	24		24	
Mahottari	3	94	6	48	0	0	0	0	0	0	64	151		151	46		46	16		16	
Sarlahi	1	86	15	84	15	0	0	0	0	0	73	201		201	72		72	60		60	
Rautahat	1	146	3	204	0	6	0	8	0	10	129	378		378	102		102	38		38	
Parsa	0	130	66	208	5	18	0	8	0	10	145	445		445	115		115	22		22	
Total	32	2,272	165	1,260	40	54	7	16	0	20	1,560	3,676	190	3,866	1,209	63	1,272	688	35	723	49

(T)Terai, (H)Hill

2-2-2 Phasing and Volume of the Project

1) Phasing

The project shall be implemented in three (3) phases so that the review of the Project may be done effectively in co-ordination with the results of the Joint Mid-term Review of BPEP-II.

2) Maximum Number of Classrooms to be constructed in Each District

Under Japan's Grant Aid Project for providing materials and equipment for the Construction of Primary Schools (II), which was carried out in FY 1996/97 and FY 1997/98, in total 2,000 classrooms were provided over two years in 10 districts, namely 100 classrooms per district a year on average. Since the floor area of a classroom constructed under BPEP-II has been increased by 40%, 70 classrooms of the new design are equivalent to the 100 classrooms of the previous size. Therefore, the maximum number of classrooms to be constructed in a district in three years should be 210 or the number of the insufficient classrooms shown on Table 2-2, whichever is smaller.

Table 2-4 Number of Classrooms per Districts (Project-II and Proposed for the Project)

Project-II Phase(Year)	Number of Districts	Number of Classrooms	Converted Number of Classrooms/One Year /District	Converted Number of Classrooms/3 Years /District
Phase-I (1996/97)	10	1,100		
Phase-II (1997/98)	7	900		
Total	10	2,000	70	210

3) Number of the buildings to be constructed at each site

The number of classrooms to be constructed in a school under the Project shall not be more than four. The schools that need more than

five, three and one classrooms on the basis of the physical survey are to be provided with four, two and zero.

A toilet block is to be provided for each of the schools that have no toilet. In case a water supply facility does not exist in such a school, a set of water supply facility is also to be provided. For the schools in hilly areas that have no water supply system, however, the water supply systems are to be covered by the Nepalese side and the materials for toilet blocks are to be provided by the Japanese side. Such schools in hilly areas are to be covered by the second phase so that the provision of the toilets may be finalised after confirmation that water supply systems have been completed by the Nepalese side more than one month before the Exchange of Notes for the second phase.

Table 2-5 Schools to be provided with Toilets and Water Supply Facilities

	School with no existing Toilet nor Water supply	School with existing Water supply only	School with existing Toilet only	School with existing Toilet and Water supply
Terai				
Toilet	1 Block	1 Block	—	—
Water Supply Facilities	1Set	—	—	—
Hill				
Toilet	1 Block	1 Block	—	—
Water Supply Facilities	Covered by Nepalese Side	—	—	—

4) Number of classrooms in each district

Number of classrooms in each district has been proposed taking the smallest figure in Tables 2-2, 2-3, and 2-4, the results of which are as shown in Table 2-6.

Table 2-6 Number of Classrooms Proposed by District

District	Area	Number of Classrooms
Jhapa	T	210
Morang	T/H	210
Sunsari	T	210
Siraha	T	206
Dhanusha	T	186
Mahottari	T	146
Sarlahi	T	192
Rautahat	T	210
Parsa	T	210
Chitwan*	T/H	162
Nawalparasi	T/H	210
Banke	T	210
Kanchanpur	T	178
Total		2,540

Note) Area: T... Terai, H...Hill, T/H...Terai and Hill

* Determined from the Enrolment Forecast Study (Table 2-2)

5) Number of classrooms to be constructed in each phase

Allocation of classrooms in each phase is determined by the following criteria.

a) The number of the classrooms in a district shall be less than approximately 130 in each year except in Mahottari, where 146 classrooms are proposed for the third phase. This criterion has been determined on the basis of previous project experience in terms of :

- (1) Initiation of communities
- (2) Capability of district engineer
- (3) Brick supply at the start of project implementation.
- (4) In order to maximise the management efficiency of BPEP, the 13 districts are sorted into six regional groups, in which construction is implemented in the same period so that the same resources may be shared in a group.

- c) In order to minimise the management cost of BPEP, the project implementation period in each district should be as short as possible. In each district, the project will be implemented in two consecutive years except in Mahottari, where fewer classrooms of only 146 are proposed; thus the costs of employing local staff members and renting depots will be minimised.
- d) In the first phase, the project will be implemented in relatively well prepared districts for the implementation of school construction.
- e) Number of classrooms shall be allocated keeping good balance of the total volume in each phase.
- f) Schools in Hill where there are no water supply system nor toilets are to be covered in the second phase so that the provision of the toilets may be finalised after the confirmation that the water supply systems have been completed by the Nepalese side more than one month before the Exchange of Notes for the second phase.

