

**MINISTRY OF EDUCATION AND SPORTS
THE GOVERNMENT OF NEPAL**

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT
FOR
CONSTRUCTION OF PRIMARY SCHOOLS
IN SUPPORT OF
EDUCATION FOR ALL (PHASE II)
IN
NEPAL**

March 2008

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

FUKUWATARI & ARCHITECTURAL CONSULTANTS LTD.

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Preface

In response to a request from the Government of Nepal, the Government of Japan decided to conduct a basic design study on the Project for Construction of Primary Schools in support of Education for All (Phase II) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Nepal a study team from September 3 to October 3, 2007.

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

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

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

March 2008

Masafumi Kuroki
Vice-President
Japan International Cooperation Agency

March 2008

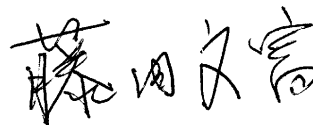
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Construction of Primary Schools in support of Education for All (Phase II) in Nepal.

This study was conducted by Fukuwatari & Architectural Consultants Ltd., under a contract to JICA, during the period from August 2007 to March 2008. 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 the Project for Construction of Primary Schools
in support of Education for All (Phase II)

Fukuwatari & Architectural Consultants Ltd.

SUMMARY

Summary

1. Country Profile

(Land/Natural Conditions)

Nepal, an independent land-locked country, is bounded on the north by People's Republic of China and on the east, south, and west by India. The land extends 885 Km east to west and 145-241 Km north to south. Steep mountains occupy around 80% of the land area. The land can be divided into three main geographical regions: Terai Region, a southern lowland plain bordering India with a hot and humid climate, Mountain Region, a sub-arctic climate in the northern mountainous land where Mt. Everest is located, and Hilly Region, a temperate climate in between the above two regions. During the rainy season, from late May until the end of September, the rain falls convergently for a short time, but not all day.

(Social Conditions/Economy)

The population of Nepal - 25.89 million in 2005/2006 - is divided into six major ethnic groups, which can be further divided into around 100 minor groups in terms of race, caste, and/or language. Hinduism is the official religion and Nepalese is the official language. Annual population growth rate is 2.4%.

Before the year 1990, Nepal had long been under the direct control of the King, which was called the Panchayat system. Then, in 1990, following widespread agitation for a multi-party democracy, a new Constitution was promulgated which retained the Monarchy as Head of State, but introduced a full parliamentary system of government. Since then, general elections have taken place three times in 1991, 1994, and 1999. On the other hand, Maoists started an armed campaign in 1996, which put the political situation and public peace of the country into confusion until a ceasefire was agreed in April 2006 among the political parties, Maoists, and the King. Finally, in January 2007, an interim constitution was promulgated and an interim government was formed, which for the first time includes Maoist Ministers. The government is now preparing for a free and fair general election.

Per capita GDP is US\$311(2004~2006). The growth rate of the national economy was negative in 2001/2002 because of the Maoist insurgency, but returned to positive territory in 2005/2006 at 1.9%. Major industries are Agriculture (accounting for 76% of the working population), tourism, and textiles. Agriculture, Services, and Manufacturing share 39%, 41%, and 25% of GDP, respectively. Tourism is an important industry for Nepal, the country of the Himalayas, for acquiring foreign currencies. It once accounted for 20% of GDP before the Maoists started their armed campaign in 1996, but declined to 10% of GDP after 2002 due to a decrease in the number of the tourists.

The major export goods are carpets and clothes, with the major trading partners being India and the USA. The major import goods are petroleum products, gold, thread, chemical fertilizer, and transportation machinery, with the major trading partners being India, Singapore, and Switzerland. The enormous trading deficit, which was 14.7% of GDP in 2004/2005, is offset by remittances from Nepalese workers in foreign countries and by foreign grant aid.

2. Background and Contents of the Project Request

Nepal has completed its 10th National Development Plan (2002-2007) and is implementing the Three Year Interim Plan (2007-2009) bridging to the 11th plan, setting the education sector as one of the engine for nation-building and implementing a major strategy for poverty alleviation. This is in line with Nepal's commitments to meet the Education for All (EFA) goals by 2015. Despite various efforts by the government including the launching of educational development programs such as Basic and Education Project (BPEP-I, BPEP-II, and EFA(2004-2009)), the country assessment of EFA indicates that the challenges still remain formidable towards attaining EFA goals. Given such a context, the Government of Japan has been supporting the efforts of the Government of Nepal by extending grant aid for the construction of primary schools in support of BPEP-I, BPEP-II, and EFA to procure construction materials for about 8000 classrooms in total. According to a review report of JICA Nepal Office (Review of Primary School Construction Project under Japan's Grant Aid in the Kingdom of Nepal, March 2006), 98% of the facilities are constructed, are being used properly, and are serving their intended purpose. The report clearly mentioned that the cooperation from Japan has been effective and replicable for constructing school facilities in Nepal, and recommended the continuation of the project in the future.

Under the circumstances stated above, in June 2006, the Government of Nepal made a request to the Government of Japan for grant aid assistance to finance the continued Project for Construction of Primary Schools in support of Education for All (Phase II). The items requested at the time are listed below:

- 1) Project Sites: 20 Districts
- 2) Construction Materials for:
 - a) 4,800 new classrooms
 - b) 2,000 sets of water supply system
 - c) 2,000 Toilet sets
- 3) Furniture for classrooms
- 4) Communication equipment (computer and printer) and material transport equipment
- 5) Technical assistance for designing school buildings

3. Results of the Study and Contents of the Project

In response to the request, the Government of Japan decided to conduct a basic design study for the Project, and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent a study team to Nepal from September 3 to October 3, 2007. The team held discussions with the officials concerned of The Government of Nepal, and collected the necessary information. Then, in Japan, the study team studied the appropriateness and the effects of the Project, reviewed and selected target districts, and worked out basic designs for the volume of the project, as well as the specifications of materials, and compiled the results in the draft Basic Design Study Report. JICA sent a study team to Nepal to explain the draft report from 21st to 30th of January 2008. The team explained and discussed the contents of the draft with the Nepalese side, and concluded the basic design as stated below.

(Target Districts of the Project)

During the discussions in September 2007, The Government of Nepal proposed eight districts as candidates for the Project. The candidate districts were surveyed and examined with data collected for further study in Japan by the Survey Team, and have been confirmed to be appropriate as the target districts for the project.

(Components of the Project)

The facilities will be constructed by School Management Committees under funding support and technical guidance provided by The Government of Nepal and with the major construction materials procured by a Japanese supplier. The Japanese side will procure the major construction materials for the following facilities.

- Classroom Building (2 types for Terai, and Hill)
- Toilet (2 types for Terai and Hill)
- Water Supply (for Terai and Hill), and
- Furniture for Classrooms

(Volume of the Project)

The volume of the Project was assessed in detail as shown in the tables below:

District Name	Classroom Blocks*		Toilet Sets**		Water Supply		Classroom Furniture Sets
	Terai	Hill	Terai	Hill	Terai	Hill	
Baglung		40		39		11	1,200
Dhading		50		48		29	1,500
Gulmi		40		39		11	1,200
Kaski		40		40		4	1,200
Lalitpur		40		37		2	1,200
Palpa		40		40		14	1,200
Rupandehi	80		80		9		2,720
Surkhet		40		39		10	1,200
Total	80	290	80	282	9	81	11,420

*One classroom building has two classrooms **One toilet set has two blocks(1 for boys and 1 for girls)

(Standard Designs of the Facilities)

The standard designs of the facilities covered by the Project are the latest ones of the Department of Education (DOE). The classroom blocks are composed of steel frame with brick/stone non-load-bearing walls, with minor changes made as necessary. The floor areas of the facilities are as shown in the table below:

Floor Areas of the Facilities

Facility	Unit Floor Area(sq m)	Number of Blocks	Total Floor Area (sq m)
Classroom (Terai)	90.00 m ²	80	7,200 m ²
Classroom (Hill)	80.40 m ²	290	23,316 m ²
Toilet(Terai)	7.56 m ²	160	1,210 m ²
Toilet(Hill)	10.47 m ²	564	5,905 m ²
Total(sq m)			37,631 m ²

4. Time Schedule and Cost for the Project

If the Project is implemented under Grant Aid of Japan, the implementation period will be 16 months in total. The total cost of the Project is estimated to be 1,364.8 million Japanese yen, with the cost borne by the Japanese side being 982 million Japanese yen and the cost borne by the Nepalese side being 209.9 million Nepalese Rupees (382.8 million Japanese yen).

