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## **DISASTER EDUCATION AND WAYS TO REDUCE SOCIAL AND PSYCHOLOGICAL VULNERABILITY TO DISASTER**

The White Paper argued that citizens and companies still lack sufficient knowledge on disaster preparedness, including ways to address disaster risks based on their own initiatives. Thus, intangible measures, such as disaster management education and response exercises, are deemed equally important as tangible ones, such as strengthening of infrastructures for disaster prevention and mitigation, in enhancing disaster awareness and preparedness in everyday life. Intangible measures, in particular, lead to raising of awareness of “self-help,” which means one’s own life must be protected by oneself.

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Education is the key to development. When we talk about mainstreaming disaster risk reduction into development practices, much has been discussed on how to bring this to national and local development plans and policies. While development plans are important to disaster risk reduction, real mainstreaming begins with education. Disaster reduction is ultimately linked to human behavior.  
Rajib Shaw Kyoto University

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## Introduction

Most people in Armenia live in areas of threat from natural disaster, whether it be from bushfires, floods, severe storms, droughts, cyclones or earthquakes. Pamphlets and brochures available from local council offices, emergency services and community groups provide helpful information on how to be prepared and what to do in an emergency situation to protect lives, home and property.

As well as information on physical and practical preparation, it is very helpful for people to know how to prepare psychologically before a natural disaster and how to cope emotionally during or after a disaster. Knowing ahead of time how a disaster situation might be experienced can help to decrease people's anxiety levels and overall psychological responses. Being psychologically prepared when a disaster is threatening can help people feel more confident, more in control and better able to make effective emergency plans. It can also help to reduce the psychological distress and longer-term mental health problems that can result from the trauma of being involved in disasters.

Of course, the first and vitally important part of psychological preparation for an emergency situation is to be physically prepared with a practiced emergency plan. Making all the necessary physical preparations and having a household emergency plan that is well known and practiced by everyone will increase the sense of being in control when the emergency begins.

This study outlines the importance of being psychologically prepared and provides the steps to take for psychological preparation when a natural disaster is threatening.

**Background and significance:** Both Japan and Armenia are disaster-prone countries. Several times both Japan and Armenia hit by the great disasters such as earthquakes, landslides, floods, etc. As Armenia lies in one of the most seismically active regions of the world, the earthquakes have affected large numbers of people and caused significant economic losses.

The Government of RA recognizes the threats to the country's development posed by natural hazards. Since 1991 it has worked to address DRR and to increase disaster response and recovery capacities for the sustainable development of the country.

Survey for Seismic Protection of MES RA develops various means for earthquake disaster management:

- coordinates activities performed in the field of seismic risk reduction in the territory of the RA;
- organizes preparedness and training of the population to cope with strong earthquakes;
- raising population knowledge and preparedness;
- training of trainers in government bodies and local authorities;
- organization of relief and rehabilitation of population and sustainable recovery.

This study seek answers to the following questions:

What is the Disaster Education system in Japan and Armenia?

- Government Institutions;

- Educational/Learning Institutions

Which methodologies are more effective for different social groups of population for disaster education?

*Within the frames of my research program I want to use up-to-date international and Japanese methods and experience for the development of population preparedness to disaster and make visible psychological elements accounting for social and psychological vulnerability to disaster, intending to develop ways for its reduction.*

**Specific aims:** The aim of this research is to investigate and compare the international and Japanese experience in “disaster education and ways to reduce social and psychological vulnerability to disaster,,.

The peculiarities of social and psychological adaptation mechanisms of an Individual:

- The efficient behavioral model of population in disaster.
- The process of the reduction of social and psychological vulnerability of population to disasters largely depends on the comprehensive interrelation of psychological qualities.
- Stress resistance, nervous and mental stability, anxiety and disadaptation risk are important constituents contributing to Individual’s psychological preparation.

**Proposed research activities:** Development of disaster education and ways to reduce social and psychological vulnerability to disaster awareness as a part of disaster risk reduction (DRR). To identify the Strategies of disaster education and ways to reduce social and psychological vulnerability to disaster.

To carry out the purpose of the research, the following research questions will be addressed:

- What kind of disaster education methodology is conducted in Japan and Armenia?
- What is the good example of the disaster preparedness that can promote the psychosocial well – being of the community?

**Required information and potential resources:** The required data and information for disaster education and ways to reduce social and psychological vulnerability to disaster obtained from relevant institutions and organizations. Research methodology:

- Arrival and observation in the visited places and institutions related to disaster education
- Attending the activities related to some Disaster Education Issues.
- Literature Study / Documents analysis; Review related literature on the psychosocial aspects of the disaster education.

**Expected results:** The results of research will give me more new ideas and allow to learn new methods which will help me to improve my knowledge in the field of public education and stimulate for new approaches. People working in emergency situations and those who investigate their core problems will benefit from the results of the research.

I hope the results of my research will be an important component for Seismic Risk Reduction and will allow me to use new approaches and methodologies in the field of disaster education and ways to reduce social and psychological vulnerability to disaster, which is very important for my Safe and Happy Armenia.

# DISASTER IN ARMENIA AND JAPAN

## General information of Republic of Armenia

Armenia and Japan are highly vulnerable to a variety of natural hazards including earthquakes, floods, landslides and others because of their geographic location.

Armenia is considered as a high-risk country, prone to disasters such as earthquakes, landslides, hailstorms, droughts, floods, etc. It is at high risk of natural hazards, owing to high levels of exposure and vulnerability.

Risks associated with geophysical hazards are significant. The landslide hazard zone covers one-third of the country, primarily in foothill and mountain areas. As Armenia lies in one of the most seismically active regions of the world, the earthquakes have affected large numbers of people and caused significant economic losses.

### Geographical information



**Territory**

29.74 thousand square km (is comparable with the territory of Belgium or Albania)

**Neighboring countries**

north- Georgia; South–Iran; East-Azerbaijan  
south-west - Nakhichevan (Azerbaijan)  
west - Turkey

**Average elevation above sea level**

1800 m

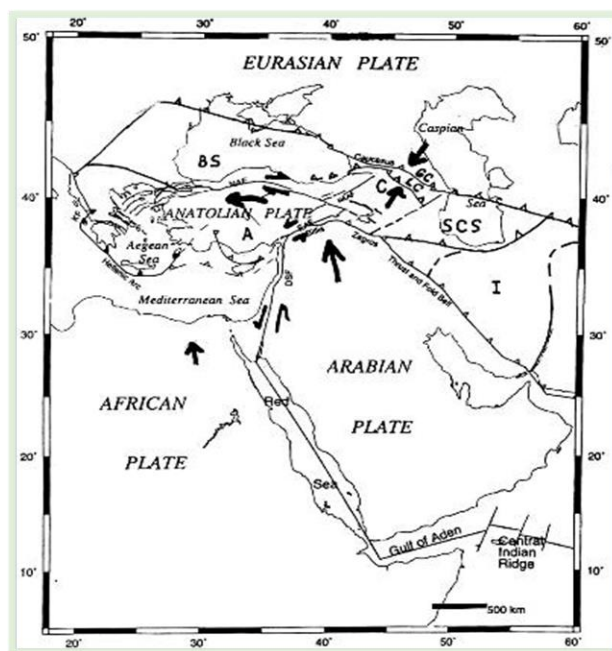
<b>The highest peak</b>	Aragats mountain - 4090 m
<b>The lowest altitude</b>	Debed river canyon - 380 m
<b>The greatest extent</b>	365 km
<b>Time zone</b>	Greenwich mean time + 4 hours
<b>Region</b>	north latitudes of subtropics
<b>Climate</b>	dry, continental
<b>Average temperature</b>	in January - $-6.8^{\circ}\text{C}$ , in July - $+20.8^{\circ}\text{C}$
<b>Population</b>	3.2 Million, population of the capital - 1.1
Million	
<b>Ethnic breakdown</b>	Armenians (98%), Russians, Yezidis, Kurds, Assyrians, Greeks, Ukrainians, Jews and representatives of other nationalities
<b>Religion</b>	Christianity (Armenian Apostolic Church), professed by the vast majority of the population

### Natural Hazards

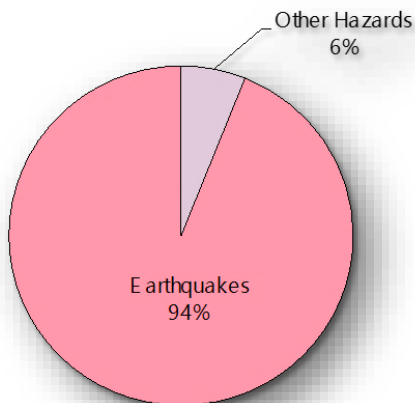
#### Natural Hazards likely to affect the country

Armenia is one of the most disaster prone countries in the world (except the sea disasters), but In Armenia the earthquake disaster is the most harmful for people and property.

Seismic events in the territory of Armenia are determined by its position in the collision zone of the Arabian and Eurasian plates.



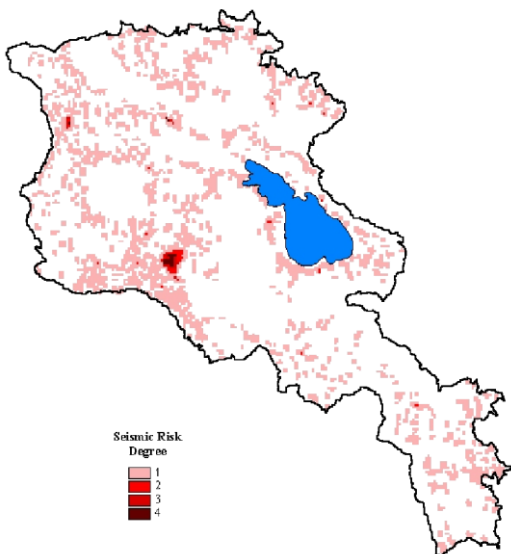
Major risks of natural disasters in Armenia:



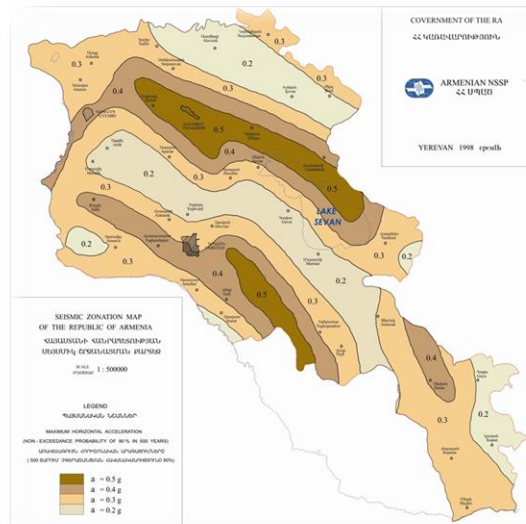
- Earthquakes – 94%**
- Landslides - 3.15%**
- Rockfalls - 1.2%**
- Floods - 0.15%**
- Road accidents - 1.5%**

The most devastating impact is caused by the earthquakes.