Through the studies stated above, the numbers of classrooms by district in each phase were proposed as shown on Table 2-7.

Table 2-7 Target Districts and Numbers of Classrooms in Each Phase

Group	District Name	Area	Phase-I	Phase-II	Phase-III	Total
1	Jhapa	T	130	80	0	210
	Morang-T	T	130	50	0	180
	Morang-H	H	0	30	0	30
	Sunsari-T	T	120	80	0	200
	Sunsari-H	H	0	10	0	10
2	Siraha	T	0	76	130	206
	Dhanusha	T	0	56	130	186
	Mahottari-T	T	0	0	136	136
	Mahottari-H	H	0	0	10	10
3	Sarlahi-T	T	0	62	122	184
	Sarlahi-H	H	0	0	8	8
	Rautahat	T	0	80	120	210
	Parsa	T	110	100	0	210
4	Chitwan-T	T	94	0	0	94
	Chitwan-H	H	0	68	0	68
	Nawalparasi-T	T	98	78	0	176
	Nawalparasi-H	H	34	0	0	34
5	Banke	T	0	82	128	210
6	Kanchanpur	T	130	48	0	178
Grand Total			846	900	794	2,540
Number of Districts			7	12	6	13

On the basis of the study by the Japanese side on the allocation of the number of classrooms by district in each phase of the Project, BPEP has selected the schools and facilities, and the results are summarised as shown in Table 2-8.

Table 2-8 Numbers of Facilities by District in each Phase

Entire Project

	District	No. of Schools	Cls. Rooms Terai Type	Cls. Rooms Hill Type	Resource Centres Terai Type	Resource Centres Hill Type	Toilet Terai Type (Block)	Toilet Hill Type (Block)	Water Supply Systems Terai Type(set)
1	Jhapa	105	210	—	—	—	92	—	70
2	Morang	98	180	30	4	2	62	12	54
3	Sunsari	100	200	10	5	—	73	5	54
4	Siraha	73	206	—	4	—	73	—	57
5	Dhanusha	75	186	—	4	—	54	—	30
6	Mahottari	61	136	10	4	—	39	4	31
7	Sarlahi	72	184	8	5	—	59	3	35
8	Rautahat	70	210	—	1	—	52	—	19
9	Parsa	81	210	—	2	—	55	—	30
10	Chitwan	78	94	68	—	—	12	24	11
11	Nawalparasi	105	176	34	9	1	66	15	23
12	Banke	89	210	—	—	—	81	—	37
13	Kanchanpur	84	178	—	3	—	46	—	11
	Total	1,091	2,380	160	41	3	764	63	462

First Phase

	District	No. of Schools	Cls. Rooms Terai Type	Cls. Rooms Hill Type	Resource Centres Terai Type	Resource Centres Hill Type	Toilet Terai Type (Block)	Toilet Hill Type (Block)	Water Supply Systems Terai Type(set)
1	Jhapa	65	130	—	—	—	51	—	38
2	Morang	65	130	—	3	—	43	—	37
3	Sunsari	60	120	—	2	—	45	—	38
4	Siraha	0	—	—	—	—	—	—	—
5	Dhanusha	0	—	—	—	—	—	—	—
6	Mahottari	0	—	—	—	—	—	—	—
7	Sarlahi	0	—	—	—	—	—	—	—
8	Rautahat	0	—	—	—	—	—	—	—
9	Parsa	55	110	—	—	—	30	—	15
10	Chitwan	47	94	—	—	—	12	—	11
11	Nawalparasi	66	98	34	6	1	35	15	11
12	Banke	0	—	—	—	—	—	—	—
13	Kanchanpur	65	130	—	2	—	38	—	9
	Total	423	812	34	13	1	254	15	159

Second Phase

	District	No. of Schools	Cls. Rooms Terai Type	Cls. Rooms Hill Type	Resource Centres Terai Type	Resource Centres Hill Type	Toilet Terai Type (Block)	Toilet Hill Type (Block)	Water Supply Systems Terai Type(set)
1	Jhapa	40	80	—	—	—	41	—	32
2	Morang	33	50	30	1	2	19	12	17
3	Sunsari	40	80	10	3	—	28	5	16
4	Siraha	32	76	—	2	—	32	—	24
5	Dhanusha	23	56	—	1	—	14	—	10
6	Mahottari	0	—	—	—	—	—	—	—
7	Sarlahi	22	62	—	2	—	18	—	9
8	Rautahat	25	80	—	1	—	19	—	6
9	Parsa	26	100	—	2	—	25	—	15
10	Chitwan	31	—	68	—	—	—	24	—
11	Nawalparasi	39	78	—	3	—	31	—	12
12	Banke	40	82	—	—	—	34	—	12
13	Kanchanpur	19	48	—	1	—	8	—	2
	Total	370	792	108	16	2	269	41	155

