National Disaster Management Agency
The Republic of Indonesia

No.

Urgent Project on Reconstruction of Schools Considering Quake-Resistance and Community based Disaster Risk Management in the Province of West Sumatra in the Republic of Indonesia

Model School Construction and Community based Disaster Risk Management Activity Report

AUGUST 2011

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)

YACHIYO ENGINEERING CO., LTD
OYO INTERNATIONAL COOPERATION

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MODEL SCHOOL CONSTRUCTION REPORT

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1. Background

A massive earthquake with a magnitude of 7.6 occurred in waters off the west coast of the Sumatra Island (approximately 45 kilometers west-northwest of Padang City) in the Republic of Indonesia (hereinafter referred to as "Indonesia") at 5:16 pm on September 30, 2009, (local time). It caused a total damage of 21.6 trillion rupiahs (approximately 229.8 billion Japanese yen) as well as 1,119 deaths and missing persons, 1,214 seriously injured persons and 1,688 injured persons. A total of 259 primary school classrooms and 158 junior high school classrooms were completely destroyed or seriously damaged in Padang City and another 1,140 primary school classrooms and 222 junior high school classrooms were completely destroyed or seriously damaged in Padang Pariaman District.

The West Sumatra and Jambi Natural Disasters: Damage, Loss and Preliminary Needs Assessment released in October 2009 by the National Disaster Management Agency (BNPB), etc., points out in 6.1 Disaster Preventive Measures in Recovery and Rehabilitation that existing school building structures are fragile and safe quakeproof buildings need to be constructed in order to protect students' lives in case of earthquake occurrences in the future (p. 114).

The disaster preparedness and rehabilitation system of Indonesia changed significantly after the earthquake and tsunami in waters off Sumatra in 2004 and the National Disaster Management Agency was established in January 2008 based on the law No. 24/2007. Based on the law, the West Sumatra Province formulated the West Sumatra Province: Disaster Management Plan 2008-2012 from July 2007 to August 2008 and it was formally announced as the annex of the West Sumatra Provincial Ordinance No. 115/2008 when it was put into effect on December 30, 2009.

The West Sumatra Province: Disaster Management Plan 2008-2012 states its vision, West Sumatra Well-Prepared, Robust and God-Defended in Facing Disaster, as well as its mission, objectives, policy, programs and actions. The Disaster management bureau (BPBD) and the disaster management committee were organized under the National Disaster Management Agency (BNPB) and the West Sumatra Provincial Governor and the budget is allocated. The plan contains not only what the public entities do but also participation and cooperation of communities, private sector, NGOs and universities.

Against the backdrop, there is very urgent need to reconstruct earthquake-resistant school buildings. In doing so, there was urgent need to reconstruct schools that were structurally fragile and whose rooms were insufficient before the earthquake into a model school that is quake-resistant and safe and serves as a base of community disaster management in accordance with the standards of the Ministry of National Education.

2. Selection of Target Schools

2.1 Schools Requested by Indonesia

Indonesia originally requested reconstruction of seven schools listed below.

Number	Code	Name of School	Region
1	SMPN7	Padang	Padang City
2	SDN15	Surau Gadang	Padang City
3	SDN02	V Koto Timur	Padang Pariaman District
4	SDN08	Enam Lingkung	Padang Pariaman District
5	SDN08	Sintuk Toboh Gadang	Padang Pariaman District
6	SMPN1	Enam Lingkung	Padang Pariaman District
7	SMPN2	Lubu Alming	Padang Pariaman District

Indonesia later added the schools below.

Number	Code	Name of School	Region
8	SMPN25	Padang	Padang City
9	SDN02	Padang	Padang City
10	SDN23/24	Padang	Padang City
11	SDN03	V Koto Kampung Dalam	Padang Pariaman District
12	SDN08	IV Koto Aur Malintang	Padang Pariaman District
13	SDN07	Sungai Geringging	Padang Pariaman District
14	SDN30	Sungai Geringging	Padang Pariaman District
15	SDN05	V Koto Kampung Dalam	Padang Pariaman District
16	SMPN1	Enam Lingkung	Padang Pariaman District

Through discussions with Indonesia on December 19 and 20, 2009, schools 2: SDN15 Surau Gadang, 6: SMPN1 Enam Lingkung, 7: SMPN2 Lubu Alming, 12: SDN08 IV Koto Aur Malintang, and 14: SDN30 Sungai Geringging were withdrawn because they receive private support and for other reasons and SDN01 Enam Lingkung, SMPN1 Vx11 Enam Lingku (2x11 Kayu Taman), SMPN3 2x11 Kayu Taman, and SDN05 Batang Gasan1 in Padang Pariaman District were added.

2.2 Selection Criteria and Results

The followings are the criteria for selection of the target schools:

(1) Government school with the land owned by the government

[1] SDN05 is spelled Batang Gasan hereinafter although it is spelled Batang Gesan in the minutes signed December 23, 2009, as it was a misspelling.

(2) Extensively damaged by the earthquake
(3) Availability of flat land of a sufficient size for the construction of a new building
(4) No reconstruction plan by the government or other donors
(5) Access to the site by vehicle for the transportation of construction materials
(6) No risk for natural hazard such as land slide and flood
(7) Higher risk for earthquake damages
(8) Existence of a local PTA for maintenance
(9) Standard size of school on major road as model school
(10) Population in the school district sufficient enough for community disaster management activities and school location suitable as evaluation site

In the site survey on December 19 and 20, 2009, it was discovered that the damage caused by the earthquake to SMPN1 2x11 Kayu Taman and SMPN3 2x11 Kayu Taman was limited and thus they do not fulfill the selection criteria (2) and thus it was excluded from the Project. It was also discovered that 9: SDN02 Padang sits on the same site together with three other schools, SDN03, 07 and 08, and it is difficult to reconstruct only one school. As a result, the three schools were also excluded from the project.

Indonesia requested to select one school from Padang City and one school from Padang Pariaman District.

As a result of the site survey on December 19 and 20, 2009, SDN23/24 Padang in Padang City and SDN08Sintuk Toboh Gadang from Padang Pariaman District were chosen for reasons described below.

＜SDN23/24 Padang＞

◊ SDN23/24 is the only school that is qualified after the other requested schools, two primary and two junior high schools, are excluded.
◊ It was seriously damaged and Indonesia is demolishing and removing the school buildings.
◊ It is in central Padang City and it is easily noticed.
◊ It is situated in an area that may be hit by tsunami and it can serve as an evacuation center in case of tsunami attacks.
◊ It can serve as a model for sharing special classrooms for schools that sit on the same site.

＜SDN08Sintuk Toboh Gadang＞

◊ It received extensive damage to a degree of almost complete destruction.
◊ It faces a road with heavy traffic between the airport and Padang City and thus it is easily accessible and can be noticed.
◊ It has six classes, which is a standard primary school.

Map-1 shows the location of the schools.

List of Selected Schools

Region	Code	Name of School
Padang City	SMPN7	Padang
	SMPN25	Padang
Padang Pariaman District	SDN02	V Koto Timur
	SDN08	2X11 Enam Lingkung
	SDN03	V Koto Kanpung Dalam
	SDN07	Sungai Geringging
	SMPN1	Enam Lingkung
	SDN05	Batang Gasan
	SDN01	Enam Lingkung

Map-1 Location of Project Sites

3. Conditions of Project Sites

<SDN23/24 Padang>

There are 764 students currently and the numbers of male and female students are almost the same. There were 736 students in 2006 and 2007, which was the smallest. Before the earthquake, one-floor buildings stood in a square shape, two for SDN23 and two for SDN24. They each had and managed classrooms, teachers' room, and library, separately. There were a total of 25 classes and 25 regular classrooms.

<SDN08Sintuk Toboh Gadang>

There are 153 students currently there has been very little fluctuation for the last five years. The numbers of male and female students are almost the same. The school size is standard for a primary school with six classes and six classrooms.

Table 3.1 Pre-Earthquake Conditions of SDN08Sintuk Toboh Gadang and SDN23/24 Padang

Area		Padang City	Padang Pariaman District
Site Code		PA-11	PP-12
School Code		SDN23 and SDN24	SDN08
School Name		Padang	Sintuk Toboh Gadang
Approximate Site Area (㎡)		3,600	1,250
Primary/Junior High		Primary	Primary
Number of Students	2005	830	156
	2006	736	157
	2007	736	163
	2008	764	150
	2009 (before earthquake)	763	153
	2009 (after earthquake)	764	153
Ratio of Female Students（2009）		49.20%	49.00%
Number of Regular Classrooms before Earthquake		25	6
Number of Teachers		44	9
Land Ownership		Government	Government
Site Availability		OK	OK
PTA/School Committee		Exist	Exist
Highest Water Level in Past Floods		25cm	10cm
Infrastructure	Water (or wells)	Available	Available
	Toilet	Available	Available
	Electricity	Available	Available
Surrounding Population		4,324	5,100

The total number of students of the three schools is 917. Although it has decreased slightly for the last four years, it will increase judging from the fact that new schools in Jogjakarta attract students and the

number has increased.

The surrounding population is the population in the school district, which is approximately 9,400. This can be interpreted as the number of evacuees at the schools in case of a disaster and the size shows that the schools can serve as a community disaster management center.、

4. Master Plan

4.1 Design Standards and Guidelines

4.1.1 Standards of Ministry of National Education

The Ministry of National Education sets the Regulation on Standard Facilities and Infrastructure for Primary, Junior High and Senior High Schools[2]. The standards for primary schools is outlined below.