Seismic risk map of RA



Seismic hazard map of RA





## **Devastating Spitak Earthquake of December 7, 1988, M=6.9**

It took place on December 7  
Force in the epicenter is 10 points  
The death toll was 25,000  
Various injuries were reported  
20,000 people  
514 thousand people were homeless  
Earthquake hit 40% of Armenia's territory  
There were 21 towns and 342 villages in  
the region



### **Spitak (1988) Destructive Earthquake**

December 7, 1988 at 7.41.22.7 GMT (11.41.22.7 local time). The epicenter by the records of seismographs has the following coordinates: latitude 40.92°N, longitude 44.23°E. The depth of the hypocenter, measured by various methods and means, varies from 2.5km to 10-15km. It is natural as the earthquake source as a spatial. The magnitude of the earthquake was 7.0. The intensity at the epicenter was 10 value on MSK-64 intensity scale.

The earthquake hit 40 % of the territory of Armenia, densely populated region with 1 ml people. The affected area, where the intensity of the earthquake was  $\geq 8$ , involved 30002 km area. 21 towns and 342 villages were destroyed, 514 000 people were left without shelter, 20 000 people were injured and 12 500 people were hospitalized. Number of victims was about 25 000. Particularly in Gyumri (15 000-17 000) and in Spitak (4 000) number of victims was more than anywhere else. 17% funds of dwellings were destroyed, the work of 170 industrial companies were halted, the great losses were caused to villages and agro industrial complexes as well as to the architectural, historical and cultural monuments, 917 public buildings were destroyed.



## GYUMRI



The rescue activities were systemized only two or three days later. From the first second the earthquake strike, the population carried out restless rescuing works. Anyhow the absence of their experience and sometimes the lack of basic knowledge on actions in emergency caused real difficulties for the efficiency of rescue operations. Even there were cases when the public unawareness brought to life losses. Also there was a need of rescue equipment. With the efforts of population and the rescuers 45.000 dead or alive people were brought out from the rubble and 12.5000 people were hospitalized.

Recent Major Disaster was Spitak earthquake in 1988. We need to have high level of readiness in case of any disaster.

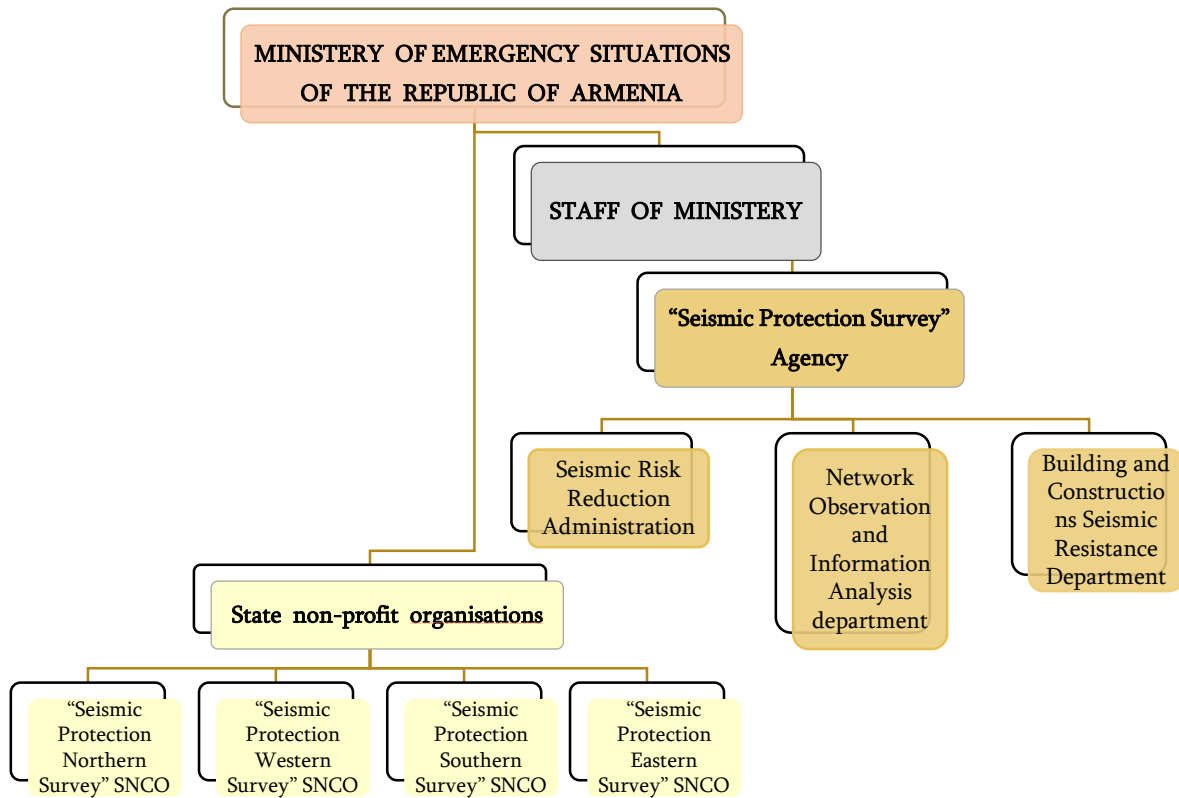
The main reasons of the losses:

1. Underestimated seismic hazard
2. Structures design and construction errors
3. Wrong behavior of the population
4. Governmental bodies weren't able to organize the rescue works in time.

### **Survey for Seismic Protection (Armenian SSP) at the Ministry of Emergency Situations of the Republic of Armenia (MES of RA)**

MES of RA is a republican body of executive authority, which in line with such competences as are vested in it by laws and other legal acts, develops, implements and coordinates RA government's policy in the area of civil defense and protection of the population in emergency situations.

## MINISTRY OF EMERGENCY SITUATIONS OF ARMENIA



The 1988 Spitak Destructive Earthquake reveals that there is no seismic protection system at all and the Government RA and people were helpless to withstand the disaster.

First, Armenian SSP was founded in 1991 with the aim to organize population as well as buildings and structures seismic protection. It takes various measures for earthquake disaster management.

SSP's main goal is seismic risk reduction in Armenia, the population residence hazard mitigation and the state economic and social loss reduction results from earthquake. It has developed two long-term Strategic National Programs on seismic risk reduction in Armenia and in Yerevan city. Today SSP is not only a national but also a keystone international center.

### **The main objectives and the aims of Armenian SSP are as follows:**

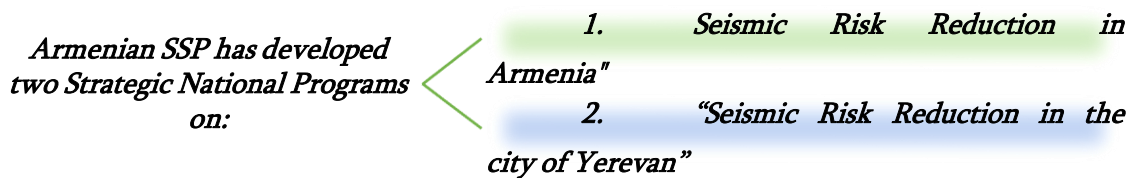
- provision of seismic hazard monitoring in the territory of Armenia
- assessment of the seismic hazard and seismic risk of the territories
- seismic risk reduction
- assessment of the levels of caused seismicity
- assessment of other secondary hazards connected with the seismic hazard.

### **The Legal Authority in Seismic Risk Reduction**

Seismic Protection activities are regulated by a number of laws and legislative acts and National programs of the Republic of Armenia:

Resolutions of Government	<i>The complex program of seismic risk reduction in the RA territory (1999).</i>
	<i>The complex program of seismic risk reduction in Yerevan city (1999).</i>
	<i>The resolution of the Government of RA on establishment of the list of critically important and general facilities in the field of seismic protection (2003).</i>
Low of	<i>The low of the Republic of Armenia on seismic protection (2002).</i>
Regulat	<i>"National Survey For Seismic Protection" Agency (2008).</i>

**The basic goal of SSP is Seismic Risk Reduction in Armenia:**



The Programs, adopted by the Government of the Republic of Armenia on the 10<sup>th</sup> and 7<sup>th</sup> of July in 1999 are designed for 30 years. All the Ministries and other Governmental, non-Governmental and private organizations will implement these National Programs under the general co-ordination of Armenian SSP assigned by the Government as a responsible body for the Seismic Risk Reduction Strategy development and implementation.

## General information of Japan

Japan is vulnerable to various natural disasters deriving from its geographical, topographical, and meteorological conditions. It is located on the circum-Pacific mobile belt, a region where volcanos are active and the earth's crust is moving at geographically rapid rate causing frequent earthquakes. Although it covers only 0.25% of the world's land area, the occurrence of an earthquake and the number of distribution of active volcanos in the country are extremely high. The March 2011 earthquake off the Pacific coast of Tohoku was a magnitude of 9.0, the highest ever recorded in Japan. Seismic intensity of 7 was observed in Miyagi Prefecture and strong shake in most areas in the eastern part of Japan. This earthquake caused a huge tsunami resulting in the immense and wide-area damage around the Pacific coast of the eastern part of Japan. For the first time in Japan, in the Kumamoto Earthquake that occurred in April 2016, a series of magnitude-7 earthquakes struck the same area twice. This earthquake caused a tremendous damage, including loss of lives and the destruction of about 160,000 houses. Other kinds of natural disasters also result in loss of lives and properties every year because of Japan's unique characteristics. Examples of these are the tornado disasters in Ibaragi and Tochigi Prefectures in September 2012 and Saitama Prefecture in September 2013, a large-scale sediment disaster triggered by the heavy rain in Hiroshima Prefecture in August 2014, and the Mount On take eruption in September 2014, which is thus far the worst volcanic eruption after the war. Japan has taken measures against these major natural disasters. For example, the disaster prevention and mitigation measures for the immense and wide-area damage following the Nankai Trough Earthquake or any earthquake that hits Tokyo area directly were planned in cooperation with the central and local governments and research institutions.