Third Phase

	District	No. of Schools	Cls. Rooms Terai Type	Cls. Rooms Hill Type	Resource Centres Terai Type	Resource Centres Hill Type	Toilet Terai Type (Block)	Toilet Hill Type (Block)	Water Supply Systems Terai Type(set)
1	Jhapa	0	—	—	—	—	—	—	—
2	Morang	0	—	—	—	—	—	—	—
3	Sunsari	0	—	—	—	—	—	—	—
4	Siraha	41	130	—	2	—	41	—	33
5	Dhanusha	52	130	—	3	—	40	—	20
6	Mahottari	61	136	10	4	—	39	4	31
7	Sarlahi	50	122	8	3	—	41	3	26
8	Rautahat	45	130	—	—	—	33	—	13
9	Parsa	0	—	—	—	—	—	—	—
10	Chitwan	0	—	—	—	—	—	—	—
11	Nawalparasi	0	—	—	—	—	—	—	—
12	Banke	49	128	—	—	—	47	—	25
13	Kanchanpur	0	—	—	—	—	—	—	—
	Total	298	776	18	12	—	241	7	148

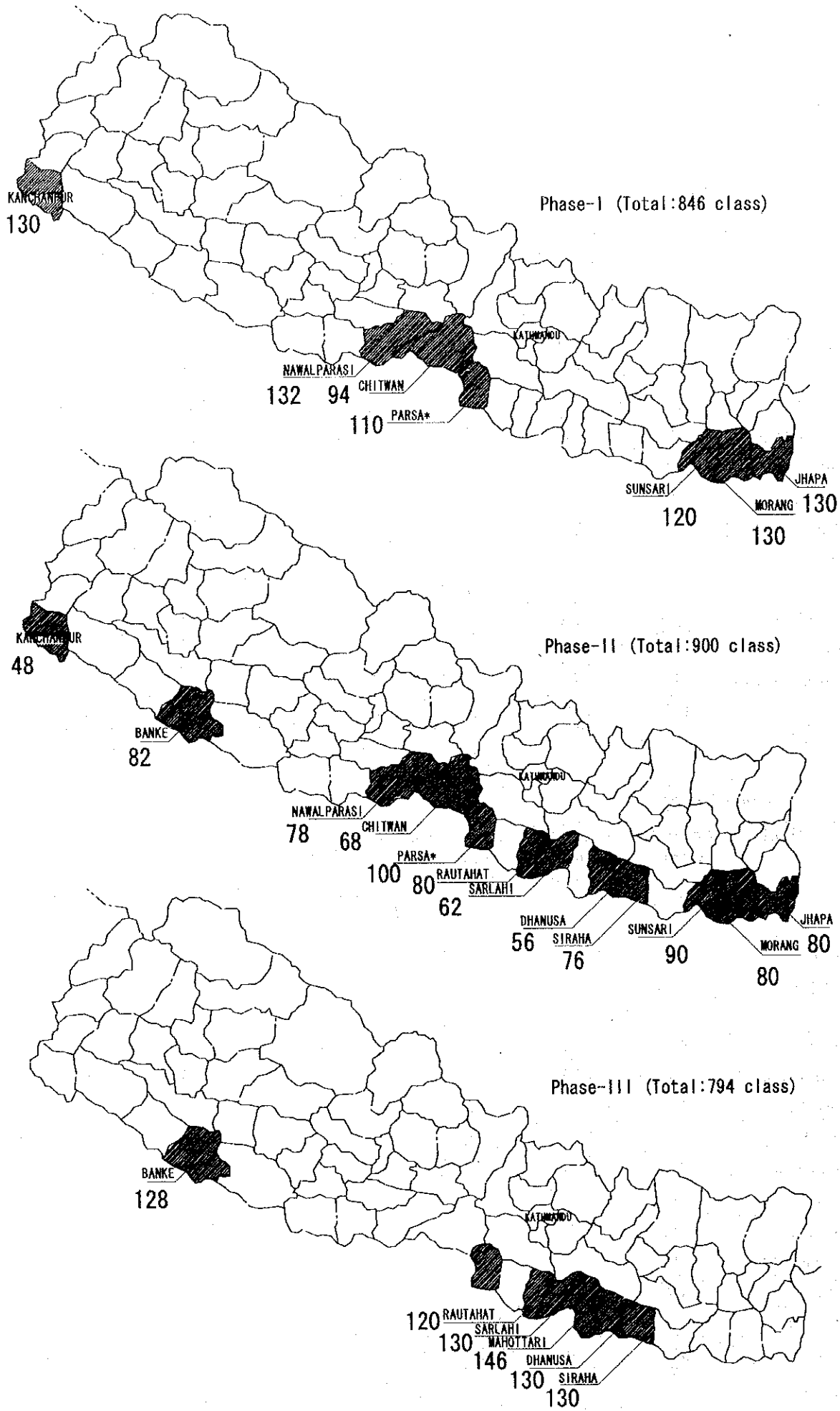


Fig. 2-1 Number of Classrooms by District in each Phase

2-2-3 Materials to be covered by the Project

1) Construction Materials

The materials to be covered by the Project are all of the major construction materials covered by the Government side for the construction of school facilities with community participation including:

a) Roofing materials

(CGI sheets, GI sheets, including fitting materials for fixing)

b) Roof trusses (Steel including fittings)

c) Cement

d) Reinforcing steel bars

e) Bricks

f) Wood

g) Door and window frames

h) Door and window shutters

i) Hardware for doors and windows

j) White wash lime

k) Paint

2) Water Supply Units

In Terai area, a hand pump set with GI pipes for boring a well will be provided, the length of GI pipes being determined from the estimated average water level in each district. Water supply facilities in hilly areas are to be covered by the Nepalese side.

3) Equipment for Logistics Support

Tent warehouses, trucks and tractors for transportation of materials, motorbikes for overseers, and 4WD diesel engine jeep for BPEP head office that have been procured under the previous Japan's Grant Aid Projects shall be fully utilised for the Project, therefore, no additional these items will be necessary.

a) Facsimile Machine

One facsimile machine is to be provided for each DEO office in the newly covered five (5) districts as shown below to communicate with BPEP head office:

(1) Kanchanpur (2) Jhapa (3) Banke (4) Sarlahi (5) Rautahat

b) Personal Computer Set

Two (2) sets of personal computers are to be provided for use by PPSMU head office. The computers shall be of a type that is compatible with the existing ones in terms of the software applications such as Word Processor, Data Base, Spread Sheets, and CAD.

2-3 Basic Design

2-3-1 Design Principles

The standard design of the facilities covered by the Project is based on the standard design that has been prepared by the PPSMU upon making minor alterations as per necessary, which are summarised as follows:

1) Natural Conditions

