

Mongolia
National Emergency Management Agency (NEMA)

**THE PROJECT FOR STRENGTHENING
THE NATIONAL CAPACITY OF EARTHQUAKE
DISASTER PROTECTION AND PREVENTION
IN MONGOLIA**

PROJECT COMPLETION REPORT

JANUARY 2020

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ORIENTAL CONSULTANTS GLOBAL CO., LTD.

KOKUSAI KOGYO CO., LTD.

OYO INTERNATIONAL CORPORATION

URBAN DISASTER RESEARCH INSTITUTE

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Exchange Rate

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【Abbreviation】

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Center
ALMGaC	Administration of Land Management, Geodesy and Cartography of Mongolia
AMCDRR	Asian Ministerial Conference on Disaster Risk Reduction
CBDRM CBDRR	Community Based Disaster Risk Management/ Community Based Disaster Risk Reduction
CCM	Construction Code of Mongolia
CDC	Construction Development Center
CR	Construction Regulation
CST	Consulting Service Team
DB	Database
DPTMC	Disaster Protection Training and Methodology Center
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EMA	Emergency Management Department of Aimag
EMDC	Emergency Management Department of the Capital City
GIS	Geographic Information System
IAG	Institute of Astronomy and Geophysics
ITPD	Institute of Teacher's Professional Development
JICA	Japan International Cooperation Agency
M	Magnitudes
MACE	Mongolian Association of Civil Engineers
MAS	Mongolian Academy of Sciences
MECSS	Mongolian Ministry of Education, Culture, Science and Sports
MCUD	Ministry of Construction and Urban Development
MNT	Mongolian <i>tögrög</i>
MP	Master Plan
MRCS	Mongolian Red Cross Society
MSK	Medvedev-Sponheuer-Karnik intensity scale
MUST	Mongolian University of Science and Technology
NDC	Mongolian National Data Center
NEMA	National Emergency Management Agency
NGO	Non-Governmental Organization
NIED	National Research Institute for Earth Science and Disaster Resilience

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PDM	Project Design Matrix
RC	Reinforced Concrete
SDGs	Sustainable Development Goals
SFDRR	Sendai Framework for DRR
SMS	Short Message Service
SISDRR	United Nations Office for Disaster Risk Reduction
UB	Ulaanbaatar
TOR	Terms of Reference
TOT	Training for Trainers
UBUDA	Urban Development Agency, Ulaanbaatar City
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
USD	United States Dollar
WB	World Bank
WG	Working Group
WHO	World Health Organization

Project Completion Report

I. Basic Information of the Project

I.1 Country

Mongolia

I.2 Title of the Project

Project for Strengthening the National Capacity of Earthquake Disaster Protection and Prevention in Mongolia

I.3 Duration of the Project (Planned and Actual)

The Project was started earlier for preparation.

Plan (Work Plan): From December 2016 to December 2019

Actual: From November 2016 to December 2019 (Actual,)

I.4 Background (from Record of Discussions(R/D))

In Mongolia, especially in the western part, earthquakes with magnitudes of 8 on the Richter scale were recorded in the 20th century. In addition recently the earthquake risk has been increasing, because several faults were discovered near Ulaanbaatar city, the capital of Mongolia which is densely concentrated with the half population of the Mongolian people. The number of both felt and unfelt earthquakes has increased.

In this circumstance, JICA extended the following cooperation for the Emergency Management Department of the Capital City (EMDC) through the technical cooperation for development planning named "The Project for Strengthening the Capacity of Seismic Disaster Risk Management in Ulaanbaatar City" from February 2012 to October 2013

- (1) Comprehensive seismic risk map based on hazard assessment and risk assessment for building
- (2) Review and recommendation of the revision of seismic disaster risk reduction plan
- (3) Guideline for the construction of seismic resistant mid-to-high-rise buildings
- (4) Human capacity development (training program in Japan, awareness raising events and campaigns)

Following this technical cooperation, the National Emergency Management Agency (NEMA) submitted another technical cooperation request "the Project for Strengthening the National Capacity of Earthquake Disaster Protection and Prevention in Mongolia" to the Government of Japan. After several discussions between NEMA and JICA on the scope and activities in the Project through a visiting program between Mongolia and

Japan in both directions, the Project was agreed upon the basis that the capacity development of NEMA will be a main focus.

I.5 Overall Goal and Project Purpose (from Record of Discussions(R/D))

An overall goal, project purpose, expected outputs and respective activities in the beginning of the Project are summarized in Table I.5.1.

Table I.5.1 Summary of overall goal, project purpose, outputs and activities

Overall Goal	Seismic risk will be reduced.	
Project Purpose	The Capacity of the National Emergency Management Agency will be enhanced through the activities for strengthening the countermeasures for seismic risk.	
	Output	Activities
Output1	Capacity for data collection on disaster risk reduction and coordination among related organizations will be enhanced.	1.1 To Improve frameworks for disaster risk reduction by reflecting the Amended Law of Disaster Protection 1.2 To strengthen cooperation among related organizations for disaster risk reduction 1.3 To improve monitoring and information gathering methods for national and local disaster protection plans
Output2	Capacity of public administration officers related with the seismic assessment and seismic strengthening for buildings will be enhanced.	2.1 To establish seismic assessment methods for buildings, infrastructures and lifelines in the country, and to implement training a program on seismic assessment 2.2 To develop seismic strengthening guidelines for buildings in the country, and to implement a training program on seismic strengthening
Output3	Implementation plan on disaster risk reduction education and awareness raising activities will be developed and realized.	3.1 To develop a guideline for disaster risk reduction education and educational materials in kindergartens and schools, and to implement a training program for instructors and teachers 3.2 To develop materials for disaster risk reduction education and raising awareness, and to implement a training program for target groups and residents

I.6 Implementing Agency

I.6.1 Overall structure of the Project

The counterpart (C/P) of this project is the National Emergency Management Agency (NEMA) so as to be mentioned in the Project purpose. NEMA collaborated with the following C/P to achieve the Project objectives.

- Ministry of Construction and Urban Development (MCUD)

- Ministry of Education, Culture, Sports and Science (MECSS)-
- General State Inspection Agency (GASI)
- Emergency Management Department of the Capital City (EMDC)
- Construction Quality and Safety Department, Urban Development Agency of Capital City (UBUDA)

I.6.2 Administrative structure of the Project

The implementation structure of the Project is shown in Figure I.6.1.

Given that many stakeholders are involved in the activities for each output, a working group (WG) was set up to conduct the Project smoothly for each of the three outputs: disaster management plan, seismic resistance, and Disaster Risk Reduction (DRR) education.

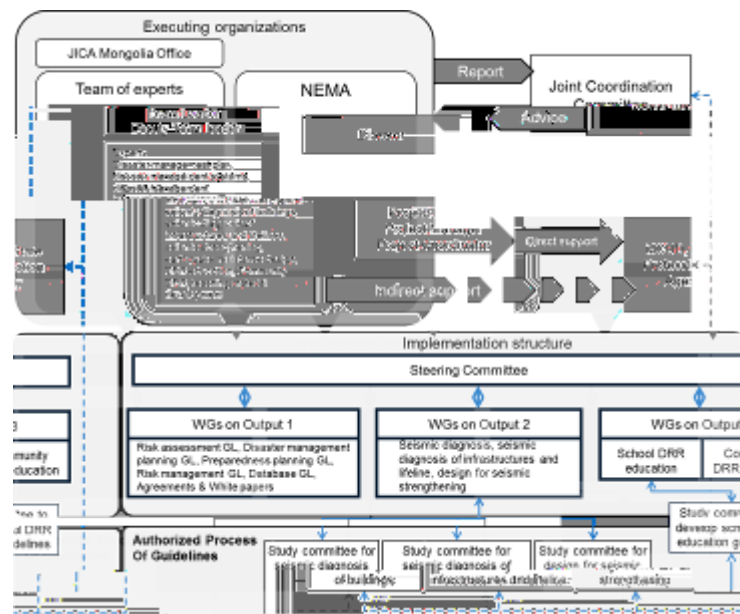


Figure I.6.1 Administrative structure of the Project

The Director of Disaster Prevention Department of NEMA is appointed as the Project Director (PD), who bears the overall responsibility for the administration and implementation of the Project.

Director of Policy Coordination and Cooperation Department of NEMA is appointed as the Project Manager (PM), who is responsible for managerial matters of the Project.

The JICA Expert Team (JET) gives the necessary technical guidance, advice and recommendation to NEMA and other C/P on any matters as needed to implement the Project.

The Joint Coordination Committee (JCC) is established in order to facilitate inter-organizational coordination. The JCC basically meets once in a quarter during the

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year and whenever deemed necessary. The Steering Committee (SC) meets together before each JCC meeting basically to discuss the progress the Project and share relevant information.

A total of nine (9) JCC and ten (10) SC meetings were held during the Project. Table I.6.1 shows the period and agenda of JCC meeting.

Table I.6.1 Contents of JCC

No.	Date	Participants	Contents of discussion
1.	December 7, 2016	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 28 participants	Members of JCC Work Plan Monitoring Sheet I & II “Ver. 1” Nominating of Officers for the Working Group Members Amendment of the concerned administration authorities of Mongolia
2.	April 14, 2017	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 37 participants	Lesson learned from the training in Japan Progress of Activities for each Working Group Amendment of Officers for the Working Group Members Amendment of the concerned administration authorities of Mongolia Procuring equipment Training in Japan or third country
3.	June 29, 2017	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 42 participants	Project Monitoring Sheet I & II “Ver. 2” Progress of Activities for each Working Group 2 nd Training in Japan Procuring equipment
4	Dec. 1, 2017	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 32 participants	<ul style="list-style-type: none"> - Progress of WG Activities - Amendment of Working Group Member - Procuring Equipment - Target Aimags for revision of the regional disaster management plan
5	Sep. 28, 2017	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 35 participants	<ul style="list-style-type: none"> - Progress of WG Activities - Amendment of Working Group Member - Schedule of Installing Equipment - Pilot Areas for DRR Education and Awareness Activities - Schedule of Next JCC
6	Sep. 21, 2018	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 34 participants	<ul style="list-style-type: none"> - Progress of WG Activities - Amendment of Working Group Member - Progress of Installing Equipment - Schedule of Next JCC
7	Nov. 1, 2018	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 36 participants	<ul style="list-style-type: none"> - Progress of WG Activities - Amendment of Working Group Member - Progress of Procuring Equipment of Earthquake Simulation Experience for the Disaster Protection Training Methodology Center - Future Plan for Publishing White Paper

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No.	Date	Participants	Contents of discussion
			<ul style="list-style-type: none"> - Schedule of Next JCC
8	June 5, 2019	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc. Total: 29 participants	<ul style="list-style-type: none"> - Progress of WG Activities - Amendment of Working Group Member - Confirmation of the Achievement of the Project Purpose based on Indicators - Discussion How to Evaluate the Achievement of the Overall Goal including items of Indicators - Schedule of Next JCC
9	Nov. 5, 2019	NEMA, MCUD, MECSS, GASI, Construction Quality and Safety Department; City Planning and Master Planning Agency of Capital City, etc.	<ul style="list-style-type: none"> - Progress of WG Activities - Confirmation of Project Completion Report - Further Activities lead by NEMA

II. Results of the Project

II.1 Results of the Project

II.1.1 Input by the Japanese side (Planned and Actual)

(1) Expert dispatch

Eighteen (18) Japanese experts were dispatched based on the Plan of Operation (PO) of Work Plan. The assigned periods of each expert are listed showing plan and actual in Table II.1.1.

Table II.1.1 Dispatch of JICA Experts

Roles		Number of Dispatch		Man Month (MM)	
		Plan	Actual	Plan	Actual
Project Management Group	Team Leader / Integrated Disaster Risk Management I	13	18	11.83	12.67
	Deputy Team Leader / Integrated Disaster Risk Management II	8*1	12*1	7.00	7.33
OUTPUT1: Disaster Management Plan	Disaster Management Plan I	9	11	8.00	8.00
	Disaster Management Plan II	4	4	3.50	3.50
	Disaster Management System I	3	3	2.00	2.00
	Disaster Management System II	3	3	2.00	2.00
	Disaster Management Information I	4	4	1.50	1.50
	Disaster Management Information II	3*1	3*1	0.50	0.50
Output 2: Seismic Resistance	Seismic-Resistance	12	12	10.83	9.67
	Seismic Diagnosis of Infrastructures and Lifelines	5	5	3.00	3.00
	Seismic Diagnosis of Buildings / Seismic Strengthening I (RC, PC)	5	6	3.67	4.00
	Seismic Diagnosis of Buildings / Seismic Strengthening II (Masonry)	3	3	1.20	1.20
	Seismic-Resistant Design	6	6	4.00	3.67
Output 3: DRR Education	DRR Education I	9	15	5.50	6.70
	DRR Education II	8	9	5.50	*24.23
	Community-Based Disaster Management / Project Coordination I	10	9	6.17	6.00
	Development of Disaster	5	6	3.00	3.17

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	Management Materials I	Teaching				
	Development Management Materials II Coordination II	of Disaster Teaching Project	※3_	※3_	※3	※3
			107	117	79.20	79.71

※1: the Deputy Team Leader was additionally dispatched as Disaster Management Information II so that the number of dispatched of Disaster Management is included in the dispatch as the Deputy Team Leader.

※2: 1.2MM, part of assign of DRR Education II, was transferred to DRR Education I, and 0.6 MM was transferred to assign in Japan.

※3: Domestic expert of Mongolia

Source: JICA Expert Team

(2) Receipt of training participants

The Mongolian side requested a second training session in Japan instead of training in third country in order to learn specific knowledge and technical approaches of Japan which will be directly utilized to prepare guidelines and training programs in the activities of each WG. Discussing the effective training, the training program was divided into three (3) themes according to the WG activities.

Table II.1.2 Contents of the training

Plan			
1st Training in Japan			10 persons
Actual			
Phase	Theme	Participant (persons)	
1 st Training in Japan	Disaster Risk Reduction and Management	12	Total 44
	Output 1: Capacity Improvement for Disaster Management Planning	13	
2 nd Training in Japan	Output 2: Capacity Improvement for Seismic Diagnosis and Strengthening Buildings	9	
	Output 3: Capacity Improvement for the Promotion of DRR	10	

Source: JICA Expert Team

(3) Equipment Provision

Five (5) units of equipment for seismic diagnosis were provided after discussions about the organization to use them effectively. Each equipment was introduced and

demonstrated in the project hosted Training Course of Seismic Evaluation equipment and MCUD's exhibition

The equipment of earthquake simulation was provided for the promotion of DRR awareness-rising in the Disaster Protection Training and Methodology Center (DPTMC).

Table II.1.3 Contents of Equipment

Name of equipment	Number of units	
	Plan	Actual
Seismic Diagnosis, five (5) types	3	5
Earthquake Simulation for DRR awareness-rising	1	1
Cost Amount (million Japanese Yen)	80	80

Source: JICA Expert Team

(4) Overseas activities cost

Amount of activities cost is shown in Table II.1.4.

Table II.1.4 Activities Cost

Name of equipment	Cost Amount (million Japanese Yen)
Office Equipment	1.65
Holding Workshop	5.26
Educational Materials	0.44
Translation	0.92
Project Assistants	44.91
Total	53.18

Source: JICA Expert Team

II.1.2 Input by the Mongolian side (Planned and Actual)

(1) Counterpart assignment

NEMA was assigned as the PD, PM and Project Coordinator, and assigned WG members from counterpart organization such as MCUD, MECSS, GASI, EMDC and UDC of Capital City.

Table II.1.5 The Number of Counterpart Assignment

Name of equipment		Number of People	
		Plan	Actual
Project Director		1	1
Project Manager		1	1
Project Coordinator		1	1
Working Group	Output1	11	15

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	Output2	6	8
	Output3	4	17
	Total	24	43

Source: JICA Expert Team

(2) Provision of offices

NEMA provided suitable office space in the building of NEMA headquarter, and supplied meeting rooms, and relating data and information. NEMA almost bore all of the running expenses necessary for the implementation of the Project including per-diems for C/P's to travel aimags.

(3) Other items borne by the counterpart government

NEMA bore the necessary cost for the improvement of the DPTMC on the occasion of the installation of the earthquake simulation equipment.

II.1.3 Activities (Planned and Actual)

(1) Output1

Activity 1.1.1 To identify problems and challenges on the implementation of legal frameworks of disaster risk reduction

At the beginning of the Project, the needs to develop new rules and regulations or to revise existing rules and regulations had been discussed in the WG1 based on the draft contents of the amended Law of Disaster Protection, and it had been considered that five (5) guidelines (hereinafter referred to as "GL") would be formulated in the activities for Output 1, namely "Risk Assessment GL", "Disaster Protection Planning GL", "Disaster Preparedness GL", "Disaster Management GL" and "Disaster Database GL".

It had been assumed that the Disaster Preparedness GL would deal with setting the levels of disaster preparation and preliminary measures according to the level of preparation, and the Disaster Management GL would be mainly deal with the management concerning the investment for mitigation at the time of an earthquake. However, in the Formal Amended Law of Disaster Protection, the provisions that had been the basis of the assumption for formulating the Disaster Preparedness GL and the Disaster Management GL were revised or deleted.

In particular, the provisions of Articles 10.2, 10.8 and 11.1 had been initially considered to correspond to the Disaster Preparedness GL. However, these provisions were revised and the roles of the police, public security, and military chiefs' headquarters were described

mainly in those Articles. Since some of their roles and resource data are confidential, it was decided that the Disaster Preparedness GL would not be prepared independently but the part of activities in preparedness phase would be included in the Disaster Protection Planning GL.

In addition, the provisions of Article 12.2 had initially considered corresponding to the Disaster Management GL. However, the part of investment for mitigation was deleted from the Article and it was newly described that "Disaster Management" is an audit of disaster prevention activities of relevant agencies by the National Audit Committee. The National Audit Committee is planned to be established within NEMA and the National Auditor shall independently conduct the audit work. Therefore, the Mongolian side mentioned that audit work includes confidential data and it is no necessary for JET to support the preparation of the GL for the national auditing.

From the above viewpoint, six (6) GLs shall be developed in Output 1 of the Project, namely, the "Earthquake Disaster Risk Assessment GL", four (4) GLs regarding Earthquake Disaster Protection Planning, and "Disaster Database GL".

Activity 1.1.2 To develop guidelines on improvement of legal frameworks and plans, assessment of disaster risk and database on disaster risk reduction

1) Earthquake Disaster Risk Assessment Guideline

The WG1 members prepared "Earthquake Disaster Risk Assessment GL", "Technical GL for Earthquake Risk Assessment" and application software for a simple earthquake risk assessment for the central and local government staff. At the beginning of the Project, two (2) guidelines, namely "Comprehensive Earthquake Disaster Risk Assessment GL" for the central and local governments and "Detailed Earthquake Disaster Risk Assessment GL" for experts and researchers of related organizations were proposed to be developed. However, through the development process of the guidelines, the WG1 members decided to integrate the two guidelines. It is because there is not a big difference between those two guidelines except the chapter on the method to analyze the risk assessment. The chapters on purpose, scope, terms, preparation of proposal, reflection of risk assessment results in disaster prevention plan, and preparation of earthquake disaster risk assessment report are common. The detailed analysis method is described in the "Technical GL for Earthquake Risk Assessment". The integrated guideline was officially approved in September 2019.