5. Project Effect and Recommendations

It is appropriate to implement the Project under Japan's Grant Aid Assistance because the Project will have the following effects:

1) By replacing deteriorated classrooms, which are structurally dangerous, with rainwater leakage, and/or insufficient natural lighting and ventilation, with new ones of better quality, the Project will contribute to improving the educational environment, which will be effective for improving internal efficiency. Furthermore, the provision of toilets and water-supply facilities will greatly encourage the attendance of female teachers and students.

2) Community participation in overall primary school management activities will be enhanced through participation in this construction project and through guidance provided by the government on various educational matters.

For the effective implementation of the project, it is recommended that The Government of Nepal take the following actions:

1) Coordination with other donors

As and when necessary for the effective implementation of the Project, the DOE should ensure effective coordination with the pool funding donors in terms of the school physical facilities components including the allocation of target districts.

2) Execution of project components other than those covered by the Grant Aid of Japan

DOE shall execute construction of facilities other than those covered by Grant Aid of Japan such as rehabilitation of existing classroom buildings, fencing for school compound.

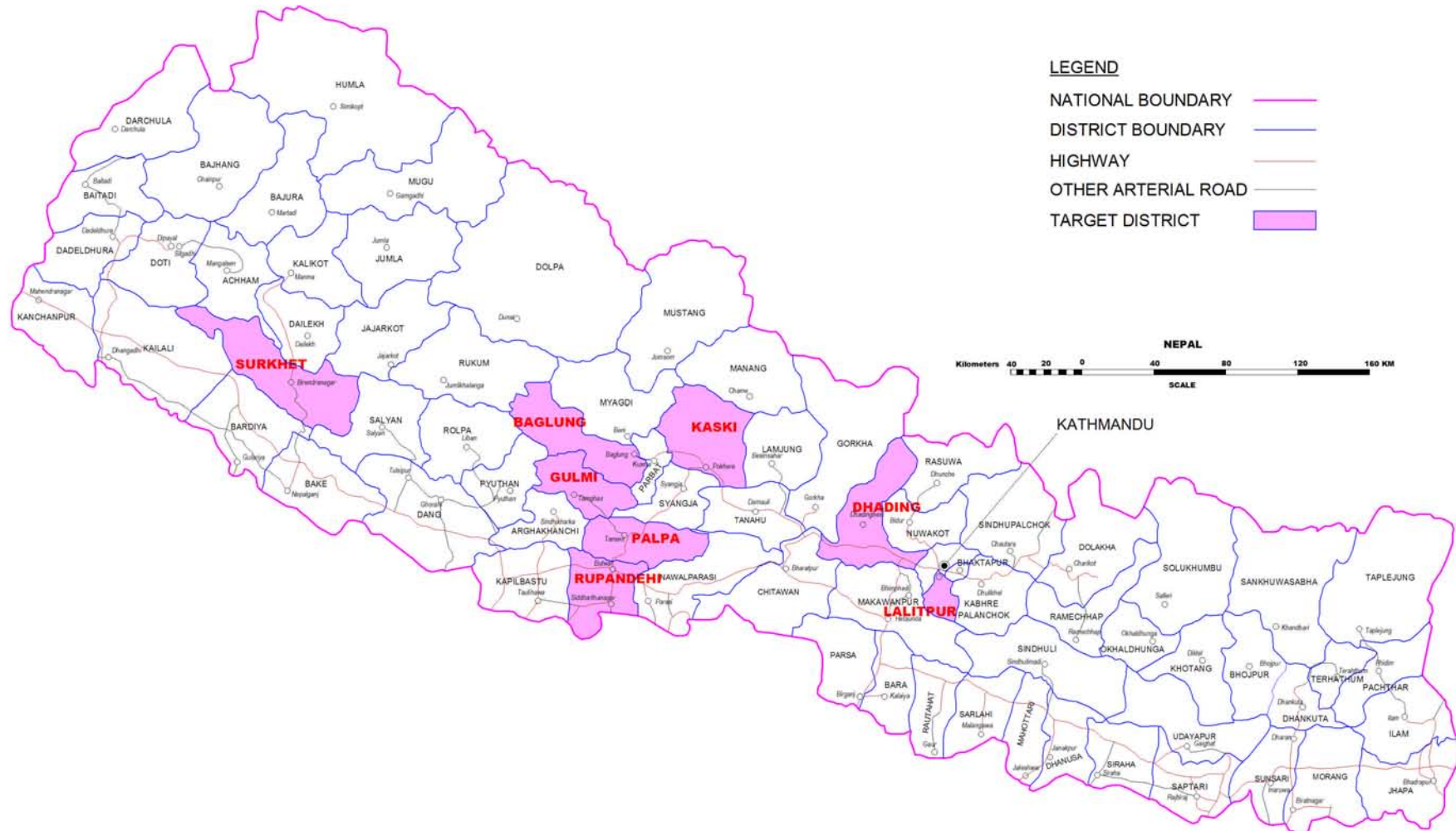
3) Measure for Arsenic Problems

To respond to the arsenic problem, The Government of Nepal will conduct water tests for arsenic contamination through the government line agency, Department of Water Supply and Sewerage, in all schools where water supply facilities are to be covered by the Project in the Terai region and to install arsenic removal plants if arsenic contamination is over 0.05 mg/litre.

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Location of the Target Districts



Perspective



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Abbreviations

ADB	Asian Development Bank
ASIP	Annual Strategic Implementation Plan
AWPB	Annual Work Plan & Budget
BPEP-I	Basic and Primary Education Project
BPEP-II	Basic and Primary Education Programme II
CASP	Community-based Alternative School Program
CDC	Curriculum Development Center
DACA	Decentralized Action for Children and Women
DDC	District Development Committee
DEC	Distance Education Center
DEO	District Education Officer(Office)
DEP	District Education Plan
DFID	UK Department for International Development
DOE	Department of Education
DWSS	Department of Water Supply and Sewerage
ECD	Early Childhood Development
EFA	Education for All
EMIS	Education Management Information System
GER	Gross Enrollment Ratio
IDA	International Development Association
INGOs	International Non-governmental Organizations
MOF	Ministry of Finance
MOES	Ministry of Education and Sports
MOLD	Ministry of Local Development
MHPP	Ministry of Housing & Physical Planning
NCED	National Centre of Educational Development
NER	Net Enrolment Ratio
NPC	National Planning Commission
NGO	Non-governmental Organization
NNBC	Nepal National Building Code
PPC	Pre-Primary Class
PSS	Physical Services Section
PTTC	Primary Teacher Training Centre
RC	Resource Centre
RED	Regional Education Directorate
RP	Resource Person
SEDP	Secondary Education Development Project (under ADB and DFID)
SESP	Secondary Education Support Programme (under ADB and Denmark)
SIP	School Improvement Plan
SMC	School Management Committee
SPIP	School Physical Improvement Plan
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VDC	Village Development Committee
VEC	Village Education Committee
VEP	Village Education Plan

CHAPTER 1 BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Background of the Project

Nepal has completed its 10th National Development Plan setting the education sector as one of the engine for eradicating the poverty and nation-building, and is implementing the Three Year Interim Plan (August 2007-October 2009/10), the education policy of which is in line with the Nepal's commitments to meeting the EFA goals by 2015. The World Education Forum on Education for All (EFA) held in Dakar in 2000 to review the achievements of EFA campaigns realized the difficulties of developing countries like Nepal, and accordingly adopted the Dakar Framework of Action (DFA), Education for All. The DFA lists six major EFA goals to be achieved by 2015 as well as the strategies for achieving the goals. The focus of the framework is on collective commitments nationally and internationally to ensure that no country is left behind because of a lack of technical capacity or resources. Being inspired and supported by the commitments, the Government of Nepal has adopted the National Plan of Action for achieving EFA goals. Based on this plan, the Government has launched and is implementing a specific program called "EFA 2004-2009" supported by pool donors; DANIDA, NORAD, Government of Finland, DFID and World Bank and, outside the pool donors, by Government of Japan, UNICEF and others.