### Geographical information



**Geographic coordinates:** 36 00 N, 138 00 E

**Map references:** Asia

**Area:** total: 377,835 sq km land: 374,744 sq km water: 3,091 sq km note: includes Bonin Islands (Ogasawara-gunto), Daito-shoto, Minami-jima, Okino-tori-shima, Ryukyu Islands (Nansei-shoto), and Volcano Islands (Kazan-retto)

**Area – comparative:** slightly smaller than California

**Land boundaries:** 0 k

**Coastline:** 29,751 km

**Climate:** varies from tropical in south to cool temperate in north

**Terrain:** mostly rugged and mountainous

**Elevation extremes:** lowest point: Hachiro-gata -4 m highest point: Mount Fuji 3,776 m

**Natural resources:** negligible mineral resources, fish the largest consumers of fish and tropical timber, contributing to the depletion of these resources in Asia and elsewhere

**Environment - international agreements:** party to: Antarctic-Environmental Protocol, Antarctic-Marine Living Resources, Antarctic Seals, Antarctic Treaty, Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Law of the Sea, Marine Dumping, Ozone Layer Protection, Ship Pollution Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling

**Geography - note:** strategic location in northeast Asia

**Time zone:** JST (UTC+9) /Summer (DST) not observed (UTC+9)

**Natural hazards:** many dormant and some active volcanoes; about 1,500 seismic occurrences (mostly tremors) every year; tsunamis; typhoons

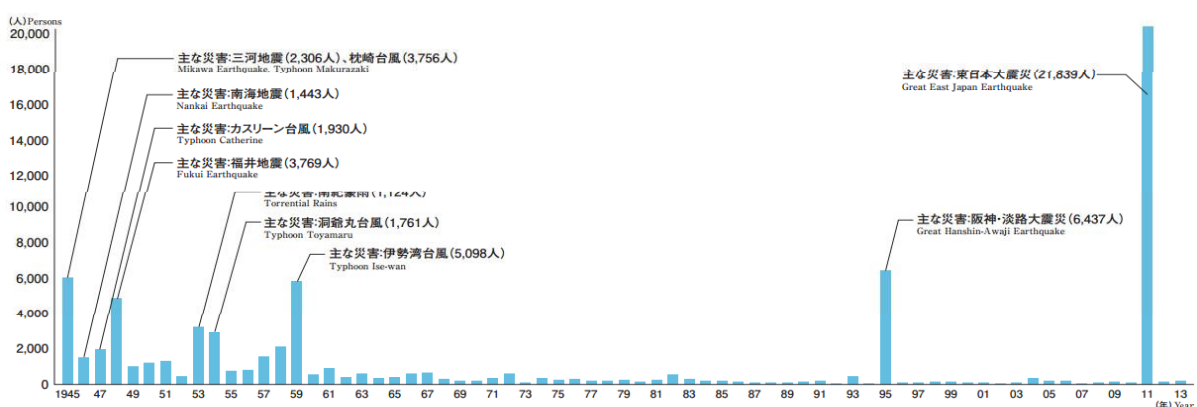
**Environment - current issues:** air pollution from power plant emissions results in acid rain; acidification of lakes and reservoirs degrading water quality and threatening aquatic life; Japan is one of

## Natural Hazards

### Natural Hazards likely to affect the country

Japan is located in the Circum-Pacific Mobile Belt, the number of earthquakes and active volcanoes is quite high, and because of geographical, topographical and meteorological conditions, the country is subject to frequent natural disasters such as typhoons, torrential rains and heavy snowfalls, as well as earthquakes and tsunami.

### 自然災害による死者・行方不明者数の推移 The Number of Deaths and Missing Persons Caused by Natural Disasters



出典：防災白書 Source: White Paper on Disaster Management ※阪神・淡路大震災及び東日本大震災については、震災関連死を含む

Every year there is a great loss of people's lives and properties in Japan due to natural disasters. Until the second half of 1950s, largescale typhoons with earthquakes caused extensive damage and thousands of casualties. Thereafter, with the progress of society's capabilities to respond to disasters and mitigate vulnerabilities to disasters by developing disaster management systems, promoting national land conservation, improving weather forecasting technologies, and upgrading disaster information communications systems.

Japan has suffered enormous damages due to repeated mega disasters since ancient times, at present the country is considered to be leader in disaster management because it has increased its resilience every time a large-scale disaster is experienced.

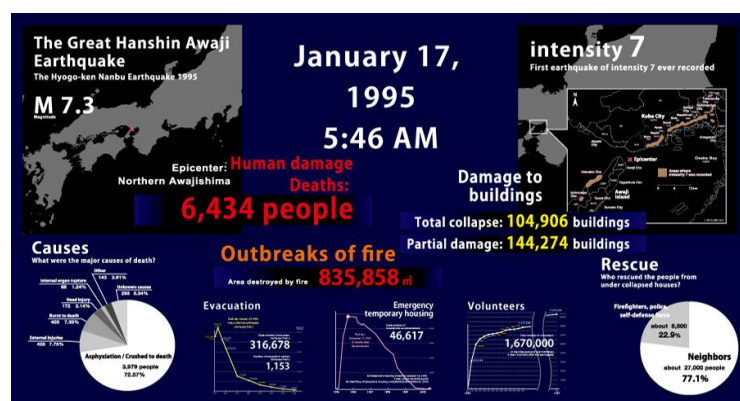
### The event that changed the course of local history

Japan is one of the countries most affected by natural disasters. Two out of the five most expensive natural disasters in recent history have occurred in Japan, costing \$181 billion in the years 2011 and 1995 only.

Japan has also been the site of some of the 10 worst natural disasters of the 21st century. The types of natural disasters in Japan include tsunamis, floods, typhoons, earthquakes and volcanic eruptions. The country has gone through many years of natural disasters, affecting its economy, development, and social life. The Great Hanshin earthquake or Kobe earthquake, occurred on January 17, 1995, Kobe, Osaka and the surrounding area were rocked by a massive earthquake. Sitting directly over the epicenter, the area, home to some 3.5 million people and one of Japan's economic powerhouses, was devastated. Electricity, water, gas, and public transport. All lifeline services were knocked out, and innumerable homes were destroyed, either by the quake or, because they were mostly old wooden structures, in the resulting fire. Huge numbers of people faced a long cold winter in temporary shelters.

**6,434 people dead, 43,792 injured, 249,180 homes completely or partially destroyed.**

**This was Japan's worst earthquake in the 20th century after the Great Kantō earthquake in 1923, which claimed more than 105,000 lives.**





### **The great Tohoku Earthquake and Tsunami (2011)**

2011 earthquake off the Pacific coast of Tohoku was a magnitude 9.0 (Mw) under sea megathrust earthquake off the coast of Japan that occurred at 14:46 JST (05:46UTC) on Friday 11 March 2011, with the epicentre approximately 70 kilometres (43 mi) east of the Oshika Peninsula of Tōhoku and the hypocentre at an underwater depth of approximately 30 km (19 mi). The earthquake is also often referred to in Japan as the Great East Japan earthquake and also known as the 2011 Tohoku earthquake. It was the most powerful earthquake ever recorded to have hit Japan, and the fourth most powerful earthquake in the world since modern record-keeping began in 1900. The earthquake triggered powerful tsunami waves that reached heights of up to 40.5 metres (133 ft) in Miyako in Tōhoku's Iwate Prefecture, and which, in the Sendai area, travelled up to 10 km (6 mi) inland. The earthquake moved Honshu (the main island of Japan) 2.4 m (8 ft) east, shifted the Earth on its axis by estimates of between 10 cm (4 in) and 25 cm (10 in), and generated infrasound waves detected in perturbations of the low-orbiting GOCE satellite.



On 10 March 2015, a Japanese National Police Agency report confirmed 15,894 deaths, 6,152 injured, and 2,562 people missing across twenty prefectures, as well as 228,863 people living away from their home in either temporary housing or due to permanent relocation. A 10 February 2014 agency report listed 127,290 buildings totally collapsed, with a further 272,788 buildings "half collapsed", and another 747,989 buildings partially damaged. The earthquake and tsunami also caused



extensive and severe structural damage in north-eastern Japan, including heavy damage to roads and railways as well as fires in many areas, and a dam collapse. Japanese Prime Minister Naoto Kan said, "In the 65 years after the end of World War II, this is the toughest and the most difficult crisis for Japan." The tsunami caused nuclear accidents, primarily the level 7 meltdowns at three reactors in the Fukushima Daiichi Nuclear Power Plant complex, and the associated evacuation zones affecting hundreds of thousands of residents. Many electrical generators were taken down, and at least three nuclear reactors suffered explosions due to hydrogen gas that had built up within their outer containment buildings after cooling system failure resulting from the loss of electrical power. Residents within a 20 km (12 mi) radius of the Fukushima Daiichi Nuclear Power Plant and a 10 km (6.2 mi) radius of the Fukushima Daini Nuclear Power Plant were evacuated.

## **Disaster Management**

### **Mission of the Cabinet Office**

Japan's legislation for disaster management system, including the Disaster Countermeasures Basic Act, addresses all of the disaster phases of prevention, mitigation and preparedness, emergency response as well as recovery and reconstruction with roles and responsibilities among the national and local governments clearly defined, it is stipulated that the relevant entities of the public and private sectors are to cooperate in implementing various disaster countermeasures. Along with a series of reforms of the central government system in 2001, the post of Minister of State for Disaster Management was newly established to integrate and coordinate disaster risk management policies and measures of ministries and agencies. In the Cabinet Office, which is responsible for securing cooperation and collaboration among related government organizations in wide-ranging issues, the Director-General for Disaster Management is mandated to undertake the planning of basic disaster management policies and response to large-scale disasters, as well as conduct overall coordination.



### **Basic Disaster Management Plan**

The Basic Disaster Management Plan is a comprehensive and long term disaster management plan forming a foundation for the Disaster Management Operations Plan and Local Disaster Management Plan. It stipulates provisions for the establishment of the disaster management system, promotion of disaster management measures, acceleration of post disaster recovery and reconstruction measures, and promotion of scientific and technological research on disaster management. The plan was revised entirely in 1995 based on the experiences of the Great Hanshin-Awaji Earthquake. It defines responsibilities of each entity such as the national and local governments, public corporations and other entities. It consists of various plans for each type of disaster, where specific countermeasures to be taken by each entity are described according to the disaster management phases of prevention and preparedness, emergency response, as well as recovery and reconstruction.