Although there is a wide range of environmental conditions (climate, geology, topography, infrastructure, etc.) within the country, the area in the 15 target districts may roughly be divided into two categories, Terai and Hill. BPEP has prepared two standard designs of facilities in terms of structure to meet the requirements for each of the two categories of natural conditions. (See the drawings attached.)

a) Topography

The districts to be covered by the Project are mostly scattered in the Terai area and partly in the Hilly area. According to the standard design of BPEP, a brick masonry structure is generally used in the Terai area, and natural stone masonry structure in the Hilly area.

b) Precipitation and Heat

Both in Terai and Hilly areas, in the rainy season, which is normally from June to September, care should be taken against heavy rainfall sometimes accompanied with strong winds. Schools should not be built at hazardous locations. In front of the classroom, a terrace with an extended roof overhang is designed to accommodate students when it is raining. The ceiling height of the

classroom for Terai is higher than that in Hill by one and half feet to decrease the temperature inside, which could otherwise be unbearably high.

c) Wind Load

The design for wind load is to meet the relevant prescriptions of the Indian Standard as stated in the recently authorised Nepal National Building Code (NNBC).

BPEP applies the wind load obtained through the following calculation:

• slope $\theta = 25$ degree

$$\bullet P_n = P \times \frac{2 \sin \theta}{1 + \sin^2 \theta} (\text{kg/m}^2) \quad P_v = P_n \times \cos \theta, \quad P_h = P_n \times \sin \theta$$

• Basic wind pressure: $P = 150 \text{ kg/m}^2$ (100~300 kg/m²)

• Building Type Coefficient $\rightarrow 1.0$ (0.6~1.3)

d) Earthquake

As a traditional masonry structure is applied, it is difficult to assess earthquake resistance through calculations of allowable stresses of structural members. The standard design of BPEP-II applies relatively safe structures such as light weight roofing with CGI sheet and reinforcement buttresses to the walls. On the basis of the recently established Nepal National Building Code (NNBC), the Standard Design of BPEP-II has been reviewed for possible improvements. (Refer to Table 2-11)

e) Natural Lighting

The BPEP-II standard design prescribes that the total area of the wall opening be 25% or more of the floor area of a classroom.

2) Social Conditions

Within the area to be covered by the Project, there are many differences in social conditions such as culture, religion, language, and customs. PPSMU has developed additional plan types to meet the various conditions of the schools as shown in Table 2-10.