Despite various efforts by the government including the launching of educational development programs such as BPEP-I, BPEP-II, and EFA(2004-2009), the country assessment of EFA indicates that the challenges still remain formidable towards attaining EFA goals.

Given such a context, the Government of Japan has been supporting the efforts of the Government of Nepal by extending grant aid for the construction of primary schools in support of BPEP-I, BPEP-II, and EFA to procure construction materials for about 8000 classrooms in total. According to a review report of JICA Nepal Office (Review of Primary School Construction Project under Japan's Grant Aid in the Kingdom of Nepal, March 2006), 98% of the facilities are constructed, are being used properly, and are serving their intended purpose. The report clearly mentioned that the cooperation from Japan has been effective and replicable for constructing school facilities in Nepal, and recommended the continuation of the project in the future.

Under the circumstances stated above, in June 2006, the Government of Nepal made a request to the Government of Japan for grant aid assistances to finance the continued Project for Providing Materials and Equipment for Construction of Primary Schools in support of Education for All (Phase II).

The items requested at the time are listed below:

- 1) Project Sites: 20 Districts
- 2) Construction Materials for:
 - a) 4,800 new classrooms
 - b) 2,000 sets of water supply system
 - c) 2,000 Toilet sets
- 3) Furniture for classrooms
- 4) Communication equipment (computer and printer) and material transport equipment
- 5) Technical assistance for designing school buildings

1-2 Natural Condition

Nepal, an independent land-locked country, is bounded on the north by People's Republic of China and on the east, south, and west by India. The land extends 885 Km east to west and 145-241 Km north to south. Steep mountains occupy around 80% of the land area. The land can be divided into three main geographical regions: Terai Region, a southern lowland plain bordering India with a hot and humid climate, Mountain Region, a sub-arctic climate in the northern mountainous land where Mt. Everest is located, and Hilly Region, a temperate climate in between the above two regions. During the rainy season, from late May until the end of September, the rain falls convergently for a short time, but not all day.

1-3 Environmental and Social Impacts

No significant impact is expected in this project as the classroom buildings, toilets and water supply units are to be constructed inside the boundary of existing schools. Furthermore, as the planned building is to have a roof structure made of steel truss instead of timber truss, the impact for damaging forests will be much less than otherwise.

CHAPTER 2 CONTENTS OF THE PROJECT

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

2-1-1 Overall Goals and Project Objectives

The “EFA 2004-2009” program has three major objectives: (1) Ensuring access and equity in primary education; (2) Enhancing quality and relevance of primary education; and, (3) Improving efficiency and institutional capacity. Under the program, the objective of the Project is to contribute to the goals of: (1) ensuring access and equity in primary education and (2) Enhancing quality and relevance of primary education, by improving the physical facilities of primary schools.

2-1-2 Basic Concept of the Project

To achieve the above-stated objectives, under the Project, school physical facilities in the eight districts listed below will be constructed in accordance with the School Physical Improvement Plan in each of the districts with community participation, and guidance and supervision from the Government of Nepal, using construction materials and furniture for 370 classroom buildings (each contains 2 classrooms, in total 740 classrooms), 362 toilet sets (each contains 2 blocks, 1 for boys and 1 for girls, in total 724 blocks), and 90 Water Supply Units to be procured under Japan’s Grant Aid.

1. Baglung
2. Dhading
3. Gulmi
4. Kaski
5. Lalitpur
6. Palpa
7. Rupandehi
8. Surket

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) Basic Policy

1) Selection of Target Districts

In the request for Japan's Grant Aid made by the Government of Nepal in June 2007, the number of target districts was stated to be 20 without mentioning specific names. Then, DOE sent JICA a list of 21 candidate districts, which were selected from among all 75 districts in Nepal in line with the policies of EFA 2004-2009, and with the following criteria:

Table 1 Criteria for Selecting Candidate Districts

	Criteria	Number of Districts Selected
1	Districts that have demands for construction of more than 450 new classrooms according to the EMIS were taken	42 out of the 75 districts were selected
2	Districts with poor access that would cause considerable difficulties in transporting the materials were excluded.	33 out of the 42 districts were selected
3	Districts that were covered by the last phase of Japan's Grant Aid were excluded	21 out of the 33 districts were selected

Table 2 Process of Selecting Candidate Districts from among 75 districts

No.	District	Demand for new classrooms	Demand that is more than 450	Access	Covered by the last phase of JGA	Candidate
1	Taplejung	393		×		
2	Sankhuwasabha	446		×		
3	Solukhumbu	290		×		
4	Panchthar	458		×		
5	Ilam	430				
6	Dhankuta	218				
7	Terhathum	245		×		
8	Bhojpur	347		×		
9	Okhaldhunga	385		×		
10	Khotang	802		×		
11	Udayapur	530				
12	Jhapa	645				
13	Morang	924				
14	Sunsari	547				
15	Saptari	348				
16	Siraha	485				
17	Dolakha	461				
18	Sindhupalchok	856				
19	Rasuwa	161		×		
20	Sindhuli	769				
21	Ramechhap	626		×		
22	Kavrepalanchok	1,203				
23	Nuwakot	621				
24	Dhading	1,340				
25	Makwanpur	872				
26	Dhanusha	949				
27	Mahottari	483				
28	Sarlahi	490				

No.	District	Demand for new classrooms	Demand that is more than 450	Access	Covered by the last phase of JGA	Candidate
29	Rautahat	676				
30	Bara	640				
31	Parsa	573				
32	Chitwan	745				
33	Lalitpur	475				
34	Bhaktapur	309				
35	Kathmandu	211				
36	Manang	64		×		
37	Mustang	154		×		
38	Gorkha	748				
39	Lamjung	436				
40	Tanahu	680				
41	Syangja	762				
42	Kaski	1,668				
43	Myagdi	379		×		
44	Parbat	432		×		
45	Baglung	601				
46	Gulmi	762				
47	Palpa	721				
48	Arghakhanchi	420				
49	Nawalparasi	875				
50	Rupandehi	668				
51	Kapilbastu	505				
52	Dolpa	265		×		
53	Jumla	313		×		
54	Kalikot	257		×		
55	Mugu	317		×		
56	Humla	336		×		
57	Pyuthan	627		×		
58	Rolpa	294		×		
59	Rukum	306		×		
60	Salyan	322		×		
61	Surkhet	813				
62	Dailekh	538		×		
63	Jajarkot	328		×		
64	Dang	609				
65	Banke	375				
66	Bardiya	439				
67	Bajura	59		×		
68	Bajhang	637		×		
69	Darchula	486		×		
70	Achham	821		×		
71	Doti	693		×		
72	Dadeldhura	445				
73	Baitadi	669		×		
74	Kailali	976				
75	Kanchanpur	399				
	Total	41,204				

During discussions in September 2007 between DOE and the Survey Team, DOE finally requested the eight (8) candidate districts listed in Table 4, which were selected from among the 21 candidate districts stated above on the basis of the criteria shown in Table 3.