<b>Law Development after Mega-Disasters</b>	
<b>Disaster</b>	<b>Law</b>
1923 Kanto Earthquake ( ) 105,385 lost: 90% by fire	1923 Special Law on Urban Planning
1946 Nankai Earthquake, 1,330 lost	1947 Disaster Relief Law
1956 Isewan Typhoon (5,098 lost, 38,921 injured)	1961 Basic Law on Disaster Countermeasures
1995 Hanshin Awaji Earthquake (6434 lost, 43,792 injured)	1998 Law on Support for Life Reconstruction
2011 East Japan Earthquake (15,894 lost, 6152 injured)	2013 Law on Recovery from Mega-Disasters

## **DISASTER EDUCATION IN ARMENIA AND JAPAN**

One of the ways of disaster mitigation, is disaster education. Armenia is considered a developing country, persistently in need of up-to-date world expertise in any scientific area which is likely to contribute to its sustainable development.

The state training system includes the following subsystems, which are done regularly:

- Training of target groups beginning from kindergartens and schools
- Educational programs, methodical manuals, relevant interactive materials
- TV and radio programs, publications in mass media
- Social-psychological preparedness.

Armenia collaborating with ADRC (since 2000) and JICA (since 2007) in the frame of various projects and programs implements the research, education and training for the DRR specialists who acquired and shared valuable Japanese experience.

### **Disaster Education For Different Age Groups of Population as a Part of Disaster Risk Reduction in Armenia**

Earthquake and other natural hazards threatening Armenia urge the need of development and strengthening of DRR system in Armenia. This process implies involvement of all the potential of the country, which can be achieved through elaboration of Disaster Risk Reduction National Platform (DRR NP). DRR system is a framework of functions and processes with the aim to reduce population's vulnerability to disaster risks. It is aimed at prevention or reduction of negative impacts of hazards and contributes to sustainable development of the society. Fund for DRR NP was established in 2010. The Head of the Board is Ministry of Emergency Situation of RA. The goal of the DRR NP is to establish a multi-spectral mechanism with involvement of all stakeholders.

### **Current Situation of the Training and Disaster Education in Armenia**

In Armenia various governmental and other organizations have been involved in DRM Education, within the framework of the HFA. MES of RA is an executive authority, which in line with competences vested by laws and other legal acts, develops, implements and coordinates RA government's policy in the area of civil defense and protection of the population in emergency situations.

The ARNAP Foundation (Disaster Risk Reduction National Platform), Crisis Management Center (CMC) and Crisis Management State Academy (CMSA) have been established for dealing with various aspects of Disaster Risk Reduction.

### **Survey for Seismic Protection of MES RA (Armenian SSP) develops various means for earthquake disaster management:**

- Develops the basic directions of state policy in the field of seismic protection  
Provides seismic risk assessment
- Coordinates activities performed in the field of seismic risk reduction in the territory of the RA

- Organizes preparedness and training of the population to cope with strong earthquakes
- Coordinates and controls the execution of the state programs in the field of seismic risk.

**Basic tasks of seismic risk reduction are:**

- reduction of territories vulnerability
  - raising population knowledge and preparedness
  - training of trainers in government bodies and local authorities
  - creation of earthquake early warning system
  - ensuring medical preparedness
  - organization of relief and rehabilitation of population and sustainable recovery
- The raise of knowledge and preparedness of population is provided by means

of state training system.

The state training system includes the following subsystems, which are done regularly:

- training of target groups beginning from kindergartens and schools
- educational programs, methodical manuals, relevant interactive materials
- TV and radio programs, publications in mass media
- social-psychological preparedness.

The state training system ensures the reliability and availability of the given information. The stage of recovery of a zone suffered from strong earthquake is the intermediate between the stages of an emergency seismic situation and reconstruction. The duration and the strategy of recovery stage defined by the Government RA.

The one of the main principles of the accomplishment of recovery works is based on the creation of the conditions for population active participation in recovery works in the disaster zone.

The purpose of aid rendering to the population and its rehabilitation is the reduction of material and psychological losses of the state after an earthquake.

**Rendering of aid to the population and its rehabilitation are based on the following principles:**

- Preliminary planning of works amount on rendering aid and rehabilitation before the catastrophe and their adjustment right after the catastrophe
- Active participation of government bodies and local authorities and society.

**The Centre of Activities with Population (CAP) of SSP:**

The Centre of Activities with Population of Survey for Seismic Protection (CAP SSP) consists of Departments of Education, Methodology, as well as of Sociology and Psychology. The Department of Education implements trainings on code of conduct of seismic protection in schools of Yerevan and regions of Armenia according to an established schedule. It carries out instructional warning/alarm drills and exercises for schoolchildren of different age groups. It also conducts lectures for the regional areas officials of SSP. The Department of Methodology performs development of

educational programs on earthquakes for different segments of the population. The department implements development of different methodical materials and manuals to provide various segments of population with necessary knowledge and skills on earthquake code of conduct. Didactic materials are developed taking into account the psycho-physiological peculiarities of the age groups.



## Disaster education at the schools



Ministry of Science and Education together with the Ministry of Emergency Situations in the frame disaster risk reduction program will submit to National Assembly proposals and additions for the Law “On Public Education” aiming at inclusion disaster risk reduction elements in the school curricula.

To implement the complex seismic risk reduction measures provided by the Comprehensive Program for Seismic Risk Reduction in Yerevan, developed and approved by the normative acts regulating seismic risk reduction activities in the territory of Yerevan

- ❑ Decree N 136-N of February 9, 2012 "On Making Changes to Government Decision No. 392 of 7 June 1999 of the Government of the Republic of Armenia“
- ❑ Government Resolution N 140 of 16 February 2012 on “Approving Pilot Program on Training of Impacts and Behavioral Impacts in Strong Earthquakes in Public Schools, Hospitals and Other Medical Institutions in Yerevan City”

Disaster education at the University, companies and municipalities,



**ADRC-Armenia Cooperative Project  
Training at the orphanages and nursing homes**

**Reaching the Most Vulnerable-Orphans and Seniors Inclusive Earthquake  
Safety in the Capital City of Yerevan and District of Ararat, Armenia**

There are 380 children and 175 staff, including guardians, mentors, nurses and technical workers, at the target Yerevan Mari Izmirlian and Kharberd (Ararat district) state orphanages.

There are 540 seniors and 275 staff, including psychologists, nurses and technical workers at Yerevan # 1 and Nork nursing homes.

Out of Plan training including lecturing and Q&A module has been provided to the staff (109 persons) and residents (up to 6 year old 61 children) of Kid's Home

which located in the Nork borough of the Yerevan-city. Thus, the Project has included all the orphanages of the city of Yerevan.

### **Earthquake protective measures and behavior rules for people with special needs and their mentors and nurses**

1. *How people with special needs (blind, dumb and deaf ones) get informed about disaster/emergency.*
2. *How the disaster/emergency does affect those people's environment.*
3. *Are those people aware of disaster/emergency peculiar to the region.*
4. *Which are the protective measures for people with special needs before disaster, during disaster and after disaster.*

### **Earthquake protection rules**

- ***Before earthquake***

- **For mentors and guardians:**

- **For people with special needs:**

*Do remember or write down and keep stand-by the phone numbers of your doctor, mentor and nurse.*

*If you have speech difficulties keep paper and pen.*

*In case of short vision teach your dog the shortest and secure exit.*

***b. During earthquake***

***c. After earthquake***

### **3. Specific features of proposed methodology**

*The methodology has the following features:*

- *selected instructions are brief,*
- *relevant emphasis is done,*
- *do not include excess information,*
- *streamlining to people who are able to act on themselves,*

*Peculiar features of methodology are:*

- *stage by stage approach when training is followed by the alert drills,*
- *periodicity of training, it is desirable to repeat it several times a year.*

### **“Earthquake Protection Behavior Rules:**

#### **Paint yourself 5+” brochure for little ones**

The specialists of SSP centers including Project participants taking into consideration the acquiring capacities of different age groups of children have developed the behavior rules for junior, middle and senior students.

The following coloring books were compiled:

<<Paint Yourself>> - for 3-4 age children.

- <<9 Planets of Solar System>> - for 4-7 age children.

- <<Secrets of Planet Earth>> - for junior school students.

- <<Tsunami Josef and Earthquake Moses>> - for 4-7 age children.

- <<Strange behavior of the Animals>> - for 5-9 age children.



- <<Earthquake Protection Rules>> - for 5-9 age children.
- <<Covenant of the Planet>> - for 3-8 age children.
- <<Game>> - for Junior school children.



<< Earthquake Protection Rules: Paint Yourself 5+>> brochure (cover)

How to Get Ready for Earthquake

The coloring book <<Earthquake Protection Rules: Paint Yourself 5+>> for 5-9 age children has recently been published in 1500 copies and shared with the stakeholders.

### **Training at the Yerevan “Kids’ Home” state orphanage**



## Training at the Yerevan Nork state nursing home



### Frequently asked questions on Earthquake

- *Do Earthquakes reoccur? Is the frequently occurred earthquake good or bad?*
- *Is there recurrence period for the major earthquakes in Armenia?*
- *Can we predict major earthquake?*
- *What are the magnitude and intensity of the would-be strongest earthquake in Armenia?*
- *Can animals predict earthquakes?*
- *Has the earthquake hazard level rightly assessed for the territory of Armenia?*
- *What does cause earthquake in Armenia?*
- *Could the Armenian Nuclear power plant withstand major earthquake?*
- *Has Spitak 1988 Earthquake had natural or man-made origin?*
- *In case of major earthquake what kind of destruction could be expected in Yerevan-city and vicinity?*
- *Could multi-story buildings be constructed in Yerevan?*
- *How the settlements in Armenia are protected from negative consequences of major earthquake?*
- *What do cause the massive destructions in case of major earthquake in Armenia?*
- *How we can ensure the seismic resistance of new apartment buildings?*
- *What is the priority for seismic safety of the country?*
- *Can I return home after the major earthquake?*
- *What shall I do while shaking is starting and which is most secure place in home?*

### Main Outcomes /preliminary/

Within the Project “**Reaching the Most Vulnerable-Orphans and Seniors Inclusive Earthquake Safety in the Capital City of Yerevan and District of Ararat, Armenia**” the following activities have been carried out:

- international experience on inclusive seismic protection behavior rules of Japan, the USA, Germany, Greece, Uzbekistan, China etc. has been studied and acquired, and

familiarized in Armenia. The specialists involved in the Project are permanently participating at the Workshops and Seminars organized by the various international organizations, Survey for Seismic Protection and Ministry of Emergency Situations of the Republic of Armenia,

- earthquake protection behavior rules for people with special needs including orphans and seniors and their guardians, mentors and nurses have been developed at the SSP of MES RA. The guidance “Earthquake Protection Behavior Rules” for children with special needs developed by the Save the Children have been mastered and used in practice,

- 1500 copies of “Earthquake Behavior Rules: Paint Yourself. 5+” color book have been published and distributed amongst stakeholders,

- preliminary agenda for the working meetings, workshop, classes and drills involving ADRC experts has been developed and is to be agreed with ADRC,

- training on Earthquake Protection Behavior Rules and Seismic Resistance of Buildings and Structures have been provided to the staff of three orphanages and two nursing homes, located in Yerevan city and Ararat district,

- The SSP specialists have summarized the frequently asked questions during meetings and trainings and our relevant answers. The preliminary outcomes have been viewed and evaluated.