◊ Minimum of six classes (for a population of 2,000) and maximum of 24 classes (for a population of 8,000)

◊ Maximum commuting distance: 3km

◊ Minimum site area (m^2) <up to three-story buildings>

		Minimum Area per Student (㎡)		
	Number of Classes	1-story building	2-story building	3-story building
1	6	12.7	7.0	4.9
2	7 – 12	11.1	6.0	4.2
3	13 – 18	10.6	5.6	4.1
4	19 - 24	10.3	5.5	4.1

◊ Minimum Floor Area (m^2)

		Minimum Area per Student (㎡)		
	Number of Classes	1-story building	2-story building	3-story building
1	6	3.8	4.2	4.4
2	7 – 12	3.3	3.6	3.6
3	13 – 18	3.2	3.4	3.4
4	19 - 24	3.1	3.3	3.3

◊ Ensure ventilation and lighting

◊ Lighting and electricity installation: minimum of 900W

◊ Ensure evacuation route

◊ Necessary Rooms

- Classrooms: minimum width of 5m, 2 ㎡ per student, minimum of 30 ㎡, maximum of 28 students

[2] Regulation National Education Minister, Number 24 Year 2007 on Standard Facilities and Infrastructure School for **Primary School**/Madrasah Ibtidaiyah (**SD**/MI), Junior High School/Madrasah Tsanawiyah (SMP/MT), and Senior High School/Madrasah (SMA/MA)

- Library: size of one classroom in minimum
- Science room (Laboratory):
- Headmaster's room: minimum of 12 ㎡, minimum width of 3m
- Teachers' room: minimum of 4 ㎡ per teacher and 32 ㎡ in total
- Heath clinic: minimum of 12 ㎡
- Chapel: minimum of 12 ㎡
- Corridor. Entrance hall: minimum width of 1.8m and height of 2.5m; minimum staircase width of 1.5m
- Storage: minimum of 18 ㎡
- Toilet: minimum of 1 unit per 60 male students, 1 unit per 50 female students, 1 unit per teacher, minimum of 3 units in total, minimum of 2 ㎡ per unit
- School ground: minimum of 3 ㎡ per student、

4.1.2 Building Design Standards of Indonesia

- Tata Cara Perhitungan Struktur beton untuk Bangunan Gedung (SNI 03-2847-2002)
  (reinforced concrete building design)
- Tada Cara Perencanaan Kethanan Gempa untuk Bangunan Gedung (SNI 03-1726-2003)
  (building quake-resistance design guidelines)
- Pedoman Perencanaan Pembebanan untuk Rumah dan Gedung (SKBI-1.3.53.1987, UDC; 624.042)
  (housing and buildings design load guidelines)
- Pedoman Perencanaan Ketahanan Gumpa untuk Rumah dan Gedung
  (SKBI-1.3.53.1987, UDC;699.841)
  (guidelines for safe housing and buildings planning against earthquakes)
- Petunjuk Perencanaan Beton Burtulang dan Struktur Dinding Burtulang untuk Rumah dan Gedung
  (SKBI-2.3.53.1987, UDC;693.55;6, 693.25)
  (planning guidelines for reinforced concrete structures and walls of housing and buildings)

4.1.3 Japanese Building Design Standards

- Structural calculation guidelines edited by Architectural Institute of Japan
- Reinforced concrete structural calculation edited by Architectural Institute of Japan
- Load guidelines edited by Architectural Institute of Japan
- Guidelines for building foundation structure design edited by Architectural Institute of Japan
- Ground survey method edited by Japanese Society of Soil Mechanics and Foundation Engineering

4.1.4 Design Load

The design load is classified into ① fixed load, ② live load, and ③ short-term horizontal force (seismic load and wind load). The fixed load arises from the actual weight of the building frame and finishing materials, etc. The live load is determined by the purpose of use of the building. Because the subject of the project is classrooms and offices, the live load shown in the table below is used based on the building design standard guidelines of Indonesia.

Table 4.1.1 List of Live Loads

Purpose of Use	Member		
	Design load for beams and floor	Design load for structural frame and foundation	For calculation of horizontal load during earthquake
Classroom, teachers' room and corridor	250 (kg/m^2)	225 (kg/m^2)	125 (kg/m^2)
Laboratory	300 (kg/m^2)	225 (kg/m^2)	125 (kg/m^2)
Library	400 (kg/m^2)	360 (kg/m^2)	200 (kg/m^2)
Roof (Steel sheet)	0 (kg/m^2)	0 (kg/m^2)	0 (kg/m^2)
Deck roof (Flat RC)	200 (kg/m^2)	150 (kg/m^2)	60 (kg/m^2)

In the building design standard guidelines of Indonesia, the load for structural frame (pillars and large beams) and foundation design is smaller than the load for small beam and floor design because of the distribution of the load. Because the roof is aluminum-zinc-coated steel sheet and it is not used as gathering space, the live load is zero. Because the deck roof is used for evacuation of local residents in case of tsunami attacks, the live load is about the degree of that of a living room in a house. Although the ③ short-term horizontal force is caused by the seismic load or wind load, that of earthquakes is used here because that is apparently bigger than that of wind load. Simultaneous action of seismic and wind load shall not be applied because it would entail excessive design.

4.1.5 Materials to be Used

Materials that are widely available in West Sumatra Province are selected. Consideration is given to the design strength suitable to the scale of buildings and no special high-strength concrete or reinforcing bar is used.

Concrete Strength	For Design of Structural Frame	For Concrete Slab on Grade and Concrete Sub-slab
	K250 (250kg/cm^2)	K150 (150kg/cm^2)

Reinforcing Bar	Deformed Reinforcing Bar	Round Bar
	BJD 32 Yield strength (3200kg/cm^2)	BJTP24 (2400kg/cm^2) Yield strength (2400kg/cm^2)

4.1.6 City Planning Regulations

Padang City has a construction regulation of setback distance from the road: road width plus one meter from the road centerline (or 1/2 of road width plus one meter from land boundary)

4.1.7 Environmental Impact Assessment in Indonesia

The basic environmental law in Indonesia is the Environmental Management Law (No.23 in 1997) and there is a government ordinance (No. 27 in 1999) regarding the environmental impact assessment (EIA/AMDAL) based on the law. The environmental ministerial order No. 11 in 2006 identifies 13 categories including national defense that are subject to the environmental impact assessment. The categories are reviewed at least once in every five years.

At the local level, the environmental monitoring and regulation department (BAPEDALDA) of provincial, district and city governments is responsible for environmental issues. The West Sumatra Provincial BAPEDALDA is in charge of the area of the Project. The discussions with the BAPEDALDA on the Project are summarized as follows:

- The Project is school reconstruction on the site where schools already exist and thus it is unlikely to be subject to the environmental impact assessment. However, a committee consisting of concerned parties of West Sumatra Province, Padang City and Padang Pariaman District will carry out an environmental feasibility study upon request from the study group.
- As the Project is urgent, the environmental feasibility study will help simplify procedures related to environmental management.
- The committee mentioned above shall encourage responsible government agencies to promptly remove the debris on the Project schools
- Although Padang City uses a former bus terminal approximately 10 kilometers north of the city center as a debris disposal site, the committee above will examine the disposal site for the Project.
- The committee shall handle other environmental issues in a speedy manner.

4.2 Design Policy and Planning Concept

4.2.1 Design Policy

The target schools are rationally designed as described below for cost reduction.

◊ A standard type of simple grid plan with a cost advantage is set up and the standard type is used as much as possible.

◊ The buildings are reinforced concrete structure that is most common and at lowest cost locally in terms of quake-resistance and fire-resistance.

◊ Traditional low-cost finishing (floor tile, wall mortar, paint finishing, roll-formed section

foundation plywood paint finish)

◊ Natural ventilation is sufficiently secured and no air-conditioning is installed.

4.2.2 Planning Concept

◊ Buildings shall be separated for regular classroom and teachers' room and special classrooms and standardized for construction on a variety of site conditions.

◊ Buildings shall be earthquake resistant and serve as evacuation center in case of disasters.

◊ There will be a multipurpose community utilization room that can be used not only for educational activities but also as a center for community-based disaster prevention activities and cultural activities.

◊ In consideration of its use in disasters, the community utilization room, headmaster's room (information management), health clinic and toilets shall be located nearby as a group on the ground floor. Storage accessible from the community utilization room shall be built and used for various purposes including storage of emergency water and food, power generators or batteries and goods for community activities.

◊ Schools in Padang near the coastline shall be three-story buildings with deck roof so that people can evacuate on the upper floor and deck roof in case of tsunami attacks.

4.3 Master Plan Policy

4.3.1 Construction Plan

The following is the basics of the school buildings based on the standards describe above:。

- Regular primary school classrooms: 7m x 8m ($56m^2$) 40 students per classroom, $1.4m^2$ per student
- In consideration of local specifications, the finishing of school buildings shall be as follows:

Table 4.3.1 Finishing

Room	Floor	Wall	Ceiling
Classroom / Teachers' Room / special rooms / Laboratory	Ceramic tile	Mortar trowel and paint finish	Roll-formed section foundation Gypsum board, paint finish
Outside corridor	Ceramic tile	Mortar trowel and paint finish	Roll-formed section foundation Waterproof board, paint finish
Toilet	Ceramic tile	Mortar trowel and paint finish	Roll-formed section foundation Gypsum board, paint finish
External Finish	Ceramic tile mortal trowel finish	Mortar trowel and paint finish	—

<SDN23/24 Padang Primary School>

Because two schools are located on one site, a three-story regular classroom building will be built for each school and a building for administration and special classrooms shall be built between the two buildings. There will be a headmaster's room and a teachers' room for each school and there will be a library, a science laboratory and a community room to be shared by the two schools.