Table 3 Criteria for Selecting the Final Candidate Districts

Criteria	Number of Districts Selected
1 Districts covered by previous support from Japan's Grant Aid were excluded	9 out of 21 districts were selected.
2 Districts with accessibility and other favorable conditions for the implementation of the Project were taken.	7 out of 9 districts were selected
3 Synergistic effects of collaboration with JICA 's technical cooperation projects.	addition of one district (Dhading)to the 7 districts

Table 4 Final Selection of Candidate Districts

No.	Districts	Previous JGA	Unfavorable conditions	Selected Districts
11	Udayapur		×	
12	Jhapa			
13	Morang			
14	Sunsari			
16	Siraha			
17	Dolakha		×	
26	Dhanusha			
27	Mahottari			
28	Sarlahi			
29	Rautahat			
31	Parsa			
32	Chitwan			
33	Lalitpur			
40	Tanahu			
42	Kaski			
45	Baglung			
46	Gulmi			
47	Palpa			
49	Nawalparasi			
50	Rupandehi			
61	Surkhet			
24	Dhading			

Table 5 Finally Requested Eight (8) Candidate Districts for the Project

	Name	Topography	School Construction Demand
1	Baglung	Hill	601
2	Dhading	Hill	1,340
3	Gulmi	Hill	762
4	Kaski	Hill	1,668
5	Lalitpur	Valley	475
6	Palpa	Hill	721
7	Rupandehi	Terai	668
8	Surket	Hill	813
	Total		7,048

The eight (8) candidate districts were surveyed and examined with the data collected during further studies in Japan by the Survey Team, and have been confirmed to be appropriate target districts for the project.

2) Selection Criteria for Target Schools

Under the program of EFA 2004-2009, in line with the decentralization policy of the government, DEO of each district is to prepare a priority list of target schools for constructing physical facilities according to criteria prescribed by DOE. The same modality will be applied to the selection of target schools for the Project as well. Namely, the DEO in each of the eight target districts will prepare a priority list of schools, from which the target schools will be selected that can be constructed within the management capacity and the budget of the Government of Nepal (See 5) a).

< Process for Giving Priority to Schools at which to Construct School Facilities >

1. Step 1: Educational Criteria

Schools shall be prioritized by the following processes:

- All of the schools providing inclusive education (i.e. Special education) are prioritized first
- All community managed schools are prioritized second
- The remaining schools are put in the priority order based on the following educational index set in the EMIS:

$$1) \text{ Enrolment of Deprived students}(x) = \frac{\text{No. of Deprived Students in PS}}{\text{Total No. of Students in PS}}$$

Weightage for x =40%

$$2) \text{ Enrolment of Girl Students}(y) = \frac{\text{No. of Girl Students in PS}}{\text{Total No. of Students in PS}}$$

Weightage for y=30%

$$3) \text{ Ratio of grade 5 to grade 1 students}(z) = \frac{\text{No of students in Grade 5}}{\text{No. of students in grade 1}}$$

Weightage z=30%

$$[\text{Index}] = 0.4x + 0.3y + 0.3z$$

Greater the value of index, higher the priority of the school for program implementation.

For each of the target districts, a long list of schools is to be prepared in the order of priorities stated above, then within the capacity of a particular project, schools will be selected from the long list in the order obtained with the criteria stated in below:

2. Need for school physical improvement program is determined on the basis of following criteria:

$$1) \text{ Adequacy of Classroom (ACR)} = \frac{\text{No. of Classrooms available in PS}}{\text{No. of classes in PS including section}}$$

If $ACR < 1$, school is eligible for NCR construction

$$2) \text{ Space Requirement (SR)} = \frac{\text{Total area of classrooms (in sqm)}}{\text{Total No. of students in PS}}$$

If $SR < 0.75$, school is eligible for NCR construction

$$3) \text{ Student Density (SD)} = \frac{\text{Total No. of students in PS}}{\text{Total No. of Classrooms available in PS}}$$

School is eligible if $SD > 50$ in Terai districts, $SD > 45$ in Hill districts, $SD > 40$ in Mountain districts

The schools are selected based on criterion 1), then on criterion 2), and lastly on criterion 3).

Because Dhading has been selected as one of the target districts of this project considering the synergy effect of collaboration with JICA technical cooperation projects, some of the target schools of the JICA technical

cooperation projects will be selected for the target schools of this project as well.

Actually, in December 2007, DOE already submitted to JICA Office in Nepal a list of candidate schools in each candidate districts, which is the compilation of the list submitted by DEOs of each candidate districts. (see Appendix-4) The list is to be reviewed and finalized based on the results of detailed surveys carried out by DOE at the implementation stage and in consultation with the Japanese side for the synergy effect of Japan's technical cooperation projects. Furthermore, some of the target schools might have to be changed at the stage of making construction contracts with communities.

3) Components to be Covered by the Project

During discussions in September 2007 between DOE and the Study Team, the following components were requested as the final components to be covered by the Project:

1. Major construction materials for classrooms
2. Major construction materials for toilets
3. Major construction materials for water supply systems
4. Classroom furniture

As for the items necessary for management and logistics support (vehicles, bicycles, computers, and printers), which were originally requested as essential items for the effective management of the Project, the Nepalese side understood that under the schemes of Japan's Grant Aid, these items are to be covered by the recipient countries.

As for the water supply systems, in the previous phases of the Project, those with steel pipe for tube well and hand pump were provided only to the schools in terai districts. For this phase of the Project, however, the Nepalese side requested inclusion of a new type of rain water storage tank for the schools in hill districts and valley districts as well. The study team reviewed the possibility of adopting the new system, and decided to adopt it with some modifications. (see 2-2(3))

As for support for the Capacity Building Program as well as Research and Innovation that were originally requested, it has been found that they could not be addressed under the scheme of Japan's Grant Aid, because they include training of DOE/DEO technical staff and policy makers in a third country that is at similar economic level.

Furthermore, in response to the request by the Nepalese side for a pilot study on cost effective and earthquake resistant building designs, it was noted that the request was to make necessary improvement of design and specification of the facilities including the seismic aspect, which had been made during previous phases of the Project as well, and accordingly it was confirmed that no soft component items were requested in this regard.

4) Number of the Facilities to be Constructed at a School Site

a) Classroom Building

Classroom buildings for primary schools selected according to the criteria stated in 2-1 (1) 2) above are the main facilities to be constructed under the Project. The number of classrooms at a site is determined from the results of a physical survey carried out by DEO within the capacities of communities for

participating in construction. In most cases, only one classroom block with two classrooms is to be constructed at a school, while in some special cases, two classroom blocks, (four classrooms) may be constructed at a school.

b) Toilet

To prepare a good sanitary environment at schools and provide students with adequate hygiene education, a toilet block with one booth plus urinals for boys and another toilet block with one booth plus urinals for girls will be built separately at each target school where a classroom block(s) is(are) to be constructed by the Project and the capacities of the existing toilets are under the standards of DOE, which are as stated below:

Boys: 40 students/booth

Girls: 25 students/booth

c) Water Supply

As in the case of toilets, to prepare a good sanitary environment at schools and provide students with adequate hygiene education, a set of water supply facilities will be installed for each target school where a classroom block(s) is(are) to be constructed, and there is no water supply in the compound.

In the terai districts, a hand pump set with GI pipes will be provided. To respond to the arsenic problem, the Government of Nepal will carry out appropriate tests for each water supply facility provided under the Project, and will take necessary measures in case arsenic contamination exceeds the level accepted by the guideline of the Government of Nepal.