These two GLs and the application software are considered to be a part of the annex of the revised Regulation for Implementation of Disaster Vulnerability and Risk Assessment (Annex of the Cabinet Decision of 176, 2006). However, the whole composition of the

Regulation has not been clearly identified.

The WG1 members introduced and used the application software to calculate the earthquake disaster damage in the pilot Aimags.

2) Earthquake Disaster Protection Planning Guideline

The WG1 members prepared four (4) GLs namely, "National Earthquake Disaster Protection Planning GL", "State Earthquake Disaster Protection Service Planning GL", "Aimag / Soum Level Earthquake Disaster Protection Planning GL" and "Capital City / District Level Earthquake Disaster Protection Planning GL".

The member of WG1 learned the composition and concept of the regional disaster protection plan in Japan at the training session in Japan conducted in December 2017. The results of the learning at the training session were reflected in the contents of new GLs. Especially, in order to use the results of risk assessment in the earthquake disaster protection plan effectively, the members of WG1 has adopted a new concept in Mongolia that sets earthquake disaster reduction goals. Furthermore, the necessity of the establishment of the working group to formulate the disaster protection plan and the procedure of the plan formulation by the working group were also clearly stated in those GLs.

In the pilot aimags and districts, the Earthquake Disaster Protection Plans are being prepared or revised as a part of Activity 1.3.2. Through these pilot activities, feedbacks about the contents of the draft GLs will be gathered from officers who are member of planning in the pilot areas and these GLs were improved.

After completion of "Aimag / Soum Level Earthquake Disaster Protection Planning GL" and "Capital City / District Level Earthquake Disaster Protection Planning GL" in September 2019, the executive meeting of NEMA made a comment that these two GL must be integrated in harmony with the structure of the Instruction of the General Disaster Prevention Plan. Therefore, WG integrated these two GL into "Regional Earthquake Disaster Protection Planning GL".

This "Regional Earthquake Disaster Protection Planning GL" has been under the process of official approval in November 2019.

"National Earthquake Disaster Protection Planning GL" and "State Earthquake Disaster Protection Service Planning GL" have been also under the process of official approval in November 2019.

3) Disaster Database Guideline

Through Activity 1.3.3, the sub-WG 1-5 decided to introduce a new mission-critical information management system for Disaster Database in NEMA by modifying “e-comi map system” based on the characteristics and environmental status in Mongolia. “e-comi map system” is free open-source software for web-based GIS produced by the National Research Institute for Earth Science and Disaster Resilience in Japan (NIED) and utilized for spatial information sharing for disaster risk reduction and emergency response in Japan. At the same time, the necessity to establish a management team for operation and management of a disaster database (hereinafter referred to as “DB”) using a new information management system had been discussed in the sub-WG 1-5 continuously. Finally the new division named “Spatial Information and Technology Division (hereinafter referred to as “SITD”)", which was composed of four officers, officially established under the Public Announcement and Emergency Administration Center in NEMA at the end of May 2018.

The drafting work on the Disaster Database GL was initiated in parallel with discussing the detailed work procedure and responsibility of SITD. After a series of intensive write-shops aimed at defining the contents of the GL with members of SITD, the work for preparing the draft GL with some supplemental documents was completed at the end of October 2018.

After some modification work under orders and comments from NEMA’s board members and JCC members, the GL on Operation and Management of Spatial Information System for Disaster Risk Reduction (hereinafter referred to as “SISDRR”) was finally approved as the order A/47 by the head of NEMA on 20 February 2019. There are two annexes of the GL about “Disaster Code” and “Spatial Database Design”. The GL consists of nine chapters shown in the table below.

Table II.1.6 Contents of the GL with annexes

<p>GL on Operation and Management of Spatial Information System for Disaster Risk Reduction</p> <ul style="list-style-type: none"> • Chapter 1: Background • Chapter 2: Definition of the Terms • Chapter 3: Collection of Spatial Database for DRR and its Requirements • Chapter 4: Administration and Management of SISDRR • Chapter 5: Utilization of SISDRR • Chapter 6: Duties and Function of Users for SISDRR • Chapter 7: Security and Safety of SISDRR • Chapter 8: Prohibitions • Chapter 9: Legal Responses 	<p>Annex 1: Coding system of Spatial Database for DRR</p> <ul style="list-style-type: none"> • 1. Purpose to Establish Coding System • 2. Codes of thematic layers /disaster codes/ • 3. Codes of baseline layers /Location codes/ <p>Annex 2: Design of Spatial Database for DRR</p> <ul style="list-style-type: none"> • 1. Introduction of Spatial Database Design • 2. Requirements for Titling Layers and Maps • 3. Creating New Column in Baseline and Thematic Layers, and Editing Texts • 4. Common Terms for Spatial Database Design • 5. Design for Baseline Layers • 6. Design for Thematic Layers
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Source: JICA Expert Team

In the preparation stage of the draft GL, the GL's name was referred to as the GL on Operation and Management of Disaster Spatial Database using Internet-based Disaster Spatial Information System (I-DSIS), but finally the GL's name was officially defined as described above.

Activity 1.1.3 To develop new regulation and the drafts of revised version of regulation on implementation of the Law of Disaster Protection

The member of WG1 verified the articles of the Amended Law of Disaster Protection mainly from the viewpoint of risk assessment and disaster protection, and investigated the necessity to establish new rules and regulations and/or revise existing rules and regulations. Table II.1.7 shows the related rules and regulations with handling policy in the Project. As a result, it was confirmed that the necessity for the establishment and revision of one (1) regulation which corresponded to the Risk Assessment GL and six (6) regulations which corresponded to the Disaster Protection Planning GL.

Table II.1.7 Related Rules and Regulations with Handling Policy

Regulations Stipulated in the Amended Law of Disaster Protection	Handling Policy and Related GL
7.4 Regulation and procedure for disaster risk assessment	Regulation for Implementation of Disaster Vulnerability and Risk Assessment was revised. 1) Comprehensive Earthquake Disaster Risk Assessment GL and 2) Detailed Earthquake Disaster Risk Assessment GL shall be created in the Project as annexes of the revised regulation.
8.3 Instruction on development of disaster protection plan	Earthquake disaster protection planning GL in the Project is corresponded to the earthquake part of this instruction.
10.2 Procedure on checkup and testing of disaster readiness assurance	The general part on "earthquake disaster preparedness" shall be part of the earthquake disaster protection planning GL.
10.8 Procedure on special working regime	
11.1 Directive on shifting to high level and all out readiness level	
12.2 Procedure on state control implementation of disaster protection	This procedure wasn't scoped in the Project. NEMA shall prepare it.
15.3 Common regulation on implementation of search and rescue operation	The part of earthquake for these rules, regulations and procedures correspond to the National Earthquake Disaster Protection Planning G", the Sate Earthquake Disaster Protection Service Planning GL, the Regional Level Earthquake Disaster Protection Planning GL prepared in the Project.
16.5 Approve procedure for transmission of disaster announcement signals	
18.2 Rule and procedure of disaster operation groups	
19.2 Procedure on mobilization of manpower and evacuation	
20.3 Procedures and instructions for disaster damage and needs assessment	
20.4 Regulation on reimbursement for a regal body who performed official disaster response activities and assistance	This regulation wasn't scoped in the Project.

Source: JICA Expert Team

As described in Activity 1.1.2, for the Regulation for Implementation of a Disaster Vulnerability and Risk Assessment (Annex of the Cabinet Decision of 176, 2006), the revision work has already been started by NEMA, and the main text of the regulation has already been completed. Annexes of this regulation include the earthquake risk assessment guideline which was prepared in the Project. Other annexes are currently under development.

Activity 1.2.1 To develop the draft of the agreement which shows the coordination and cooperation among NEMA and related organizations

The progress of agreement development for each sector is summarized in Table II.1.8. During the development process of the agreement documents, the WG1 members developed "Manual of Preparation Procedure of the Agreement".

Table II.1.8 The Situation of Conclusion of Agreements

Sector	Contents	Organizations	Situation
1.Food	Organize stable supply of foods and water to disaster victims in evacuation places and temporary housings	NEMA – Ministry of Food and Agriculture	Agreement established on October 16, 2018.
2.Medicine and medical equipment	Stable supply of medicine for providing emergency medical services in regions struck by disaster	Ministry of Health - 3 major pharmaceutical manufacturer and importer companies	Agreement established on November 12, 2018.
3.Construction materials and temporary housings	Supply of construction materials required for the immediate restoration of structures, and construction of temporary housing	Ministry of Construction and Urban Development - Association of Construction Material Manufacturers and Association of Construction	Agreement established in September 28, 2019
4.Clean water	Organize stable water supply at in regions struck by disaster	NEMA-Water Management Authority	Agreement is expected to be established in December 2019.
5.Road and transport	Providing road and transport means necessary for organizing search and rescue, damage mitigation, and immediate restoration activities without delay in regions struck by disaster	NEMA – Ministry of Road and Transportation Development	Agreement established in October 29, 2019
6.Fuel and gas	Providing stable fuel supply required for organizing search and rescue, damage mitigation, and immediate restoration activities in regions struck by disaster	NEMA – Mineral Resource and Petroleum Agency	Draft of agreement was formulated.
7.Communication	Setting up priority telephone lines during disasters, and limiting regular telephone services	Telephone companies, NEMA, Communication and Information Technology Agency	Draft of agreement was formulated.

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8.Evacuation place	Utilizing school buildings as evacuation places (Including the use of disaster prevention facilities of the school being built by Japanese government grants)	NEMA (EMDC) - Education Office of UB City Urban Development Agency of UB City	Agreement established in October 30, 2019
9.Waste water treatment	Establish public lavatories in evacuation places and temporary housing, and organize the immediate restoration of sewage systems	EMDC-Facility Service Office of UB City	Agreement established in October 30, 2019

Source: JICA Expert Team

Activity 1.2.2 To realize training programs for disseminating the agreement mentioned in 1.2.1 and strengthening the coordination structure among organizations related with disaster risk reduction

In order to test the effectiveness of agreement for earthquake disaster response, and to demonstrate the good practice of agreement to promote agreement in health sector to other sectors, a joint training session was performed on April 9th in UB City. A total of 38 participants from various sectors joined the training.

Good practice of agreement for disaster response in Japan, progress of agreement in Mongolia, and draft agreement in health sector in Mongolia was presented by NEMA and the JET. Then, participants conducted table-top exercise based on an earthquake disaster scenario in UB City to fill the gaps in health workers and medicines using draft agreement and 1/50,000 scale map for the period from 6 to 72 hours after an earthquake of intensity VIII.



Presentation at the Training



Table-top Exercise

Source: JICA Expert Team

Figure II.1.1 **Scenes of Training to Test the Effectiveness of Agreement for Earthquake Disaster Response**

Activity 1.3.1 To identify problems and challenge of monitoring, report, evaluation and disclosure of disaster protection plan at national and local levels

The current National Disaster Protection Plan in Mongolia mainly describes the emergency response activities for each disaster and there are a few descriptions about disaster prevention and preparedness. Therefore, the JET shared the document of “countermeasures common to all disaster types” in the Basic Disaster Management Plan in Japan with the WG1 member as a reference.

The current regional disaster protection plans of UB city, Aimag and Soum levels were basically prepared based on the Instruction Manual for Utilization of Disaster Management Plan Form (Order of Head of the NEMA, 2013). The new draft earthquake disaster protection planning guidelines were prepared in WG1 as described in Activity 1.1.2, and the policy to revise the regional disaster protection plans based on this guideline was confirmed.

Activity 1.3.2 To revise the plans made in 1.3.1 and make a manual for the revision of disaster protection plan

The pilot activities to revise / newly develop the earthquake disaster protection plan continued in the pilot areas, Darkhan-Uul Aimag, Umnugovi Aimag, Bayangol District and Chingeltei District in UB City. WG1 performed the workshops (WS) several times. In the WS, the task force was divided into four groups namely telecommunications, urban development, health care and environment, disaster prevention measures and education. Each group discussed earthquake risk induction measures and their implementer, time, period and budget. These results are summarized in the "risk reduction planning sheets". From the sheets, an earthquake risk reduction plan will be compiled. Summary of activities is shown in the Table II.1.9

Table II.1.9 Pilot Activities for the Revision of Disaster Protection Plans

Pilot Area	WS Name	Date	Number of Participants	Activity
Darkhan-Ulu Aimag	WS1	24, 25 May 2018	19	<ul style="list-style-type: none"> • Introduction of GL • Check on existing data • Simple earthquake risk assessment
	WS2	18, 19 Sep. 2018	12	<ul style="list-style-type: none"> • Establishment of task force group • Determination of planning schedule • Setting disaster scenario • Determination of risk reduction objective
	WS3	15, 16 Nov. 2018	18	<ul style="list-style-type: none"> • Set the risk reduction targets (10 years) of the current disaster scenario • Extraction of problems facing the risk reduction target • Enumeration of measures to solve the problem

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	WS4	28 Jan. 2019	19	<ul style="list-style-type: none"> • Enumeration of measures to resolve issues (continued) • Designation of major response agencies • Setting of implementation time, period of measure
	WS5	19 Apr. 2019	13	<ul style="list-style-type: none"> • Judgment of priority of measure • Calculation of estimated operating expenses
	WS6	1 Jul. 2019	10	<ul style="list-style-type: none"> • Making basic policy on disaster risk reduction measures in each field • Determination of budget acquisition strategy • Discussion on how to manage the progress of the plan
	WS7	5 Aug. 2019	10	<ul style="list-style-type: none"> • Final confirmation for planning documentation
Umnugovi Aimag	WS1	16, 17 May 2018	17	<ul style="list-style-type: none"> • Introduction of GL • Check on existing data • Simple earthquake risk assessment
	WS2	28 Sep. 2018	13	<ul style="list-style-type: none"> • Establishment of task force group • Determination of planning schedule • Setting disaster scenario • Determination of risk reduction objective
	WS3	28, 29 Nov. 2018	25	<ul style="list-style-type: none"> • Set the risk reduction targets (10 years) of the current disaster scenario • Extraction of problems facing the risk reduction target • Enumeration of measures to solve the problem
	WS4	18 Feb. 2019	23	<ul style="list-style-type: none"> • Enumeration of measures to resolve issues (continued) • Designation of major response agencies • Setting of implementation time, period of measure
	WS5	30 May 2019	20	<ul style="list-style-type: none"> • Judgment of priority of measure • Calculation of estimated operating expenses
	WS6	12 Aug. 2019	10	<ul style="list-style-type: none"> • Making basic policy on disaster risk reduction measures in each field • Determination of budget acquisition strategy • Discussion on how to manage the progress of the plan
	WS7	12 Aug. 2019		<ul style="list-style-type: none"> • Final confirmation for planning documentation
Bayangol District	Joint WS1	28, 29 Aug. 2018	8	<ul style="list-style-type: none"> • Introduction of GL • Check on existing data • Setting disaster scenario • Extraction of priority items
Chingeltei District			8	

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Bayangol District	Joint WS2	31 Jan. 2019	8	<ul style="list-style-type: none"> • Set the risk reduction targets (10 years) of the current disaster scenario • Extraction of problems facing the risk reduction target • Enumeration of measures to solve the problem
Chingeltei District			8	
Bayangol District	Joint WS3	9 May 2019	2	<ul style="list-style-type: none"> • Enumeration of measures to resolve issues (continued) • Designation of major response agencies • Setting of implementation time, period of measure
Chingeltei District			7	
Bayangol District	WS4	30 Aug. 2019	15	<ul style="list-style-type: none"> • Designation of major response agencies • Setting of implementation time, period of measure • Judgment of priority of measure • Calculation of estimated operating expenses
Chingeltei District	WS4	13 Sep. 2019	10	

Source: JICA Expert Team



Workshop in four groups



Presentation of achievement

Source: JICA Expert Team

Figure II.1.2 Scenes of Training to Test the Effectiveness of Agreement for Earthquake Disaster Response

The WG1 created "Manual for Earthquake Disaster Risk Reduction Planning" through these activities.

Activity 1.3.3 To improve the present system which collect and analyze information on disaster risk reduction

NEMA is responsible for improving the database for disaster related data under the Article 14 "Creating a Disaster Database" of the amended Law of Disaster Protection. From the point of views of carrying out the NEMA's duty in the Law and contributing to the priority

actions in "Sendai Framework for Disaster Risk Reduction 2015-2030" in Mongolia, the improvement policy of the present system had been discussed in the sub-WG 1-5. As a result of the discussion for the improvement policy of the current system in the WG1, the over-all framework of upgrading the database for disaster related data and installing a new information sharing system in NEMA was clarified in consideration of expected relationships among NEMA headquarters, regional offices and related organizations in Mongolia. Then, the sub-WG 1-5 members confirmed their intent to develop a new spatial database of disaster events and disaster related information based on a Geographic Information System (GIS) for supporting DRR activities by NEMA as mission-critical system.

1) Development of New information Management System for Disaster Spatial Database

The sub-WG 1-5 decided to utilize "e-comi map system" which is a free open-source software for web-based GIS produced by the National Research Institute for Earth Science and Disaster Resilience in Japan (NIED) as a new mission-critical system for Disaster Database. Then, they started installation work of the system to the Mongolian National Data Center (NDC) from the viewpoint of security and ensuring the system operation continuity by NEMA. At the beginning of June, 2017, the work for installing the system to the server of NDC was completed. After that, the works for modifying system functions and developing new tools to improve the usability of the system in consideration of the new rules and work procedures by SITD has been continued. As of now, everybody can connect to the system and check the information in the database from following URL (<http://map.nema.gov.mn/>).

2) Development of Guideline for Operation and Management of Spatial Information System for Disaster Risk Reduction (SISDRR)

The most suitable rules and procedures for operation and management of Disaster Database in NEMA were discussed with the sub-WG members through the development of the GL in consideration of feedback from regional offices' staff. From November 2017, the sub-WG members had spent their time formulating the first draft of GL on the assumption of new job descriptions of the new management team which had been proposed by aiming to secure the human capacity to operate and manage Disaster Database using the new information management system. At the end of May 2018, the Spatial Information and Technology Division (SITD) were established as the new management team. Afterward, the drafting work was accelerated by the sub-WG members and new division staff, and the first draft of GL was completed at the end of October 2018. After some modifications of the

draft GL based on the suggestions from directors in NEMA headquarters, finally the GL on Operation and Management of Spatial Information System for Disaster Risk Reduction (SISDRR) was approved as the order A/47 by the head of NEMA on 20 February 2019.

3) Making Agreements for Spatial Database Sharing with Related Organizations

The Sub-WG members have spent their time and effort making agreements for spatial database sharing between NEMA and DRR related organizations to develop a better environment of data utilization for DRR related activities in Mongolia.

The agreement between the Administration of Land Management, Geodesy, and Cartography of Mongolia (ALMGaC) and NEMA was concluded in April 2018 (within the previous reporting period) as the first official agreement on cooperation and spatial data sharing.