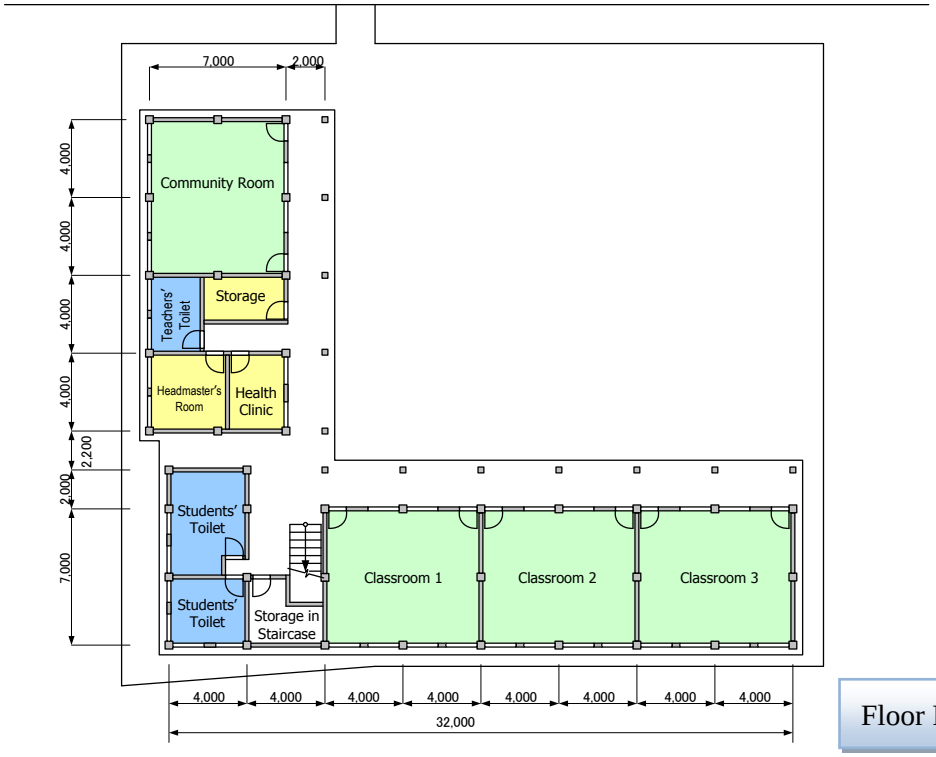
Floor Plan (Total Floor Area=3,096m^2)

Elevation

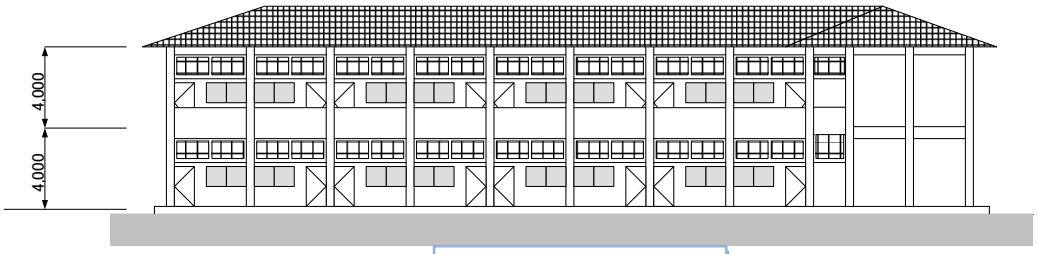
<SDN08Sintuk Toboh Gadang>

The school is located on a main road that connects Padang City and the airport. Because the site is small, buildings will be two-story buildings: one regular classroom building (3 classrooms and toilet

on the first floor and three classrooms and teachers' room on the second floor) and one building for administration and special classrooms (headmaster's room, health clinic, storage and community room on the first floor and library and science laboratory on the second floor). The two buildings will be located in an L shape.



Floor Plan (Total Floor Area =873m^2)



Elevation

4.3.2 Structure Plan

◊ Because the schools are to serve as an evacuation center for local residents in case of disasters, the structure shall be strong enough for safe use after the disaster.

◊ The buildings shall be categorized as critical buildings in the most critical zone, Zone-6, under the New Earthquake Hazard Map issued by the Indonesian Government. And 0.3 story shear force coefficient shall be applied. The main structure shall be reinforced concrete structure that is most common locally in terms of quake-resistance and fire-resistance.

◊ The main structure plan will be in accordance with the Japanese standards and the buildings will have reinforced concrete foundation and underground beams to secure sufficient stiffness.

◊ SDN23/24 Padang primary Schools near the coastline shall have asphalt waterproof deck roof where people can evacuate. SDN08 Sintuk Toboh Gadang Primary School shall have roll-formed truss and aluminum-zinc-coated steel sheet gable roof.

4.3.3 Facility Plan

<Plumbing Sanitary>
Schools already have water systems. Water supply work from the connection with public water shall be performed

Because there is no wastewater treatment in Padang City or Padang Pariaman District, septic tanks shall be installed for the toilet. They will be connected to the sewage system on the site with such a system and wastewater shall be percolated underground on the site with no drainage path.

<Electricity and Telephone>
Electricity is available on all Project sites. Primary panel board and power line installation, lighting and outlet installation work shall be performed.

Telephone lines shall be installed to the headmaster's room and teachers' room.

4.3.4 School Furniture

Desks and chairs that had been used before the earthquake are still available. School buildings are given priority in the Project and thus only school furniture included in the Project is blackboard.

4.4 Master Plan

Table 4.4.1 Area Size of Project Sites

Site Code	PA-11		PP-11	
Area	Padang City		Padang Pariaman District	
School Code	SMPN23/24		SDN08	
School Name	Padang		Sintuk Toboh Gadang	
Primary /junior high	Primary		Primary	
Number of storeyes	3		2	
	Number of Rooms	Area	Number of Rooms	Area
Classroom				
Regular classroom	24	1,344 ㎡	6	336 ㎡
Library	1	56 ㎡	1	56 ㎡
Science laboratory	1	56 ㎡	1	56 ㎡

Administration				
Headmaster's room	2	24 ㎡	1	16 ㎡
Teachers' room	2	112 ㎡	1	32 ㎡
Others				
Storage	3	24 ㎡	1	18 ㎡
Teachers' toilet	2	18 ㎡	1	10 ㎡
Students' toilet	6	216 ㎡	1	32 ㎡
Health clinic	1	14 ㎡	1	12 ㎡
Community room	1	56 ㎡	1	56 ㎡
Hallway, corridor, staircase, others		1,104 ㎡		248 ㎡
Total		3,024 ㎡		872 ㎡

4.5 Bidding Results and Unit Price per Square meter

The JICA Indonesia served as the ordering party of the bidding. It was a general competitive bid and the technical capacity and price were evaluated comprehensively.

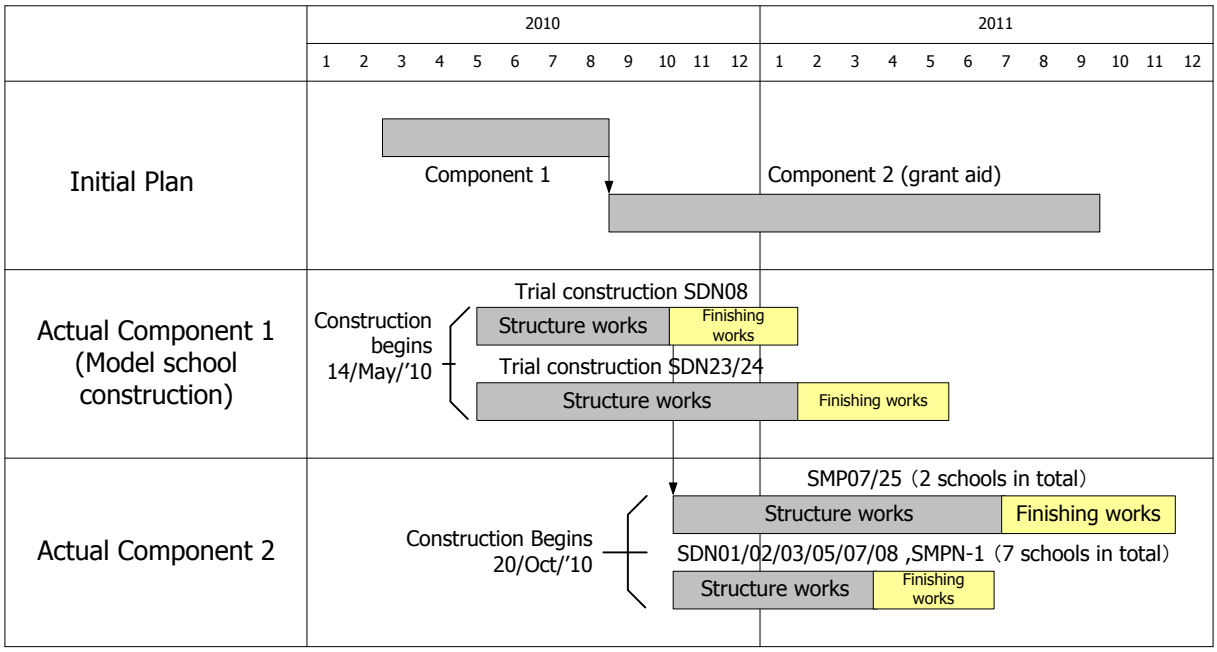
As a result of the evaluation, PT.WASKITA KARYA won the bid.

The bidding price is (IDR) 12,286,533,275 (approximately 120,500,000JPY when 1 JPY is 102Rp.)

Unit price per area is approximately 30,360 JPY (tax not included) and it is almost same as the standard unit price of the Public Works Ministry (PU) of Indonesia.

5. Implementation Schedule

Table 5.1 Comparison of Initial Implementation Schedule and Actual Implementation



The purpose of the model school construction is to clarify the competence of local constructors and what are problems and what needs to be improved so that the findings can be utilized for improving the quality of school construction of grant aid projects that are to be carried out. Taking this into consideration, a grant aid project was originally planned to be implemented after the completion of the model school construction. However, because the bidding was carried out twice as the original bidding did not go smooth and because the scale of the project changed (The original target was a standard-size school of six classrooms or so in Padang Pariaman District but 24 classrooms in Padang City were added after the survey.), the model school construction works began 2.5 months later than originally planned. As a result, a grant aid project began before the completion of the trial project. However, problems of the structure works (concrete construction) that was a focal issue in quality control were learned and used in school construction in the grant aid project.