In hill districts, the traditional type of water supply is to provide surface water from a remote highland by gravity through a long water pipe, which does not come under Japan's Grant Aid scheme because of the difficulty in estimating the quantity of pipes required and monitoring after provision of materials. Recently, in some hill districts, however, a new system(s) using rain water from building roofs for non-potable purposes has been introduced and successfully maintained. The system(s) could come under Japan's Grant Aid without difficulties. Hence, a set of rain-water storage facility, which is made of stone masonry walls covered with a concrete lid, is to be provided for each target school where no water supply system exists.

d) Furniture for Classrooms

Three-seater benches and desks, which comprise the standard furniture of DOE, will be provided for classrooms constructed. The quantity of furniture to be provided in each classroom is shown below:

Terai: 50 students /classroom 17 Sets (Long Desk and Bench)

Hill: 45 students /classroom 15 Sets (Long Desk and Bench)

5) Number of Facilities in Each District

a) Demand and Management Capacity for Constructing Classrooms

The maximum number of classroom construction in each target district will be determined within the

demand for classroom construction. The total demand of all eight districts is 7,048 classrooms as shown in Table 5. On the other hand, because the classrooms are to be constructed with community participation, the maximum number of classrooms to be constructed is to be determined within the construction management capacity of the Nepalese side. The number of school sites that could be controlled well by technical staff allocated by DOE would be, according to the past project experience, around 40 schools in the case of hill districts and 80 schools in the case of terai districts. Above number of schools will be selected in each of the target districts according to the selection criteria shown in (1) 2). In addition to them, some of the schools that are selected as target schools for the JICA technical cooperation projects, such as “Community-based Alternative Schooling Program”, “The Support for Improvement of Primary School Management”, and “The Support for Improvement of School Health and Nutrition (tentative name)”, are to be selected as target schools for this project as well aiming at synergy effect in collaboration with the technical cooperation projects. While Dhading is the only one overlapped target district both for this project and for the technical cooperation projects, it has been confirmed that the technical staff allocated by DOE in Dhading will be capable of controlling the construction of up to 50 classroom blocks. Hence, the number of schools to be constructed in Dhading district will be 50 classroom blocks instead of 40.

b) Number of Other Facilities (Toilet, and Water Supply)

Once the target schools for classroom construction are determined, the number of other facilities to be constructed at each site are automatically determined according to the processes described in 2-1 (1) 4) above.

The numbers of facilities assessed from data in the list of schools submitted by DOE to JICA in December 2007 are shown in Table 6. As stated in the previous section, the numbers of facilities are subject to change in case the target schools are changed. Therefore, the numbers of facilities will be finalized on the basis of the results of the latest physical surveys to be carried out by DEOs by the beginning of the detailed design phase in accordance with the criteria stated in the Basic Design Report, and the upper limits of numbers stated in the Report. More specifically, the number of classrooms to be constructed in each district shall not exceed the numbers stated in the Report, while the number of toilets or water supplies in a district may exceed the number stated in the Report to compensate for a decreasing number in other districts, so that the total number of facilities does not exceed the number stated in the Report.

In case the finally assessed total number of facilities is less than the total number stated in the Report, the Project shall be implemented with the finally assessed number of facilities. In case the finally assessed number of facilities exceeds the upper limit stated above, the balance will be covered by the Nepalese side.

Table 6 Numbers of Proposed Facilities in Each District

District Name	Classroom Blocks*		Toilet Sets**		Water Supply		Classroom Furniture Sets
	Terai	Hill	Terai	Hill	Terai	Hill	
Baglung		40		39		11	1,200
Dhading		50		48		29	1,500
Gulmi		40		39		11	1,200
Kaski		40		40		4	1,200
Lalitpur		40		37		2	1,200
Palpa		40		40		14	1,200
Rupandehi	80		80		9		2,720
Surkhet		40		39		10	1,200
Total	80	290	80	282	9	81	11,420

*One classroom building has two classrooms

**One toilet set has two blocks (1 for boys and 1 for girls)

6) Materials to be Covered by the Project

a) Construction Materials

The materials to be covered by the Project are the major construction materials for the construction of classrooms and toilets including:

- Roofing (CGI sheet, including furnishing metal and training by supplier)
- Roof truss (steel pipe, including furnishing metal and training by supplier)
- Steel post (including furnishing metal and training by supplier)
- Cement
- Reinforcement bar
- Brick
- Doors & windows frame
- Doors & windows shutter
- Furnishing metal for doors & windows
- Paint
- Translucent sheet

b) Water Supply Systems

In a terai district, a hand pump set with GI pipes will be procured.

In a hill district, materials for constructing a set of Rain Water Collecting Unit are to be procured including plastic Gutters and Plastic Lead Pipes.

c) Furniture for Classrooms

Three-seater benches and desks, which comprise the standard furniture of DOE, will be provided for the classrooms constructed. The quantity of furniture to be provided in each classroom is shown below:

Table 7 Quantities of Furniture per Classroom

Classroom Plan Type	Students Accommodation	Quantities of Furniture
Terai Type	50	17
Hill Type	45	15

(2) Consideration of the Natural Conditions

1) Topography

While there is a wide range of environmental conditions (climate, geology, topography, infrastructure, etc.) within the country, all 75 districts in Nepal are divided roughly into three categories: terai, hill, and mountain. DOE has made a variety of standard designs for classroom buildings to meet the requirements for each of the categories of natural conditions. Under the Project, eight target districts are scattered in terai and hill districts. Hence, a type of classroom building design for each of these two areas is to be selected for the project.

For building walls, brick masonry walls are generally used in a terai district, because bricks are easily available from the local chimneys located all over the terai area while natural stone masonry walls are often used in hill and mountain districts because stones are relatively easy to collect in these areas. Under school construction by EFA (2004-2009), in hill districts, communities are to collect the stones by themselves with some financial support from the Government of Nepal. Exceptionally, in some hill districts where bricks and/or concrete blocks are more easily available than stone, DOE accepts their use instead of stone.

The depth of tube wells in each district is based on the average depth of the underground water table in the area. The depth of tube wells in Rupandehi will be 42 m.

2) Precipitation and Hot Climate

In each terai, hill, and mountain district, during the rainy season, normally from June to September, measures should be taken against heavy rainfall, which is sometimes accompanied by strong winds.

Schools should not be built at hazardous locations. In front of a classroom, a terrace with an extended roof overhang is designed to accommodate students when it is raining. Moreover, under the Project, a translucent sheet is to be arranged at the opening of the tops of the walls to prevent rain from blowing into a classroom without intercepting natural light.

It gets very hot during the summer in a terai district, therefore, the ceiling height of a terai-type classroom is designed to be higher than those of hill and mountain types to mitigate the effects of heat.

3) Wind Load

The design wind load is to comply with the Indian Code IS 875 Part 3. Considering the highest wind speed shown in the wind map is 55 m/s, the wind pressure works out to be approximately 2 kN/m²

4) Earthquake

It is difficult to assess earthquake resistance of the buildings with traditional masonry structures through

calculations of the allowable stresses of structural members. In 2002, DOE introduced a standard design with a steel frame for the main structure, which is much safer in the event of an earthquake. The steel-frame structure will be applied in this Project.

5) Natural Lighting and ventilation

By introducing a steel-frame structure as in the case of DOE standard design of classroom block, the building can more easily receive as much natural light and ventilation as necessary. The ratio of the total area of the openings to the classroom area ensures more than 20%, with a gap between the walls and the roof, on assumption that classes are held with windows open.

(3) Consideration of Social Conditions

As many areas of the target districts are economically challenged, facilities are designed to use local materials and local construction methods so that the communities can easily and economically construct and maintain the buildings.