### **Disaster Education For Different Age Groups of Population as a Part of Disaster Risk Reduction in Japan**

Ministry of Education, Culture, Sports, Science and technology (MEXT) has a Disaster Operational Plan (2001). One of the points of plan is Guidance about Disaster Education at School which include advice to relevant organizations about education of safety, spirit of respect for life and volunteerism, and must be improved for securing children's safety and disaster time. MEXT compiled a Guide to Make a Disaster Reduction resilience at disaster time. „Manual for Schools (Earthquake and Tsunami),, and „Development of a Disaster Reduction Education to Nurture Power to Live On,, demonstrating the direction of the school education in disaster reduction, and to enhance the disaster education at school.

Educational curricula of disasters applied in schools of different provinces of Japan are different. The main ideology is based on recognition of the natural phenomenon and on organization of quick and relevant actions during a possible disaster. The models of training inside and outside a classroom are topical, critical role is given to recognition of the experience of the past and to the issue of avoiding the failures of the past, for implementation of which efficient means are considered to be meetings with adults with experience of surviving disasters and visits to museums and libraries of disasters.

Disaster Mitigation Education at schools Important to mention that Each Prefecture's school's Disaster Education based on own Prefectures and Cities Board

of Education. For example, Disaster Education of Kobe City based on Board of Education of Kobe City and Board of Education of Hyogo Prefecture. And this mechanism is actual for each Prefecture in Japan.



## Disaster Resilience Education

What is Disaster Resilience Education?

The Aims of Disaster Resilience Education.

The primary objective of disaster resilience education is to bolster the disaster resilience (the capabilities to prevent the damage from worsening and to enact restoration measures) of communities, by heightening the disaster resilience awareness of each individual belonging to a community and by forging links within the community.

*In order to do this, it is vital to create an educational climate that fosters equilibrium of the three elements of knowledge of the disaster history of a particular community, the attitude required to work together in standing strongly against disasters, and the skills necessary for safe evacuation and emergency aid.*

In the Great East Japan Earthquake of March 11,2011, disaster resilience education initiatives bore fruit, exemplified by the case of Kamaishi city Kamaishi Higashi Junior High School in Iwate Prefecture, where the lives of many school children and students who were at school were saved from the tsunami.

## Disaster Reduction Drills and Exercises

The Government has designated the 1st day of September as the Disaster Preparedness Day and the week including this day as the Disaster Preparedness Week, and carries out various events to raise awareness and readiness about the disaster. Disaster drills and „disaster reduction fairs,, are held in various parts of Japan.

It is obviously that Disaster Drills is one of the very important tasks for Disaster Education.

Action for Disaster Resilience Education in Japan With the objective of improving the resilience of communities to disasters, related government ministries have set out and revised laws such as the following			
Name of Agency	Revision to Law	Phase	Summary
Cabinet Office	Revision to Disaster Countermeasures Basic Act	June 27, 2012 (Act number 41)	Specifies the obligation of residents to hand down to younger generations the lessons of disaster resilience. Specifies that each disaster prevention organization including regional public bodies, private business etc. must endeavor to implement disaster resilience education, and pursuant to this one permitted to seek the cooperation of education bodies and public/private organizations.
Ministry of Education, Culture, Sports, Science and Technology (MEXT)	Guidelines for school disaster resilience education that nurtures "best for life"	March, 2013	Created as reference materials outlining the ideal state of school disaster resilience education and disaster prevention management, reflecting new items of concern emanating from school in the wake of recent natural disasters including the Great East Japan Earthquake (Update of materials drafted in 1998). In drafting the guidelines, a new frame of reference was added to the definition of safety in the existing government curriculum guidelines: this included nurturing "the attitude of acting with an independent mind" and "the awareness of contributing to creating a safe and secure society" in consideration of the report issued by the "Council of advisors related to disaster resilience education and disaster prevention management post 3-11" (July 2012). In particular, based on "School Health and Safety Act" and "School Safety Promotion Plan" (Cabinet decision in April 2012), the guidelines made it clear to schools that they must set aside time for teaching disaster resilience, and in order to bolster their instruction, should organize structured and systemic contents."
Fire and Disaster Management Agency (FDMA)	Law on strengthening regional disaster resilience with volunteer firefighting at the core	December 13, 2013 (Act Number 110)	Specifies that national and local public bodies shall enact measures necessary to promote learning regarding disaster resilience in education at both the school and societal level. Specifies that fire brigades shall assume a leadership role in the education and training for autonomous voluntary disaster management organization women fire safety clubs, junior fire resilience clubs, and public entities within the boundaries of municipalities and any other organizations related to disaster reduction. Specifies that pursuant to this, municipalities shall enact any necessary measures.

## Five basic principles for successful Disaster Resilience Education

Below are five basic principles to remain mindful of when implementing disaster resilience education.

1.

### **Learn about the problems and peculiarities of a community, as well as its past experiences in suffering disasters**

It is important to precisely gauge the envisaged disaster risk of a community by using materials and site visits to understand its vulnerabilities.

Message from Organization with Featured Initiatives

When it comes to creating resilient communities, the disasters that each community faces are different. Thus, it is first and foremost important to understand the kinds of disasters that each community faces, and then to respond to the needs of the local people, with a view to making them more resilient to disasters.

[Aichi Prefectural Handa Commercial High School]

2.

**Act on your own initiative, witness everything firsthand**

Get active, experience everything yourself.

It is important to start by taking action yourself, setting an example to others.

Message from Organization with Featured Initiatives

Don't start out setting yourself limits; it is a key that you take the first step, reaching out to the authorities, corporations and other entities. Adopt the mindset that it may not even work out, but get going anyway with something, no matter how small.

[Shiga Prefectural Hikone Technical High School]

There are some things that only make sense once you begin. If indeed you aren't successful in your aims then take the chance to reflect on what the issues are.

[Itoigawa City Nechi Elementary School]

3.

**Set Smart, Realistic Goals**

While it is fine to set ideals and goals, it is important to confirm the resources necessary for your programs, and to go about implementing them within realistic boundaries in a reasonable manner without being greedy in one's objectives.

Message from Organization with Featured Initiatives

It is most important to keep your activities going, however small, as you will reap the benefits in areas where you were not expecting to.

[Yasashii Nihongo Volunteer Association]

Although we started out just wanting to make a good map, the more we did the more we realized that the aims of disaster resilience education can be met just by "walking around the area, getting to know the area"

[Toba City Arashima Children's club]

4.

**Be proactive in mingling with key people in various fields and disciplines**

It is important to take onboard new insights and know-how by networking and cooperating with key persons in the field, always looking to reinforce the framework of your initiatives.

Message from Organization with Featured Initiatives

Members have various qualifications and because they are affiliated to all sorts of organizations they can use their network to create new links with experts and other bodies. We have a cooperative spirit whereby we aim to make out other's deficiencies. Which empowers us to do activities that we wouldn't have expected to be able to do.

[Nadeshiko Resilience Network]

First and foremost is finding like-minded people. Without like-minded cohorts, your initiatives won't catch on, and your network will be limited.

[Yasashii Japanese Volunteer Association]

5.

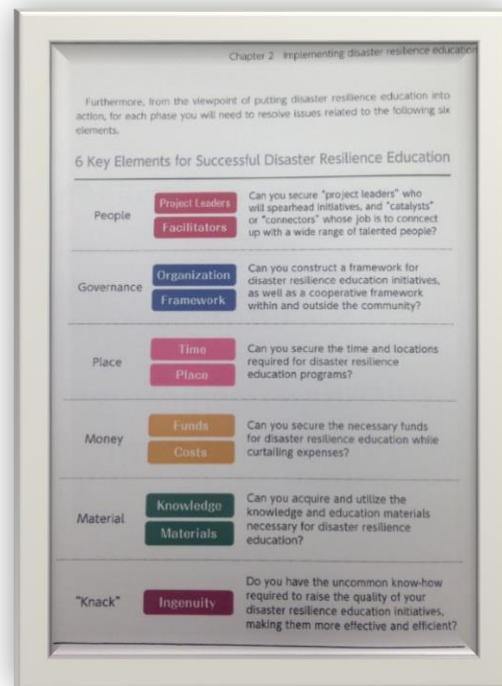
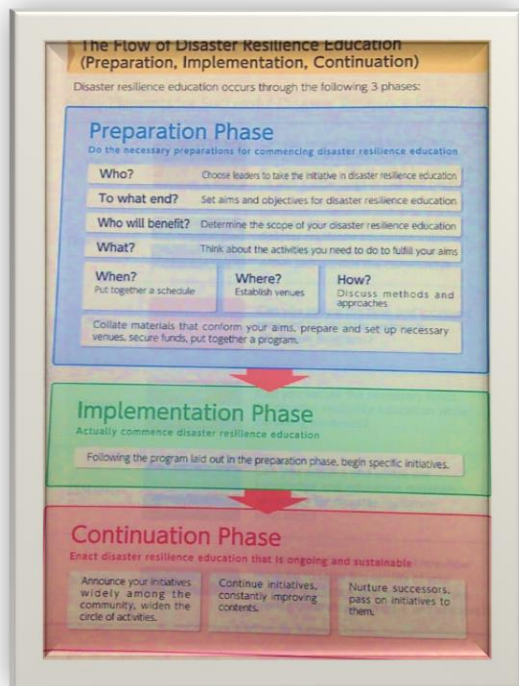
**Keep your approach positive, fun and lighthearted**

Connect disaster resilience with having fun, and ensure that your initiatives and programs can be comfortably accommodated within daily life on an ongoing basis. Also, develop initiatives that provide people with knowledge of the beneficence of nature, rather than focusing exclusively on seismic and wind/water disasters, and in doing so engender a sense of pride in living in that particular community.