And also, the official agreement between NEMA and the Master Planning Agency of Capital City was concluded on 5 May 2019 after a series of discussions about both technical matters and administrative affairs.

4) Implementation of Training for Utilization of SISDRR in NEMA

For formulating a new organization structure for the operation and management of SISDRR, assessment and development of human capacity for NEMA Headquarters as well as EMDC and local offices in 21 Aimags are one of the key actions. Therefore, The Sub-WG members and SITD staffs provided three-time training sessions for gaining basic knowledge and skill of SISDRR utilization targeted on approximately 150 officers from the central and regional offices of NEMA. In addition, for ensuring a means of continuous self-training and taking precautions regarding the relocation of personal who well know SISDRR O&M, teaching materials that explain SISDRR O&M in a video were developed and uploaded to the NEMA's website.

In particular, on March, 12th and 13th 2018, 50 staff from central NEMA and local emergency departments participated in a 2-day training session. The main purposes of training were to gain basic knowledge and skill of DSDB using I-DSIS and to discuss a better way to utilize DSDB for DRR activities in NEMA. There were many opinions that they wanted more time for the exercise. It seems that they could obtain practical knowledge and experience by cooperating with the group member. It was not so difficult for them to gain system operation as many of the trainees have already had basic skills in GIS operations.



Source: JICA Expert Team

Figure II.1.3 Scenes of Exercises in the 2-Day Training for Disaster Database

On October 24 and 25, 2018, The Sub-WG members conducted a 2nd training session for the operation and management of the Disaster Database using SISDRR to invite 30 staff from local emergency departments. The main purpose of the training was to gain enough advanced knowledge to operate the system by them.



Source: JICA Expert Team

Figure II.1.4 Scenes of Exercises in the Advanced Training for SISDRR held on October 24th and 25th 2018

On April 30, 2019, The Sub-WG members and new division staffs conducted a 3rd training session for the operation and management of SISDRR and invited 42 staffs from the EMDC, Emergency Management Department of 21 Aimags and the Public Announcement and Emergency Administration Centre in NEMA Headquarters. The main purpose of the training was to learn how to register data for all types of hazards and accidents in SISDRR. The training mainly consisted of hands-on practices using the participants own computers.

From May 17 to 31, 2019, a series of training sessions targeting each department of NEMA Headquarters to gain better understanding SISDRR O&M based on the new order A/47 by

the head of NEMA was conducted. At the beginning of June 2019, the sub-WG members coordinated and decided to prepare teaching materials that explain SISDRR O&M in a video in preparation for ensuring a means of continuous self-training and taking precautions regarding the relocation of personal who well know SISDRR O&M. During July, the development of these teaching materials was promoted in cooperation with sub-WG members, and a total of 13 types of teaching materials (10 to 15 minutes for 1 teaching material, 8 types for general users, and 5 types for system administrators) were completed. It was confirmed that those teaching materials are managed and operated by SITD as the system administrator.

Activity 1.3.4 To elaborate white paper on disaster risk reduction which let the Mongolian people know the progress on implementation, monitoring, evaluation of disaster risk reduction plan at national and local levels through the activities of 1.3.1 and 1.3.2

“Mongolia Disaster Risk Reduction White Paper 2017” was published in December 2018. The contents of the Paper are shown in Table II.1.10.

Table II.1.10 Contents of White Paper

<p>Chapter 1. Current State and Restructuring of the Legal Environment of Disaster Risk Reduction in Mongolia</p> <p>1.1. Mongolian Disaster Risk Reduction Legislation</p> <p>1.2. Disaster Risk Reduction Policy Documents</p> <p>1.3. Structure and Organization of Disaster Risk Reduction Activities.</p> <p>Chapter 2. Disaster Risk Reduction Activities</p> <p>2.1. Emergencies, Disasters and Accidents that have Occurred in Mongolia in 2017, Measures Taken</p> <p>2.2. Disaster Risk Reduction and Disaster Prevention Activities</p> <p>2.3. Disaster Risk Reduction Training and Awareness-Raising</p> <p>2.4. Measures to Ensure Disaster Preparedness</p> <p>2.5. Disaster Alerts and Emergency Management</p> <p>2.6. Disaster Risk Reduction Personnel and Equipment</p> <p>2.7. Disaster Risk Reduction Training</p> <p>Chapter 3. Multilateral Cooperation in Disaster Risk Reduction</p> <p>3.1. International Cooperation in Disaster Risk Reduction</p> <p>3.2. Coordination of Disaster Risk Reduction Authorities</p>	<p>Chapter 5. Strategic Reserves and Humanitarian Aid</p> <p>5.1. Documents Related to Strategic Reserves and Humanitarian Aid</p> <p>5.2. Activities Related to Strategic Reserves and Humanitarian Aid</p> <p>Chapter 6. Earthquake Disaster Prevention Activities</p> <p>6.1. Earthquake Disaster Prevention Standing Committee</p> <p>6.2. Documents Related to Enhancing Earthquake Disaster Prevention Measures</p> <p>6.3. Study of the Faults Near Ulaanbaatar City</p> <p>6.4. Earthquake Emergency Plan for Ulaanbaatar City</p> <p>Chapter 7. Disaster Research and Disaster Risk Reduction Research Activities</p> <p>7.1. Research Conducted by the Disaster Research Institute</p> <p>7.2. Disaster Risk Reduction Database</p> <p>Chapter 8. Disaster Risk Reduction Budget and Investment</p> <p>8.1. Investments from the National Budget</p> <p>8.2. Foreign Investments</p> <p>8.3. Projects and Programs Being Implemented at the National Emergency Management Agency</p>
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<p>3.3. Participation of Non-Governmental Organizations, Community-Based Organizations and Citizens in Disaster Risk Reduction Activities</p> <p>Chapter 4. Fire Protection</p> <p>4.1. Documents Related to Fire Protection</p> <p>4.2. Activities to Combat Fires</p>	<p>8.4. Compensation for Disaster Victims</p> <p>Appendixes</p> <p>1 List of Legal Documents Related to Disaster Risk Reduction</p>
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The WG1 members also prepared "Creation Manual of the Disaster Risk Reduction White Paper". This manual explains the following items while reviewing the process of preparing the white paper in 2017.

- | |
|--|
| <ul style="list-style-type: none"> • Establishment of a white paper preparation working group • Discussion of composition and contents • Determination of collection sources • Collection of materials • Arrangement of collected materials • Preparation of manuscripts • Editing of manuscripts • Instruction and management of English translation • Management of editing by a printing company, etc. |
|--|

Based on the manual, the WG for Disaster Reduction White Paper 2018 was established and planned for publication in November 2019.

Activity 1.3.5 To improve the system of database on seismic strength of buildings, infrastructure and lifeline

As described in Activity 1.3.3, the SISDRR is upgrading the management of a spatial database for DRR including the result of seismic diagnosis of buildings, infrastructures and lifelines which will be evaluated by appropriate organizations.

Based on the agreement for data exchange with the Master Planning Agency of Capital City, the environment to share the result of seismic diagnosis of buildings assessed by UB City with NEMA was developed.

Furthermore, the WG1 members are preparing for uploading the results of the earthquake risk evaluation of buildings, infrastructures and lifelines in UB City estimated in the former JICA project "The Project for Strengthening the Capacity of Seismic Disaster Risk Management in Ulaanbaatar City" to the SISDRR. The contents of the spatial database for DRR are gradually increasing as a supporting system for the planning of disaster protection.

(2) Output2

Activity 2.1.1 To analyze the manual of seismic assessment of buildings and lifeline based on the context of the Law of Disaster Protection and develop the draft of revised version

WG2 members investigated the current standards and regulations regarding the evaluation of buildings to identify the issues and to examine the countermeasures. It was noted that current documents were regarding the evaluation of deterioration and/or aging. Therefore, WG2 decided that the issues and countermeasures that are identified will be reflected in the guidelines that will be newly established in the project.

WG2 members also discussed the seismic evaluation of infrastructure and lifeline structures with the personnel of relevant organizations. In the discussions it was pointed out that regular replacement of structures is urgently needed since many of the structures are aged and have deteriorated. So WG2 concluded that the seismic capacity of the structures will be examined based on the existing check sheet with some modifications.

Activity 2.1.2 To develop guidelines-methodologies which show the method for implementing seismic assessment for buildings and lifelines, and how to use equipment

The WG2 members decided to follow the same procedure as approval of standards and regulations in order to ensure the effectiveness of guidelines on seismic evaluation and retrofitting.

Figure II.1.5 shows the procedure, in which the Construction Development Center (CDC) plays important roles, such as preparing the Terms of Reference (TOR), selection of the Consulting Service Team (CST) who writes guidelines, finalizing draft guidelines, and so on.

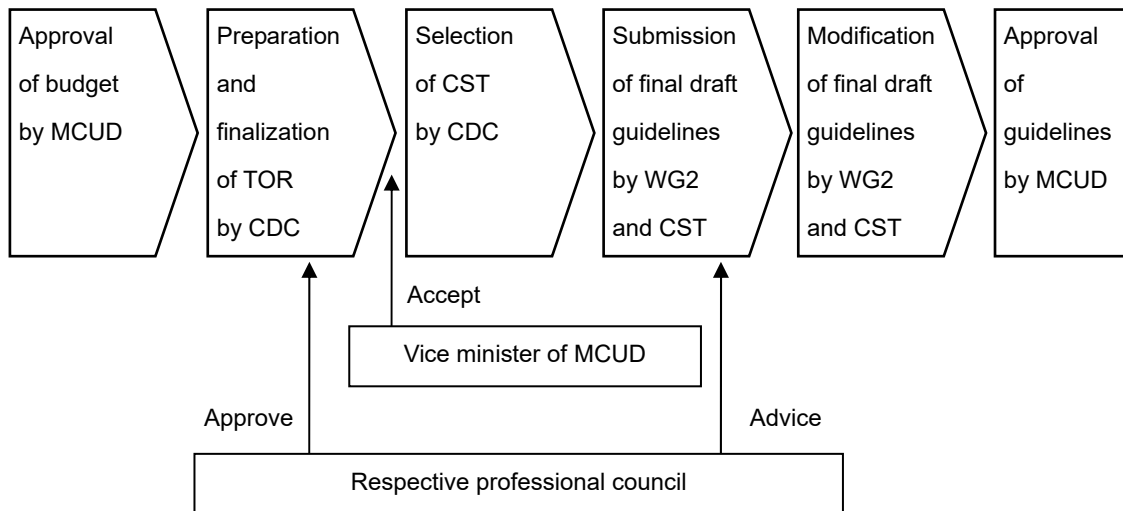


Figure II.1.5 Procedure to prepare guidelines

On Nov. 6th, 2018, the GLs for buildings were approved by No.185 Ministerial Order of MCUD. And on Dec. 28th, 2018, the GL for infra structures and lifeline structures was approved by No. 174/303 Joint Ministerial Order of MCUD and MRTD as shown in Figure I.6.1.

Approved guidelines are 4 types as following.

“Seismic Evaluation and Retrofitting Method of Existing Reinforces Concrete Buildings”,

“Seismic Evaluation and Retrofitting Method of Existing Wall type Precast Concrete Buildings”

“Seismic Evaluation and Retrofitting Method of Existing Masonry Buildings”

“Methodology of Seismic Risk Analysis Evaluation of Road, Bridge and Engineering Supply System”

Activity 2.1.3: Implementation of the Training to Improve Knowledge and Ability for Those Who Carry Out Seismic Estimation on Structures and Lifelines

1) Training course of seismic estimation

WG2 carried out a three-day training course on the seismic estimation of buildings from June 4th to 6th, 2018 at the conference room of CDC, in which 110 officers and engineers participated. Also a one-day training course for the seismic estimation of lifelines was conducted on June 7th, 2018 at the same venue with 70 participants. The number of participants exceeded expectations, showing the high interest in the technology.

According to the questionnaire survey on the training course, it was pointed out that the course was useful for the participants and further and continuous implementation is desirable.



Exercise of seismic evaluation for buildings



Lecture of seismic evaluation for lifeline

Source: JICA Expert Team

Figure II.1.6 Scenes of Training of Seismic Evaluation

2) Training course of seismic evaluation equipment

Following the handing over of equipment of non-destructive testing, the relevant training course was conducted from Nov. 12th to 13th, 2018 at the conference room of CDC, in which 64 trainees not only from government organizations but also from private companies participated. In the training course, the exercise using the procured equipment was well-received.



Measurement of concrete strength



Measurement of location and diameter of re-bar.

Source: JICA Expert Team

Figure II.1.7 Scenes of Training Usage of Seismic Evaluation Equipment

3) Conduction of TOT and other training courses

To disseminate the technology on seismic evaluation, TOTs were conducted for officers in the organizations to which WG2 members belong from May to October, 2019. A small number of participants were selected in each organization to provide enough explanation and discussion.



TOT for NEMA



TOT for GASI (building)



TOT for GASI (lifeline)



TOT for MCUD and CDC



TOT for UBUDA



Guidelines used in TOT

Source: JICA Expert Team

Figure II.1.8 Scenes of Training of Trainer for Relevant Organizations

There were also some training courses which collaborated with MACE. The course is regularly held and gives participants the certificate necessary to apply for a license, raising the motivation to attend.



Lecture on masonry building

Lecture on RC building

Exercise of seismic evaluation

Source: JICA Expert Team

Figure II.1.9 Scenes of Training of Seismic Evaluation as one of MACE's Training

Activity 2.2.1 To develop guidelines-methodologies on seismic strengthening and reconstruction of buildings

The WG2 decided that seismic evaluation and seismic strengthening should be combined in one GL for each structure except for Infrastructures and lifelines, since seismic evaluation and seismic strengthening are strongly related to each other. As mentioned before, GLs were approved by No.185 Ministerial Order of MCUD on Nov. 6th, 2018.

Activity 2.2.2: Trial Design of Rebuilding and Strengthening Construction for Housing, Kindergartens, Schools, Hospitals and Government Buildings

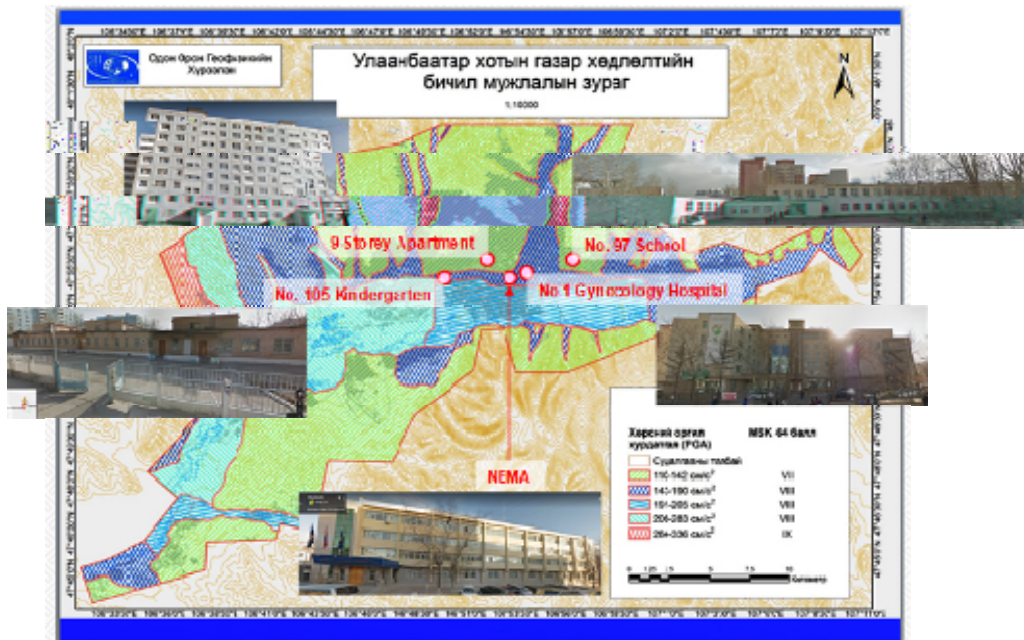
The WG2 members discussed the selection of model buildings that will be used in the trial design. Based on the work plan five buildings with various usage and structural type were selected as shown in Table II.1.11. The location and external appearance of the buildings are summarized in Table II.1.11 and Figure II.1.10.

Table II.1.11 Model buildings for seismic strengthening

Structural Type	Usage	Name	Location	Note
Masonry	Kindergarten	No. 105 Kindergarten	Songino Khairkhan District	Constructed with standard design drawings
	School	No. 97 School	Bayanzurkh District	Constructed with standard design drawings

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	Public Office	NEMA	Sukhbaatar District	Public office necessary for emergency response
RC	Hospital	No.1 Gynecology Hospital	Sukhbaatar District	One of few RC hospital buildings
PC	Apartment House	9-Storey Apartment	Bayangol District	Apartment house based on standard design



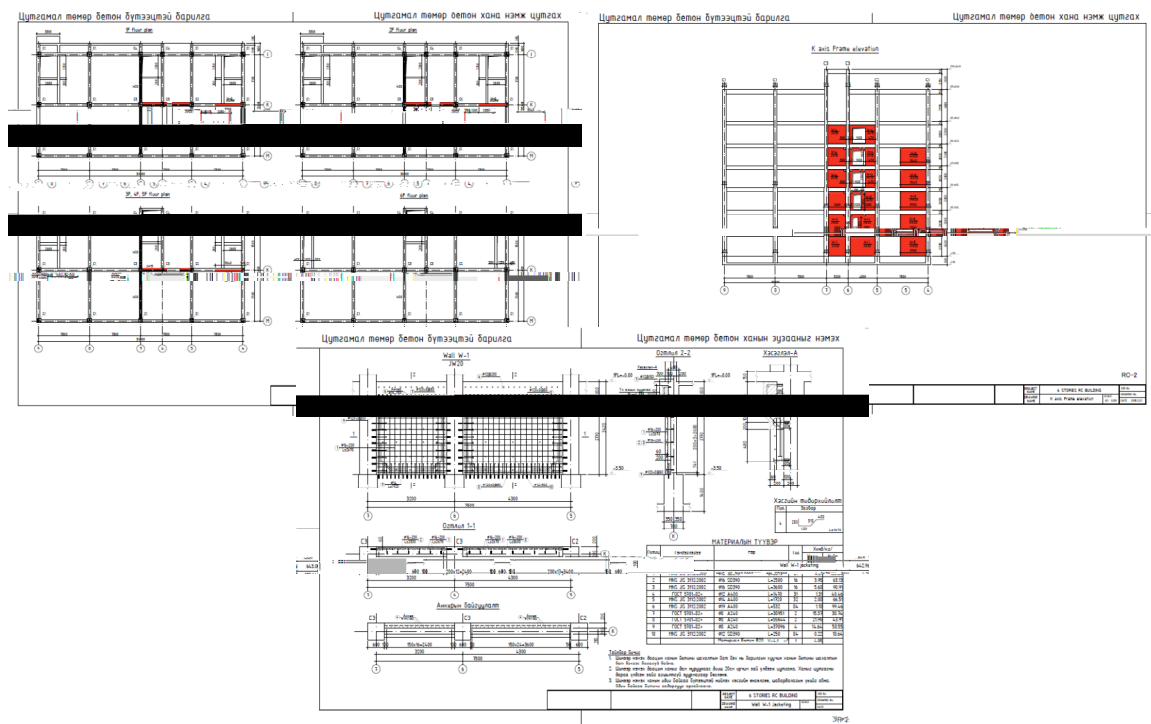
Source: IAG and JICA Expert Team

Figure II.1.10 Location and External Appearance of Model Buildings for Trial Design

The data necessary for the strengthening design for these buildings, such as design drawings, calculation sheets, report of existing seismic evaluation and so on were collected and arranged by WG2

Following data collection, the precise seismic evaluation was conducted for RC and PC buildings in accordance with GLs established, to obtain the necessary amount of strengthening as required in Japan. Then a seismic strengthening design was conducted for the buildings. Figure II.1.11 shows the examples of design drawings.