3) Conditions for Construction

The Nepal National Building Code (NNBC) has been authorised, but without specifying the area and the types of building to which it is applied. The standard design of the facilities of BPEP-II has been reviewed according to NNBC for improvements as shown in Table 2-11.

4) Utilisation of Local Materials and Sub-contractor

Construction works are to be implemented with community participation. Therefore, the maximum use of local methods of construction, materials, and manpower would naturally be advantageous. The standard designs of the facilities have been prepared applying these principles.

5) Maintenance

The operation and the maintenance of the facilities of the Project are also to be provided by the communities. In this respect as well, the maximum use of local methods of construction and materials would naturally be advantageous. Furthermore, use of sophisticated equipment, which might result in high running and maintenance costs is not recommendable.

6) Grade

With proper support from BPEP, the quality of the facilities constructed under local community participation is generally acceptable for schools.

7) Time Schedule

In assessing the time schedule of the Project, the following points are important:

- a) Rainy season (June to September), which makes transportation of materials and construction work impractical in many areas.
- b) Avoiding busy farming seasons in rural areas, manufacturing of bricks is normally done after harvesting crops in autumn. The Delivery of materials, as well as most construction work for the facilities, are to be done before the rainy season.
- c) Fiscal year of Nepal starts in the middle of July. The entire time schedule of the Project should be so prepared that the procedures regarding the implementation of a Japan's Grant Aid Project including detailed design, tendering, and procurement of materials will be well co-ordinated with the procedure for finalising the selection of the target schools on the basis of the district SPIP in each of the target districts.
- d) The period for preparing district SPIP is estimated to be about three months. The construction period for each school is estimated to be about three to four months, and the entire work period for the construction of the schools including delivery and local transportation of materials from depot centres to construction sites will be eight to 8.5 months. The entire period of a phase of the Project is estimated to be about 11 to 11.5 months.

2-3-2 Basic Design of the Facilities

1) Standard Design of the Facilities of BPEP-II

The BPEP, with technical support from DANIDA, has been developing a standard design for the facilities, taking advantages of the central procurement system of the Project from the first phase.

Under the previous phases, the following alterations were made:

1. Enlarging the plan sizes of classrooms
2. Adding a terrace with extended roof overhang
3. Elimination of plastic sheets skylight
4. Adding buttresses to walls
5. Increasing ceiling height of Terai-type buildings
6. Applying steel pipe roof trusses instead of timber trusses
7. Applying steel door/window frames instead of timber frames
8. Applying plywood flush panel door/window shutters instead of hardwood shutters
9. Making holes to the wall of pit latrines
10. Two-booth toilet block instead of three-booth block

Then, under SPIP of BPEP-II, the following development has been proposed by PPSMU:

1. Additional Plan Types
2. Additional Types of Roof Truss Structure
3. Additional vertical bracing
4. Review on Earthquake resistance to meet NNBC
5. Additional upstand walls along terrace
6. Additional Concrete flooring around the buildings

Table 2-9 Plan Types of the Facilities

Plan Types of the Facilities proposed for BPEP-II

No.	Plan Type	Type	Classroom Capacity	Area per Pupil (sqm.)	Effective Construction Area
Terai Type (Brick Masonry)					
1		Terai 2ClsR. without Office	55	0.76	101.3 m ²
2		Terai 2ClsR. with Office	55	0.76	123.1 m ²
3		Terai 3ClsR. without Office	1,2 = 45 3 = 55	1,2=0.68 3=0.76	126.7 m ²
4		Terai 1ClsR. with Office	55	0.76	78.8 m ²
5		Terai Resource Centre			129.5 m ²

No.	Plan Type	Type	Classroom Capacity	Area per Pupil (sqm.)	Effictive Construction Area
Hill Type (Stone Masonry)					
1		Hill 2ClsR. without Office Multi Grade	45	0.89	92.4 m ²
2		Hill 3ClsR. without Office	27	0.82	92.4 m ²
3		Hill 2ClsR. without Office	27	0.82	61.6 m ²
4		Hill 1ClsR. with Office	45	0.77	76.9 m ²
5		Hill Resource Centre			96.6 m ²

Table 2-10 DESIGN COMPARISON / KEY ALTERATIONS (Proposed Two Class room building is taken for comparison purpose)