Message from Organization with Featured Initiatives

By interweaving resilience into common local events (festivals/rice-cake making events) people can get to know each other, providing opportunities to encounter disaster resilience in a fun manner which in turn makes the community more resilient and in tune with nature.

[Sakuragaoka 2 chome self-governing bodies (Nishi Yamato 6 Neighborhood Council Liaison Group )]



## Preparation Phase

In the first phase (Preparation) of disaster resilience education, you need to think about who is doing what, for whom, where, and how it will take place. You then need to put together your program with materials that fit your goals, secure the necessary time slots and venues, and of course, funding.

### *Appoint project leaders*

Consensus must be reached with all stakeholders when selecting project leaders and frontrunners, taking into consideration their individuality and functional capabilities.

### Case Study 1-1 Organization :

Toba City Arashima Childrens' Club (Toba City, Mie Prefecture)

Issue: We were implementing disaster resilience education as part of our activities at the Children's Club. However, rotation of staff threatened to alter our approach to disaster resilience education activities. To ensure disaster resilience education that is continuous, you need to appoint project leaders who won't be impacted by staff alternation.

Solution: A graduate of the children's club who is also a local mentor type figure, took up the reins as project leader for disaster resilience education during his spare time. By adopting a system different to the one of the children's club, which involved regular rotation of staff, it became possible to implement ongoing initiatives.

*Network with Key persons in the community*



Consult with people who are cornerstones of the community including neighborhood watch leaders and local government officials, and maintain a network with them by exchanging information.

Case Study 2-1 Organization:

Kamaishi City Kamaishi Higashi Junior High School (Kamaishi City, Iwate prefecture)

Issue - Needed to get the cooperation of the local community in order to spread activities out beyond just the school

Solution - Consulted with PTA chairman and district head to introduce people who could help. When doing so, instead of communicating just by email and telephone, we made an effort to go with the students who would form the main body of the initiatives to meet and talk to potential collaborators.

Case Study 2-2 Organization:

Tanabe City Shinjo Junior High School (Tanabe City, Wakayama Prefecture)

Issue: Needed a pipeline-type figure that could be the link between school and the local area, in order implement initiatives in tandem with the community at large.

Solution: Consulted with a key person who serves as a director at the public hall for community events, and enlisted their cooperation in overseeing contact and division of duties between schools and self-governing bodies.

Systematize the core of your initiatives

Deliberate with all relevant parties to determine the name of your organization, persons in charge, allocation of responsibilities, and methods for sharing information. Having designed your activities plan, you can systematically enact disaster resilience education. When systematizing the body of your initiatives, consider using existing organizations where necessary.

Case Study 3-1 Organization:

Chiba Prefectural Togane Special Support School (Togane City, Chiba Prefecture)

Issue: Pursuant to raising the level of disaster resilience education for the community as a whole, various stakeholders involved in the community's resilience and welfare needed to get together and share information, to better understand their respective roles.

Solution: Set up “Sanbu Resilience Universal Network” \* comprising various organizations involved in disaster resilience/welfare/education within the Sanbu Community, and scheduled regular information and opinion exchanging sessions between the persons in charge of disaster resilience in each. This was conducive to a coordinated, aligned approach across the community and the implementation of an integrated disaster resilience education program.

Through the “Togane community Disaster Resilience Education Network Conference, which is one of the constituent elements of “Sanbu Resilience Universal Network”, disaster resilience officers get together to swap notes and work on raising the overall level of resilience education for the region.

Case Study 3-2 Organization: Sakuragaoka 2 chōme self-governing bodies (Nishi Yamato 6 Council Liaison Group) (Kanmaki, Nara Prefecture)

Issue: Because self-governing bodies officers change every year, the group needed to deploy a structure that would be conducive to maintain disaster resilience education.  
Solution: As a separate entity to officers of self-governing bodies, Sakuragaoka 2 chōme self-governing bodies appointed special members to assist them, fulfilling the function of head office for disaster resilience education activities. The fact that these special members do not rotate every year and are in the first place experienced officers of self-governing bodies with a high awareness of disaster resilience education has translated into being able to maintain sustainable disaster resilience education measures.

Case Study 3-3 Organization:

Tanabe City Shinjo Junior High School (Tanabe City, Wakayama Prefecture)

Issue: Because the whole school was starting disaster resilience education, it was necessary to create activity goals and activity policies for each instructor.

Solution: For several consecutive years at a time, project leaders coordinate the disaster resilience education officers for each school year. Selected an officer in charge of disaster resilience education from each school grade (three members totally), and organized section meetings for these officers. These meetings are held once a week, during which project leaders can confirm the direction of disaster resilience education with each officer and discuss other matters. This has paved the way for a singular coordinated approach to disaster resilience education across the school year groups.

Do not over-extend the range of your activities

Make the program gradually wider, rather than act widely from the beginning of the activities but act as possible as you can.

Case Study 4-1 Organization:

Tokushima City Tsuda Junior High School (Tokushima City, Tokushima Prefecture)

Issue It was expected that it would be hard to implement a smooth program that involved all students in the school, because some children lack motivation to participate, clash with extracurricular activities, and sometimes it's hard getting the approval of parents to attend programs during long school holidays.

Solution Started out with small numbers (1 class in each year group) who presented what they had learned to other children during school assemblies.

## **DISASTER EDUCATION AND WAYS TO REDUCE SOCIAL AND PSYCHOLOGICAL VULNERABILITY TO DISASTER**

*The psychological and social effect of a disaster is harder to see rather than the physical effect. The recovery from it often takes far longer. The effect of disasters can bring vary reactions to the people. Helping people for facing the situation after disaster is important. This research is to investigate the psychosocial support program and the best practices related the disaster preparedness activities in Japan that can promote the psychosocial well-being.*

### **The importance of being psychologically prepared**

Being directly involved in any potentially life-threatening emergency situation can be genuinely terrifying. People often don't have prior experience of being in natural disasters or knowledge of just how stressful this can be. When people are under severe stress they are usually not able to think as clearly as usual and this can affect decisions and reactions. These are normal, although not always helpful, responses to a possibly life-threatening situation.

When people have a better understanding of their own likely psychological responses in natural disaster warning situations this can help them to feel more in control and better able to cope. Being psychologically prepared can assist people to think more clearly and reduce the risk of serious injury and loss of life or property. Being cooler, calmer and more collected can also be very helpful to family members and others who may not be as well prepared psychologically for what is happening. Of course, it is unrealistic to think that people can be fully emotionally prepared for such stressful and confronting situations as severe natural disasters. However, being psychologically prepared can help in coping with the stress of the unfolding situation and can help to reduce the distress after the disaster has passed. This does not mean that people can be fully prepared for anything that may happen or that being psychologically prepared means being emotionally 'bullet-proof'.

Being psychologically prepared also includes having realistic expectations that an emergency situation such as a bushfire or cyclone event can very quickly become unmanageable, unpredictable and life threatening. Being able to anticipate that such a situation could occur can help people to 'let go' when necessary and leave the situation to the expertise of emergency services.

### **What does being psychologically prepared involve?**

Once the household emergency plan has been set and practised and the necessary physical preparations have been made, we can turn our attention to psychological strategies for managing the stress of a threatening natural disaster.

Psychologists use a term called 'stress inoculation' to assist people to prepare themselves psychologically for emergencies, which in other words means planning to be better protected from stress by working through the likely psychological reactions beforehand and learning strategies to cope. These strategies 'inoculate' people against being overly anxious or overwhelmed by their emotional responses, and will help prevent being caught up in unhelpful thinking in an emergency situation. Obviously this approach will work better with some disaster events that may be more frequent and to some extent more predictable, but the psychological principles can be applied for any emergency.

The way people feel in highly stressful situations is strongly affected by the way they cope with the signs of physical arousal (e.g., racing heartbeat, shortness of breath) and the thoughts that they are having (e.g., 'I can't cope'; 'We're going to get badly hurt'). These reactions and thoughts can make people feel anxious, hopeless or even angry, and while these feelings are understandable, they are not very helpful in an emergency situation. Being psychologically prepared means that these natural reactions to stress can be anticipated and managed to help people feel more in control and confident.

There are three main steps to being psychologically prepared for a threatening natural disaster:

1. Anticipate the anxiety and concerns that will arise.
2. Identify uncomfortable or distressing thoughts and feelings that may cause further anxiety.
3. Manage the responses so that the ability to cope remains as effective as possible.

An easy way to remember the skills involved in being psychologically prepared is to focus on aiming for psychological as well as emergency household preparedness.

### The three steps to being psychologically prepared

1. **ANTICIPATE** that you will be feeling worried or anxious and remember these are normal, although not always helpful, responses to a possible lifethreatening situation
2. **IDENTIFY** what the specific physical feelings associated with anxiety are and whether you are having any frightening thoughts that are adding to the fear
3. **MANAGE** your responses using controlled breathing and self-talk so that you stay as calm as possible and can focus on the practical tasks that need attention

## **Step 1: Anticipating the psychological reactions leading up to a disaster**

In the lead up to most natural disasters like bushfires, cyclones, floods or severe storms there is usually a series of warnings on radio, television and in newspapers. For example, there may be repeated reminders about buying batteries for torches and radios, having gas bottles filled, ensuring an adequate supply of emergency water and food, removing flammable material from around homes, or securing doors and windows.

Warnings and uncertainty in an emergency situation affect people psychologically. There are often repeated risk messages and frightening images and sounds to ensure people know about the risk. This can leave people feeling anxious, helpless or confused.

How to anticipate your reactions?

- To begin preparing yourself for the natural disaster that may be coming, try to anticipate what your likely response to the situation will be.
- Expect that the situation will be highly stressful and think about how you usually react to stress. Although these reactions are very natural they can get in the way of other necessary preparations.
- If you understand your usual reactions, you can learn ways to be better prepared to manage them when they happen.

## **Step 2: Identifying the specific feelings and thoughts**

It's important for people to tune into the specific feelings and thoughts they are having in response to a threatening natural disaster, as this will help them to find ways to manage them.

People usually become physically aroused in highly stressful situations. Common physical symptoms include:

- Racing heart and palpitations
- Shortness of breath and dizziness
- Tense muscles
- Fatigue or exhaustion
- Nausea
- Numbness or tingling
- Headaches.

When these physical reactions to stress begin, they usually trigger stressful thoughts such as:

- I can't cope
- I'm so afraid
- I'm panicking
- I don't know what to do.

How to identify your own feelings and thoughts?