6. Conditions of Trial Project Sites

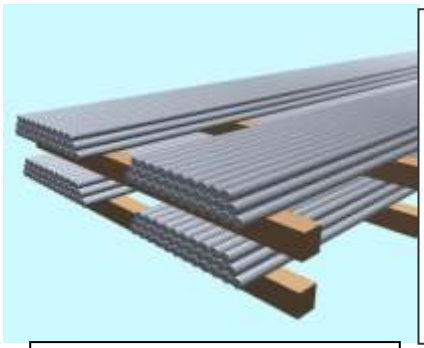
6.1 Material Management

As seen in the photographs on the right, reinforcing bars are left directly in the ground and rusted and impurities are attached on them. Sand and aggregate are also piled up directly on the ground with no separation of gravel and sand or no measure is taken to protect them from rain.

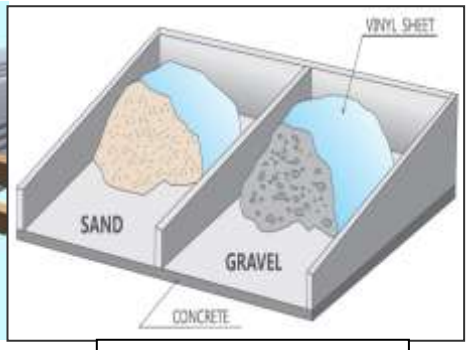
Reinforcing bars left on the ground

Aggregate left on the ground

Reinforcing bars should be stored on sleepers as shown in the picture on the right to prevent impurities from attaching on them. The shipment from the factory should be limited to a minimum amount in order to prevent rust. Soil and gravel need to be separated with a partition wall and covered with a plastic sheet for protection.



Proper storage of reinforcing bars

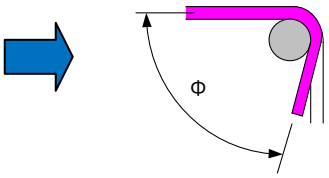


Proper storage of aggregate

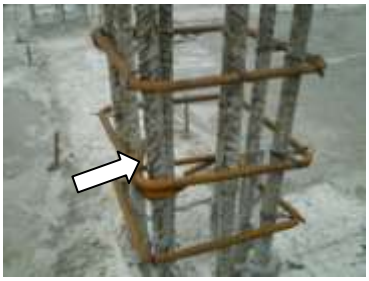
6.2 Reinforcement Placing

Assembly of reinforcing bars had following problems:

(1) Covering depth of reinforcing bars is not secured.
(2) Shear reinforcement hook of hoop and stirrup is excessively wide open.
(3) The lapped splice is not properly located.
(4) Gravel, wood pieces and paper at the bottom of the formwork are not cleaned.
(5) There are a lot of attachments on the reinforcing bars and they are not



The hook is excessively wide open.



Many attachments

Bottom of formwork is not cleaned.

removed.

(6) Space between reinforcing bars is not secured.
(7) There are too many reinforcing bars.
(8) There is no separator under the beams or of slab reinforcements.

6.3 Formwork Construction

Formwork construction had following problems:

(1) There is much space in the connection area.
(2) Formwork is used repeatedly and thus deformed.

6.4 Reinforced Concrete Construction

Reinforced concrete construction had following problems:

(1) The concrete placing plan was insufficient, the location of placing joint was not clear and there was no stopper.
(2) Although they have a habit of performing compression strength tests, they rarely perform slump test or air content test.
(3) There is no habit of spraying water in the formwork before concrete placing.
(4) The vibrator is not used correctly.
(5) When freshly-mixed concrete is put from the top of the pillar, the placing method especially for the high pillars in the higher floors is not correct.
(6) Although there is a habit of placing joint of pillar concrete at the bottom of the beam, the chipping and cleaning of the joint is not sufficient.
(7) The formwork is removed too soon.
(8) Concrete curing after placing is not sufficient enough.

6.5 Local Engineers and Architects

(1) No engineer has an understanding of the duty of supervision of construction.
(2) They do not understand the meaning of inspections or inspection methods. In particular, they leave all duties of reinforcing bar processing, joint location, fixation length and covering thickness in reinforcement arrangement and formwork placing in the concrete construction completely to construction companies.
(3) On the other hand, no social status of local consulting agencies is established, generally speaking, and the boss of construction companies has more power. Thus, they cannot always give instructions to construction companies in a firm manner even when they find defects.
(4) No construction supervision manual is established at the national level.

6.6 Local Construction Companies (Contractors)

(1) Although each construction company has a quality control manual, they do not necessarily observe it. It is not an exaggeration to say that the quality depends on the capacity of the site manager rather than that of the construction company. They are not equipped with management capacity of overall construction works and quality control cannot be expected if he site manager do not have good communication with subcontractors.

(2) Construction works are often performed based on the convenience or habit of the subcontractor rather than led by the contractor and thus given instructions are not fully understood or informed. As a result, same mistakes are repeated and redoing of the work is instructed on site each time when a mistake is made.

(3) Because of lack of a habit of creating a construction plan or drawing before works, they do not have a plan and thus they often have to redo their work.

(4) Because the reinforcing bar processing chart is created on the site blackboard rather than in the design room, overlapping and top-bottom allocation of crossover are not taken into consideration frequently and thus reinforcing bars are reassembled frequently.

(5) They have very little awareness of safety that including wearing a helmet, work shoes or safety belt.

7. Problems in Model School Construction and Improvements

7.1 Contents of Activities

On the model school construction site, we gave instructions on the discovered problems, and made them rectified and works were performed properly. The problems were compiled into a construction supervision manual and utilized on the site of grant aid projects. The following is a list of major activities:

(1) Seminar for local consulting agencies (1 session before beginning of construction works and 2 sessions during the works)
(2) Seminar for site managers of construction companies (1 session before beginning of construction works and 2 sessions during the works)
(3) Use of always-available supervision manual for technical instruction on each site based on their condition (as needed)
(4) Local consulting agencies were given instructions on daily inspection points repeatedly. By clearly writing down the point for each item on the whiteboard and taking photographs, contents and quality of works improved. They were also instructed to check the on-site work constantly not only in inspections.
(5) Instructions on creation of construction plan and drawings were given to improve quality and prevent redoing of works.
(6) Checking of work before performing the works, material preparation, worker preparation and points that require attention in works was instructed repeatedly.
(7) Inspections were carried out frequently on site and redoing was ordered for defects until they were acceptable based on the supervision manual.

7.2 Achievements

Because there is no habit of workers who have learned teaching other workers, quality control requires patience. However, construction companies learned to perform quality control voluntarily. Significant improvements are made as follows:

(1) Improvement of reinforcing bar assembly for pillars and beams

Underground beams: neatly arranged reinforcing bars

Foundation: formwork with no deformation or gap

Pillar: neatly assembled reinforcing bars

Underground beam: plastic cover to prevent contamination in concrete placing

(2) Use of non-deformed formwork and assembly with no gap
(3) Prevention of contamination during concrete placing
(4) Creation of construction drawings and plans
(5) Improvement of concrete placing methods

COMMUNITY BASED DISASTER RISK MANAGEMENT ACTIVITY REPORT

Table of Contents

1. Introduction

1.1 Objectives of the project

In this project, quake resistant schools, two schools as model school and nine schools for grant aid schemes will be constructed. These reconstructed schools will function as evacuation site, distribution center of supplies for refugees, and information center.

In order to make reconstructed school functional, improvement of knowledge of evacuation center users on disaster management and emergency response needs to be done. Voluntary disaster management activities also need to be conducted.

Besides, monitoring of school reconstruction by residents is expected. Activities to realize such actions was carried out and reported herein.

1.2 Implementing Formation

Formation of Implementing Community Based Disaster Risk Management (CBDRM) was as such; firstly technical education was conducted by SNS International Disaster Prevention Center (Japanese NGO) and Professor Iman's group of Gajahmada university which have experienced in earthquake recovery works in Jawa, and secondly CBDRM activities have been conducted by SEEDS Asia which can input recent CBDRM updates in Kobe, and local NGO of Yakkum Emergency Unit (YEU) which has branches in different parts of Indonesia and experienced in emergency responses after the Padang earthquake.

Collaboration of Japanese NGOs and local NGOs made two things possible at one time. The first one is input of latest Japanese experiences from Kobe, and the second thing is establishing system of up-scaling. The following figures illustrate the formation for implementing the Project.