S.No.	Particulars	Previous	Proposed	Remarks
I.				
Classification / types of design				
1	Geographical location	i) Terai ii) Hill	i) Terai ii) Hill iii) Mountain	Not adopted
2	Load bearing structure	i) Load bearing wall	i) Load bearing wall ii) Frame-RCC columns iii) Frame-Steel columns	
3	Roof structure			
a)	Terai	i) MS Tubular truss	i) MS Tubular truss ii) Steel Angle +Channel sections iii) Wire Girders	
b)	Hill	i) MS Tubular truss	i) MS Tubular truss ii) Steel Angle +Channel sections iii) Wire Girders iv) Timber	Not adopted
4 Requirement of school				
a)	Terai	i) Two Cl. Rms.	i) One Cl.Rm. + Office ii) Two Cl. Rms. iii) Two Cl.Rms. + Office iv) Two Cl.Rms.(S)+One Cl.Rm.(B) v) Two Cl.Rms.(S)+One Cl.Rm.(B)+office	
b)	Hill	i) Two Cl. Rms.	i) One Cl.Rm. + Office ii) Two Cl. Rms. iii) Two Cl.Rms. + Office iv) Two Cl.Rms.(S)+One Cl.Rm.(B) v) Two Cl.Rms.(S)+One Cl.Rm.(B)+office	
II. Area per student				
		0.50 sq m. / student	0.75 sq.m. / student	
III. Designed student capacity				
a)	Terai	55 students	55 students	
b)	Hill	55 students	45 students	
IV. Internal width of Cl.Rm.				
a)	Terai	4.37 m.	6.00 m.	
b)	Hill	4.37 m.	4.575 m.	

V.	Internal length of Cl.Rm.			
a)	Terrai	6.63 m.	6.95 m.	
b)	Hill	6.4 m.	4.85 m.	
VI	Area of Cl.Rm.			
a)	Terrai	27.79 sq. m.	41.7 sq. m.	
b)	Hill	27.97 sq. m.	22.19 sq. m.	
VII	External width of building			
a)	Terrai	6.27 m.	8.326 m.	
b)	Hill	6.70 m.	7.175 m.	
VIII	External length of building			
a)	Terrai	14.18 m.	11.173 m.	
b)	Hill	14.18 m.	11.05 m.	
IX.	Depth of foundation			
a)	Terrai	0.86 m.	0.55 m. for L.B. Wall / 0.975 m. for Frame	
b)	Hill	0.81 m.	0.75 m. for L.B. Wall / 0.75 m. for Frame	
X	Width of foundation			
a)	Terrai	0.83 m.	0.45 m for L.B. Wall / _____ for Frame	
b)	Hill	0.81 m.	0.75 m. for L.B. Wall / 0.75 m. for Frame	
XI	Size of windows			
a)	Terrai	3.16 m. x 1.37 m.	0.90 m. x 1.35 m.	
b)	Hill	3.16 m. x 1.37 m.	1.20 m. x 1.35 m.	
XII	Effective span of Truss			
a)	Terrai	4.57 m.	6.38 m.	
b)	Hill	5.80 m.	5.025 m.	
XIII	Number of pieces of Truss			
a)	Terrai	2	3	
b)	Hill	3	Design not prepared for Steel truss	
XIV)	DPC			
a)	Terrai	75 mm thick	250 mm thick Plinth band	
b)	Hill	75 mm thick	75 mm thick	
XV	Lintel			
a)	Terrai	150 mm thick lintel band	75 mm thick over opening only	
b)	Hill	150 mm thick lintel band	150 mm thick lintel band	
XVI	Tie band			
a)	Terrai	No	200 mm thick tie beam	
b)	Hill	No	No	

Table 2-11 Structural Design Study Results

Particulars	As per Nepal Bldg. Code (NBC)	Type	As per NBC (mm)	As per revised drawing (mm)	Remark
1 Distance of opening from inside corner	Should be at least 1/4 of the height of the short opening, but not less than 600mm	Terai Hill	600 600	475 500	202 p12, 32
2 Cross wall length	10 times the thickness of the wall or 3,500 mm max.	Terai Hill	3500 3500	6000 4575	202 p2, 45
3 Buttresses	Length of the buttresses shall not be less than the thickness of the wall.	Terai Hill	250 450	250 450	202 p45
4 Total length of the opening on the wall	Not more than 0.5L, (L= Length of the wall in between two consecutive cross wall.	Terai Hill	3600 3975	3600 3600	202 p12
5 Length of the pier (wall between two openings)	Should not be less than 1/2 of the height of small opening or 600 mm whichever is greater	Terai Hill	675 675	600 1450	202 p12
6 Minimum foundation width	750 mm	Terai Hill	750 750	750 750	202 p3
7 Minimum foundation depth	800 mm from ground level	Terai Hill	800 800	800 800	202 p3
8 Dowel bars at corner and T-junction	Shall provide Dowel bars at corners and T-junction to integrate the box action of the wall	Terai Hill	← ←	Buttress Buttress	202 p21
9 Plinth Band	75 mm	Terai Hill	75 75	75 75	202 p17
10 Lintel Band	Min. 150 mm	Terai Hill	150 150	150 150	202 p17
11 Roof and Gable Band	Min. two Nos. of 10 mm dia bars if the length of the cross walls are less or equal to 5 m	Terai Hill	2 Nos. Dia 10 2 Nos. Dia 10	3 Nos. Dia 10 3 Nos. Dia 10	202 p17
12 Gable Band	75 mm	Terai Hill	75 75	75 75	202 p17
13 C/C distance of buttresses	Maximum 3,000mm	Terai Hill	3000 3000	1812 5300	202 p31, 32