- Notice what is happening to your body and the physical sensations that tell you that you're feeling anxious.
- Try to focus in on the frightening thoughts you may be having that are adding to the fear. What exactly are you saying to yourself? Are your thoughts helping you or making things harder? Check whether you are jumping to conclusions.
- Remind yourself that strong bodily sensations and frightening thoughts are normal reactions to stress but they are not helping you to stay calm and clearheaded. Don't get too critical of yourself though!

### **Step 3: Managing responses to the stress**

In stressful situations, people can feel more in control through two strategies:

1. Slowing down breathing to help calm the physical arousal symptoms
2. Replacing frightening thoughts with more helpful ones ('self-talk').

Learning to breathe and think more calmly

- To slow your breathing down, take smaller breaths and pause between breaths to space them out. When you have breathed out slowly, hold your breath for a count of three before inhaling your next breath. Sometimes people find it helps to breathe in through the nose and out through the mouth.
- While concentrating on breathing out slowly, say to yourself 'Relax', or 'Stay calm', or 'It's OK, I'm managing OK'. These are good words to use because they are associated with feeling relaxed and in control.
- Try not to dwell on the bad things that might happen, but instead tell yourself that the calmer you are, the better you'll be at managing exactly what needs to be done.
- Remember you need to be able to draw on your own strengths and survival resources and your coping ability. It's important not to let unhelpful feelings and thoughts get in the way of careful and well planned actions.
- Remind yourself that this is an emergency situation and that it's natural you are feeling anxious and stressed. You cannot directly control what's happening but you can manage your responses in this emergency and influence the impact on you and your family.

Helping others to cope with their feelings

- Teach others the simple breathing exercises.
- Be sensitive and supportive to them, rather than judging. They may be feeling scared, anxious or embarrassed if they are not coping as well as you.
- Encourage them to talk about how they are feeling with you.
- Assist them to find more helpful thoughts to say to themselves and others.
- Get people involved in occupying their time rather than worrying.
- Encourage them to take responsibility for a task that needs attending to.

## Some unhelpful psychological 'traps'

There are a number of common 'traps' that people can fall into in response to a threatening natural disaster. Knowing that these are common reactions may help people to understand and be better prepared if they find themselves feeling this way.

<p><b>Anxiety and worry are triggered by the preparations for the natural disaster</b></p>	<p>Once people start preparing for a natural disaster, they may experience sudden and unexpected feelings of anxiety and helplessness as the reality and possible consequences of a forthcoming natural disaster may suddenly become more real.</p> <p><b>What happens:</b> The worry often stops people from doing what they are doing, so they don't complete preparations for the natural disaster.</p> <p><b>What to do:</b> Go ahead with your preparations knowing that it is normal for people to feel this worry and even to experience occasional panic. It's not pleasant, but you <b>can</b> deal with it.</p>
<p><b>Feeling that everything is completely uncontrollable</b></p>	<p>Another cause for feelings of worry and helplessness is the repeated thought that a natural disaster is an awesome and uncontrollable 'act of God or nature'.</p> <p><b>What happens:</b> These feelings of helplessness and futility may cause people to do nothing.</p> <p><b>What to do:</b> Remind yourself that although you cannot directly control the disaster, you are not helpless to protect yourself and your family from its consequences. Undertaking the protective measures contained in your local disaster emergency guides will not only help make you safe, it will help you to feel more in control and less anxious.</p>
<p><b>Blindly following others</b></p>	<p>When people are frightened and anxious, it is easy to become overwhelmed and confused, and do whatever someone else is doing, without thinking about it.</p> <p><b>What happens:</b> Uncertainty, along with a sense of urgency that something must be done, can lead to blindly following someone else's anxious behaviour.</p> <p><b>What to do:</b> Don't be afraid to take charge if that is what you feel you should do. It is important, however, that you know what should be done, and that you behave calmly.</p>

<p><b>The disaster feels 'unreal'</b></p>	<p>Unless people have been through a natural disaster, it is difficult to imagine what it will be like, and what the feelings of fear and panic might be. Some people deal with this by making light of the threat and treating it as if it isn't real.</p> <p><b>What happens:</b> This feeling of unreality can interfere with disaster preparation by interfering with making necessary practical plans.</p> <p><b>What to do:</b> You need to keep telling yourself that what is happening is very real and requires sensible behaviour.</p>
<p><b>Warnings lose their impact</b></p>	<p>Once people have heard a number of similar warning messages, they may start to expect that nothing serious is going to happen. The messages can be repetitive and it may be that the threat of the disaster becomes just a threat, as the disaster misses the area or simply doesn't happen.</p> <p><b>What happens:</b> The repeated warnings lose their impact and people feel a sense that things are unreal or that the risk isn't as threatening as it really is.</p> <p><b>What to do:</b> Watch out for this, as you may miss critical new information and start behaving as though things are back to normal.</p>
<p><b>False sense of security</b></p>	<p>It is also possible and indeed common for people to experience a false sense of security in response to disaster warnings, because they may think that modern technology, the government, or the emergency services would not allow such an event to happen.</p> <p><b>What happens:</b> People think they are safe because we now live in safer houses and can very accurately 'track' what is happening with threatening events in terms of location, speed and intensity. This is reassuring but can also be very dangerous. Location on a map does not mean there is scientific control over the event nor accurate predictions.</p> <p><b>What to do:</b> Always treat the actual danger as very real so that you can respond realistically and responsibly, minimising the risk to your family and yourself.</p>



## **After the emergency has passed**

Checking on how you coped

After the disaster or threat has passed it is helpful to check whether identifying and managing your feelings and thoughts helped you feel being better psychologically prepared and able to cope.

Were you able to:

- Anticipate how you might react?
- Identify emotional responses?
- Practice breathing more slowly and calmly?
- Use more helpful thoughts?
- Identify any psychological traps?
- Make decisions more easily and attend to the necessary practical tasks?

Coping with losses and damage

It is inevitable in disaster prone areas that some loss or damage will occur. Many people have strong emotional or physical reactions following a disaster. Emotional distress following a disaster can include anger, anxiety, sadness or grief and a tendency to unfairly blame people or agencies.

The APS Tip Sheet *Understanding and managing psychological trauma* describes some of these symptoms of distress and provides suggestions promoting recovery, such as:

- Trying to maintain a normal routine
- Spending time with people who care about you
- Giving yourself permission to experience some reaction to the distressing experience.

## **Department of seismic Risk Reduction of Survey for Seismic Protection**

Department of seismic Risk Reduction of Survey for Seismic Protection conducts social-psychological research, sociological surveys, as well as processing and psychological analysis of data. As the main specialist of the Department of seismic Risk Reduction of Survey for Seismic Protection, social-psychological investigations are implemented, by me the goals of which are to reveal the level of cognitive and psychological preparedness on earthquakes among different segments of population.

Training on code of conduct of seismic protection is implemented by SSP CAP with an aim of increasing the level of knowledge on proper behavior during a possible earthquake, as well as a psychological research program is conducted in order to form the description of anxiety, stress resistance, cognitive-psychological preparedness of population on earthquake.

The relevance of the above noted activities is directly driven by the fact of seismic riskiness of our region.

The aim of the program is to

Increase the level of cognitive-psychological preparedness of earthquake resistance, as well as to investigate the effectiveness of the training on code of conduct on seismic protection implemented by CAP and the possible level of application of that knowledge in practice by the trainees.

Work description

The process consists of the following 5 stages:

I. Training stage

- Instruction of code of conduct on seismic protection
- Group discussion on “What should I and my friends do in case of an earthquake?”
- Watching of didactic materials
- Role plays

II. Research stage

- Characteristics of a temperament (test, author – Rusalov)
- Trepidation (Taylor's alarm methodology)
- Perception of cognitive and practical knowledge on earthquake, as well as emotional attitude (questionnaire)

III. Stage of an instructional alarm drill

IV. Psychological debriefing

V. Social-psychological analysis of the group behaviour

I. Training stage

Training of code of conduct on seismic protection is implemented with a presentation material developed by CAP, which includes 3 basis points of actions:

- What to do before an earthquake?
- What to do during an earthquake?
- What to do after an earthquake?

Group discussion

During the thematic discussion on “What should I and my friends do in case of an earthquake?” a conversation-discussion is held with the group on earthquake, on its possible consequences, on necessary code of conduct during an earthquake and on the importance of the code’s applicability.

Observation of didactic materials

- Exploration of a poster prepared by CAP
- Watching of visual materials on earthquake – cartoons on “The disaster-let and the earthquake” (2,5 minutes), “This is the planet” (6 minutes), “The disaster-let in everyday life” (3 minutes) and films on “When the crust is shaking” (5 minutes), “Resistance” (55 minutes), “How to resist the earthquake” (14,5 minutes), “Mega-tsunami” (50 minutes).

- Watching of thematic photos, booklets, brochures.

Role play

This is an effective method applied during an education process. For instance, the trainer can suggest unexpected situations to the group, where they need to take a role or a viewpoint and further, try to develop or finish it.

Those who aren't taking part in the main role play take a role of an observer and make conclusions after the end of the game.

#### After the role play

- what happened is clarified,
- the mistakes are discussed,
- the positions, feelings, changes are discovered which existed during the main role play,
- a possibility of self-observation is created,
- the results of the role play are compared with the initial goals,
- the behavior is analyzed,
- new topics for thinking are proposed,
- the role play is connected with already-watched didactic materials.

The effectiveness of the method is that the gained practice is maintained for a long time. This is an interesting way of accumulation of knowledge and skills and gives a possibility to understand the situational demonstrations of the problems.

#### II stage. Social-psychological research

Diagnostics of a temperament with testing (Rusalov)

Temperament is a complex of more or less stable typological characteristics which describes the dynamic specifications of mental processes and behavior of an individual, their strength, the speed of their occurrence, flow and pause, as well as influences on the vital and energetic tonus of a personality.

It is important to note that in nature there is no pure type of a temperament and people are bearers of each of the above noted types, however, prevalence of one of them predefines the behavior of a personality, based on what we have decided to explore the types of temperaments of the group members.

Diagnostics of trepidation with testing (Taylor's alarm methodology)

Trepidation is the expectation of a negative outcome of certain situations and phenomena. When the level of trepidation is high, a person is distinguished with inclination of emotional outbursts. It is important to note that in case of high trepidation the self-esteem of a personality is low, because of which he does not consider himself and his actions to be competent. In case of low trepidation, a person is distinguished with inactivity, indifference and low level of motivation. Thus, in both of the cases the inclination of a personality on acting in an organized and targeted manner decreases. Based on all this we have considered it to be purposeful to explore the grade of trepidation of the group members.