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Source: JICA Expert Team

Figure II.1.11 Example of Strengthening the RC building by Additional RC Walls

Activity 2.2.3: To realize training programs with the participation of NEMA for enhancing knowledge and capacity of the experts who implement seismic strengthening of buildings

WG2 carried out a three-day training course of seismic strengthening of buildings from May 1st to 3rd, 2019 at the DPTMC and at the conference room of CDC, in which 65 officers and engineers participated.

By questionnaire survey, it was pointed out that the training course was useful for their jobs and similar and continuous training is needed not only in Ulaanbaatar City but in other Cities and towns.

Also TOT on seismic strength was conducted for officers in the organizations to which WG2 members belong, and for the engineers from private company.



Lecture on strength calculation



Introduction of strengthening works

Source: JICA Expert Team

Figure II.1.12 Training of seismic strengthening

(3) Output3

Activities of Output 3 are conducted in two components, i.e., the school disaster risk reduction (DRR) education component (Activity 3.1.1 – 3.1.4) and the community DRR education component (Activity 3.2.1 – 3.2.3).

Activity 3.1.1 To develop a guideline which shows contents, method and implementation way of disaster risk reduction (DRR) education in kindergarten and primary and secondary schools based on Law of Disaster Protection

1) Implementation Policy for the Activities for the Development of School DRR Education Guidelines

After the detailed discussions among the WG members, it was decided not to establish a committee for the development of the guideline which was originally planned and to conduct main development activities by the WG3-1 members in periodical consultation with the external experts for their technical advice and comments.

Also, it was decided that the guideline is to be developed covering not only earthquake, but also all the disasters which occur in Mongolia as target disasters, with the consideration for developing comprehensive school DRR guidelines.

2) Steps of the Guideline Development

(a) Introduction of the Guideline and Reference Documents in Japan

Prior to the development activities, basic ideas and systems for the school DRR education in Japan were introduced using the guideline “Reference Book for School DRR: Implementation of DRR Education for Nurturing a Zest for Living” developed by the Ministry of Education, Culture, Sports, Science, and Technology (hereinafter referred to as “MEXT”)

in Japan. Also, the detailed DRR education plans and guidebooks developed based on the guideline by the prefectural and municipality education boards were introduced. Further, the table which shows the relationship of the educational contents described in the guideline and sample lecture plans was provided showing the respective pages of the school textbooks. In addition, more reference documents for the guideline were translated into Mongolian and provided for the WG3-1 activities. A trial DRR lesson on DRR education was also conducted targeting the grade 4 students of the primary school of No. 131 School by a Japanese expert.

(b) Research on Current Situation of School DRR Education in Mongolia

In order to identify the current situation of school DRR education in Mongolia, DRR education contents in each educational level were examined in the Course of Study for Pre-School, Primary School, and Secondary School in Mongolia. The major findings by the research were as follows.

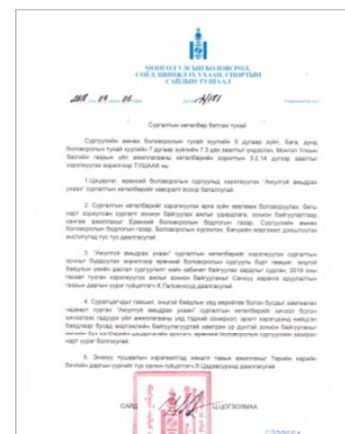
- The contents of hazard phenomenon and disasters are sufficiently included in the higher education, and higher and lower secondary education. In the pre-school education and primary education, contents of hazard phenomenon and disasters are reasonably well included.
- The content on disasters derived from ecology is 48%. Most of them are reflected mainly in the subjects of geography and chemistry of basic education, higher education and secondary education
- Contents of natural disasters are included in the geography education programs.
- Contents of technology disasters are included in the chemistry educational program in connection with confirming the handling of chemical substances and the influence of toxic substances.
- The contents of social disasters are lacking in education programs, and biological disasters are not included in educational programs.
- In general, the purposes and objectives of the DRR education in the current education programs are not clear. Although DRR-related educational contents are individually included in some subjects such as geography and social studies, they are not systematically treated as DRR learning.
- Contents of personal safety education are included more in pre-school and primary education programs and education contents related to hazard phenomenon, accidents, disaster, and social safety are included more in lower and higher secondary education.

(c) Development of the Draft Guideline for School DRR Education

Based on the studies of the reference documents and result of the research on the current school DRR education situation, title, composition, and purpose of the DRR education of each educational level was discussed and decided as follows.

- Title of the Guideline: “The Program for Life Safety Education”
- Type of the Document: Course of Study which will be approved by the Minister of Education and Vice Prime Minister.
- Contents: The education guideline for life safety as a whole, not merely covering natural disasters
- Composition of the Program: 1) Background, 2) Purpose, 3) Contents, and 4) Teaching Method

Based on the above outline, the draft Program was developed. After the initial technical comments in the Ministry of Education, Culture, Science and Sports (hereinafter referred to as “MECSS”) were collected in September 2017, a hearing meeting for taking technical comments and advice for the draft Program was organized on October 4th, 2017 by inviting professionals and experts in the relevant organizations for finalization of the document. After the counterpart training in Japan in November 2017, the draft was further improved by the counterparts based on the knowledge learned in the training and the comments sent by the relevant organizations in January and February 2018. After submitting the final draft to the MECSS in March 2018, the Program was modified based on the comments provided by the reviewers in the official approval process in MECSS. The Program was approved by MECSS on April 6th, 2018 as A181 Decree.



Source: JICA Expert Team
Figure II.1.13
Approved Program

The approved Program is composed by 1) Background, 2) Purpose, 3) Contents, 4) Teaching Method, 5) Educational Assessment, and Matrix of DRR Education Contents in the School Education Curriculum in each educational level. (Annex: The Program for Life Safety Education)

Activity 3.1.2 To develop educational materials such as textbooks and supplementary readers for DRR education in kindergarten and primary and secondary schools

1) Collection and Review of the Existing Materials for DRR Education

Prior to the development of the educational materials, the existing materials for DRR education were collected and reviewed. Among them, the textbooks for the school DRR education were developed with the support of UNDP but still need improvement before they can be used in the school education nationwide. They were composed for teaching the DRR education contents as one subject and the contents and images of the textbook do not consider copyrights and were sometimes just copied from the Russian textbooks.

In addition to the above UNDP textbooks, there are some good materials which can be used in school DRR education, such as the children's educational materials for each disaster developed by World Vision Mongolia. However, no materials were systematically organized for school education based on each school grade and each subject. It was required to provide the materials and lesson guidebooks in a manner easily utilized by teachers according to their education plans.

2) Development of the Guidebook for the Program of Life Safety Education

Considering the above situation, it was decided to develop a "Guidebook" for teachers' lessons as an annex of the "The Program of Life Safety Education". Through the several WG3-1 meetings, the composition of the "Guidebook" was decided as follows.

Foreword

1. Outline of "Life Safety Education"

2. "Life Safety Education" in the School Subjects

3. "Life Safety Education" in Other Educational Activities

Glossary

A list of Reference Materials

The draft ideas of the guidebook was compiled in some of the study workshops of WG3-1 and the trial lessons by Japanese experts, and draft development works were conducted separately by individual working group members from October 2018 to March 2019. The final draft from each member was edited in consideration of the total structure and compiled as guidebooks for pre-school education and primary and secondary school education from March to May 2019. The final draft submitted to the MECSS in May 2019 was modified and finalized based on the comments provided by the reviewers in the official process of the MECSS in July 2019 as shown in the table below.

Table II.1.12 Contents of Guidebook (Primary and Secondary Schools)

Contents of the Teacher's Guidebook for Implementing the "Safety Life Skill" Program in Primary and Secondary Schools	
<p>Foreword The "Safety Life Skills" Program</p> <p>Introduction</p> <ul style="list-style-type: none"> ◇ Rationale for Developing the "Safety Life Skills" Program ◇ Contents of the "Safety Life Skills" Program ◇ Structure of the Manual and Points to Consider <p>Chapter 1: General Understanding of Disasters</p> <ul style="list-style-type: none"> ◇ Current Situation of Disasters ◇ Disasters, Hazards and Vulnerabilities ◇ Understanding Earthquakes <p>Chapter 2: Outline of Lessons (Primary School)</p> <ul style="list-style-type: none"> ◇ Safety in the Social Environment: Learning the Cardinal Directions ◇ Safety in the Social Environment: Climate Change ◇ Natural Hazards: Developing a Model for an Earthquake-Resistant Building ◇ Earthquakes ◇ Fires <p>Chapter 3: Outline of Lessons (Lower Secondary School)</p> <ul style="list-style-type: none"> ◇ Safety at Home: Protect Your Health from Water Contamination ◇ Climate Hazards: "Let's Become Climatologists" 	<ul style="list-style-type: none"> ◇ Climate Change and Our Role in Mitigating It ◇ Natural Hazards: Protecting Yourself and Others from Earthquakes Hazards / Preventing Lightning Hazards <p>Chapter 4: Outline of Lessons (Upper Secondary School)</p> <ul style="list-style-type: none"> ◇ Natural Hazards: Developing a Preparedness Plan for Household Risks ◇ Safety in the Social Environment: Preventing Cybercrime <p>Chapter 5: Contents and Methodology of Activities to Support Training</p> <ul style="list-style-type: none"> ◇ Example Planning of School Activities ◇ Objective of Extra-Curricular Activities ◇ Primary School: Contents of Extra-Curricular Activities and their Methodological Reasoning ◇ Middle School: Contents of Extra-Curricular Activities and their Methodological Reasoning ◇ High School: Contents of Extra-Curricular Activities and their Methodological Reasoning <p>Terminology Bibliography</p>

Source: JICA Expert Team

Table II.1.13 Contents of Guidebook (Pre-School Education)

Contents of the Teacher's Guidebook for Implementing the "Safety Life Skill" Program in Pre-School Education
<p>Introduction</p> <ol style="list-style-type: none"> 1. Rationale for Developing the "Safety Life Skills" Program 2. Contents of the "Safety Life Skills" Program 3. Structure of the Manual and Points to Consider <p>Chapter 1 General Understanding of Disasters</p> <ol style="list-style-type: none"> 1. Current Situation of Disasters 2. Disasters, Hazards and Vulnerabilities 3. Understanding Earthquakes <p>Chapter 2 Including DRR activities in the Curricula of Kindergartens</p> <ol style="list-style-type: none"> 1) Relation Between the Pre-School Core Curriculum and the "Safety Life Skills" Program 2) Examples of Implementing "Safety Life Skills" Program Activities through Daily School Activities <p>Terminology Bibliography</p>

Source: JICA Expert Team

After the final editing works, the Guidebook was printed in October 2019 and distributed to the schools and kindergartens across the country in November 2019.

Activity 3.1.3 To implement training programs for the instructors of Teacher Training Institutes and experts of educational departments in local governments, using the guideline and materials developed in 3.1.1 and 3.1.2 respectively.

1) Implementation Plan of the Training Programs

The implementation plan including the participants to be invited and location of the training course were discussed through the working group activities. In the discussion, the working group members decided to have a pre-workshop for trial implementation of the training for the officers of the Education Research Institute and Institute of the Teacher’s Professional Development to confirm the program and methods of the training in advance of the training. Considering the other training schedule for the teachers and instructors in a year, it was decided to conduct the pre-workshop and the training programs for three educational levels as shown in the table below.

Table II.1.14 Implementation Plan of the Training Programs

	Pre-Workshop	Training (Batch 1)	Training (Batch 2)
Location	UB City	UB City	UB City
Date	11-13 September 2018	18-21 September 2018	8-11 October 2018
Target Participants	Officers of Education Research Institute and Institute of Teacher’s Professional Development	Teacher’s Instructors/ Educational Supervisors of Primary and Lower-Secondary Education	Teacher’s Instructors/ Educational Supervisors of Pre-School Education
Number of Trainees	Total 50 persons	2 persons from Education Department of each provinces and districts (Total 60 persons)	1 persons from Education Department of each provinces and districts (Total 30 persons)

Source: JICA Expert Team

Further, just before the implementation of the pre-workshop, there was a request from the DPTMC for the participation of the instructors of the Center in the workshop. In consideration for the current situation that the Center is mainly providing education to the school children, the working group decided to accept ten instructors to join the workshop.

2) Pre-workshop for the training on “Life-Safety Education”

The pre-workshop was conducted on 11-13 September 2018 attended by 50 officers of Education Research Institute and Institute of Teacher’s Professional Development and 10 instructors from DPTMC. Through the active involvement of the participants in the workshop, the contents of the training program on “Life Safety Education” were verified. Also, several important points for promoting “Life Safety Education” were identified and recommended. Major points were as follows.

- To take the “Life Safety Education” as one of the focused research themes of the teacher’s professional development

- To promote close collaboration with relevant organizations, such as an emergency management department in each province and district for providing practical education.
- To prepare on-line training materials for “Life Safety Education”
- To create a specific website for the educational tools and materials for “Life Safety Education” for easy access for teachers and stakeholders
- To collect and share good practices of the lessons for “Life Safety Education”
 - To make the visit to DPTMC the regular education activities in the school
 - To promote collaboration with DPTMC for teacher’s training
- To confirm the regulations and rules of the school for the coordination of disaster management and DRR education in the school
- To prepare a brochure to introduce “Life Safety Education” to guardians and stakeholders

Further, with the participation of the instructors of DPTMC, as a result, the DRR experts and children’s education experts could build a close network through the training program which will help improving their future activities.

3) Training Program on “Life Safety Education” (Batch 1)

The batch 1 of the Training Program on “Life-Safety Education” was held on 17-21 September 2018 with 57 teacher’s instructors/ educational supervisors for Primary and Lower-Secondary Education from Education Departments of 21 provinces and 9 districts.

Compared to the participants of the pre-workshop, the participants of the training had less experience with newly introduced education, integrated subjects as well as education with practical activities, such as arts and crafts and workshop-style discussion. Therefore, it took more time to gain understanding of the contents of “Life Safety Education” than expected. The working group member discussed in the course of the training, and slightly changed the program for taking more time for the explanation of the contents and giving trial lessons instead of their own planning and trial of the lessons. With the change, the participants had better understanding of the contents and could make their own plans for disseminating the “Life Safety Education” at their own provinces and districts at the end of the program. Some of the good ideas in the proposed plans were as follows.

- To form a team for promoting “Life Safety Education” composed by the principal, vice-principal, manager, social worker, teachers of Science and Health & Physical Education in each school
- To establish a “Safety Learning Room” with relevant information and educational tools and materials in the school
- To create close collaboration with Emergency Management Department, Traffic Police, and Red Cross, etc.
- To provide “Life Safety Education” to guardian utilizing the opportunities of “Guardian Day” or home visit

- To conduct a contest for good practices of the “Life Safety Education” in the province
- To propose to the Governor to include the promotion of “Life Safety Education” in the annual plan



Source: JICA Expert Team

Figure II.1.14 Lectures and Workshops in the Training Program on “Life Safety Education” (Batch 1)

4) Training Program on “Life Safety Education” (Batch 2)

The batch 2 of the Training Program on “Life-Safety Education” was held on 8-11 October 2018 with 30 teacher’s instructors / educational supervisors for Pre-School Education from Education Departments of 21 provinces and 9 districts.

With the experience learned in the batch 1 training, the training program was slightly changed in advance and included the observation of a lesson and facility of the No. 61 kindergarten in which the working group conducted trial lesson in May and had some good practices of the safety education through some other past projects and their own efforts. With these changes, the participants of the program had practical and concrete ideas for the safety and DRR education and conducted a good discussion during the training program. In the discussion of the workshop on the final day, the participants proposed the following points to promote the safety education in their own areas:

- To be aware of the relevant stakeholders including the executive officers of the Provinces about the Law of Disaster Management and ensure the 1% of total budget of the organization for DRR activities
- To provide safety education linking to the daily life
- To regularly conduct DRR drills in cooperation with the community.
- To try to announce and promote life safety education through mass media
- To get necessary cooperation from local government, NGOs, international organizations, and donors for solving the issues and challenges to conduct the life safety education in each kindergarten
- To promote the life safety education focusing on the point that the education should be provided in combining with the existing subjects and education activities
- To increase the staff members who understand the contents and methods of the life safety education.

The pre-school education is basically closely connected with life safety education. Therefore, all the participants seriously considered how they can effectively implement the education based on the guideline throughout the program.



Source: JICA Expert Team

Figure II.1.15 Lectures and Workshops in the Training Program on “Life Safety Education” (Batch 2)

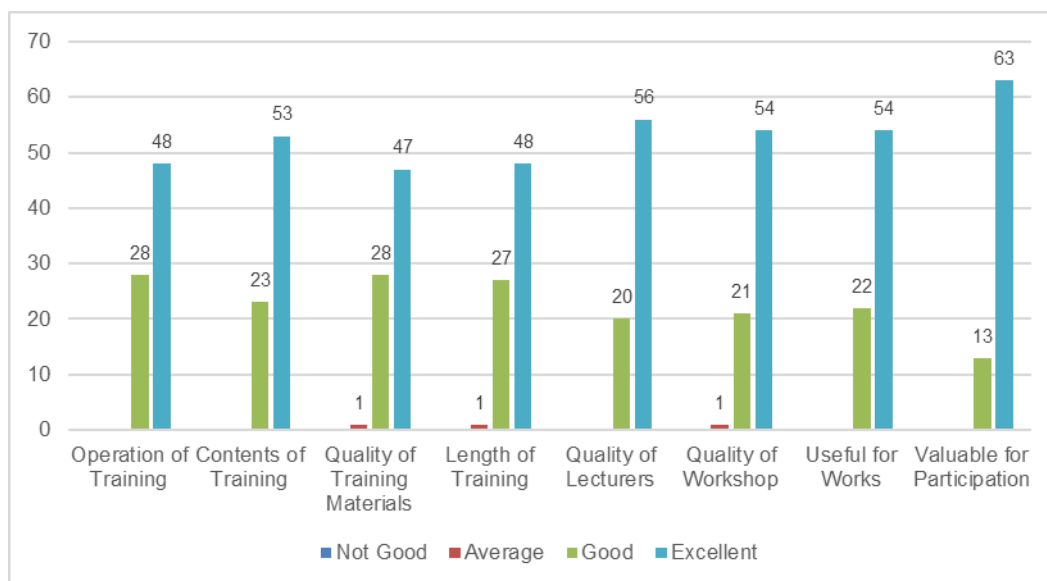
5) Review of the Training Programs on “Life Safety Education”

The working group 3-1 members had a review meeting of the training program on 12 October 2018

. The members proposed to take the following actions as follow-up activities of the training.

