

**Annex 5: Project Completion Report**

**NATIONAL EMERGENCY MANAGEMENT AGENCY (NEMA)  
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

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

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**PROJECT COMPLETION REPORT  
(DRAFT)**

**NOVEMBER 2019**

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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 төгрөг
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

UB 

## **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,)

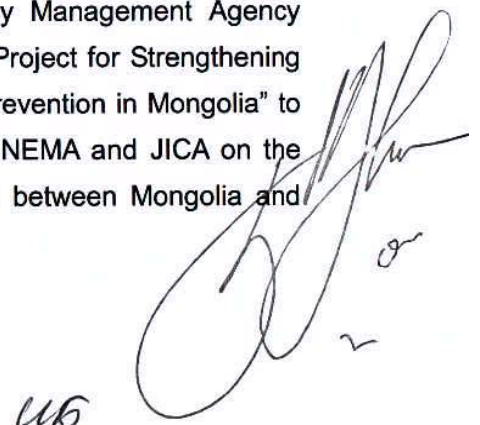
#### **I.4 Background (from Record of Discussions(R/D))**

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



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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.

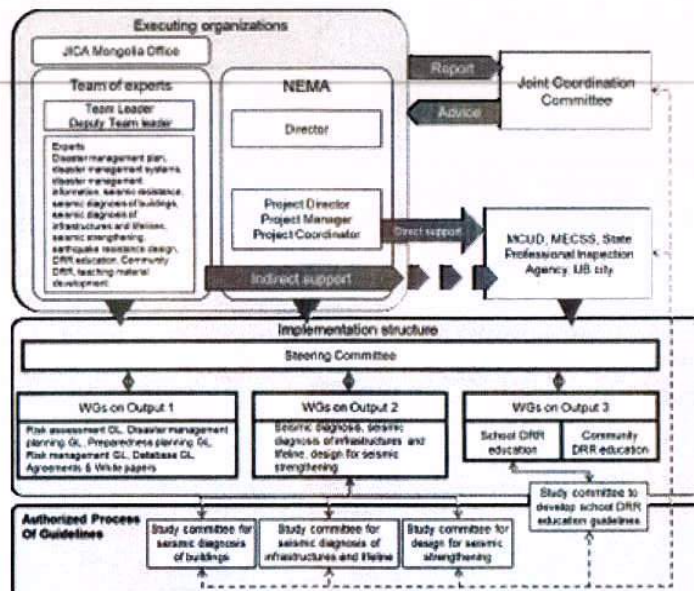
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- Ministry of Construction and Urban Development (MCUD)
- Ministry of Education, Culture, Sports and Science (MECSS)-
- General State Inspection Agency (GASI)
- Emergency Management Department of the Capital City (EMDC)
- Construction Quality and Safety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

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inter-organizational coordination. The JCC basically meets once in a quarter during the 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 <sup>nd</sup> 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	- Progress of WG Activities - Amendment of Working Group Member - Procuring Equipment - Target Aimag 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	- 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	- 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.	- Progress of WG Activities - Amendment of Working Group Member - Progress of Procuring Equipment of Earthquake Simulation Experience for the Disaster Protection Training Methodology

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No.	Date	Participants	Contents of discussion
		Total: 36 participants	Center - Future Plan for Publishing White Paper - 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	- 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.	- Progress of WG Activities - Confirmation of Project Completion Report - Further Activities lead by NEMA

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## 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	7.00
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	0.5	0.5
Output 2: Seismic Resistance	Seismic-Resistance	12	12	10.83	10.00
	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	10	9	6.17	6.00

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	Coordination I				
	Development of Disaster Management Materials I	5	6	3.00	3.17
	Development of Disaster Management Materials II / Project Coordination II	※3_	※3_	※3	※3
		107	117	78.70	78.64

※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 <sup>st</sup> Training in Japan	Disaster Risk Reduction and Management	12	Total 44
	Output 1: Capacity Improvement for Disaster Management Planning	13	
2 <sup>nd</sup> 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**


  
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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

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Project Coordinator		1	1
Working Group	Output1	11	15
	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.