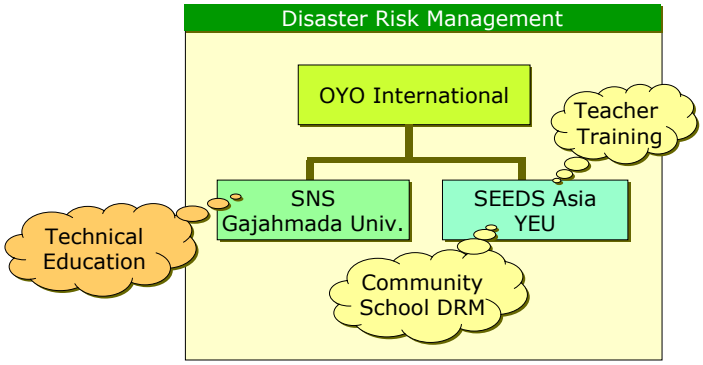


Figure 1.2.1 Implementing Formation

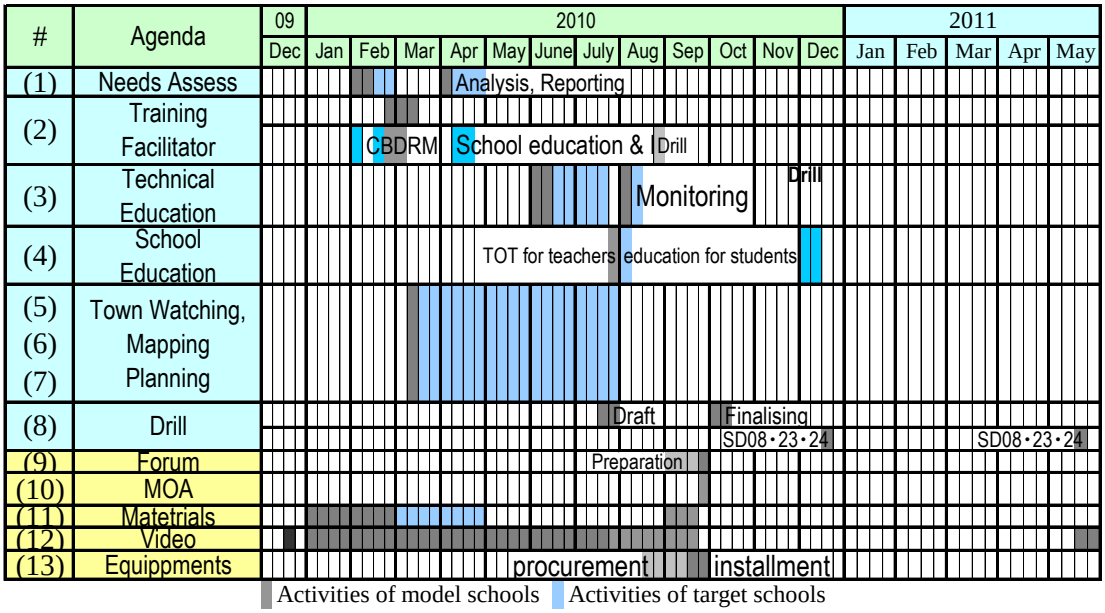
1.3 Activities of Local Contract

Main activities of local contracts are (1) Needs assessments, research on lessons learned by the

previous earthquake (2) Training of facilitators (3) Technical education (4) Training of school teachers (5) Town watching (6) Preparing maps on disaster risk management (7) Preparing community based disaster risk management plans (8) Evacuation trainings (9) Conducting forum (10) Conclusion of agreements (11) Preparing textbooks (12) Preparing video (13) Installing equipments for disaster risk management

Contracted activities and its schedule are shown in the following table.

Table 1.3.1 Contracted Activities and Schedule



2. Activities carried out in the project

2.1 Needs Assessments and Baseline Survey

2.1.1 Objectives

Interviews and Focus Group Discussions were conducted to identify issues and lesson learned how to respond in the previous earthquake and residents' awareness and perceptions of post disasters. Consequently, implementing policies on CBDRM are decided.

2.1.2 Implementing Methodology

Focus Group Discussions were conducted at the beginning of CBDRM activities for schools and communities around schools. Five to twenty samples were taken from each site for interviews and Focus Group Discussions. Participant wrote their own opinions apart from discussions, and they were analyzed.

2.1.3 Results

(1) Lessons Learned by the Previous Earthquake Disasters

1) Necessity of Earthquake Resistant Construction（Majority）

- Majorities of respondents, 45 samples out of 116 samples answered the necessity of earthquake resistance construction. They have notions that existing way of construction cannot sustain from the next earthquake. Not only the necessity of earthquake resistant construction, but also, necessities of observing building code, knowing earthquake resistant buildings, providing knowledge on earthquake resistant buildings, knowing method of inexpensive earthquake resistant construction, constructing buildings by skilled construction workers were raised.
- After the 30th of September earthquake, the necessity of earthquake resistant buildings or buildings which have slight impacts for human has become prevalent. In the 30th of September earthquake, wooden houses had less damage, compared with brick houses. Thus, the fact has created general perceptions that wooden houses are stronger. In this way, perceptions of people have changed and people started to use woods at the upper side of the houses. However, it is necessary to disseminate correct knowledge on buildings to the general public.
- There are lots of contractors which construct buildings by their own ways at present. There are many people who insist the necessity of acquiring earthquake resistant technology.
- There are often cozy relationship between public officials and contractors of school in constructing schools, so schools are not necessarily constructed by spending necessary costs. Thus, many people want foreign donors to construct schools.

2) Changes of Awareness

- Many people had problem of getting water, foods, and medicines. Those people who answered the necessity of emergency kit bags were 13 persons, which was the second majority answer after necessity of earthquake resistant buildings.
- Due to the aftershocks, many families started to prepare emergency kit bags. Some families which have small children have prepared not only torch, but also child care goods, too. Many families have kept important documents and identification cards at some convenient places. These are the signs of awareness after the past experiences. However, among the schools we surveyed, no schools have prepared emergency kit bags. Schools need awareness raising.
- Some people are raising general preparation as lessons learned by the September earthquake.
- To prepare for the future natural disasters, there were a few schools which started evacuation drills by themselves. In Indonesia, most schools teach the students that they should get out of the buildings as the first reaction to take during earthquakes. However, teachers and students who got out of the buildings became panic, due to aftershocks. It is important to share among teachers and students more suitable way of evacuation.
- Many people pointed out the necessity of knowledge on safe places and routes from the ordinary time.
- It is notable that some pointed out about mental preparedness not to be panic. For this, it would be effective to disseminate how to react during and soon after the earthquake minutes by minutes, to avoid unexpected incidents.

3) Preparation for other disasters

- At V Koto Kampung Dalam, landslide occurred after the earthquake, and a hundred of people passed away. In the neighboring schools and communities, people pointed out that not only earthquake but also secondary disasters should be taught.
- In the elementary schools near the sea shore, disaster risk management education on not only earthquake but also Tsunami and flood should be taught.

4) Trauma Care

- Many teachers said trauma care is needed at the time of early recovery to recovery phase. Needs of trauma care was ranked after 1) necessity of earthquake resistant construction, 2) preparing emergency kit bags, 3) general preparedness. There are teachers who still have trauma due to after shocks. Thus, there were many opinions that targets of trauma care should be not only students but also teachers.

5) Goton Royon（Mutual Aid）

- Seven persons mentioned about community cooperation during emergency, which is the fifth majority answer. Goton Royon, which is the base for community mutual assistance, exists at communities in Padang and Padang Pariaman. Residents said that at the time of earthquake, Goton Royon functions and mutual assistance was a great assistance for the

residents. Such lessons can be shared among other areas of Indonesia.

6) Others

- It was not majority of opinions, however, other notable opinions were the necessity of training evacuation and first-aid (4 persons), basic knowledge on disaster risk management (3), raising awareness on disaster risk management (3), knowledge on how to react soon after the disasters (3), coordination between communities and public authorities (2), education on disaster risk management (2), and preparation toward other disasters such as flood and landslide (2).

7) Characteristics of Indonesia

- People accepts the current situations and are patient, due to strong religion background that everything is up to the God's will and God will protects people. There was only one person who was desperate, replying that "I cannot do anything, I do not want to do anything." Most people are motivated, trying to overcome, and want to prepare something, though the experiences of disasters were terrible.

(2) Needs for School Education on Disaster Risk Management

1) Evacuation Drill

Before the 30th of September earthquake, some schools in Padang had experiences of conducting evacuation drills by a local NGO, however, only a few schools in Padang Pariaman had experiences of evacuation drills. Such schools in Padang Pariaman had conducted evacuation drills by their own ways. The teachers said that in the evacuation drills, they instruct students to run out of the buildings, and it may cause panic. It is advisable to propose appropriate ways of evacuation and evacuation routes by considering local conditions of each school buildings, furniture, topography and geophysics.

2) First Aid

There was a growing demand of first aid since it is practical. Some communities have neither access to nearby health centers, nor limited means of transportation, many people requests practical things like first aid. At many schools, there are groups of students called "small doctors" who can treat first aid. However, after the earthquake disaster, there is no equipments left at schools and cannot continue it. For first aid, both training and equipments are needed to be improved.

3) School Disaster Education

Many teachers said that they want to teach disaster risk management, but they have neither appropriate educational materials nor time for preparing educational materials. There was an urgent demand for teachers to provide educational materials that can be used for school classes.

4) Game of Disaster Risk Management

Teachers said that there were still many students who have trauma, thus they request

disaster education program which students can feel that coming to schools are pleasant. Therefore, teachers shows interests in the games which can gives both knowledge and playing, such as card games, board games, and sports festival types of drills on disaster risk management.

5) Knowledge Development on Disasters Risk Management

Many teachers mentioned that before teaching students, teachers themselves have to understand knowledge on disaster risk management at first. They insist that training should be conducted for teachers to learn general knowledge about disasters, mechanism of natural disasters, general ideas and methods of disaster risk management.

6) Lessons Learned by Other Countries and Other Areas in Indonesia

Many people were interested to know about the lessons learned by the past disasters in Indonesia. Some are interested to know the experiences of Japan which has many disasters. They say that they want to apply such experiences and lessons learned from Ache, Yogyakarta, and Japan to West Sumatra.