- To share the training materials through a mailing list of the Primary School Education Departments
- To recommend conducting meetings or training sessions for introducing the life safety education guideline by utilizing autumn school holidays and remaining budget of Year 2018.
- To incorporate the life safety education training (half-day or one day) into the regular training program, such as Orientation training, 5th-year training, and 10th-year training provided by Institute of Teacher’s Professional Development
- Make a desirable training program for the Province level training
- To conduct model activities in some selected kindergarten and schools

A questionnaire survey was conducted for evaluating the training programs on “Life Safety Education” for teacher’s instructors/ educational supervisors in September and October 2018. As shown in the figure below which compiles the result of the survey, most of the participants were satisfied with the overall contents, activities, and arrangements of the training. Further, about 80% of the participants described that the training contents were satisfactory, very timely and important. As for the most important points they learned through the training, they pointed out the following; importance of disaster preparedness, uncertainty of occurrence of disasters, how to save themselves, mutual cooperation in a disaster, integration life-safety education into existing subjects, understanding of “Life-safety Education” program, contents of “Be Ready” education kit, etc.



Source: JICA Expert Team

Figure II.1.16 Result of Questionnaire Survey

Activity 3.1.4 To implement the training program for teachers by the instructors and experts who received the training programs mentioned in 3.1.3

On 27-28 December 2018, a training program on “Life-Safety Education” was conducted for the principals and teacher’s instructors of kindergartens in Bayanzurkh District with the support of EMDC, WG3-1 members, and JET.

On 16 January 2019, the instructors who were trained in the Activity 3.1.3 conducted DRR training in the MECSS’s regular in-service training for teachers with 10-year of experience with the support of the JET.

Further, the model school activities were conducted to give good examples for promoting DRR education in line with the “Life-Safety Education Program” in the No. 244 kindergarten, No.13 school, and No. 42 school as shown in the table below.

Table II.1.15 Outline of Model School Activities

Purpose	<ul style="list-style-type: none"> ✧ To give good examples for promoting DRR education in line with the “Life-Safety Education Program” in pre-school, primary and secondary education ✧ To develop video program of the lessons which are conducted as a final result of model school activities for the annex of “Guidebook”
Participants	Students, teachers and staff of the selected model schools, Staff of Education Department and EMDC of the respective district which the selected model schools are located, and WG3-1 members
Duration	5-19 March 2019
Venue	Selected Model Schools

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Main Activities, Date and Time (no. of participants)		No. 244 Kindergarten	No. 13 School (primary)	No. 42 School (lower-secondary)
	1) Seminar for Teachers and Staff	3/5 10:00~13:00 (43 persons)	3/7 10:10~13:10 (53 persons)	3/6 9:30~12:30 (38 persons)
2) Workshop 1 for model lessons	3/11 10:00~13:00 (14 persons)	3/12 10:15~13:10 (4 persons)	3/11 14:00~17:00 (5 persons)	
3) Workshop 2 for model lessons	3/13 14:00~17:00 (16 persons)	3/14 16:00~18:00 (4 persons)	3/13 10:00~13:00 (5 persons)	
4) Research Lessons of “Life-Safety Education”	3/15 9:30~10:30 (Evaluation meeting after the lesson) (13 persons)	3/19 10:15~11:40 (Evaluation meeting after the lesson) (4 persons)	3/18 12:20~14:00 (Evaluation meeting after the lesson) (8 persons)	

Source: JICA Expert Team



Source: JICA Expert Team

Figure II.1.17 Model School Activities in Each Level

The training program for “Life-Safety Education Program” will be conducted in the MECSS regular in-service training by Institute of Teacher’s Professional Development (ITPD) using the developed “Guidebook” for the Program.

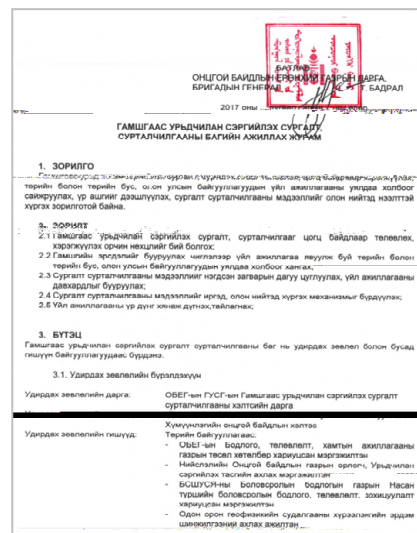
Activity 3.2.1 To develop comprehensive work plan for disaster risk reduction education and raising awareness at national and local levels

1) Framework for the Comprehensive Work Plan

(a) Issues about coordination of DRR

At the beginning of Activity 3.2.1, JET examined the current situation and issues for planning the DRR education and raising awareness and summarized in the WG 3-2 activities. Major issues for DRR education and awareness coordination are as follows.

- DRR education and training annual plans of the NEMA and the EMDC are individually developed. The plans are not updated in the course of implementation in a year.
- Donors’ activities which provide a lot of assistance to the DRR education and training are not considered when making the plans in NEMA and EMDC.
- There is no coordination mechanism among donors regarding DRR education and awareness raising activities and material development, and some of the donors’ activities overlap.
- Information of the DRR education and awareness activities are not published well.



Source: JICA Expert Team
Figure II.1.18 Regulation approved by NEMA Administrator

In order to respond the above-mentioned issues, the following activities were proposed during the WG 3-2 meeting.

- i) Development of an institutional framework among stakeholders of the DRR education and awareness raising activities to regularly update the training schedule.
- ii) Development of a website which can be accessed by government organizations and donor agencies and manage the DRR education and training activities plans. The simple system and design of the website is to be developed in consideration of easy to update at any time of the year and ensuring sustainability.
- iii) Integration of the donor’s activities in the annual plan
- iv) Development and operation of a mailing list with which government organizations and donor agencies can share the latest information

2) Development and Activities of Comprehensive Training Schedule

(a) Operational system development

The operational system for sustainable activities of the Comprehensive Work Plan was developed through WG3-2 activities, and was discussed in the meeting that the

stakeholders relevant to the DRR education and awareness activities had been invited to. As a result of the discussions in the meeting, a “DRR Training and Raising Awareness Team” was established as a system led by the Disaster Prevention Department of NEMA and supported by the Policy Coordination and Cooperation Department of NEMA, with external support by World Vision Mongolia for the Comprehensive Training Schedule. The operational rules including purpose, composition and roles of the members of the Team were designated as shown in the Table II.1.16, and approved as a regulation by the NEMA Administrator.

After establishing the “DRR Training and Raising Awareness Team”, JET supported NEMA implementing regular meetings to build a culture of coordinating with related agencies to implement programs not by communicating with an agency one-by-one. Since May 2017, in total five meetings with SC has been held and various small meetings with limited number of members has been held.

Table II.1.16 Purpose and SC Members Stipulated in the Regulation

Regulation of DRR Training and Raising Awareness Team Activities	
Purpose:	To plan and implement DRR training and awareness activities in a comprehensive manner, and to improve coordination between the governmental, non-governmental and international organizations for effective implementation of the activities. To publish information on DRR training and awareness activities to the public.
Steering Committee (SC) Members	Chair: Director of Disaster Prevention Dept., NEMA Vice-chair: Humanitarian Emergency Management Dept., World Vision Mongolia Members: (Government organizations) <ul style="list-style-type: none"> • Program Officer, Policy Coordination and Cooperation Dept., NEMA • Deputy Director and Senior Officer of Disaster Prevention Div., EMDC • Officer of the Lifelong Education Policy Planning and Coordination, Education Policy Div., MECSS • Senior Researcher, IAG • Lecturer, DRR Training Center, EMDC (Non-government organizations) <ul style="list-style-type: none"> • Staff of UNDP • Officer of DRR Program, MRCS • Staff of Save the Children Japan

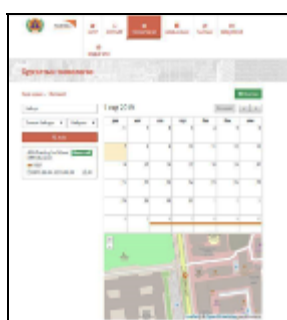
Source: JICA Expert Team

(b) Development of Website for the Comprehensive Training Schedule

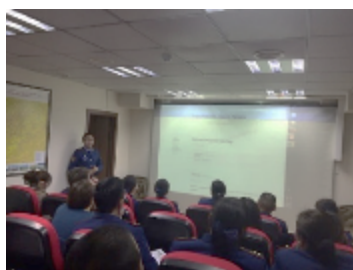
Information to be shared for the Comprehensive Training Schedule was discussed in detail with the references to the cases in Myanmar and Nepal. As a result of the discussion, the WG concluded that the major necessary information regarding the activities, such as “When (date)”, “Who (organizers)”, “Where (place)” and “What kind of activities” at a glance was designed. Also, the data entry system was developed in consideration of easy input of data by each stakeholder.

Website development was completed in January 2019 with the creation of a manual¹. On 31 January, a meeting to explain the system was conducted for the persons concerned in the NEMA. Twenty-one (21) people from NEMA, EMDC, UNDP, Save the Children, World Vision, Mongolian Red Cross, and other donor organizations were attended the meeting. Further on-line briefing session was provided for the fifty-seven (57) people in charge in 21 NEMA district offices.

The website (<http://4w.ontsgoisur.gov.mn/>) started trial operation from 1 February 2019 and was modified and improved based on the comments and opinions by the users by the end of April 2019. No major modifications were proposed.



Top Page of the Website for the DRR training schedule



Meeting to explain the website system



On-line briefing to district offices

Figure II.1.19 Developed Website and Trainings

(c) Mailing List for the Team

A mailing list (mdptteam@googlegroups.com) for the DRR Training and Raising Awareness Team had been effectively used for schedule sharing and coordination. At the beginning, only NEMA was posting the information related to the training and meetings, yet the Project promoted other member agencies to post the information that is valuable for sharing with other members including request for collaboration to DRR related events organized by NEMA.

Activity 3.2.2 To develop materials for the training on disaster risk reduction education and raising awareness, and implement the training for the target groups in pilot areas

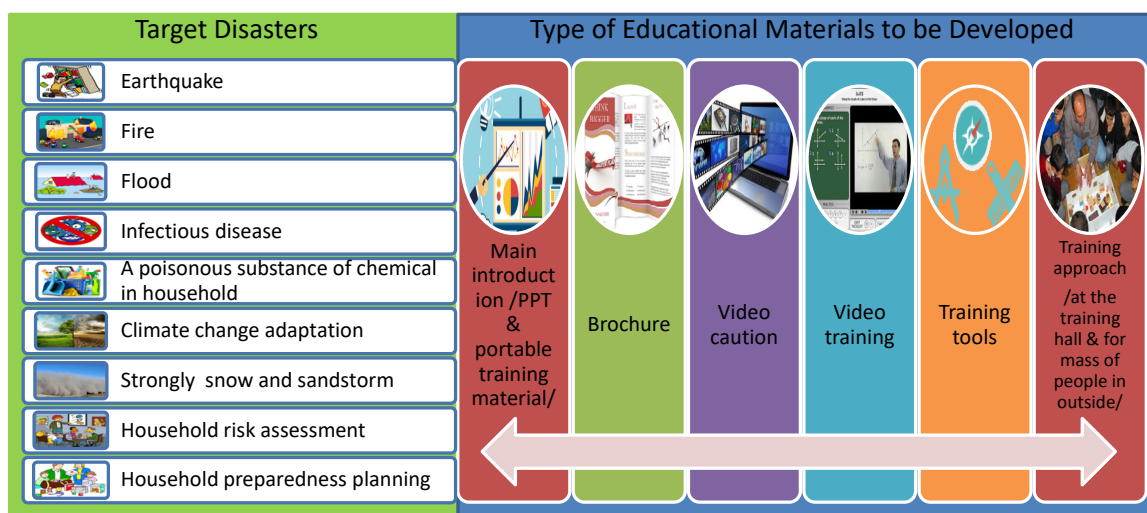
1) Development of the DRR Training Materials for the Community

Prior to starting development work for the new educational materials, the existing DRR education materials for the community were collected and listed. (Refer to Activity 3.1.2).

¹ Refer to <http://ontsgoisur.gov.mn/pages/taylan-4w-programm-khangamzhiyn-taniltsuulga-garyn-avлага>

Among the collected materials, a series of the textbooks and curriculum developed by UNDP for the DRR education to “Residents”, “Volunteers”, and “Employees of Companies and Organizations” were approved by the NEMA Administrator Regulation. The Project team reviewed the textbooks and curriculum for “Residents” in detail, since DRR education and awareness activities by NEMA and relevant organizations are conducted based on the Regulation. As a result, it was identified that the textbooks have very detailed explanations for the DRR education and training contents, however, more easy-to-understand educational materials are required for the community training program.

The activities of component 3 (called “Be Ready!”) of the “Disaster Resilient Ulaanbaatar Project” conducted by the World Vision Mongolia with help from NEMA included the development of a set of DRR training materials and implementation of DRR awareness activities for the community. The Project team learned that the development of the educational material for the “Be Ready!” segment was also planned for the preparing of easy-to-understand additional educational materials for conducting the DRR educational activities under the UNDP curriculum approved by the NEMA Administrator Regulation, which is similar to the Project. After the identification of the similarity, the Disaster Prevention Department of NEMA requested the collaboration of the two Project activities so as to develop one package of educational materials as a standard for DRR training and education.



Source: JICA Expert Team

Figure II.1.20 Target Disasters and Type of Educational Materials to be developed by the “Be Ready!” Project

In view of the circumstances, the Project team studied and sorted out the proposed outputs of the “Be Ready!” (Refer to the Table II.1.17), so as to avoid duplication of the activities to

be conducted in the Project. The development of the educational materials in the Project will be pursued in coordination with the activities of “Be Ready!”

NEMA, the JET and World Vision held a coordination meeting in August 2017 and decided to work on the material development under the leadership of NEMA. After extensive coordination with the World Vision Mongolia related to the activities of component 3 (called “Be Ready!”) of the “Disaster Resilient Ulaanbaatar Project” throughout the period and the WG3-2 activities, including a 2-day workshop in February 2018, meetings in February and March 2018, and individual work, the draft DRR training materials and tools in the Project were prepared in March 2018.

Table II.1.17 Demarcation between JET and Stakeholders for Developing Educational Material

No	Topic	Organization in charge
1	Understanding hazard, accident, disaster, disaster risk	JICA Project
2	Assuring HH disaster response, disaster risk reduction by disaster	World Vision (Be Ready) Except for EQ and HH
3	Search and Rescue, First Aid	MRCS
4	Participation of community DRR activities	JICA Project

Source: JICA Expert Team

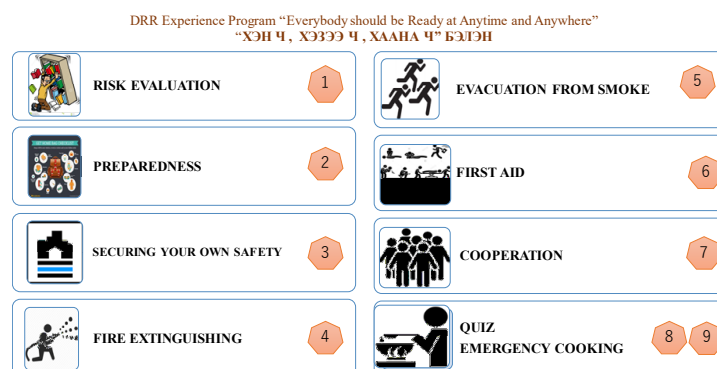
The Project conducted an intensive workshop for educational material development in February 2018 to determine the contents that JICA Project developed considering the existing “Be Ready!” material and Chief of NEMA Decree. C/P members concluded that the Project should cover practical training as a supplement of “Be Ready!” which is mainly composed of lectures. C/P members also appreciated Japanese experience-based training programs during the Counterpart Training Program in Japan. Therefore, C/P members concluded the demarcation between JICA, World Vision, and Mongolia Red Cross Society (MRCS) as shown in the table below. The timeframe follows the Chief of NEMA Decree 10 May 2016 A/130 that prescribes the DRR Awareness raising activities at resident level based on the Amended Law of Disaster Protection.

Table II.1.18 Demarcation between JET and Stakeholders for Developing Educational Material

No	Items	Organization in charge
1	Understanding hazard, accident, disaster, disaster risk 【Lecture 1 hour】	World vision JICA Expert Team (Technical assistance for Earthquake’s lecture)
2	Understanding hazard, accident, disaster, disaster risk 【Practical Training 1 hour】	World Vision JICA Expert Team
3	Assuring HH disaster response, disaster risk reduction by disaster 【Practical Training 5 hour】	JICA Expert Team
4	Search and Rescue, First Aid 【Lecture 1 hour】	MRCS
5	Search and Rescue, First Aid 【Practical Training1 hour】	MRCS JICA Expert Team
6	Participation of community DRR activities 【Lecture 1 hour】	World Vision

Source: JICA Expert Team

The training was named as “DRR Experience Program – Everybody be ready at anytime and anywhere-“composed of practical training that reaffirms what the trainees learned in the “Be Ready!” program.



Source: JICA Expert Team

Figure II.1.21 Contents of the Training Program

Based on the review of ToT and the workshops as well as the event in the school, WG3-2 revised and finalized the Instructor’s Manual “DRR Experience Program – Everybody be ready at anytime and anywhere-” for wide dissemination of the activities in Mongolia. Contents of the Instructor’s Manual includes the step-by-step process and items to prepare for each training session and a DVD that includes Power Point lecture files used for explaining the program and short movie that summarizes each training program. The soft

copy of the Instructor's Manual and short movie are also available on the website² so that everyone can download the contents.

The JET printed out the Instructor's Manual and distributed to nine districts in UB city and all aimags to promote implementing the program. In addition, NEMA obtained funding from MRCS to print out additional 1,000 copies for MRCS volunteers to implement the training. The soft copies of the manuals are also available on the NEMA website so that everyone can download the contents.

The training equipment used in the TOT and community workshops is stored in EMDC office and rent for those who are interested in conducting the training program.

2) Selection of the Pilot Areas for Community DRR Training and Education

The selection of the pilot areas for the community DRR training and education in the Project was discussed in the WG3-2 meeting. As selection criteria, risks of deteriorated buildings for urban areas, and disaster risks other than earthquakes, such as flooding, for the Ger area, and earthquake risks for rural areas were proposed. As a result, the areas in the Table II.1.19 were proposed in the JCC held in June 2017. The final decision of the pilot areas was made in the Steering Committee held in the end of September after the detailed discussions and studies with the relevant persons. Bayngol District, Bayanzurkh District, and Zavkhn Aimag were selected. The selection of the pilot areas, i.e., Bayangol District and Bayanzurkh District in UB City, and Zavkhan Aimag, was confirmed in the SC meeting held in March 2018 and the JCC meeting in April 2018.