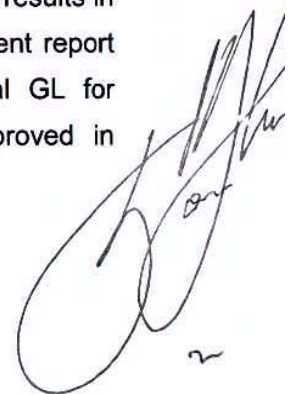
In addition, the provisions of Article 12.2 had initially considered corresponding to the Disaster Management GL. However, the part of investment for mitigation was deleted from the Article and it was newly described that "Disaster Management" is an audit of disaster prevention activities of relevant 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**

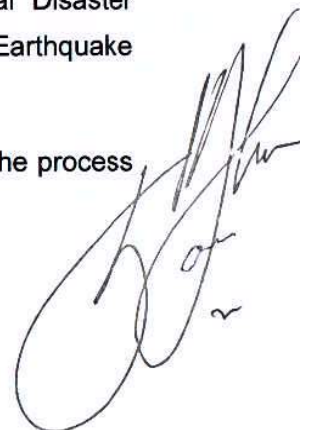
The WG1 members prepared four (4) GLs namely, "National Earthquake Disaster Protection Planning GL", "State Earthquake Disaster Protection Service Planning GL", "Aimag / Soum Level Earthquake Disaster Protection Planning GL" and "Capital City / District Level Earthquake Disaster Protection Planning GL".

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

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

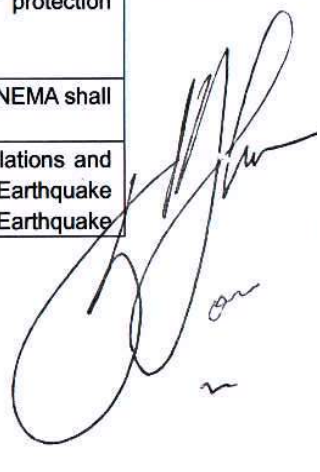
In the preparation stage of the draft GL, the GL's name was referred to as the GL on Operation and Management of Disaster Spatial Database using Internet-based Disaster Spatial Information System (I-DSIS), but finally the GL's name was officially defined as described above.

**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
16.5 Approve procedure for transmission of	

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disaster announcement signals	Disaster Protection Service Planning GL, the Regional Level Earthquake Disaster Protection Planning GL prepared in the Project.
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 legal 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 2019.
4.Clean water	Organize stable water supply at in regions struck by disaster	NEMA-Water Management Authority	Agreement established in September 2019.
5.Road and transport	Providing road and transport means necessary for organizing search and rescue, damage mitigation, and	NEMA – Ministry of Road and Transportation	Draft of agreement was formulated.



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	immediate restoration activities without delay in regions struck by disaster	Development	
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.
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 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 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 jointed 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.



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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**

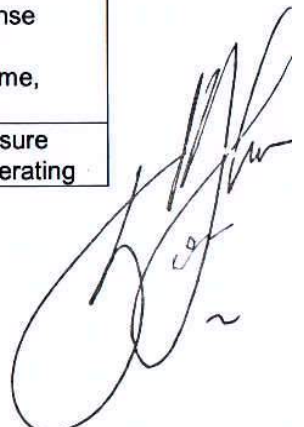
The pilot activities to revise / newly develop the earthquake disaster protection plan continued in the pilot areas, Darkhan-Uul Aimag, Umnugovi Aimag, Bayangol District and Chingeltei District in UB City. WG1 performed the workshops (WS) several times. In the WS, the task force was divided into four 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"> <li>• Introduction of GL</li> <li>• Check on existing data</li> <li>• Simple earthquake risk assessment</li> </ul>