Table 2.1.1 Lessons Learned by Earthquake in September 2009

#	Lessons Learned	Countes
1	**Necessity of Quake Resistant Construction**	**45**
2	**Preparation of Emergency Kit Bags (water, foods, medicines)**	**13**
3	**General Preparedness**	**8**
3	**Trauma Care**	**8**
5	**Cooperation in the community**	**7**
6	**Securing safe evacuation place & shelters**	**5**
7	**Mental preparation, not to be panic**	**4**
7	**Evacuation Drill and First Aid Trainings**	**4**
9	**Basic knowledge on Disasters**	**3**
9	**Awareness Raising**	**3**
9	**Knowledge on emergency reactions**	**3**
12	**Coordination between communities and public authorities**	**2**
12	**Necessity of Disaster Education**	**2**
12	**Preparation to flood and landslides**	**2**
12	**Contermeasures of Infrastructures**	**1**
16	**Preparation for landslide**	**1**
16	**Preparation for Tsunami**	**1**
16	**Knowledge sharing of other disaster affected areas**	**1**
16	**External Assistance**	**1**
16	**Cannot do anything**	**1**
	Total	**115**

2.2 Training of Facilitators

Facilitator trainings were planned for public officials of disaster management, school teachers, and representatives of residents. However, the CBDRM activities have started just three months after the earthquake, and it was a little early to start the facilitator trainings for public officials. Because only some BPBDs have been established, even though they have established, they have neither many staffs nor enough budgets. As for residents, they were living simple shed after losing their own houses. It

was simply too early to start facilitator trainings for residents.

As for school teachers, at the time the project started, they were very busy making a school in the normal conditions. However, ten months after the earthquake, they can start facilitator trainings since they had strong sense of mission, leadership and responsibilities.

After all, the facilitator trainings have been conducted only for teachers, however, training materials have been prepared 10 months after the earthquakes and BPBDs and Education Offices of West Sumatra, Padang City, Padang Pariaman District are willing to conduct CBDRM activities using the education materials. After increase of staffs, some officials of BPBDs can be facilitators of the CBDRM workshops.

2.3 Training for School Teachers for Education on Disaster Risk Management

Trainings were conducted for the teachers, by using a Handbook. The Handbook was prepared as a guidance to deliver classes on disaster risk management for students. Handbook covers basic knowledge on disaster risk management (DRM), cycles on DRM, educational curriculum on DRM, topic wise DRM education such as evacuation, first aid, town watching, non-structural measures, essay and drawing on DRM, preparation of newspapers, emergency cooking, preparation of emergency kit bags, situations of disasters, songs etc.

Teacher trainings were conducted twice at Padang city and Padang Pariaman district. From Padang city, twelve teachers and two officials of education office in charge of developing curriculum, and from Padang Priaman District, twenty two teachers and one officials in charge of developing curriculum were participated were participated.

Those trained teachers are planned to deliver classes to their own students based on the training. Moreover, teachers of two model schools of SD08 Sintuk Toboh Gadang, and SD23/24 Padang will conduct trainings for teachers within the same cluster schools. Monitoring will be conducted in December 2010.

2.4 Technical education on quake resistant building

Technical education on quake resistant building for residents was conducted by SNS, a Japanese NGO. Target of education was residents and teachers within earthquake affected area. 242 persons in eleven areas in total were educated during July and August.

The purpose of technical education is to recognize the importance of quake resistant house, to acquire minimum knowledge to monitor carpenters' work, to prioritize works in case of financial difficulties, and to make a plan to build safer house against earthquake.

The contents of technical education include building materials, foundation, beams, stone masonry

building, columns, roof, and cost estimation. Visual explanation using figures and photos was done regarding mix ratio of concrete, how to loop steel bars, and etc.

Prior to hold workshops, hearing to participants was conducted, and following answers were obtained.

- Regarding the type of structure of houses, about 80 % of participants from Padang district have house of Confined Masonry, 15 % lives in house made of Un-reinforced Masonry. On the other hand, in Padang Pariaman regency, more than half of participants (54%) live in house made of Un-reinforced Masonry. Therefore, it is found that type of house structure differs significantly from place to place.
- Regarding the damage to houses in Padang district, it was found that 52% suffered "minor damage", 39% suffered "moderate damage", and 9 % suffered "major damage". On the contrary in Padang Pariaman regency, it was found that 3% suffered "minor damage", 15% suffered "moderate damage", and 82 % suffered "major damage".
- About reconstruction plan in the future, about 80% participants in Padang district answered "repair", however, about 50% of participants in Padang Pariaman regency wishes " new building of Confined Masonry house". This implies that damages to houses were severer in Padang Pariaman regency than that in Padang district. Though many participants have financial difficulties to rebuild their houses, majority of participants prefers "building new Confined Masonry" or "repair" to "building semi-permanent house" Though many participants had difficulties to find funding for housing reconstruction, they preferred repair or building new confined masonry house to building semi-permanent house. This fact suggests that residents wish permanent house rather than semi permanent house.
- Regarding the cost for rebuilding house, about 70% of participants in Padang answered that it costs less than five million Rp., while about 70% of participants in Padang Pariaman answered that it costs more than twenty million Rp. The result suggests that in Padang Pariaman regency houses suffered higher degree of damages than those in Padang district.
- Male participants had better knowledge on key requirement of building houses than female participants. However, in Minangkabau region including Padang and Padang Pariaman, women traditionally own house. For this reason, women participates workshop as owner of house. Therefore, workshops were conducted aiming to improve the knowledge of women.

2.5 Town Watching

Participants were divided into groups of approximately 8 people, and checked neighboring risks and resources. The purpose of Town Watching is to analyze local risks by compiling risks and resources on a map and prepare community based disaster risk management plans.

At 11 sites where schools will be constructed, risk and resource maps were prepared. At most sites, Google maps were utilized, since people understand easily the areas. Some areas where Google maps were not available, base map prepared by UNOCHA were utilized.

Sample map of disaster risk and resource is shown.

Figure 2.5.1 Map on Disaster Risk and Resource (Example)

2.6 Preparation of Maps on Disaster Risk Management

Safe and secure evacuation routes were identified by utilizing risk and resource maps. This activity was conducted in the course of planning for community based disaster risk management. Example is shown in the following.

Figure 2.6.1 Examples of Community Disaster Risk Management Map

2.7 Development of community based disaster management plan

Workshops to develop community based disaster management plan were held in eleven communities with the assistance of YEU. Voluntarily disaster management organization was formed, assigning

2.8 Implementing Disaster Risk Management Drills

(1) Implementation of preliminary drills

As the last activities of CBDRM, response type disaster risk management drills and games of disaster risk management were conducted at two model schools in December 2010. The games of disaster risk management were introduced as a new activity for Padang and Pariaman area, and probably in Indonesia. Equipments for 2 model schools were installed, so the drills were conducted by utilizing them. The scenario is shown in the following table.

The drills were disaster response type drills, in which participants will not be informed of the scenario, but respond to the given situations of various incidents such as fire, falling objects, and blockages. Students are trained the entire process from the beginning of the estimated earthquake, till evacuation, fire extinguishing, first aid, and communication. Video about the

drills was made and distributed to the counterpart organization and persons and NGOs.

Currently, temporary schools for SD23/24 Padang are located in two different places, one for SD23, and the other for SD 24. Games and response type disaster risk management drills were conducted at SD23 and SD24 respectively. SD08 Sintuk Toboh Gadang conducted response type disaster risk management drills, and teachers plan to continue such drills every month on Saturday. Two classes a month are newly allocated for elementary schools in West Sumatra to teach disaster risk management. It will be a good chance to conduct such drills and disaster risk management education utilizing the handbook JICA team has produced. The video CD of the response type drill were distributed to the relevant public organizations, cluster schools of model schools and NGOs.

In April, at the completion of the new school buildings, games and response type of disaster risk management drills are planned to be conducted by the initiatives of SD 23/24 Padang and SD Sintuk Toboh Gadang.

Table 2.8.1 Sample Scenario for Evacuation Drill

ITEM	Necessary Equipments	Person in charge Organization / Name	Time	Action by PARTICIPANTS	Remarks
Instruction of Drill process with situation of earthquake (Only for Students)		Each teachers	**00:00-00:15**	Gather at classrooms and listen to the instruction by teachers	
Siren of Earthquake	2 Handy Sirens Mosque Speakers 1. 2. 3.	School principle and Community leaders 1.School Principle 2.Wali Kolong Mosque Speakers 1. 2. 3.	**00:15-00:20**	Protect yourselves (ex. hiding under table etc.) Safety Check of themselves Shut down electric breakers, gas and fire sources	<Try to utilize mosque speakers>
Second Siren of Evacuation	2 Handy Sirens 3 Mosque Speakers 1. 2. 3.	School principle and Community leaders 1.School Principle 2.Wali Kolong Mosque Speakers 1. 2. 3.	**00:20-00:30**	Take emergency kit, bags, helmets, if any Start evacuation to school compound Go outside carefully; especially falling objects. Bring keys of the houses. Check safety, lost, injured, trapped people utilizing name lists of the community Respond to the fire extinguish and Injury treatment.	**Watch out for robberies!! (DM task force inspect/check the neighborhoods)**
Report to local Nagari the situations **Evacuation to school compound of temporary schools at/around SDN24 Padang, SD08 Sintuk Toboh Gadang**	Mobile phones	1 Representative of Resident	**00:20-00:40**	Report to local Nagari office about situation of the community by mobile phone; (report situation, ask assistance) NOTE: Need to mention TRAINING at first in a loud voice, then speak the reports Evacuation to the designated evacuation site (Open space of schools) by walk	Acceptance by Nagari Trigger of actions by Governments Leaders of evacuation teams may lead each evacuation group
Following **Incidents** will be prepared <Setting Signboards in Advance> 10 incident sign boards 1 signboards per site	<Production of Signboards for Incidents in advance> (Fire(3), Road blockage(2), Falling objects(2), Injured(3))	Fire dep./BPBD? 1.Fire: 2.Fire: 3.Fire: 4.RB: 5.RB: 6.FO: 7.FO 8.Injured: 9.Injured: 10.Injured:	**00:00-00:15**	**NB:** Participants do not know the damages, fire incidents, injuries on the way to evacuation centers Residents / Students will respond to the incidents on the way they head to evacuation sites.	<Setting places are identified by school principles community representatives, YEU, and JICA in advance (without notice to participants, evacuees)> <After the evacuation, all signboards should be cleared>
· **Fire** Setting signboards 3 Fire	3 signboards	1. 2. 3.	**00:00-00:15**	In facing ***Fire:*** Extinguish them by water in buckets	
· **Injured** Setting signboards 2 Fake Injured Persons With notes on papers 2 types of injuries and seriousness (1) Fainted and unconscious:1 (2) Leg is broken:1 (3) Head is injured:1 2 blankets are provided as 2 instant stretchers for injuries (1) and (2)	3 Injured Volunteers (1 person x 3 types) 3 Small place cards Explanation notes of Injuries 2 Blankets and 4 poles for 2 instant stretchers	Residents/Volunteers 1. 2. 3. Health Center Staffs 1. 2.	**00:00-00:15**	In facing the ***Injured:*** Apply first aids to the injured Evacuate with the Injured or Carry them to evacuation sites	Injured persons and sites are indicated in advance. (For the injured who cannot walk, use instant stretcher)
· **Road Blockages** Setting signboard at 2 places	2 Signboards	Resident Volunteers 1. 2. 3.	**00:00 - 00:30**	In facing ***Road Blockage*** Find alternative route and Detour	
· **Falling Objects (Electric Poles/wire, window glasses, air conditioners etc.)** Setting signboard at 2 sites	2 Signboards	Resident Volunteers 1. 2.	**00:00 - 00:30**	In facing ***Falling Objects (Electric Poles/wires, window glasses, air conditioners etc.)*** Find alternative route and Detour	