² <http://ontsgoisur.gov.mn/pages/khen-ch-khezee-ch-khaana-ch-belen>

Table II.1.19 Proposed Pilot Areas for Community DRR Training

		Proposed Area	Location	Reasons for Selection
1	UB city (center)	Bayangol district	Central Western Part of UB	District with both new and old residential areas , and tall buildings
		<u>Additional option:</u> Khan-Uul district	South Western Part of UB	High flood risk areas with soft soil
2	UB city (ger areas)	Bayanzurkh district	Central Eastern Part of UB	Highly dense ger areas.
		<u>Additional option:</u> Songinokhairkhan district	Western Part of UB	Same as above
3	Rural areas	Zavkhan aimag		High probability of earthquakes less duplication with other donors' activities
		<u>Additional options:</u> Khuvsgul aimag Erdenet (Orkhon aimag)		

Source: JICA Expert Team

3) Implementation of the Training for Trainers

The workshops for the ToT were conducted on 21 March 2018 in UB City and on 26 March 2018 in Zavkhan Aimag combined with the “Be Ready” training program organized by the World Vision Mongolia and MRCS. Total 75 participants including the DRR Volunteer Team members, and staff members of the local governments and the lifelong learning centers in the target Aimags and Soums attended the workshops.

After the ToT workshops, the materials used in the training were compiled with detailed instruction points, information for preparation of “DRR Experience Program”, and reference data as a draft guidebook for instructors.



Source: JICA Expert Team

Figure II.1.22 Trainings for Trainers in the Pilot Areas

4) Implementation of the Workshop for DRR Awareness Raising

The workshops for DRR Awareness Raising in Zabkhan Aimag were successfully conducted on 12 May 2018 in Otgon Soum and on 14 May 2018 in Uliastai Soum. Also the workshops in the pilot area in UB City were conducted on 17 May 2018 in Bayangol District and on 20 May 2018 in Bayanzurkh District with great success. Each workshop was mainly coordinated by the instructors trained in the TOT workshop in March 2018 using the draft guidebook for instructors. Approximately 50 local residents of each workshop were trained in consideration of community characteristics of disasters.



Source: JICA Expert Team

Figure II.1.23 Workshops for DRR Awareness Raising in the Pilot Areas

Besides, on 20 March 2018, prior to the TOT, based on the request from NEMA, WG3-2 provided support to conduct the “DRR Experience Program” in the 87 schools of the Bayanzurkh District utilizing the materials and tools prepared for the Project activities as one of the events for the Earthquake Awareness Day in Mongolia.

5) Expansion to Other Regions

After implementing the workshops at the community level, JET printed out the Instructor’s Manual and distributed it to nine districts in UB City and all aimags to promote implementing the program. In addition, NEMA obtained funding from MRCS to print out an additional 1,000 copies for MRCS volunteers to implement the training.

The training equipment used in the TOT and community workshops is currently stored in the EMDC office and available for rent for those who are interested in conducting the training program. EMDC Bayangol District voluntary conducted the program after the ToT training by utilizing the equipment. As for purchasing the training equipment, some of EMDC and emergency management offices requested the district government to secure the budget to purchase the items used in the workshop.

After the implementation of the TOT and community workshop, in order for the 21 aimags and 9 districts to implement the pilot activities, NEMA and MRCS jointly implemented competition among EMAs.

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In addition, in order to institutionalize the pilot activities, the Director of Disaster Prevention Department Mr. Batsaikhan issued a letter to each EMA on April 5th, 2018 (11/ No.717 Letter). The letter was an instruction to prepare the educational material that was created by the pilot project funded by Disaster Risk Reduction fund from each municipality and implement DRR awareness raising by May 1st, 2018. NEMA would send the information on how to prepare educational material.

The period of competition was until December 2018 and the result of each EMA and the result of the training from the 1st to 3rd phase of 2019 are shown in the table below.

Table II.1.20 Record of Training and Development of Equipment

№	Aimags /District EMA name	As of end of 2018		From January 2019 to end of the 3rd quarter		
		Training number	Participants number	Training number	Participants number	Training package
1	Arkhangai	25	1,279	11	1,717	1
2	Baynkhongor	6	500	1	12	1
3	Bayan-Ulgii	6	900	8	511	1
4	Bulgan	4	58	12	58	1
5	Gobi-Altai	5	450	6	9,484	1
6	Gobisumber	57	5,878	4	247	1
7	Darkhan-Uul	78	4,838	17	1,341	1
8	Dornogobi	80	6,200	16	1,707	1
9	Dornod	6	378	18	906	1
10	Dundgobi	45	606	12	900	1
11	Zavkhan	6	1,076	32	10,011	1
12	Orkhon	10	341	27	929	1
13	Umnugobi	43	1,543	4	104	1
14	Uvurkhangai	3	230	28	7,639	1
15	Sukhbaatar	15	1,350	38	1,174	1
16	Selenge	4	1,200	27	1,729	5
17	Tuv	1	40	33	1,142	1
18	Uvs	5	306	2	223	1
19	Khovd	8	756	23	2,376	1
20	Khuvsgul	6	756	6	347	1
21	Khentii	10	570	12	3,360	1
22	Ulaanbaatar	100	6,347	229	27,466	9
	Total	523	35,602	566	73,383	34

Source: NEMA

Activity 3.2.3 To develop and implement educational and training program for implementing disaster prevention and simulation program in DPTMC

As a first activity, the current situation of the operation of the education program and equipment installed in DPTMC was reviewed. DPTMC officially launched the training activities in October 2016 and had conducted many training programs, with the training equipment provided from China and Korea, such as an earthquake simulation shaking table and a vehicle with DRR experience devices.



Source: JICA Expert Team

**Figure II.1.24 Observation
of the Program of DPTMC**

Through the WG3-2 activities including the observation of the current training program in the Center, the current situation and issues of the Center were discussed. The major issues raised in the discussion were as follows.

- Only a part of the Program officially prepared for DPTMC in October 2016 is implemented due to the lack of educational materials, etc.
- Mainly school student groups are the current target of the training, although the schools without school buses have difficulty to visit DPTMC.
- More exhibits which school children can directly experience are required.
- The movie used in the earthquake simulation shaking table, which starts with an earthquake early warning alert should be improved. There is no early warning service for earthquake at this moment and usually most of earthquakes occur without any previous warning.
- Consideration of the use of volunteers for the operation of DPTMC so as to provide more training programs is a proposal from the practice learned in the training in Japan.

Based on the above identified issues, discussions on the improvement of the Program were held in May and June 2017. After the introduction of the training programs and basic plans of some DRR training centers in Japan, the Program was revised with the view to incorporate the importance of experiences into the purpose of the Program as a whole. Also, the other Japanese ideas for the educational contents, such as the catch phrase “Don’t push, don’t run, don’t speak, and don’t return (O-Ha-Shi-Mo) for the experience program for evacuation from smoke, were taken as good examples for learning which children can easily remember.

After the training in Japan in November 2017, WG3-2 discussed the improvement of the exhibition of DPTMC based on the learning in Japan through several meetings and the 2-day workshop held in February 2018. Also, the members made coordination with the

World Vision Mongolia which has a plan to support DPTMC’s activities for avoiding duplication. As a result, the members decided to develop the following items for the improvement of the exhibits in DPTMC for the Project activities.

- i) Posters/Panels for the Earthquake Experience Room
- ii) Miniature Building Models for learning Seismic Resistant Structure (Brick and Wall Precast Concrete structure)
- iii) Educational Material for Kids’ Room

1) Posters/Panels for the Earthquake Experience Room

WG3-2 appointed one of the instructors of the DPTMC as a person in charge of the panel development. After the discussion in the several meetings in September 2018, the panels to be developed were decided as follows.

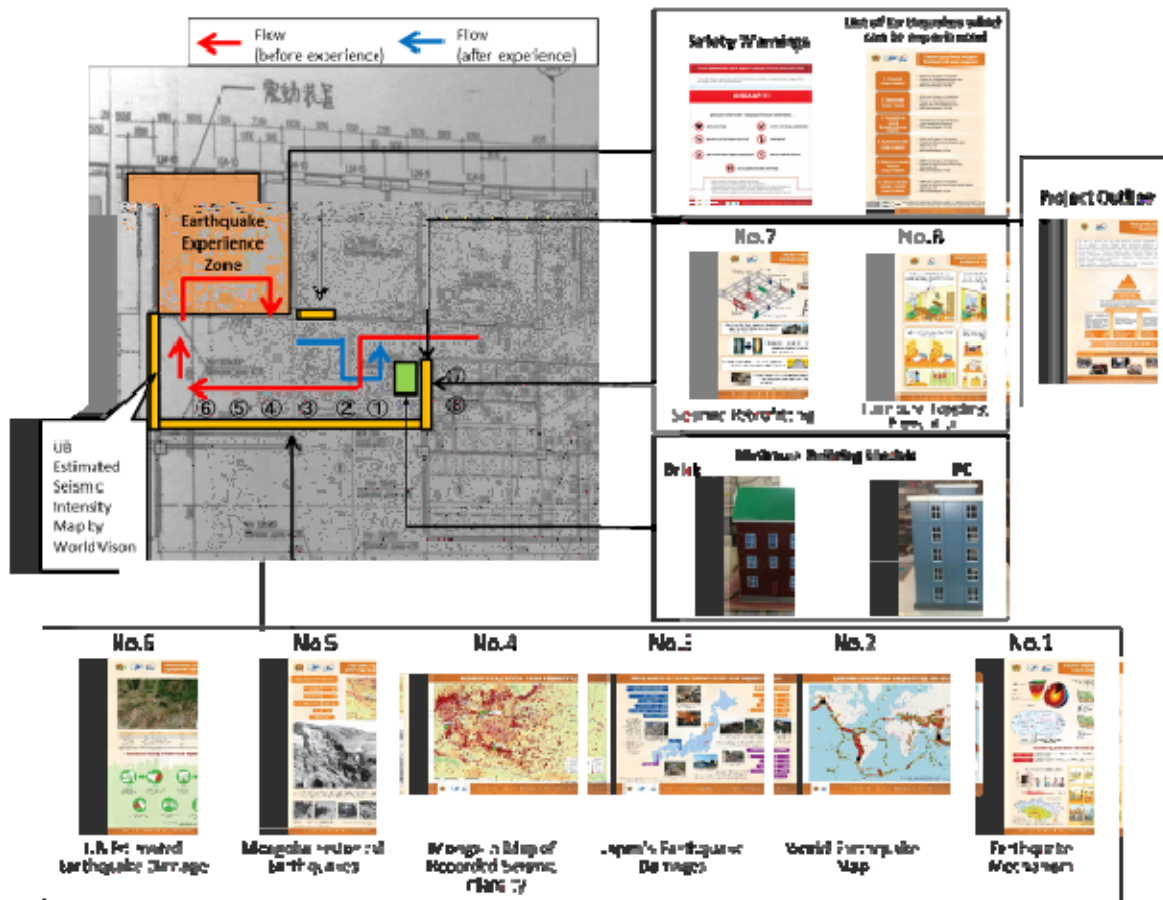
Table II.1.21 Contents of the Panels

<ul style="list-style-type: none"> 1) Basic Precautions for the Experience of Shaking Table 2) Basic Mechanism of Earthquake 3) World Earthquake Map 4) Basic Information of the Great Hanshin-Awaji Earthquake 5) Basic Information of the Kumamoto Earthquake 6) Basic Information of the Niigata Chuetsu Earthquake 	<ul style="list-style-type: none"> 7) Basic Information of Earthquake in Mongolia (Active Faults, Observation Data, etc.) 8) Basic Information of Past Earthquakes in Mongolia 9) Earthquake Risks in Mongolia (simulation data, pictures of 1988 Spitak Earthquake, etc.) 10) Earthquake Preparedness: Prevention of Furniture Toppling 11) Earthquake Retrofitting of Buildings <p style="font-size: small;">*4)-6) for as information of shakes of the Shaking Table</p>
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Source: JICA Expert Team

JET provided technical advices, information, materials and data for the panel development through some meetings in September, October, and November 2018. Also, the coordination for the data to be used in the panels was made with IAG (Institute of Astronomy and Geophysics) and other relevant activities in October and November 2018.

The panel development was completed in March 2019 and all the panels were exhibited together with the miniature building models for learning seismic retrofitting in the earthquake experience room of the DPTMC as shown in the image below.



Source: JICA Expert Team

Figure II.1.25 Layout of Panels and Models Installed in the Earthquake Experience Room

Further, the model to learn the relation of scale of Magnitude and its energy was developed and installed in the earthquake experience room.



Source: JICA Expert Team

Figure II.1.26 Panels and Models Installed in the Earthquake Experience Room

2) Miniature Building Models for Learning Seismic Resistant Structure (Brick and PC Structures)

WG3-2 appointed one of the instructors of DPTMC as a person in charge of the development of miniature building models. On 3 May 2018, a mini workshop was

conducted for the development of the miniature building model with the support of JET of WG2. Further, several meetings were conducted for providing technical advices to develop the models throughout the period from June to November 2018.

After structure design and images were developed by the working group team members, the models were developed with the help of a furniture worker in Mongolia as shown in the pictures below.



Source: JICA Expert Team

Figure II.1.27 Miniature Building Models (Left: Brick Structure/ Right: PC Structure)

3) Educational Material: Paper-Story Telling for Kids' Room

One of the instructors of DPTMC was appointed as a person in charge of the development of the Kids' Room Educational materials. She attended the training program for instructors targeted Pre-school Education and enhanced the understanding of education materials for kids. Through further discussion in the WG3-2 meeting, the materials to be developed were decided.

As the Kids' Room educational material, a picture-story show (Kamishibai) for learning earthquake DRR was developed after discussion among working group members and coordination with the World Vision's relevant activities. On 24 April 2019, using the developed picture-story show, a lesson for kindergarten pupils were conducted as a launching of the material. Beside the picture-story show with frame which was installed in the DPTMC, the printed materials were distributed to NEMA, EMDC, MECSS, Education Research Institute, ITPD, and the model schools of the WG3.1 activities.



Developed picture-story show for learning earthquake DRR

Lesson used the picture-story show

Source: JICA Expert Team

Figure II.1.28 Picture-Story Show for Kid's Room

II.2 Achievements of the Project

II.2.1 Outputs and indicators

(1) Output1

The following three indicators are applied to evaluate the achievement of the Output 1 based on the PDM.

1.1 The number of guidelines, operational rules, provisions which are developed.

As described in Activity 1.1.1, three (3) kinds of GLs were decided to be developed in Output 1 namely, the "Earthquake Disaster Risk Assessment GL", "Earthquake Disaster Protection Planning GL", and "Disaster Database GL". In the category of "Earthquake Disaster Protection Planning GL", three (3) administrative levels of GLs were decided to be developed, namely "National Level", "State Service Level", "Regional Level".. Thus, finally five (5) GLs were developed as shown below.

- ✓ Earthquake Disaster Risk Assessment GL
- ✓ National Earthquake Disaster Protection Planning GL
- ✓ State Earthquake Disaster Protection Service Planning GL
- ✓ Regional Level Earthquake Disaster Protection Planning GL
- ✓ GL on Operation and Management of Spatial Information System for Disaster Risk Reduction

The WG1 also developed the following documents as an appendix for the GLs.

- ✓ Technical GL for Earthquake Risk Assessment
- ✓ Operation Manual on Earthquake Risk Assessment Software
- ✓ Manual for Earthquake Disaster Risk Reduction Planning

A total of eight (8) GLs and manuals are developed by WG1. Therefore, it is concluded that the achievement is high.

1.2 The number of the drafts of agreements developed and participants who participated in the programs on agreements

The number of the drafts of the agreements developed by the WG1 is nine (9). At the beginning of the Project, it was considered to be four (4) cases. Thus, the number of the draft agreement shows a high degree of achievement.

For the training program, a total of 38 people from the Ministry of Health, National Hospital, Private hospital association, Pharmaceutical association, Ministry of Food and Agriculture, Ministry of Construction and Urban Development, Ministry of Road and Transportation Development, Mineral Resource and Petroleum Agency, Communication and Information Technology Agency, NEMA and EMDC participated to the training. Of the 50 invitees, 38 actually attended. Although the number of participants is not large, the participants' organization contributed the promotion of conclusion of agreement with NEMA.

From these viewpoints, it can be said that the achievement rate is high.

1.3 White paper on disaster risk reduction

"Mongolia Disaster Risk Reduction White Paper 2017" in both Mongolian and English was published with 300 copies in December 2018.

Prior to this, for the AMCDRR held in July 2018 at UB City, summary of the 2017 White Paper in English was edited by WG1. One thousand copies of the summary were printed and distributed to the participants of the Conference.

"Creation Manual of the Disaster Risk Reduction White Paper" was also developed by WG1.

Although the 2018 version of the Paper has not been published yet, WG1 completed the contents of the Paper and the composition of the Paper was approved at the executive meeting in October 2019. Currently, editing work is in progress at the Disaster Prevention Department. It is expected that the Paper will be published in December 2019.

(2) Output2

The following two indicators were applied to evaluate the achievement of the Output 2 based on the PDM.

2.1 Guideline for seismic assessment: The number of the participants in the training program on seismic assessment

After obtaining the approval on the draft GLs by STC of MCUD, WG2 conducted a training course of seismic evaluation for buildings on June 4th to 6th, 2018, and one for infrastructures and lifeline structures on June 7th, 2018. For the former, 110 trainees including inspectors from GASI participated. For the latter, 70 trainees which were also beyond the estimate participated.

In addition to the planned training course above, a training course on seismic evaluation was held in Erdenet on September 8th, 2018 in response to MACE's request. Twenty-three (23) engineers in Erdenet attended it. It is noted that collaboration with MACE will be one of practical way to disseminate the technology on seismic evaluation and seismic strengthening, since the MACE's program can make attendees motivated to participate by giving them "points" needed to be a registered engineer.

On November 12th to 13th, 2018, the training course on non-destructive inspection equipment for seismic evaluation was conducted, in which 64 trainees participated.

After the publication of guidelines, TOTs started to disseminate the technology as mentioned before, in which 53 officers participated. Also 68 engineers from private companies participated in the training program for seismic evaluation supported by MACE, to which WG2 contributed.

The total number of participants is considerably beyond the estimate. So it is concluded the achievement is high.

2.2 Guideline for seismic strengthening: The number of the training program on seismic strengthening

Since the training program for seismic strengthening contains RC, PC and masonry buildings, it became unnecessary to prepare several programs. On May 1st to 3rd, 2019, the planned training course on seismic strengthening was conducted, in which 65 trainees participated.

It is noted that the number of participants was beyond the estimate and the achievement is high.

(3) Output3

The following two indicators are applied to evaluate the achievement of the Output 3 based on the PDM.