DOE has recently adopted the policy of accepting disabled students at all schools in the country. The policy now is to design all classrooms to accommodate disabled students by widening one of the classroom doors and adding a ramp to the classroom block. The design of the classrooms under the Project will follow the policy. It has recently been reported that girls tend to be reluctant to use toilets when the booth is in one block together with the boys' booth. Hence, DOE is now instructing DEOs to construct toilets for boys and girls separately. On the other hand, DOE also adopted a toilet design that accommodates disabled students with an enlarged booth and a wide door. However, DOE does not include ramp way assuming that a helper could take care of a wheelchair. The school physical facilities will be designed in line with these policies of the Government of Nepal.

(4) Consideration of Local Conditions of Building Construction/Procurement of Materials

The Nepal National Building Code (NNBC) was authorized in 1997, and the school facilities constructed in EFA 2004-2009 are in conformity to NNBC structural standards and other codes. The standard design of the facilities under the Project will also follow NNBC wherever practical.

The structures of the classroom buildings are designed to meet the following structural code:

- IS code No. 875: for all types of loading
- IS code No. 800: for steel structure

The following software is used for the structural analysis:

- STAAD Pro 2001 Indian version, Research Engineers Pvt. Ltd.

(5) Consideration of Using Local Consultants and Sub-contractors

Construction works are to be implemented with community participation. Therefore, the maximum use of local methods of construction, materials, and manpower is advantageous. The standard designs of the facilities have been prepared with these considerations. To obtain appropriate qualities of materials, as well

as to secure their timely delivery, materials are to be procured under the control of a supplier at the central level. When procuring materials and supervising the procurement of materials, local consultants and suppliers should be used to the maximum to reduce costs for the entire project.

(6) Consideration of Maintenance of Facilities

The facilities constructed in the Project are to be operated and maintained by the communities. In this respect, the maximum use of local methods of construction and materials would naturally be advantageous. On the other hand, use of sophisticated equipment, which might result in high operating and maintenance costs, is not recommended.

(7) Consideration of Grade of Facilities

The quality of the facilities is to be sufficiently good and durable for the use as primary school facilities in the range that can be achieved by construction with community participation.

(8) Consideration of Time Schedule

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

- 1) Rainy season (June to September) makes transportation of materials and construction work difficult in many areas.
- 2) Avoid busy farming seasons in rural areas; bricks are manufactured normally after harvesting season. Therefore, materials will be delivered during six months from December, so that delivery of materials and the construction work can be completed before the rainy season.
- 3) The fiscal year of Nepal starts in mid-July. It is advisable, therefore, to sign the Exchange of Notes between the two countries in August at the latest, preferably in mid-June or before.

2-2-2 Basic Plan

(1) Overall Planning

- 1) Standard Designs of the Facilities by DOE

1)-1 Standard Designs of Classroom Building

DOE has prepared a variety of standard designs for the classroom buildings to be constructed under EFA(2004-2009) as shown in Table 9, so that communities can choose one considering various conditions such as cost, local industries, topography, and technical capacity. Among the standard designs, there is a type introduced at the beginning of BPEP-II, adopting a steel-frame structure instead of brick or stone masonry load-bearing wall structures, which are commonly used as traditional designs in Nepal. This new design was also adopted in the Project under Japan's Grant Aid with some minor modifications. Through the implementation of the Grant Aid Project, it has been found that the newly introduced designs are working quite well in terms of safety, cost, ease of transportation, and ease of construction.

Therefore, the same types of standard design will be adopted with some very minor improvements as stated below:

- a) Reduce sound transmission through the partition between classrooms by adding one more layer of CGI sheet, or other methods.
- b) Add RCC bands at the corners of external walls, thus improving the earthquake resistant performance of the walls.
- c) Add eave gutter to collect rain water (in hill districts only)
- d) Adjust the space above the walls so that children cannot pass through.
- e) Add horizontal member(s) to window grills
- f) Other improvements that could be done at reasonable cost or no increase of cost

1)-2 Standard Designs of Toilet

While it has been noted that a toilet is an important component of a school, most schools do not have necessary number of toilets. At some schools, only teachers use the toilet(s). As a logical solution, DOE has introduced standard designs for toilet blocks with a urinal room.

For the Project, a toilet block with one booth and a urinal room for boys, and another block with one booth and a urinal room for girls, will be constructed separately following the policy of DOE. The roof structure and door frame will be of steel.

1)-3 Standard Designs of Water Supply Units

While water supply facilities are recognized by the government of Nepal as well as by the donors as essential components of school facilities, water supply facilities were provided only in terai districts in the previous phases of the Project under Japan's Grant Aid for the following reasons.

In terai districts, water is generally obtained from tube wells that could be constructed easily by local contractors. The depths of wells can be estimated easily. So, the estimation of the quantities of materials, supervision of work, and confirmation of completion are relatively easy. On the other hand, in hill districts, the traditional type of water supply is to provide surface water from a remote highland by gravity through a long water pipe, which makes it difficult to estimate the quantity of pipes and to monitor their use after provision of materials.

Recently, in some hill districts, however, a new system(s) of using the rain water from building roofs for non-potable purposes has been introduced and successfully maintained. The system(s) could come under Japan's Grant Aid without difficulties. The Government of Nepal requested the study team to review the possibility of applying the newly introduced system. In response to the request, the study team carried out a field survey in Palpa and Gulmi with site inspections, interviewing the people concerned, and then interviewed members of an INGO in Kathmandu. The results of the field survey are as follows.

In Gulmi, a rainwater storage system has been introduced at a variety of sites such as private residences, merchandize stores, and schools, etc. In most cases, the rainwater was used for cleaning and/or laundry etc., and potable water was obtained from other safer sources. Such rainwater storage systems were installed with some participation from users, the extent of participation being very different from one

case to another.

The rainwater storage tanks that were often observed in both districts were those made of ferro-cement in the shape of a big jar, which is called a Modified Tai Jar Type. Only workers with special skills can construct tanks of this type, and a training course of about three weeks would be necessary to train skilled workers. The cost of a Jar, which naturally depends on capacity, would not be very different from the cost of a tube well in a terai district. Durability is assumed to be 10 years or more, although it was not precisely known because only eight years had passed from the introduction of the tanks to Nepal. (Information obtained from interviews with members of International Development Enterprise, (IDE))

Consequently, the recommended designs of the water supply systems for the Project are as follows.

The water supply system in a terai district will be the same type that adopted in the previous phase of the Project, which is a tube well with hand pump set. The depth of the well is estimated to be 42 m.

The water supply system in a hill district is to be a stone masonry rainwater storage tank with upper caps of reinforced concrete panels, which can be constructed with ordinary construction skills without providing special training.

1)-4 Standard Designs of Classroom Furniture

The study team reviewed two typical examples that have recently been adopted in the school construction projects by DOE, one of them was adopted in a project by UNICEF and the other was adopted in the previous phase of the Project under Japan's Grant Aid. A comparison is shown in Table 8.

Table 8 Comparison of Classroom Furniture Designs

		UNICEF	Japan	Remarks
Desk	Descriptions	3 types (one each for the different grade, lower, middle, and higher.	1 type for Middle and Higher grades	Lower : 1~2 Years Middle : 3~4 Years Higher : 5 Years
	Sizes	L:1,350x400x300 mm M:1,370x350x575 mm H:1,370x350x610 mm	1,143x381x520.7 mm	
	Materials	Top: Wood Blocks 19mm thick, edge:12 mm wood piece with cut corners Legs: Steel Pipes square section 25x25x2 mm with plastic caps at bottoms Storage: Steel Plate 1.6 mm	Top: Ply wood 19 mm thick Stand Frame: Steel Bar 12mm and Flat Bar 25x4 mm	
Bench	Descriptions	2 types for M and H Grades 1 seater L grade students are to sit on the floor	1 type for M and H Grades 3 seater	
	Sizes	M : 400x300x350 mm H : 400x300x375 mm	1,143x228.6x317.5 mm	
	Materials	Top: Wood Blocks 19 mm thick, edge:12 mm wood piece with cut corners Legs: Steel Pipes square section 25x25x2 mm with plastic caps at bottoms	Top: Ply wood 19 mm thick Stand Frame: Steel Bar 12 mm and Flat Bar 25x4 mm	
How to Build up	Complete at Delivery	Built up at sites by the communities		
Advantages	More child friendly (curved corners and plastic foot caps) More varieties in size	Easier to transport Low production cost Lower Costs for production and transportation		
Disadvantages	Higher Costs for production and transportation Not easy to transport Too large for L grade	Relatively unfriendly to child Too large for L grade		

The target schools for the Project are expected to be those located in remoter areas than those covered by the UNICEF project. Hence, it is essential to keep the design suitable for ease of transportation. It is recommended that the design of the classroom furniture should be the same type as that adopted in the previous phase of the project with some possible modifications to make it more child friendly without major increase of production cost.