Registration at SD24 Padang (SD08 Sintuk Toboh Gadang) 1.Tent with desk setting for registration 2.Assisting Registration of evacuees	Registration sheets Pens (name, address, tel#, time of entry) Desk (a tent)	Community leaders 1. 2. 3.	**00:30 Onward**	Evacuees at open space of School to register, using registration desk	
Training : **Notice boarding** In case of rain, this training will be conducted at Tent 2&3	2 boards 20 Pens 40 Sheets Small papers	Community leaders 1. 2. 3.	**00:30 - 00:50**		Private notice for announcing safe information to families friends. Vulnerable points with location
Critics	Microphones	YEU JICA	**00:50-01:00**	**All Participants**	Evaluation presentations Evaluation comments from participants coordinators, and observers
Video	Video documentation	YEU	**For the event**	All participants	

Photo 2.8.1 Response Type of DRM Drill and Games of DRM

(2) Implementation in constructed school building

When the construction of school buildings was completed in two model schools in May 2011, the schools implemented disaster response type drills and game of disaster risk management with their initiatives. The school buildings of SD 23/24 In Padang District had almost been constructed and the building of SD 08 in Padang Pariaman District starts to be used. As initial schedule, the drills and game would be implemented together with handover ceremony. But they conducted small size of drills and game because they give consideration to the Great East Japan Earthquake in March 2011.

This time, in addition to the contents of previous preliminary drills, survival rice (cooking rice with empty can and milk carton) and practical work on how to make simplified lump were also conducted. School SD 23/24 is located in a part of estimated areas where tsunami is expected to

reach. Therefore, the lessons of the Great East Japan Earthquake are transferred, damage estimation in Padang District was explained, and response in tsunami situation was confirmed.

In SD08, the school kept budget and invited relevant persons of West Sumatra Province and Padang Pariaman District. Then the drills and games were conducted combining with handover ceremony.

In disaster risk management drills, disaster response type drill was conducted as it had been done in previous drills. The students played the roles of various kinds of injuries and they evacuated, rescued injuries, applied first aid. After this, instant stretcher relay, jack-up game, emergency kit bag nunting, disaster management obstacle relay, fire extinguishing bucket relay, and disaster management ultra quiz were also conducted. At the end of this event, awarding ceremony is held and trophies were given to two model schools in order to salute their efforts on their innovative challenges and activities on disaster management education.

The following are the programs of disaster risk management drills and disaster risk management game and the photos of disaster risk management game and trophy.

Table 2.8.2 Program of disaster risk management drills and games in SD08

Activity	Contents	Relevant persons
Handover ceremony		Mr. H.Damsuar Mayor Secretary of Padang Pariaman District Mr. Kase, JICA Project Team
Opening speech		Mr. Bahari, Head of department of education of Padang Pariaman District
		Mr. Ir. Mawardi Samakh, Head of the department of disaster management of Padang Pariaman District
Presentation	Lessons of the Great East Japan Earthquake, and damage estimation and response	Ms. Shaw, JICA Project Team
Disaster risk management drills	Disaster response type drills	All and school head (as director)
Game of disaster risk management	Simplified stretcher relay Jack-up game Emergency bag game Disaster management obstacle race Fire bucket relay Disaster management ultra quiz	
Comment and award ceremony	All and school head	Shaw, JICA Project Team

Photo 2.8.2 Handover ceremony, disaster response type drills, and practical work of survival rice

Photo 2.8.3 Games of disaster risk management, specified incident, Award ceremony

2.9 Commemoration Workshop

As a part of the commemoration event for the 2009 West Sumatra earthquake, a workshop was held on October 1st. JICA project team together with West Sumatra provincial government organized a workshop on promotion of quake resistant school. The program for the workshop is shown below.

■ **Opening (20 mins)**

◇ **Welcoming Address (15)**

Hon. Prof.Dr.H. Irwan Prayitno, Psi, M.Sc Governor, West Sumatra Province
Her Majesty's Amabassodor to Indonesia, Mr. Kojiro Shiojiri, Ambassador of Japan
Hon. Mr. Motofumi Kohara, Resident Representative of JICA

◇ **Keynote Address (5)**

Mr. Bakri Beck, Deputy Chief for Rehabilitation and Reconstruction, BNPB

■ **Video Presentation (10 mins)**

◇ **Overview of JICA Project**

Ms. Anastasia Maylinda, SEEDS Asia and YAKKUM Emergency Unit (YEU)

■ **Gaps, Lessons Learned, and Future Actions (Presentation) (30 mins)**

◇ **Gaps and Solutions from Two Construction Sites**

Mr. Yamamoto, Structural Engineer, Deputy Team Leader of JICA Project Team

◇ **Implication to Future Actions, Lessons Learned from Technical Education on Construction**

Mr. Okubo, President SNS

◇ **Implication to Future Actions, Lessons Learned from School based DRR Activities**

Ms. Shaw, Community Based Disaster Risk Management, JICA Project Team

■ **Forum (60 mins)**

How can we build Disaster Safer Schools for All?

Agenda

☐ Legalization of Manuals and Regulation
☐ Training of Engineers and carpenters
☐ School Based Disaster Risk Management

◇ **Panelist (Draft: 3-5 mins * 8 -10persons = 40 mins)**

- Mr. Didi Aryadi, Deputy Mayor Padang City
- Mr. Bakri Beck, Deputy Chief for Rehabilitation and Reconstruction, BNPB
- Mr. Dody Ruswandi Head of Public Works, West Sumatra
- Mr. H. Harmensyah, Head of Dep., BPBD
- Mr. Burhasman, Head of Education Dep., West Sumatra Province
- Mr. Bambang Sutrisno, Head of Education Dep., Padang City
- Mr. Syamsulrizal, Head of Education Dep., Pdang Pariaman District
- Mr. Ridzal Sh, Head of Association of Contractors (GAPENSI)
- Person in charge of School Construction Guideline MoNE
- Deputy District Mayor, Padang Pariaman District

Declaration (5)

2.10 Signing Minutes of Meeting

Minutes of meeting were documented based on the opinions raised from participants of the workshop on quake resistant school and key requirement as follows;

1. The consensus of necessity of specified quake resistant structural standard for school buildings was obtained, however, increased cost is a sensitive matter and it should be shared among stakeholders, namely central government, provincial governments and local governments.
2. To construct quake-resistant schools, monitoring by communities should take into consideration.
3. Standards for quake resistant building should be prepared based on seismic zoning according to SNI.
4. BPBD is responsible for preparing technical guideline to be applied at provincial level by coordinating with Governor, and relevant offices.
5. There should be one authorized guideline of quake-resistant buildings. “Key Requirements for Quake-Resistance Design for School Building” which JICA Project Team has produced, should be converted to “Technical Guideline” format to be enacted as Governor’s Regulation of West Sumatra Province about School Buildings.

・Agreement on legalization process of building quake resistant schools

An agreement was documented as follows, which will be signed by Ministry of National Education and JICA.

Based on the Workshops on Quake-Resistant School Construction, held in Padang on 26th August, 2010 and following discussion between Ministry of National Education (hereinafter referred to as “MoNE”) and Japan International Cooperation Agency (referred to as “JICA”) , both MoNE and JICA have come to an agreement that MoNE shall take actions to include “Quake-Resistant School Construction Guideline” (hereinafter referred to as “Guideline”), into Technical Guideline of School Construction, namely, “Perunjuk Teknis” in Indonesian, issued by MoNE.

Upon getting consensus of MoNE, JICA Project Team shall start preparing jointly with Technical Team of MoNE the Guideline along with standard drawings, to be completed by the end of 2010. After completion of the Guideline and standard drawings, MoNE shall proceed to an authorization process and issue the Guideline by May, 2011.

2.11 Development of educational material

Development of a Handbook for teachers (96 pages) to conduct disaster education is underway by Seeds Asia and YEU. Textbook for technical education of quake resistant building was developed by SNS, and 500 copies were printed. JICA project team also developed slides regarding basic knowledge of earthquake, guideline for conducting town watching, development of hazard map, development of disaster management plan, and implementation of disaster drill).