3.1 The number of the cases of delivering classes on disaster risk reduction based on the activities of the Project

Due to the delay of the editing work, the WG3 developed the Guidebook for teachers to implement “Life-Safety Education” Program with the reference DVDs in October 2019 which was printed and distributed to the schools in November 2019. Full-fledged implementation of the Program at schools will be started from second semester of 2019 school year. Therefore, at this moment, it is difficult to evaluate the number of the cases of delivering classes on DRR based on the activities of the Project. Since the implementation of the “Life-Safety Education” is the responsibilities of each school under the approved Decree, it would be conducted in all schools. Further, another Decree to support the implementation of the “Life-Safety Education” is under preparation which includes descriptions on necessary measures for enabling environment, budget preparation, coordination with relevant stakeholders, and capacity development for teachers. This will ensure the delivering of classes on DRR.

3.2 The number of visitors in DPTMC

The WG3 developed educational materials in March 2019 and improved the training program for DPTMC in line with the “Life-Safety Education” Program for DRR education and raising awareness. The program was approved in July 2019 by Decree of EMDC Director.

After the handing over ceremony of the equipment of earthquake simulation experience conducted at the Earthquake Experience Room of DPTMC on 20 March 2019, the equipment and all exhibitions including explanatory materials of earthquake mechanism and the miniature building models for learning seismic retrofitting have been made available for the training program for implementing earthquake disaster prevention.

As of 17 September 2019, the number of visitors to DPTMC who participated in the training program for implementing earthquake disaster prevention from opening at the Earthquake Experience Room was about 16,820 persons collectively. The breakdown of visitors' number is shown in below.

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Table II.2.1 Number of visitors to DPTMC

Group of Visitors	Number of Visitors
	From March 23 to September 17, 2019
Public Service	4,008
Private Firm	5,054
Residents	4,372
School Students including Kindergarten, Primary, Lower-Secondary, higher-Secondary	9,041
University & College Students	1,835
Teachers	427
Total	24,737

Source: DPTMC

(4) Indicators

The project output indicators are summarized in Table II.2.2.

Table II.2.2 Project Output and Indicator

Outputs	Objectively Verifiable Indicator	Achieved Value	
1. Capacity for data collection on disaster risk reduction and coordination among related organizations will be enhanced.	1.1 To Improve frameworks for disaster risk reduction by reflecting the Amended Law of Disaster Protection	<ul style="list-style-type: none"> · Guideline(GL) on Earthquake Disaster Risk Assessment · GLs on Earthquake Disaster Protection Planning (3 GLs for "National", "State Service", "Regional") · GL on Operation and Management of Spatial Information System for Disaster Risk Reduction · Manual to Support Regional Earthquake Disaster Protection Planning · Manual to Support Conclusion of Agreements on DRR · Manual to Support development of White Paper for DRR 	<ul style="list-style-type: none"> · The number of guidelines, operational rules, and provisions which are developed. 8 / 8 (developed) (6 GLs of 8 GLs were approved.)
	1.2 To strengthen cooperation among related organizations for disaster risk reduction	<ul style="list-style-type: none"> · Agreements on cooperation among governmental agencies and related organizations for DRR actions (9 agreements planned to be developed) · Agreements on spatial database exchange among the DRR related organizations (2 agreements planned to be developed) 	<ul style="list-style-type: none"> · The number of the draft of agreements developed 11 / 11 (developed) (9 agreements have already been signed officially.) · The number of participants who participated in the training programs on agreements : 38 trainees (Apr. 8, 2018)
	1.3 To improve monitoring and information gathering methods for national and local disaster protection plans	<ul style="list-style-type: none"> · Earthquake Disaster Protection Plans in pilot aimags and Districts (2 aimags and 2 Districts in UB city) · White Paper for DRR in 2017, 2018 	<ul style="list-style-type: none"> · Pilot Activity for local earthquake disaster protection planning in the pilot area(2 aimags, 2 districts of UB City) · White Paper for Disaster Risk Reduction

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		<ul style="list-style-type: none"> · Spatial Information System for Disaster Risk Reduction including Disaster Spatial Database 	2 (approved) / 2 (developed)
2. Capacity of public administration officer related with the seismic assessment and seismic strengthening for buildings will be enhanced.	2.1 To establish seismic assessment methods for buildings, infrastructures and lifelines in the country, and to implement training program on seismic assessment	<ul style="list-style-type: none"> · GLs on Seismic Evaluation of Buildings (3 GLs : RC, PC and Masonry) · GL on Seismic Evaluation on Infrastructures and lifelines · Manual to Support Training Program Implementation 	<ul style="list-style-type: none"> · Guideline for seismic assessment 4 (approved) / 4 (developed) · The number of the participants in the training program on seismic assessment · Seismic evaluation 491 trainees (including TOT and MACE's program)
	2.2 To develop seismic strengthening guidelines for buildings in the country, and to implement training program on seismic strengthening	<ul style="list-style-type: none"> · GLs on Seismic Strengthening of Buildings (3 GLs : RC, PC and Masonry) · Trial Designs of Rebuilding and Strengthening Construction (5 kinds of buildings) · Manual to Support Training Program Implementation 	<ul style="list-style-type: none"> · Guideline for seismic strengthening 3(approved) / 3 (planned to be developed) · The number of training programs on seismic strengthening : 107 persons
3. Implementation plan on disaster risk reduction education and awareness raising activities will be developed and realized.	3.1 To develop a guideline for disaster risk reduction education and educational materials in kindergartens and schools, and to implement training program for instructors and teachers	<ul style="list-style-type: none"> · GL titled "The Program for Life Safety Education" · Guidebook for teachers to implement lessons based on the GL "The Program of Life Safety Education" 	<ul style="list-style-type: none"> · The number of the cases of delivering classes on disaster risk reduction based on the activities of the Project: Classes on DRR education will be delivered from the second semester of the 2019 school year.
	3.2 To develop materials for disaster risk reduction education and raising awareness, and to implement training program for target groups and residents	<ul style="list-style-type: none"> · DRR Training Materials for the Community · Disaster Prevention and Simulation Program with related Materials in the DPTMC · Webpage for sharing the DRR training schedule 	<ul style="list-style-type: none"> · The number of visitors in DPTMC: Total 24,737 (9,041 students and 15,696 citizens visitors from 23 Mar. to 17 September 2019 (16,820 persons for the Earthquake Experience Room)

Source: JICA Expert Team

II.2.2 Project Purpose and indicators

The "The Capacity of the National Emergency Management Agency will be enhanced through the activities for strengthening the countermeasures for seismic risk" were achieved based on the assessment of objectively verifiable indicators that revised in the 8th JCC held on June 5, 2019. The achievements of the Project Purpose are summarized in Table II.2.3.

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Table II.2.3 Project Purpose Output and Indicator

Project Purpose	Objectively Verifiable Indicator	Achieved Value
The Capacity of the National Emergency Management Agency will be enhanced through the activities for strengthening the countermeasures for seismic risk.	The number of the approved guidelines, rules, and provisions/	OUPUT 1 Activity: 8 (approved) / 9 (developed) OUPUT 2 Activity: 7 (approved) / 7 (developed) OUPUT 3 Activity: 2 (approved) / 2 (developed)
	The number of the Earthquake Disaster Protection Plans formulated or revised based on the guidelines developed through the activity in the Project	The number of the Earthquake Disaster Protection Plans formulated or revised based on the guidelines developed through the activity in the Project: • 2 (approved) / 5 developed : National Level, 2 Aimags, 2 Districts)
	Following systems for Earthquake Disaster Risk Reduction which have taken root in NEMA based on the approved guidelines, rules, and provisions:	<ul style="list-style-type: none"> • Formulation and Revision of Regional Earthquake Disaster Protection Plan • Development of White Paper for Disaster Risk Reduction • Collection and Management of Disaster Related Information • Implementation of Earthquake Risk Assessment • Promotion of Disaster Risk Reduction Education and Awareness Raising

Source: JICA Expert Team

II.3 History of PDM Modification

The modification of PDM was made in the following JCC meeting as shown in Table II.3.1.

Table II.3.1 History of PDM Modification

Parent Document	Date of Signing	Revised Content
MM on the 8 th JCC	June 5, 2019	<p><u>Objectively Verifiable Indicators for Overall Goal</u></p> <ol style="list-style-type: none"> 1. The formulation of Disaster Protection Plans at Regional Level will be continued by referring the guidelines developed through the activity in the Project. 2. The White Paper for Disaster Risk Reduction will be developed every year based on the system established through the activity in the Project. 3. The implementation of Seismic Evaluation for public facilities will be continued across the country by referring the guidelines developed through the activity in the Project. 4. The implementation of Seismic Evaluation for infrastructures and lifelines will be continued across the country by referring the guidelines developed through the activity in the Project. 5. The fostering engineers who have expertise in Seismic Strengthening of buildings will be continued based on the system established through the activity in the Project. 6. The implementation of School Disaster Risk Reduction Education will be continued across the country by referring the guidelines developed through the activity in the Project. 7. The Activity of Disaster Risk Reduction Education and Raising Awareness for the public will be continued across the country under NEMA's initiative based on the system established through the activity in the Project. <p><u>Objectively Verifiable Indicators for Project Purpose</u></p> <ol style="list-style-type: none"> 1. The number of the approved guidelines, rules, and provisions: <ul style="list-style-type: none"> • Related to OUPUT 1 Activity: XX (approved) / 9 (planned to be developed)

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		<ul style="list-style-type: none"> • Related to OUPUT 2 Activity: XX (approved) / 7 (planned to be developed) • Related to OUPUT 3 Activity: XX (approved) / 2 (planned to be developed) <p>2. The number of the Earthquake Disaster Protection Plans formulated or revised based on the guidelines developed through the activity in the Project:</p> <ul style="list-style-type: none"> • XX (approved) / 5 (planned to be developed : National Level, 2 Aimags, 2 Districts) <p>3. Following systems for Earthquake Disaster Risk Reduction are taken root in NEMA based on the approved guidelines, rules, and provisions:</p> <ul style="list-style-type: none"> • Formulation and Revision of Regional Earthquake Disaster Protection Plan • Development of White Paper for Disaster Risk Reduction • Collection and Management of Disaster Related Information • Implementation of Earthquake Risk Assessment • Promotion of Disaster Risk Reduction Education and Awareness Raising
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Source: JICA Expert Team

II.4 Others

II.4.1 Results of Environmental and Social Considerations

The Project does not involve environmental and social considerations. However it is important to pay attention to the environmental impact in the activities of DRR.

II.4.2 Results of Considerations on Gender/Peace Building/Poverty Reduction

It is necessary to consider gender, especially in the operation of evacuation centers and educational activities, when implementing disaster prevention measures using the guidelines formulated in this project. It is also necessary to take care that the information on disaster prevention measures should be steadily disseminated to residents at all levels.

III. Results of Joint Review

III.1 Results of Review based on DAC Evaluation Criteria

(1) Relevance

Relevance can be described how the Project is consistent with the development policy, sector policy and development needs of the recipient country's government as of project completion.

Relevance is high. The Project started while in the preparation of the revision of the Law of Disaster Protection that is newly focusing on pre-disaster action and risk reduction measures. The revised law was enacted in February, 2017 that introduced the Pre-Disaster Activities including assessment of risks, development of disaster protection plan, control and monitoring of a disaster protection, conduct of training and advocacy and creation disaster information data base. Whereas NEMA has a responsibility to cope with these pre-disaster activities in prompt manner, all activities of the project are related to these issue.

In terms of the Country Assistance Policy of Japan, the purpose of the project is highly consistent with aiming to contribute to the realization of safe cities through support to mainstream disaster prevention utilizing Japan's expertise.

(2) Effectiveness

Effectiveness is judged by if the Project purpose and outputs have been achieved as a result of project implementation.

Effectiveness is high. As mentioned in Section II, 2-2, the Project Purpose had generally been achieved as long as it was looking at the Objectively Verifiable Indicator. Some project activities, however, were partially completed. The activities related to Output 1 such as the "Earthquake Disaster Risk Assessment GL", "Disaster Database GL", "State Earthquake Disaster Protection Service Planning GL", "Regional Level Earthquake Disaster Protection Planning GL" were formulated by the WG and approved. But "National Earthquake Disaster Protection Planning GL" has not been approved yet although the manuscript was prepared by WG and submitted to the executive meeting of NEMA on August, 2019. The reason why the "National Earthquake Disaster Protection Planning GL" has not been approved yet at this moment is that it takes several months to obtain the consent of the relevant organization of disaster protection. It is expected to be approved within several months as soon as the coordination with relevant organization of disaster protection is completed. An external factor that delays approval is a delay in the response from disaster protection organizations.

(3) Efficiency

Efficiency is evaluated in terms of the level of achievement of the Project cost/period relative to the actual project cost/period.

Efficiency is fair. The actual cost with regard to inputs had been executed within the planned budget. Although the budget was added 14.8 million Japanese Yen for 2nd Training in Japan as shown in the table below, since the additional budget was originally estimated separately as a 2nd training in Japan or a training in third country, the budget within the initial assumption was executed following the request of the Mongolian side.

The actual period spent in the Project was equal to the planned period that was from 23 November 2016 to 22 November 2019.

Table III.1.1 Contents of Additional Budget

timing	Amount (Japanese Yen)	Reason
October, 2017 (Before 2 nd Training in Japan)	14.85 million	Increased the number of participants for 2 nd Training in Japan.

Source: JICA Expert Team

(4) Impact

Impact is mainly evaluated according to the achievement level of overall goal in the ex-post evaluation phase. At the time of project completion, it shall be described early signs or prospects of impacts.

Impact is high. The reasons of the determination is that, first of all, the project objectives have been generally achieved as shown in the Table II.2.2, and results have greatly contributed to the promotion of disaster protection policies in related organizations toward the overall goal. Further impacts are described as follows. In addition, the following impacts are assumed.

1) Prospects to achieve the Overall Goal

The Project produced the output as shown in the section II.2.1, which in turn, would promote the activity of NEMA and related organizations. Table III.1.2 shows the relationship between the Objectively Verifiable Indicators, the related output of the Project, and signs of prospects.

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Table III.1.2 Overall Goal, Verifiable Indicators and Prospects

Overall Goal		
Seismic risk will be reduced.		
Objectively Verifiable Indicators	Relating Output	Prospects
<p>1. The formulation of Disaster Protection Plans at Regional Level will be continued by referring to the guidelines developed through the activity in the Project.</p> <p>2. The White Paper for Disaster Risk Reduction will be developed every year based on the system established through the activity in the Project.</p> <p>3. The implementation of Seismic Evaluation for public facilities will be continued across the country by referring to the guidelines developed through the activity in the Project.</p> <p>4. The implementation of Seismic Evaluation for infrastructures and lifelines will be continued across the country by referring to the guidelines developed through the activity in the Project.</p> <p>5. The fostering engineers who have expertise in Seismic Strengthening of buildings will be continued based on the system established through the activity in the Project.</p> <p>6. The implementation of School Disaster Risk Reduction Education will be continued across the country by referring to the guidelines developed through the activity in the Project.</p> <p>7. The Activity of Disaster Risk Reduction Education and Raising Awareness for the public will be continued across the country under NEMA's initiative based on the system established through the activity in the Project.</p>	<ul style="list-style-type: none"> ✓ Earthquake Disaster Risk Assessment GL ✓ Regional Level Earthquake Disaster Protection Planning GL ✓ Manual of the Disaster Risk Reduction White Paper ✓ Seismic Evaluation Guideline for Buildings ✓ ✓ Seismic Evaluation Guideline for Infrastructure and Lifelines ✓ WG of the Project conducted three ToTs to foster seismic diagnosis engineers during the project implementation period. ✓ The Program for Life Safety Education ✓ The Guidebook for the program of Life Safety Education ✓ Conducting training for the school teachers ✓ DRR Training Materials for the Community ✓ Conducting ToT for EMA, MRCS Volunteer etc. ✓ Development of website for the Comprehensive Training Schedule. 	<p>It can be assumed that the formulation of the earthquake disaster protection plan with reference to the GL will proceed by incorporating the disaster protection plan in the aimags and districts of the Capital City into the NEMA annual plan.</p> <p>The white paper will be published continually to be listed on NEMA annual plan every year.</p> <p>It is planned that seismic evaluation of the public building will be implemented by UBUDA, MCUD and GASI by referring to GL.</p> <p>NEMA and other organizations to which non-destructive inspection equipment was handed will increase the accuracy of evaluation.</p> <p>It is expected that the seismic evaluation for infrastructure and lifelines will be promoted by GASI. NEMA and other organizations to which non-destructive inspection equipment was handed will increase the accuracy of evaluation.</p> <p>MCUD and Mongolian Association of Civil Engineers (MACE) conducted training program during the project period, and are planning to continue fostering seismic strengthening engineer by using GL.</p> <p>MECSS incorporated the contents of "Life-Safety Education" in the regular teacher training program in cooperation with Institute of Teacher's Professional Development from 2019. It can be inferred that some Aimags/Districts will organize training for "Life-Safety Education" by them.</p> <p>Based on the request by NEMA, all the district EMAs have continuously conducted Community DRR training developed in the Project activities. The website for sharing the information of DRR training and education activities has been continuously used by EMAs.</p>

Source: JICA Expert Team

2) Causal relationship

The Overall Goal does not deviate from the Project Purpose because the enhancement of NEMA contributes to risk reduction.

3) Ripple effect

Most local governments are the first to develop an earthquake disaster protection plan. The earthquake risk assessment GL shows a simple method for assessing earthquake risk, and can indicate specific damage figures. This will deepen the understanding of earthquake disasters and countermeasures for disaster prevention staff, and they understand that citizens need to be aware of earthquake disasters. The formulation of a disaster protection plan by government will be able to bring an opportunity for awareness raising of disaster at the private sector

If the Disaster Risk Reduction White Paper is written in plain text and widely distributed to citizens, their awareness of disaster risk reduction will increase.

MACE promotes the understanding of seismic diagnosis through training for member engineers, and the implementation of seismic diagnosis for general buildings will be promoted in the near future, and the effect of reducing the risk of building collapse against earthquake disasters will be expected. .

It is envisaged that the awareness raising measures for the community will induce the emergence of a new disaster protection culture.

(5) Sustainability

Sustainability is evaluated comprehensively considering secure continuation of the project effect.

Sustainability of the Project is relatively high considering the following aspects.

1) Political and Institutional Sustainability

The Project strives to ensure the political and institutional sustainability of the Project by institutionalizing the outcome of the project including technical guidelines, agreements and organizational framework. This documentation contributes to secure human resource for further implementation of the Project activities.

It is observed that the finalization of White Paper 2018 has been delayed as of August 2019. The preparation of White Paper is not yet to be institutionalized to enforce its implementation. Thus, it is desirable to ensure the timely publication by institutionalization of the activity.

2) Organizational Sustainability

The Project appointed WG members from NEMA and related agencies for implementing the project activities. Due to frequent transfer of C/P officials, it was observed some of the activities were delayed because former WG members transferred to irrelevant department to the Project. In order to ensure the organizational sustainability, it is desirable to incorporate the activities of the project into terms of reference of the transferring department or division so that the activities will be surely succeeded after the transfer of officials.