2) Review of the Proposed Standard Design of the Facilities

The standard design for the Project has been prepared on the basis of the standard design by BPEP-II with the following improvements or adjustments:

1. Basic principles are as proposed by BPEP-II. Only two classroom types (One each of Terai type and Hill type) are applied to avoid complications in distributing the materials to the communities. As for Resource Centres and Toilet Blocks, one each of Terai type and Hill type) are applied.
2. Steel trusses are of steel pipe.
3. Upstand walls in front of the classrooms are eliminated.
4. Structural members are adjusted in accordance with NNBC where practical.
5. The pit under the toilet block is slightly moved to support the wall above so that the building can be easily constructed by the community.

Table 2-12 Plan Types of the Facilities Applied in the Project

No.	Plan Type	Type	Classroom Capacity	Area per Pupil (sq.m.)	Effective Construction Area
1	<p>6250 ClsR. 6950x6000 7200 7200 ClsR. 6950x6000</p>	Terai 2 Classrooms without Office Brick Masonry	55	0.76	101.3m ²
2	<p>5025 ClsR. 7500x4575 7950 7950 ClsR. 7500x4575</p>	Hill 2 Classrooms without Office Multi-Grade Stone Masonry	45	0.89	92.4m ²
3	<p>6250 Hall 10550x6000 Office 3350x6000 Store 3350 x 7575 10800 3600 3600</p>	Terai Resource Centre Brick Masonry			129.5m ²
4	<p>5025 Hall 10150x4575 Office 4850 x 6150 10600 5300</p>	Hill Resource Centre Stone Masonry			96.6m ²

3) Finalised Standard Design of the Facilities

The finalised standard designs of the facilities prepared by BPEP are summarised as shown in the tables-2-13 to 2-15 and the drawings. The floor areas are calculated according to the Japanese standard method, namely the plan sizes are measured at centre lines of the walls. Half of the area of the terrace/external corridor is included.

Table 2-13 Floor Areas of Buildings

Type	Capacity	Calculation	Area(m ²)
Two Cl. Rms.(B)	110	$=(7.2+7.2) \times (6.25+1.575/2)$	101.3
Two Cl. Rms.(B)	90	$=(7.95+7.95) \times (1.575/2+5.025)$	92.4
Terai RC	120	$=(1.575/2+6.25) \times 14.4+3.6 \times (7.575+0.25)$	129.5
Hill RC	90	$=(1.575/2+5.025) \times 10.6+5.3 \times 6.6$	96.6
Terai Latrine	2	$=2.49 \times 1.45+1.9 \times 2.36$	8.1
Hill Latrine	2	$=2.64 \times 1.60+2.51 \times 2.06$	9.4

50% of balcony counted

Table 2-14 Total Floor Areas

Type	1 unit Area(m ²)	Phase I		Phase II		Phase III		Entire Project	
		Nos	Area(m ²)	Nos	Area(m ²)	Nos	Area(m ²)	Nos	Area(m ²)
Two Cl. Rms.(B)	101.3 m ²	406	41,128	396	40,115	388	39,304	1,190	120,547
Two Cl. Rms.(B)	92.4 m ²	17	1,571	54	4,990	9	832	80	7,392
Terai RC	129.5 m ²	13	1,684	16	2,072	12	1,554	41	5,310
Hill RC	96.6 m ²	1	97	2	193	—	—	3	290
Terai Latrine	8.1 m ²	254	2,057	269	2,179	241	1,952	764	6,188
Hill Latrine	9.4 m ²	15	141	41	385	7	66	63	592
Total	—	—	46,677	—	49,934	—	43,708	—	140,319

Table 2-15 Structure and Finish Schedule

Classrooms /Resource Centre (Terai)	
(Structure)	
	Single Story, Brick Masonry, 250mm thick
(Roof)	MS Tubular Truss, 26 Gauge-CGI sheet (Standard)
(Foundation)	Continuous Footing
(External)	
(Roof)	26 Gauge-CGI sheet (Standard I)
(Wall)	Mortar Pointing
(veranda)	Cement Plaster Finish
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Mortar Pointing, Lime Finish
(Opening)	Salwood Rails and Plywood Panel Shutter for door/window Enamel paint MS door and window frames, Enamel paint
(Blackboard)	Cement Plaster, Paint
(Ceiling)	MS Truss Exposed