As for Handbook, it was released in the first Commemoration of the Earthquake of 2009, and has received a positive evaluation about the contents from the heads of the education departments of West Sumatra Province, Padang City, and Padang Pariaman District. Head of Education Departments of West Sumatra Province requested us to distribute the handbooks to all the elementary schools in West Sumatra Province, however due to limitation of budgets, digital data of the handbook was provided to be distributed for schools requesting them. Fortunately, from the end of the year 2010, elementary schools in West Sumatra have started to conduct disaster risk management education two classes in a month. The handbooks were distributed for model schools and their cluster schools. Since there were no particular educational materials for disaster risk management, the handbooks were utilized in the model schools and their cluster schools.

Regarding issues, it is necessary to conduct trainings of enough time for more numbers of teachers by utilizing the handbook. The trainings were conducted in August 2010, with a view to replicate the activities of model schools to other cluster schools by activating the teachers who have experience of attending the community based disaster risk management activities in two model schools, since there were needs of education on disaster risk management by teachers. The participants of the training were about thirty each. If we plan to expand the activities to all the elementary schools in West Sumatra, the approach will be different, and sufficient number of master trainers needs to be trained. The participants of the training were about thirty at both sites.

Considering the fact that later on in late September 2010, the handbook having been received a good evaluation from Education Office of West Sumatra, training of the teachers to up-scale the activities for all the schools in West Sumatra Province need to be organized, at the same time by ensuring incentives for master trainers. However, the nature of the handbook is prepared for conducting CBDRM activities for neighborhood communities, some disaster risk reduction (DRR) components for basic education need to be added. Furthermore, for up-scaling nation wide, it is ideal to include some components on relevant hazards for each locality.

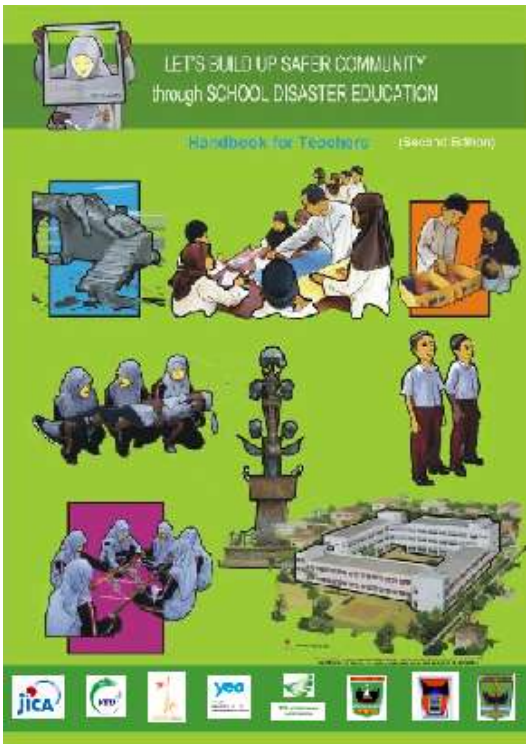


Figure 2.11.1 Handbook for Teachers to Conduct Disaster Education

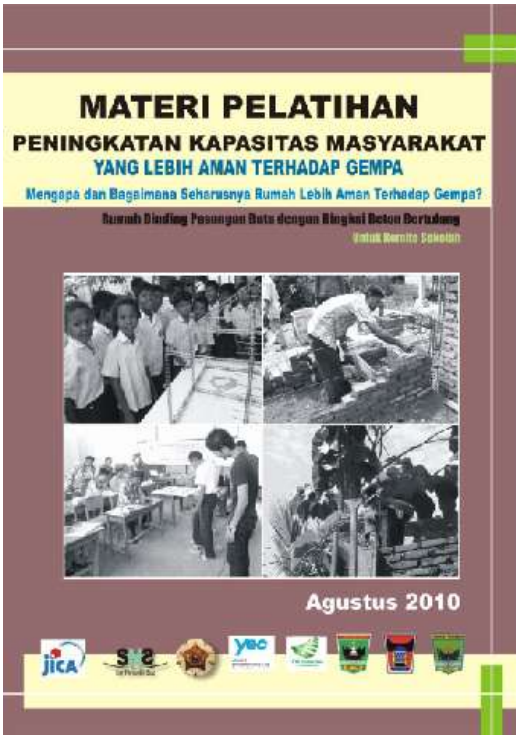


Figure 2.11.2 Textbook for Technical Education of Quake Resistant Building

2.12 Preparing Video

Video were prepared to introduce and upscale CBDRM activities to other areas. Target groups for the video are BPBD, Education offices, teachers, and community residents. There are two videos; one is about 30 minutes and the other one is summary version for 10 minutes. The 10 minutes video was shown in the workshop at the first commemoration of the earthquake.

2.13 Installation of disaster prevention equipment

・Installation to model schools

Disaster prevention equipment as shown in table below were purchased and installed in schools to be reconstructed.

Table 2.12.1 Equipments of Disaster Risk Management for Reconstructed Schools in Padang

No	Name of equipment	SDN 23/24 Padang	SMPN 07 Padang	SMPN 25 Padang
1	Water tank	1	-	-
2	Emergency Lamp	2	1	1
3	Generator	1	-	-
4	First Aid Bag + medicines	6	3	3
5	Fire Extinguisher	2	-	-
6	Loadspeaker / TOA	2	-	-

Table 2.12.2 Equipments of Disaster Risk Management for Reconstructed Schools in Padang Pariaman

No	Name of equipment	SDN 08 Sintuk Toboh Gadang	SMPN 01 Enam Lingkung	SDN 01 Enam Lingkung	SDN 08 2x11 Enam Lingkung	SDN 05 Batang Gasan	SDN 07 Sungai Geringging	SDN 02 V Koto Timur	SDN 03 V Koto Kp. Dalam
1	Water tank	1	-	-	-	-	-	-	-
2	Emergency Lamp	1	1	1	1	1	1	1	1
3	Generator	1	-	-	-	-	-	-	-
4	First Aid Bag + medicines	3	3	3	3	3	3	3	3
5	Fire Extinguisher	1	-	-	-	-	-	-	-
6	Loadspeaker / TOA	1	-	-	-	-	-	-	-

Emergency kit distributed to schools by JICA project team is as shown in table 2.12.3.

Table 2.12.3 List of Items in Emergency Kit Bag

Instant Bandage No.1	Sulfa levertran Zalf
Elbow pads	Iodine
Gauze bandage of 5 cm	Rivanol
Gauze bandage of 8 cm	Tetra Cycline
Sterile hydrophilic gauze 16/16	Band aid
Cotton pads of 10 gram	Plaster
Cotton pads of 25 gram	Pin
Liniment	Scissors

3. Conclusion

3.1 Issues found from implementation

- Technical education on building structures and earthquake resistant structure, male participants had more knowledge. However, in the target areas of Minangkabau culture, women have the ownership of the houses. Thus, it was necessary to spend more time than it was planned to focus on women and explain well in the workshop.
- It was time consuming to coordinate with department heads, while Japanese experts were away.
- CBDRM activities could not be conducted with the local NGO of DRR, because they are applying the similar DRR projects funded by JICA. To disseminate the first hand knowledge was not simple.

3.2 Lessons learned from the project

- Structure type of houses, degree of damages to houses, and method of housing reconstruction differs in regions. Therefore, needs assessment of residents prior to technical education is necessary.
- Considering the cultural background of the project area of Minangkabau culture, technical education for quake resistance needs to be focused on women. Building model can be utilized for assisting easy understandings, enough time need to be spent for explanations.
- Wali kolon (village chief), decision maker in community, needs to be involved in the development process of community disaster management plan from the beginning. Wali kolon, since he is usually in good terms with school principals, can facilitate activities with them.
- Youth leaders also need to be involved in the development process of community disaster management plan, since many of them are active and enthusiastic of volunteer works, and indispensable as a member of community disaster management groups.
- Different groups of communities in a school area need to be included and coordinated as necessary stakeholders to develop community disaster management plan.

3.3 Suggestions on Implementation of Community Based Disaster Risk Management and Education on Disaster Risk Management

- Scientific risk knowledge on earthquakes and other disasters wiped away the groundless rumors and worries, while there were still aftershocks. Especially, question and answer sessions by experts of seismology and geophysics were very useful.
- Risk communication at the early stage of recovery contributed to mental care.

- Reconstructions of Schools in earthquake resistant manner have demonstration effects for local communities to reconstruct their own houses earthquake resistant, since schools are the core community facilities.
- Most communities have realized the necessity of at least one earthquake resistant structure at one community. It is expected for BPBD to designate at least one safer evacuation site as evacuation site in future.
- In the joint workshops with community and school teachers at the stage of reconstruction, teacher contributed very much by showing strong leadership.
- Those who have experienced earthquakes can prepare more concrete and practical community based disaster risk management plans.
- Preparation of educational materials is necessary, since classes on DRR education are newly allocated twice a month. The handbook, which was produced in this project has received good evaluation from education offices of West Sumatra Province, Padang Pariaman District, and Padang City, and could be utilized in the classes on DRR education. By conducting trainings, teachers need to gain practical capacities. Because handbooks are prepared based on the community based DRR activities, it is expected to add some more basic knowledge on disasters and DRR to make the educational materials more comprehensive as a part of basic education.

3.4 Considerations on Up-scaling

- Participants were very interested in acquiring scientific knowledge such as historical earthquakes, possible next earthquake, thus, it is necessary to provide opportunities to explain such knowledge.
- By activating existing community groups such as security, health, autonomous disaster management groups can be established.
- School teachers can play roles of driving forces since they are very much motivated, take leadership, and showed good presentation capacity.
- Minangkabau is matrilineal, with property and land passing down from mother to daughter, and women are very much involved in participation to workshops, and decision makings.
- To acquire scientific knowledge and technical knowledge on construction, visual and active learning materials attracts interests and facilitates understandings of participants.