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	WS2	18, 19 Sep. 2018	12	<ul style="list-style-type: none"> <li>• Establishment of task force group</li> <li>• Determination of planning schedule</li> <li>• Setting disaster scenario</li> <li>• Determination of risk reduction objective</li> </ul>
	WS3	15, 16 Nov. 2018	18	<ul style="list-style-type: none"> <li>• Set the risk reduction targets (10 years) of the current disaster scenario</li> <li>• Extraction of problems facing the risk reduction target</li> <li>• Enumeration of measures to solve the problem</li> </ul>
	WS4	28 Jan. 2019	19	<ul style="list-style-type: none"> <li>• Enumeration of measures to resolve issues (continued)</li> <li>• Designation of major response agencies</li> <li>• Setting of implementation time, period of measure</li> </ul>
	WS5	19 Apr. 2019	13	<ul style="list-style-type: none"> <li>• Judgment of priority of measure</li> <li>• Calculation of estimated operating expenses</li> </ul>
				<ul style="list-style-type: none"> <li>• Making basic policy on disaster risk reduction measures in each field</li> </ul>
	WS6	1 Jul. 2019	10	<ul style="list-style-type: none"> <li>• Determination of budget acquisition strategy</li> <li>• Discussion on how to manage the progress of the plan</li> </ul>
	WS7	5 Aug. 2019	10	<ul style="list-style-type: none"> <li>• Final confirmation for planning documentation</li> </ul>
Umnugovi Aimag	WS1	16, 17 May 2018	17	<ul style="list-style-type: none"> <li>• Introduction of GL</li> <li>• Check on existing data</li> <li>• Simple earthquake risk assessment</li> </ul>
	WS2	28 Sep. 2018	13	<ul style="list-style-type: none"> <li>• Establishment of task force group</li> <li>• Determination of planning schedule</li> <li>• Setting disaster scenario</li> <li>• Determination of risk reduction objective</li> </ul>
	WS3	28, 29 Nov. 2018	25	<ul style="list-style-type: none"> <li>• Set the risk reduction targets (10 years) of the current disaster scenario</li> <li>• Extraction of problems facing the risk reduction target</li> <li>• Enumeration of measures to solve the problem</li> </ul>
	WS4	18 Feb. 2019	23	<ul style="list-style-type: none"> <li>• Enumeration of measures to resolve issues (continued)</li> <li>• Designation of major response agencies</li> <li>• Setting of implementation time, period of measure</li> </ul>
	WS5	30 May 2019	20	<ul style="list-style-type: none"> <li>• Judgment of priority of measure</li> <li>• Calculation of estimated operating</li> </ul>

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				expenses
	WS6	12 Aug. 2019	10	<ul style="list-style-type: none"> <li>• Making basic policy on disaster risk reduction measures in each field</li> <li>• Determination of budget acquisition strategy</li> <li>• Discussion on how to manage the progress of the plan</li> </ul>
	WS7	12Aug. 2019		<ul style="list-style-type: none"> <li>• Final confirmation for planning documentation</li> </ul>
Bayangol District	Joint WS1	28, 29 Aug. 2018	8	<ul style="list-style-type: none"> <li>• Introduction of GL</li> <li>• Check on existing data</li> <li>• Setting disaster scenario</li> <li>• Extraction of priority items</li> </ul>
Chingeltei District			8	
Bayangol District	Joint WS2	31 Jan. 2019	8	<ul style="list-style-type: none"> <li>• Set the risk reduction targets (10 years) of the current disaster scenario</li> <li>• Extraction of problems facing the risk reduction target</li> <li>• Enumeration of measures to solve the problem</li> </ul>
Chingeltei District			8	
Bayangol District			2	<ul style="list-style-type: none"> <li>• Enumeration of measures to resolve issues (continued)</li> </ul>
Chingeltei District	Joint WS3	9 May 2019	7	<ul style="list-style-type: none"> <li>• Designation of major response agencies</li> <li>• Setting of implementation time, period of measure</li> </ul>
Bayangol District	WS4	30 Aug. 2019	15	<ul style="list-style-type: none"> <li>• Designation of major response agencies</li> <li>• Setting of implementation time, period of measure</li> <li>• Judgment of priority of measure</li> <li>• Calculation of estimated operating expenses</li> </ul>
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**

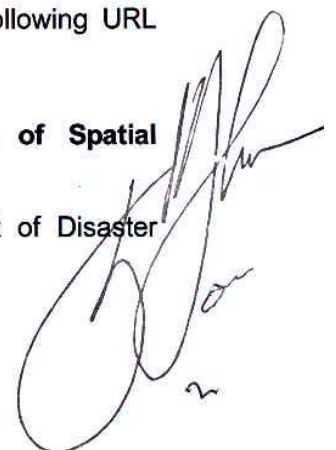
NEMA is responsible for improving the database for disaster related data under the Article 14 "Creating a Disaster Database" of the amended Law of Disaster Protection. From the point of views of carrying out the NEMA's duty in the Law and contributing to the priority actions in "Sendai Framework for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

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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) was 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.