Classrooms /Resource Centre (Hill)	
(Structure)	
	Single Story, Stone Masonry, 450mm thick
(Roof)	MS Tubular Truss, 26 Gauge-CGI sheet (Standard)
(Foundation)	Continuous Footing
(External)	
(Roof)	26 Gauge-CGI sheet(Standard)
(Wall)	Mortar Pointing
(veranda)	Cement Plaster Finish
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Mortar Pointing, Lime Finish
(Opening)	Salwood Rails and Plywood Panel Shutter for door/window Enamel paint MS door and window frames, Enamel paint
(Blackboard)	Cement Plaster, Paint
(Ceiling)	MS Truss Exposed

Toilet Blocks (Terai)	
(Structure)	
	Single Story, Brick Masonry, 9"thick
(Roof)	Salwood Beam, 26 Gauge-CGI sheet (Standard)
(Foundation)	Continuous Footing
(External)	
(Roof)	26 Gauge-CGI sheet (Standard)
(Wall)	Mortar Pointing
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Mortar Pointing, Lime Finish
(Opening)	Salwood Rails and Plywood Panel Shutter for door Enamel paint Salwood door and window frames, Enamel paint
(Ceiling)	Beam Exposed

Toilet Blocks (Hill)	
(Structure)	
	Single Story, Stone Masonry, 15"thick
(Roof)	Salwood Beam, 26 Gauge-CGI sheet (Standard)
(Foundation)	Continuous Footing
(External)	
(Roof)	26 Gauge-CGI sheet (Standard)
(Wall)	Mortar Pointing
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Mortar Pointing, Lime Finish
(Opening)	Salwood Rails and Plywood Panel Shutter for door Enamel paint Salwood door and window frames, Enamel paint
(Ceiling)	Beam Exposed

4) List of Materials

The unit quantities of materials necessary for a block of facilities are shown in Table 2-16.

Table 2-16 Quantities of Materials to be Covered by Japanese side Per Block

No.	Particulars	Unit	Cl Rm Terai	Cl Rm Hill	RC Terai	RC Hill	Latrine Terai	Latrine Hill
1	Ordinary Portland Cement	Bags	204	128	258	139	25	10
2	Bricks	Pc	43,000		53,700		5,500	
3	Salwood	Cft	5.250	5.250	6.000	5.098	9.367	10.068
4	26 Gauge - CGI sheet	Bdle	11.944	11.250	14.533	11.780	0.630	0.857
5	26 Gauge - GI sheet	Sft	84.000	96.000	102.000	96.000		
6	10/12/16 mm dia Tor steel	Kg	513.009	588.445	675.821	682.995	56.758	62.569
7	6 mm dia Mild steel	Kg	129.408	202.839	172.166	206.587	13.801	16.013
8	Binding wire	Kg	6.000	7.000	8.000	7.000	1.500	1.500
9	MS Door frame	Sft.	40.673	40.673	61.009	40.673		
10	MS Window frame	Sft.	183.028	174.312	235.321	191.743		
11	MS Tubular truss.	Sft.	1,492.278	1,458.774	1,859.745	1,498.034		
12	MS Tubular post	Set	5	7	4	4		
13	8 mm dia J-hook set	Set	567	555	695	647		
14	4"(100mm)long towerbolt	Pc	56	40	72	44		
15	6"(150mm)long towerbolt	Pc	4	4	6	4	2	2
16	(4" × 1")Handles	Pc	30	22	39	24	4	4
17	6" (150mm) long hinges	Pc					6	6
18	4" (100mm) long hinges	Pc						
19	10" Holdfast	Pc					12	12
20	10" sliding bar locking set	Pc	2	2	3	2	2	2
21	3/4" (20mm) Screws	Pc	800	600	1,000	500	50	50
22	1.25" (30mm) Screws	Pc	100	100	100	60	75	75
23	Ordinary nails (2" and 2.5")	Kg	5	5	7	7	1	1
24	Roofing nails (2.5")	Pc					55	55
25	Enamel paint	Ltr	11	7	15	8	2	2
26	Primer paint	Ltr	5	4	8	4	1	1
27	Whitewash lime	Kg	113	95	162	116	13	15
28	Door shutters							
	3' × 7' size	Pc	2	2	3	2		
	2.5' × 6' size (for toilet)	Pc					2	2
29	Window shutter	Pc	28	20	36	22		
30	100mmPVC Pipe/ Sanitary ware set	set					1	1
31	Donation board	Pc	1	1	1	1		
	Water Supply System							
32	Hand-pump 1.5"G.I.Pipe(24m.Length)	Set m	1 24~42					

5) List of Equipment

Table 2-17 List of Equipment

No.	Item	Quantities			
		Phase-I	Phase-II	Phase-III	Total
1	Personal Computer	2	—	—	2
2	Facsimile Machine	5	—	—	5