As for Output 3, the Project firstly investigated the organizational framework for coordinating with donors that conduct DRR activities to efficiently use donor's budget and human resources. This coordination framework was approved as regulation by the NEMA Administrator, which contributes to facilitate collaborations with other agencies. For example, NEMA could obtain the funds from MRCS to print out the material of Output 3-2 and hold a contest to expand the activities implemented in pilot districts/aimags.

3) Technical Sustainability

Each output developed training material as guidelines to expand the result of the Project to other regions. The Project strives to utilize C/P officials as facilitators/lectures for ensuring the technical sustainability and implemented the ToT workshops if necessary. Due to the small number of WG members and limited budget, it is challenging to disseminate the pilot activities to outside of the pilot areas.

Especially, Output 2 strategically involves related agencies not only government agencies but also professional organizations including MACE to foster the importance of seismic evaluation and seismic strengthening.

4) Financial Sustainability

The Project ensures the financial sustainability of the Project by legalizing and approving the outcome of the Project, which facilitates the future budgeting of the activities. In additions, the Project emphasizes on strengthening the working relationship with other DRR related government agencies. This is designed to enhance the capacity of NEMA as a DRR focal in Mongolia as well as facilitate the cost share with other government agencies.

Building coordination framework among donors and related agencies developed by Project contributes to ensure the financial sustainability of the community DRR

education because a concrete framework and decree for collaboration endorsed by NEMA can be convincing for donors to raise a budget for supporting NEMA's activities.

III.2 Key Factors Affecting Implementation and Outcomes

The following points are the items that had a negative impact on the Project by each output. There were no political negative impacts.

(1) Output1

1) Frequent change of person in charge and delay of the development work of GLs

Regarding the Earthquake Disaster Protection GL, originally, two GLs namely, "Aimag / Soum Level GL" and "Capital City / District Level GL" were planned to be made, however, according to the request of Mongolian side, two more GLs namely "National Earthquake Disaster Protection Planning GL" and "State Earthquake Disaster Protection Service Planning GL" were added to be prepared. For this additional preparation work, two more WG members were appointed in the middle of 2017.

However, these two members were transferred together in 2018 and the successors were not decided for several months. Although new members were nominated, but they were also transferred again. As a result, the creation of guidelines was significantly delayed.

In addition, for WG members, the Project work is a task given to them in addition to their daily work. Since NEMA is a state of emergency organization, the principles of command hierarchy are thorough. Therefore, WG members are obliged to accept the additional Project work in principle, but tend to be late. This is also the cause of the delay.

2) Recognize the need for effective pre-disaster DRR investment

Since buildings, infrastructure and lifelines are the most vulnerable component in Mongolia, it is indispensable to incorporate the concept of "Pre-disaster DRR investment" into the outcome of the WG. Considering the possible residual risk during pre-investment **in this case**, effective combination of structural measures and non-structural measures is **also** crucial. It is also necessary to prioritize the areas with imminent risk of economic loss and with urgent needs of countermeasures. As for structural measures that take years to complete, their implementation schedule should be described in the plan.

JICA Expert Team strived to incorporate above-mentioned ideas referring to the experience from Japan. The process required considerable time for the WG to comprehend and incorporate into their outputs.

3) Preparation Work of the White Paper 2018

Although the working group for the White Paper 2018 has been established and started to develop, it took considerable time to formulate 2018 version. It is expected to be published in December 2019. In order to issue the Paper at an appropriate time (at least before the second quarter), it is necessary to institutionalize the preparation by the documentation or legalization establishing a formulation system across NEMA departments.

4) Make Redundancy of System Administration for SISDRR O&M

There are some challenges regarding a shortage of human resources for system administration for SISDRR O&M. The Spatial Information and Technology Division has a responsibility of operation and management of SISDRR, but there is only four staffs including division chief. In addition, only one focal system engineer is assigned as of November 2019. If the key person leaves the division, it is difficult to keep a stable operation and management of SISDRR. It is a serious risk and the JET requests the NEMA side to assign a few additional system engineers in the division to share the task of SISDRR O&M.

(2) Output2

1) Establishment of Guidelines as Mongolian standards

To make the guideline practical and effective, WG2 decided to follow the Mongolian standards that were established under the direction of MCUD, since the previous guideline for mid- and high-rise buildings, which was established in the previous project is not being used. On the other hand, the Project recognizes that implementing the official procedure was time consuming.

To expedite the procedure to make the project on schedule, WG2 and JET collaborated to prepare the TOR and to give explanations to members of CST and of the Respective Professional Council in advance. WG2 also made a prototype of each guideline to help CST to establish draft guideline, followed by the frequent exchange of opinions to make prototype practical in Mongolia.

2) Frequent Change of Working Group Leaders and Members

Through the project period, the leader of WG2 changed three times, making it difficult to give the responsibility to WG2 to conduct tasks. WG2 members were also changed so that few members are consistent through the project period which made it difficult to transfer the technology.

In order to solve the issue, JET and WG2 conducted the intra-group workshop to transfer the background of project and methodologies to new members.

3) Providing the Tools for Technology Transfer

Since the seismic evaluation and seismic strengthening is quite new technologies for the Mongolian counterparts, other officers and engineers who are the target of technical transfer, it was very challenging for them to fully understand the methodologies within a limited time of the project.

Therefore, JET and WG2 prepared the seismic evaluation tools using the Microsoft Excel spread sheets to understand the method. These tools were utilized in the training courses and workshops followed by the well-received comments from participants, since the tools were effective to understand.

(3) Output3

1) Better Understanding of the Project Activities as a Technical Assistance Project

Since this Project is the first project for NEMA as a Technical Assistance Project, the counterparts had some confusion regarding what should be done by the JET and what should be done by the Mongolian side. In most of foreign assistance projects for NEMA in the past, major activities and works were done by the project members and NEMA's involvement in the project activities was limited. Under those circumstances, the superiors of the departments and divisions which the counterparts belong to had also difficulty with estimating how much time the counterparts need to spend for the Project activities and the counterparts are always busy with their other commitments. Counterpart officials were often in a dilemma between the project activities and the other commitments in their organization.

For a more comfortable working environment of the counterparts for the Project activities, regular and timely explanations, reporting, and consultation with the superiors of the counterparts from the Project team were indispensable. Repeating explanations

to the counterparts about the procedures of the Project activities were required for better understanding the scheme.

2) Delay of Individual Editing Work of Working Group Members

Due to the frequent mission and business travels to districts of WG 3-1 members and other personal reasons, the individual editing work for the Guidebook development by working group members had been delayed. In order to secure the time for finalize the Guidebook MECSS included the work in the MECSS's official work plan of 2019 and finally the work was completed in May 2019.

3) Coordination with Other Projects for Website Development

The development of a comprehensive schedule website was delayed due to frequent changes of NEMA's information sharing platforms funded by other donors. Eventually, ADPC's website platform to share donor's information was suspended due to technical difficulties and NEMA developed a different platform funded by the World Vision Mongolia. This change was informed to JET after the platform development, which made unifying the entry form difficult. Prior coordination among agencies that develop web platforms for similar purpose was indispensable as well as understanding the overarching vision and goal for information sharing as DRR focal agency.

After recognizing the differences of the web platform system among the relevant agencies, NEMA and the JET have always been trying to invite the relevant persons of other organizations when the discussion is conducted for the development of a website for a comprehensive schedule. All the members now understand the importance of sharing information for avoiding unnecessary redoing coordination.

(4) Common items for all outputs

1) Cooperation between related organizations

Before the commencement of the project, there was a concern for NEMA that coordination among related agencies was insufficient. For example, the Project found overlap of the activities of other donors, which was pointed out by other donors. Strengthening the coordination with related agencies including government agencies, professional societies, and donors is the urgent priority for NEMA as national machinery of DRR in Mongolia

The project strived to establish the framework for the necessary coordination and collaboration by WG activities and appointing them as participants of JCC. This

enables related agencies to have regular meetings with NEMA to update the progress of the project in a timely manner. This framework also contributed to more efficient work demarcation and cost sharing among NEMA and related agencies.

2) Timely input responding to inundation in training center

The Project supported DPTMC by installing shaking table and educational materials to upgrade the earthquake experiencing program such as scale models, and informative panels. Due to heavy rain in UB city this year, ground floor of DPTMC was inundated. This caused delay of installation of shaking table and some training program on the ground floor was stagnated. Timely input from NEMA including human resource, budget allocation and prompt arrangement was indispensable and expected for the response in order to solve the issues by the end of the Project.

III.3 Evaluation on the results of the Project Risk Management

As for the key factors of previous section, the JET conducted a meeting with the PD or/and PM immediately when a negative situation occurred, and consulted with it on how to cope with the response to avoid adverse effects on project implementation. With reference to the direction of the PD or/and PM, NEMA, MCUD and other C/P member made an effort to cope with the issues such as change of WG, and delay of activities.

Although the impact of not approving the one guideline could not be avoided, other risks were largely avoided.

III.4 Lessons Learned

(1) Appointment of appropriate resources with duties for effective project implementation

In the activity of WG1, members were NEMA's personnel, a great deal of effort and support was required to complete the formulation of guidelines and the pilot work because of busyness in daily work. In addition, eight (8) of the thirteen (13) participants from WG1 in the 2nd Training in Japan for the practical level were transferred or retired, which also prevented the progress of the Project. To avoid such problems, it is important for the NEMA to appoint personnel with appropriate duties.

(2) Sharing the experience and knowledge

In the Project, the activities of technology transfer were divided into three (3) stages such as learning (first), arrangement (second), formulation (third). The WG members were concentrated in working during the project period, and the horizontal expansion was limited. Although, some ToT have started partially in WG2 and WG3 activities, it is necessary to share information for appropriate the expansion of the project outputs.

(3) Appropriate budget allocation

The scope of the Project covers the development of guidelines and manuals, and pilot activities in a few areas. After the project ends, budget arrangement at the aimag level is essential because the dissemination of the Pilot activities is required to be spread throughout the country to achieve the Overall Goals. It is expected that NEMA supports the budget allocation to DRR activities at local government level through supporting Emergency Management Department of Aimag (EMA).

In addition, the Project procured equipment for seismic evaluation and seismic strengthening and equipment and material for the DPTMC. It is required that NEMA secures the operation and maintenance budget for the above-mentioned equipment to ensure the continuous implementation of strengthening DRR education.

Installation of the shaking table was delayed due to inundation of the ground floor of the DPTMC and after the installation another inundation occurred therefore the training program had to be stopped. In order to assure the safe operation of the shaking table, the Japanese side has continuously requested NEMA to take necessary measures including waterproofing work.

IV. For the Achievement of Overall Goals after the Project Completion

IV.1 Prospects to achieve Overall Goal

The project set Overall Goal as “Seismic risk will be reduced”. The overall goal will be achieved when the outcome of each output continues to be implemented or disseminated throughout Mongolia. An overview of the prospect of achieving Overall Goals have been summarized in the III (4) Impact Table III.1.2.

The prospects for achieving the Overall Goal are described for each output as follows.

(1) Output 1

The formulation of Disaster Protection Plans at Regional Level will be continued by referring to the guidelines developed through the activity in the Project.

The WG members learned how to make the earthquake disaster risk mitigation plan through WS and became able to carry it out in local government. Therefore, if NEMA's Order on the preparation of the regional earthquake disaster protection plan is issued, the preparation work will proceed.

Since there are a limited number of WG members who are familiar with the coordination of the WS, if they are transferred, there is a risk that the WS will not be conducted. NEMA should immediately conduct earthquake disaster protection planning in areas other than the Pilot Area in order to transfer the knowledge to other appropriate staff of NEMA.

As for the revision of "National Earthquake Disaster Protection Plan", it is expected that NEMA will revise the plan based on the "National Earthquake Disaster Protection Planning GL" and implement disaster mitigation measures in national level to contribute to risk reduction.

The Project observes that preparation work of White Paper 2018 has started but not published yet as of November 2019 even though the preparation of White Paper is clearly stated in the NEMA's business plan. Since the White Paper provides basic information for planning risk reduction measures, it is expected that the white paper will be revised steadily every year by introducing a strong legalization.

(2) Output 2

Seismic evaluation for facilities will be implemented referring the guidelines, since GASI submitted letters to conduct the seismic evaluation according to some procedures, in which guidelines were developed in the project, are also referred to. UBUDA prepares the passports of building including seismic diagnosis. UBUDA may also use the guidelines as an alternative method in case.

NEMA will conduct risk evaluation of essential buildings in case of disaster such as schools or hospitals and of apartment houses and residential dwellings protecting human lives and wealth. Guidelines for seismic evaluation contribute to the activity, followed by the actual countermeasure as rebuilding and retrofitting.

A training course for seismic strengthening will be included in the MACE training programs, so that the course has a power to motivate relevant engineers to attend the course since MACE training course gives participants a certificate necessary to apply for a license. Therefore, it can be concluded that fostering engineers will be continued.

(3) Output 3

The “Life-Safety Education Program,” which was approved by MECSS on 6 April 2018 as A181 Decree, clearly stipulates the roles and responsibilities to promote the life-safety education including of DRR education of each stakeholder in school education. Further, the Program was developed with due consideration of the school education situation in which it is difficult to introduce new subjects and explains how to include the life-safety education in the existing subjects and school activities. Also, since the training program for the “Life-Safety Education” in the Project was provided to all the provinces and districts, the importance and necessity of implementation of the school DRR education is well understood by key actors across the country. In these conditions, the above goal will be achieved in Mongolia.

Therefore, for the further promotion of the education, the Guidebook for the implementation of “Life-Safety Education” should be improved. Since the guidebook was developed based on the limited numbers of pilot or model school activities in the Project, it needs to reflect more practice in school education activities in Mongolia. Also, due to time and area limitations in the Project activities, contents of the Guidebook do not cover some disasters and risks. It is recommended to periodically improve or update the Guidebook based on the accumulation of experiences and practices of the “Life-Safety Education” in the schools.

In addition, the working group members identified the directions for encouraging the implementation with the following ideas. 1) To include contents of “Life-Safety Education in the Grade 3 examination for promotion to the next grade conducted by Education Evaluation Center, 2) To conduct an academic achievement test focused on health education and life-safety education, because it is difficult to evaluate the learning result by normal education evaluation methods or 3) To include life-safety education in the checklist of school self-assessment. Such kinds of activities should be pursued for ensuring the continuation of the nationwide implementation.

The Activity of Disaster Risk Reduction Education and Raising Awareness for the public will be continued across the country under NEMA's initiative based on the system established through the activity in the Project.

The "DRR Experience Program- Everybody be ready at anytime and anywhere" was developed with due consideration of existing DRR education and raising awareness activities in Mongolia and good coordination with various major stakeholders including MRCS and World Vision Mongolia. Also, with the official direction from Director of Disaster Prevention Department of NEMA to each EMA in April 2018, the program was conducted across the country in 2018 and continued in 2019. Further, by the Website for the Comprehensive Training Schedule developed for the "DRR Training and Raising Awareness Team", the implementation of the activities can be monitored. In these conditions, the above goal will be achieved in Mongolia.

The "DRR Experience Program- Everybody be ready at anytime and anywhere-" was mainly for the outside activities targeting to adult and earthquake disasters, expansion of the contents should be considered in the future for wider participants, from the view of a wider-range of disasters, and with consideration for the venue conditions of cold weather.

Further, the DPTMC is playing important roles for DRR education and raising awareness for the public with the improvement of the program by the Project activities. Currently the DPTMC is only established in Ulaanbaatar and it is difficult for the residents in other provinces to visit the center. The establishment of the DPTMCs at least 4 other areas of Mongolia will be recommended for the purpose of supporting the achievement of the goals.

Throughout the project, JET had supported procuring equipment for seismic evacuation and equipment for earthquake experience room including shaking table and materials for kids' room. Proper operation and maintenance of above-mentioned equipment and materials in terms of human resource and budgeting are indispensable for achieving Overall Goal.

IV.2 Plan of Operation and Implementation Structure of the Mongolian side to achieve Overall Goal

In order to achieve Overall Goal, expansion of the pilot activities outside the pilot areas and on the local level is indispensable. Therefore, the involvement and commitment of local government is essential for implementation. C/P at national level establishes coordination framework including local government level. Below is the implementation structure for each output.

(1) Output 1

NEMA, EMAs and EMDCs are the main actors for formulating and instructing the local disaster protection plan and its implementation. The operational plan for the formulation of a disaster protection plan at the aimag level and its implementation to the baug level led by NEMA in the next few years is indispensable.

(2) Output 2

It is expected that NEMA would establish a monitoring framework of implementation of seismic evaluation and seismic strengthening. This monitoring framework will contribute to planning and implementation monitoring of disaster protection plans.

(3) Output 3

As for DRR Education, NEMA and EMDC continuously support DRR education through the operation of the DPTMC as an opportunity for learning hands-on. It is also expected NEMA can technically support the strengthening of the contents of DRR Education.

As for community DRR Education, NEMA, EMAs and EMDC continuously implement the program in close collaboration with donors and will be a coordination body for the stakeholders of community DRR Education.

IV.3 Recommendations for the Mongolian side

(1) Institutionalization of project activities as C/P's regular works

Throughout the project activities, it is observed that project activities delayed or stagnated due to the transfer of staff in all outputs. This is partly because the works are designated as each person's responsibility not their affiliations. Some activities of the Project such as publishing White Paper and managing agreement between related agencies were not originally NEMA's duty but the necessary works as a national machinery of DRR. For sustainable implementation, it is recommended to officially designating the terms of reference of the department/division in charge.

(2) Implementation of effective arrangement for nationwide dissemination

Since the objective of the Project is the capacity enhancement of NEMA, the Project does not directly implement technical cooperation at the local level. The pilot activities were designed to implement through NEMA after technical transfer to NEMA and related agencies. The Project supported an inter-agency coordination framework NEMA, EMAs and related local organizations through the project activities including the ToT and coordination meetings.

It is essential that NEMA, as the DRR focal agency in Mongolia, takes the lead for disseminating the outcome of the three outputs of the Project by incorporating into NEMA's policy and planning frameworks in collaboration with stakeholders for nationwide to improve DRR capacity of whole Mongolia.

(3) Proper budget allocation for the countermeasure of DRR

To disseminate DRR activities nationwide after the project, it is recommended strongly that NEMA supports and monitors the budget arrangement at the aimag level.

It is also recommended that NEMA secure the operation and maintenance budget for the equipment that had been procured in the project.

As mentioned in III.4 Lessons Learned, the budget allocation to protect it from the inundation of the ground floor of the DPTMC is required immediately to continue conducting effective disaster reduction activities.

As of November 2019, the waterproofing work has not completed yet then there remains a risk of damage to the equipment in possible future inundation. Therefore, it is recommended to take necessary measures immediately.

IV.4 Monitoring Plan from the end of the Project to Ex-post Evaluation

In order to follow up the NEMA's approval of "National Earthquake Disaster Protection Planning GL", which is still in the approval process of NEMA as of November 2019, and to ensure that the National Disaster NEMA Risk Management Department continuously monitor the activities of the three outputs and recognize its bottleneck, NEMA will monitor the progress of continuous training regarding GLs formulated in the project. At the same time, NEMA will have a meeting with the JICA Mongolia Office once a quarter.