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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 themselves.



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</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>
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<p>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>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>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> <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"> <li>• Establishment of a white paper preparation working group</li> <li>• Discussion of composition and contents</li> <li>• Determination of collection sources</li> <li>• Collection of materials</li> <li>• Arrangement of collected materials</li> <li>• Preparation of manuscripts</li> <li>• Editing of manuscripts</li> <li>• Instruction and management of English translation</li> <li>• Management of editing by a printing company, etc.</li> </ul> |
|--|

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.

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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

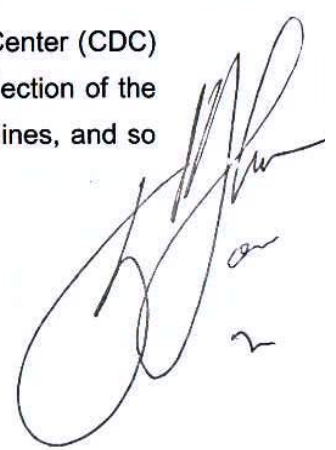
WG2 members investigated the current standards and regulations regarding the evaluation of buildings to identify the issues and to examine the countermeasures. It was noted that current documents were regarding the evaluation of deterioration and/or aging. Therefore, WG2 decided that the issues and countermeasures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

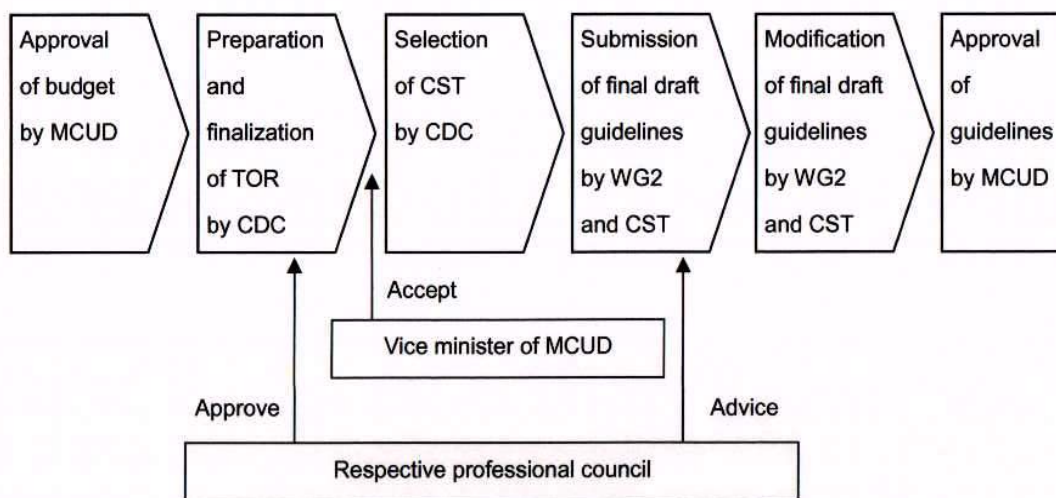
WG2 members also discussed the seismic evaluation of infrastructure and lifeline structures with the personnel of relevant organizations. In the discussions it was pointed out that regular replacement of structures is urgently needed since many of the structures are aged and have deteriorated. So WG2 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.

A large, stylized handwritten signature in black ink is located in the bottom right corner of the page. Below the main signature, there are several smaller, less distinct handwritten marks or initials.



**Figure II.1.5 Procedure to prepare guidelines**

On Nov. 6<sup>th</sup>, 2018, the GLs for buildings were approved by No.185 Ministerial Order of MCUD. And on Dec. 28<sup>th</sup>, 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 4<sup>th</sup> to 6<sup>th</sup>, 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 7<sup>th</sup>, 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. 12<sup>th</sup> to 13<sup>th</sup>, 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