Table 9 Standard Designs of Classroom Buildings by DOE

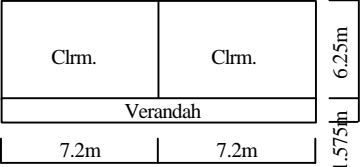
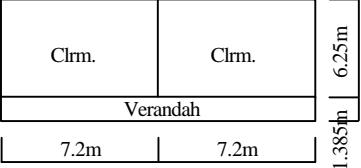
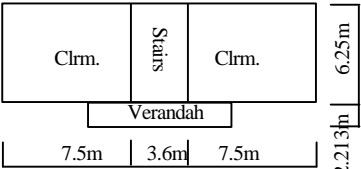
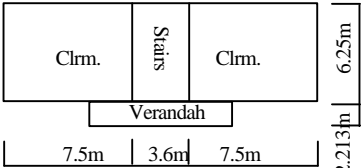
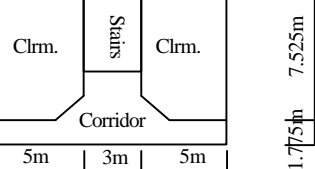
Classroom Building, Mountain Type

No.	Topography	Plan Type	Structure & No. of Classrooms	Specification				Room Size (m, m ²)			Room Area per Student	No. of Students per Room
				Wall	Roof Truss	Roof	D&W Frame	Length	Breadth	Area		
1	Mountain		Steel Post & Truss 1 Story 2 Classrooms (Previous JGA Project Plan Type)	Stone masonry in cement mortar + concrete band	Steel Truss	CGI Sheet	Steel	6.800	4.625	31.450	0.75	42
2	Mountain		Stone Masonry & Wooden Truss 1 Story 2 Classrooms	Stone masonry in mud mortar + concrete band	Wooden Truss	CGI Sheet	Wooden	6.800	4.200	28.560	0.75	38
3	Mountain		Stone Masonry & Steel Truss 1 Story 2 Classrooms	Brick masonry in cement mortar + concrete band	Steel Truss	CGI Sheet	Wooden	6.800	4.200	28.560	0.75	38

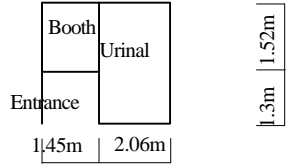
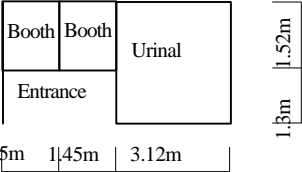
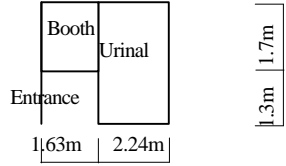
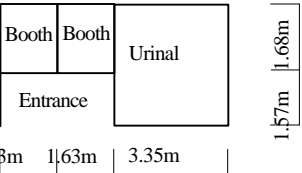
Classroom Building, Hill Type

No.	Topography	Plan Type	Structure & No. of Classrooms	Specification				Room Size (m, m2)			Room Area per Student	No. of Students per Room
				Wall	Roof Truss	Roof	D&W Frame	Length	Breadth	Area		
4	Hill		Stone Masonry 1 Story 2 Classrooms (3rd JGA Project Plan Type)	Stone masonry in mud mortar + concrete band	Steel Truss	CGI Sheet	Steel	7.500	4.575	34.313	0.75	45
5	Hill		Stone Masonry 1 Story 2 Classrooms	Stone masonry in mud mortar + concrete band	Wooden Truss	CGI Sheet	Wooden	6.800	4.200	28.560	0.75	38
6	Hill		Stone Masonry 1 Story 2 Classrooms	Stone masonry in mud mortar + wooden band	Wooden Truss	CGI Sheet	Wooden	6.800	4.200	28.560	0.75	38
7	Hill		Brick/Stone Masonry 2 Stories 4 Classrooms	Load bearing brick/Stone masonry in cement mortar + concrete band	Steel Truss	CGI Sheet	Wooden	8.025	4.175	33.504	0.75	45
8	Hill		Brick/Stone Masonry 2 Stories 4/8 Classrooms	Load bearing brick/Stone masonry in cement mortar + concrete band	Steel Truss	RCC Slab (CGI Sheet above stairs)	Wooden	8.025	4.175	33.504	0.75	45

Classroom Building, Terai Type

No.	Topography	Plan Type	Structure & No. of Classrooms	Specification				Room Size (m, m2)			Room Area per Student	No. of Students per Room
				Wall	Roof Truss	Roof	D&W Frame	Length	Breadth	Area		
9	Terai		Brick Masonry 1 Story 2 Classrooms (3rd JGA Project Plan Type)	Brick in cement mortar + concrete band	Steel Truss	CGI Sheet	Steel	6.950	6.000	41.700	0.75	55
10	Terai		Steel Post & Truss 1 Story 2 Classrooms (Previous JGA Project Plan Type)	Brick in cement mortar + concrete band	Steel Truss	CGI Sheet	Steel	6.950	6.000	41.700	0.75	55
11	Terai		Brick Masonry 2 Stories 4 Classrooms	Load bearing brick in cement mortar + concrete band	Steel Truss	CGI Sheet	Wooden	7.125	5.875	41.859	0.75	55
12	Terai		Brick Masonry 2 Stories 4/8 Classrooms	Load bearing brick in cement mortar + concrete band	Steel Truss	RCC Slab (CGI Sheet above stairs)	Wooden	7.125	5.875	41.859	0.75	55
13	Urban Area		Reinforced Concrete 2 Stories 4 Classrooms		-	RCC Slab (Roof top verandah)	Wooden	4.750	7.000	33.250	0.75	44

Toilet

No.	Topography	Plan Type	Structure	Specification			Nos. & Unit Area of Booth	Capacity of Urinal
				Wall	Roof Underlining	Roof		
1	Terai		Brick Masonry 1 Story	Brick masonry with cement mortar	Wooden beam & rafter	CGI Sheet	1 booth 1.22x1.27 m	6 persons
2	Terai		Brick Masonry 1 Story	Brick masonry with cement mortar	Wooden beam & rafter	CGI Sheet	2 booths 1.22x1.27 m	12 persons
3	Mountain Hill		Stone Masonry 1 Story	Stone masonry with mud mortar	Wooden beam & rafter	CGI Sheet	1 booth 1.22x1.3 m	6 persons
4	Mountain Hill		Stone Masonry 1 Story	Stone masonry with mud mortar	Wooden beam & rafter	CGI Sheet	2 booths 1.22x1.3 m	12 persons

3) Floor Areas and Descriptions of Proposed Facilities

The floor areas are calculated according to the method prescribed in the Building Law of Japan, namely the plan sizes are measured at the centerlines of the walls. Half of the area of the terrace/external corridor, and 30% of the area of the ramp are included in the construction work floor area.

Table 10 Floor Areas of the Buildings

Plan Type	Seat		Calculation	Add in ratio	Construction Work Area (sqm)	Total Floor Area (sqm)
Terai Clrm. Building	100	classroom	14.4×6.25	1.0	106.62	90.00
		corridor	14.4×1.5	0.5		
		ramp, stair	15.9×1.1	0.333		
Hill Clrm. Building	90	classroom	16×5.025	1.0	98.55	80.40
		corridor	16×1.5	0.5		
		ramp, stair	16.7×1.1	0.333		
Terai Toilet	1+6	booth	1.5×1.81	1.0	10.01	7.56
		urinal	1.5×1.84+1.3×1.6	1.0		
		Front room	1.3×2.06	0.5		
		septic tank	1.83×1.83	0.333		
Hill Toilet	1+6	booth	1.745×2.29	1.0	14.07	10.47
		urinal	1.745×2.29+1.355×1.83	1.0		
		Front room	1.355×2.74	0.5		
		septic tank	2.29×2.29	0.333		

Table 11 Floor Areas in Each District

Floor Area /Block	Classroom Block Terai		Classroom Block Hill		Toilet Block Terai		Toilet Block Hill		Total (sqm)
	90.00		80.40		7.56		10.47		
District	No. of Blocks	Floor Area (sqm)	No. of Blocks	Floor Area (sqm)	No. of Blocks	Floor Area (sqm)	No. of Blocks	Floor Area (sqm)	
Baglung			40	3,216			78	817	4,033
Dhading			50	4,020			96	1,005	5,025
Gulmi			40	3,216			78	817	4,033
Kaski			40	3,216			80	837	4,053
Lalitpur			40	3,216			74	775	3,991
Palpa			40	3,216			80	837	4,053
Rupandehi	80	7,200			160	1,210			8,410
Surket			40	3,216			78	817	4,033
Total	80	7,200	290	23,316	160	1,210	564	5,905	37,631

Table 12 Structure and Finish Schedule

Classrooms (Terai Type)	
(Structure)	
(Main Structure)	Single Story, (Steel Frame Structure)
(Roof/Post)	MS Tubular Truss, 26 Gauge-CGI sheet (Standard)
(Foundation)	Column Brick Footing, Continuous Brick Footing
(External)	
(Roof)	26 Gauge-CGI sheet(Standard)
(Wall)	Brick Masonry, Waterproof Painting
(Corridor Floor)	Cement Plaster Finish
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Cement Plaster, Lime Finish
(Opening)	Salwood Framed Plywood Panel for Doors/ Window Shutters, Enamel Paint MS Door/ Window Frames, Enamel Paint
(Blackboard)	Cement Plaster, Paint
(Ceiling)	MS Tubular Truss Exposed

Classrooms (Hill Type)	
(Structure)	
(Main Structure)	Single Story, (Steel Frame Structure)
(Roof/Post)	MS Tubular Truss, 26 Gauge-CGI sheet (Standard)
(Foundation)	Column Stone Footing, Continuous Stone Footing
(External)	
(Roof)	26 Gauge-CGI sheet(Standard)
(Wall)	Stone Masonry with Mud Mortar, Mortar Pointing
(Corridor Floor)	Cement Plaster Finish
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Cement Plaster, Waterproof Painting
(Opening)	Salwood Framed Plywood Panel for Doors/ Window Shutters, Enamel Paint MS Door/ Window Frames, Enamel Paint
(Blackboard)	Cement Plaster, Paint
(Ceiling)	MS Tubular Truss Exposed

Toilet (Terai)	
(Structure)	
(Main Structure)	Single Story, Load Bearing Wall Structure
(Roof)	MS Tubular beam, 26 Gauge-CGI sheet
(Foundation)	Continuous Brick Footing
(External)	
(Roof)	26 Gauge-CGI sheet
(Wall)	Waterproof Painting
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Cement Plaster, Waterproof Painting
(Opening)	Salwood Framed Plywood Panel for Door Shutters, Enamel Paint MS Door/ Window Frames, Enamel Paint
(Ceiling)	MS Tubular Beam Exposed

Toilet (Hill)	
(Structure)	
(Main Structure)	Single Story, Load Bearing Wall Structure
(Roof)	MS Tubular beam, 26 Gauge-CGI sheet
(Foundation)	Continuous Stone Footing
(External)	
(Roof)	26 Gauge-CGI sheet
(Wall)	Mortar Pointing
(Internal)	
(Floor)	Cement Plaster Finish
(Wall)	Cement Plaster, Waterproof Painting
(Opening)	Salwood Framed Plywood Panel for Door Shutters, Enamel Paint MS Door/ Window Frames, Enamel Paint
(Ceiling)	MS Tubular Beam Exposed

(2) Material Planning

1) List of Materials

The unit quantities of materials necessary for each block of the facilities are shown in **Table 13**.

Table 13 Quantities of Materials Per Block of Each Facility

No.	Material	Unit	Classroom Block		Toilet Block		Water Supply Unit	
			Terai	Hill	Terai	Hill	Terai	Hill
1	Bricks	Pcs	30,300.00	0.00	9,600.00	0.00		
2	Ordinary Portland Cement	Bag(50kg)	160.00	139.00	68.00	24.00		8.00
3	Reinforcement							
a.	10/12 mm dia ribbed bar	Kg	348.00	253.00	51.00	84.00		29.66
b.	4.75 mm dia steel bar	Kg	58.00	94.00	10.00	10.00		
c.	Binding wire	Kg	5.00	4.00	1.00	1.00		0.30
4	MS frames (40 x 40x 4)							
a.	Door frames	m2	8.40	8.40	4.14	4.14		
b.	Window frames with grills	m2	14.58	14.58				
5	Wooden shutters							
a.	Door shutters D(1.1*2.1)	Pcs	2.00	2.00	1.00	1.00		
b.	Door shutters D1(0.9*2.1)	Pcs	2.00	2.00	1.00	1.00		
c.	Window shutters(0.9*1.3)	Pcs	24.00	24.00				
6	Painting on shutters							
a.	One coat primer	L	4.00	4.00	1.00	1.00		
b.	Two coats of enamel paint	L	8.00	8.00	1.50	1.50		
7 a.	Truss complete set including posts	Kg	1,846.00	1,886.61				
b.	Roof structure for toilet	Kg			75.00	83.00		
8	Red water proof cement paint outside	Kg	44.00	0.00	18.00			
9	White water proof cement paint	Kg	67.00	70.00	16.00	24.00		2.01
10	CGI sheets 26 gauge (0.50 mm)	m2	276.02	265.55	24.00	41.16		
11	GI sheets 26 gauge (0.50 mm)	m2	8.67	9.40				
12	Translucent sheets (2mm thick)	m2	26.88	36.58				
13 a.	J-hooks set (7.5 mm dia)	Pcs	543.00	613.00				
b.	J-hooks set (small)	Pcs	341.00	332.00	95.00	142.00		
14	Tower bolt							
a.	100 mm long	Pcs	48.00	48.00				
b.	150 mm long	Pcs	8.00	8.00	2.00	2.00		
15	Handles (100mm x 25 mm)	Pcs	32.00	32.00	4.00	4.00		
16	Sliding bar locking set	Pcs	2.00	2.00	2.00	2.00		
17	Screws							
a.	a) 25 mm long	Pcs	700.00	700.00	25.00	25.00		
b.	b) 30 mm long	Pcs	100.00	100.00	59.00	59.00		
18	Steel hooks for windows	Pcs	24.00	24.00				
19	Orrisa pan with "P / S" - trap, etc	Set			1.00	1.00		
20	Donation board	Pcs	1.00	1.00				
21	f 1.5"GI Pipes(for Tube Well)	M					42.00	
22	Hand Pump set	Pcs					1.00	
23	Water Tap for Rainwater Tank	Set						1.00
24	f 140 mm PVC Gutter w/ fittings	m						35.64
25	f 140 mm PVC Gutter w/ fittings	m						20.00