#### III stage. Social-psychological analysis of the group behavior

Therefore, it is assumed that this complex program will increase the proficiency level of the code of conduct during an earthquake and the cognitive-psychological preparedness and, in the meantime, an opportunity will be created for the evaluation of this assumption with the means of feedback.

Social-psychological research program intended for 17-65 age group

Psychological research is implemented by the Department of Sociology and Psychology of SSP CAP, which tend to discover the level of stress resistance and trepidation, as well as the cognitive-emotional perception of the earthquake among the population of RA (17-65 years). The aim of the implemented research is to discover the following:

Level of trepidation expression (Taylor's alarm methodology)

Overall level of de-adaptation risk and neuropsychological stability during stress

It is important to note that

*Stress-resistance* is the ability of a personality for resisting stress, conditioned with a person's individual, social-psychological, social-demographic characteristics.

*Trepidation* is the feeling of expressed uncertainty, fear and expectation of negative outcome, i.e., the perception of different situations (regardless of their nature) as distressful and fearing, where expectation of some sort of negative flow and outcome is existing.

It is important to note that the low level of stress-resistance, as well as the high indicator of trepidation can conduce that a person gets into panic even in case of slight shocks and is not able to use the necessary code of conduct.

*Panic* is the occasion when a person is distinguished with untargeted actions, performs inadequately and is unable to make thought and centralized actions. Because of that a big danger exists for the personality and his surrounding environment.

Based on the received results necessity of psychological work arises. For its implementation we consider to be effective the application of such psychological methods and techniques as: Relaxation techniques which are special means of creating psycho-neuromuscular relaxed, peaceful and balanced condition via generation of inhalation, special breathing and corresponding therapeutic atmosphere

- Art therapy – therapy of self-expression via art. Art therapy is a psycho-therapeutic method, which is implemented with means of imaginative activity. It is one of the gentlest and, in the meantime, deepest methods in the work of psychologists and psychotherapists.

By painting, carving or expressing the problem or mood in an artistic way, a person seems to receive an encrypted message from the subconscious level.

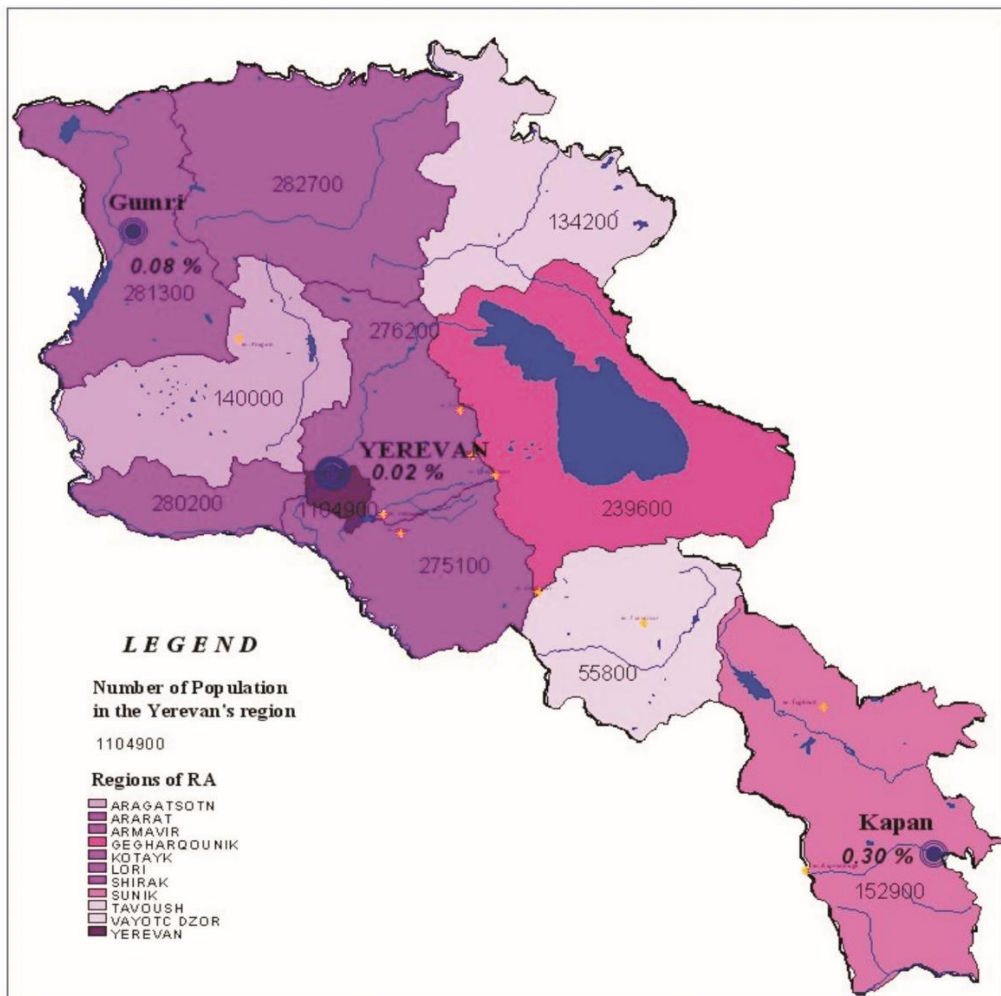
Art therapy ensures

- expression of feelings, emotions search of new ways for communicating with the world
- confirmation of the uniqueness and significance of the self
- increase of adaptability in the constantly changing world.

## Educational Psychological Measures and Research results of population society-psychological vulnerability in earthquake

In case of the absence of psychological preparedness, the suddenness of the situation is one of the causes of affective behavior. The forms of emergency behavior depend on the individual's psychological protection and subjective governance.

Testing has been organized and periodically implemented. Based on the results obtained, a correlation analysis of test results was performed. Research has been done to verify the effectiveness of the methodology. The above-mentioned first three tests were given to the audience, followed by teaching process. A month later, the same tests were held in the same auditoriums again.



Map of spatial and quantitative data of psychological testing

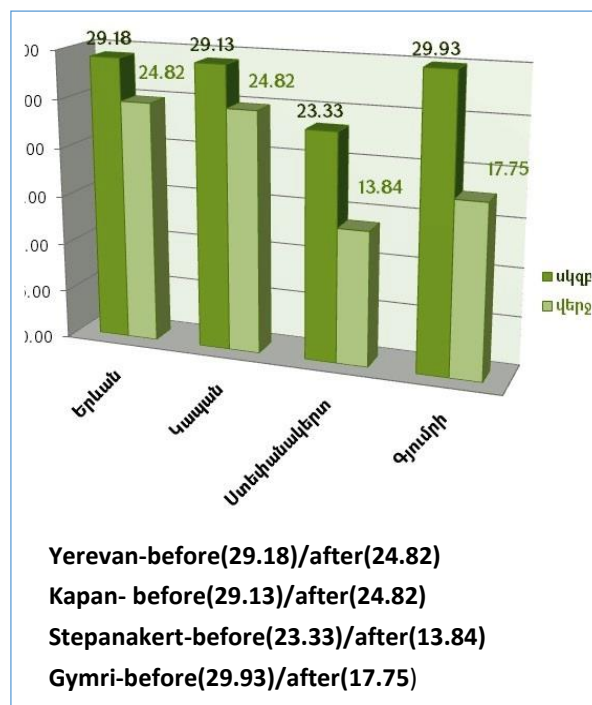
Basic research methods:

- T. Holmes' Method of Diagnosis of Stress Disorder and Diagnosis of Neurosurgical Stability,

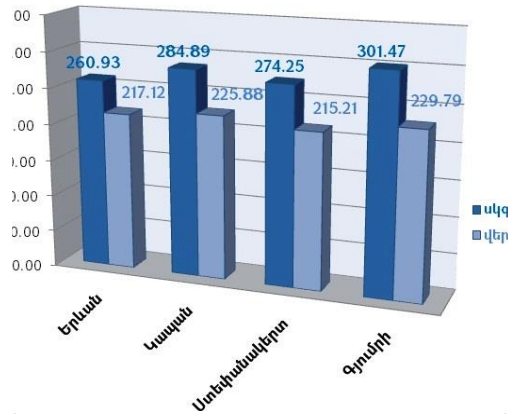
- Taylor's alarm methodology,
- T. Holmes and R. Rhee's "Methods for Identifying Stress-Resistant and Social Adaptation"
- At the same time we used the questionnaire and statistical analysis methods.

Below the graphic are imagery of the three tested tests that show what indicators have been recorded before the training and what indicators after the application of the methodology.

### **Taylor's alarm methodology**

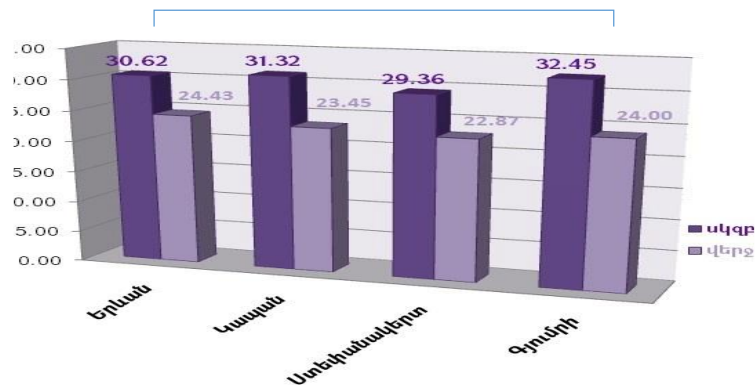


**T. Holmes and R. Rhee's "Methods for Identifying Stress-Resistant and Social Adaptation"**



Yerevan-before(260.93)/after(217.12)  
 Kapan-before(284.89)/after(225.88)  
 Stepanakert-before(274.25)/after(215.21)  
 Gyumri-before(301.47)/after(229.79)

**T. Holmes' Method of Diagnosis of Stress Disorder and Diagnosis of Neurosurgical Stability,**



Yerevan-before(30.62)/after(24.43)  
 Kapan-before(31.32)/after(23.45)  
 Stepanakert-before(29.36)/after(22.87)  
 Gyumri-before(32.45)/after(24.00)

According to preliminary data, the alarm in Yerevan was at a high level (25-40), and then increased by an average (15-25), indicating anxiety reduction. Stress resistance did not undergo substantial changes in initial and final indices, for example it corresponds to the boundary level (200-299). Neurological stability was initially considered to be lower in the NRC conventional scale (29-32, = 2), ie moderate neurological stability and greater risk of misdiagnosis, and then relatively more stable (23-28, = 3).

According to the data from Kapan, at first there was a high level of distress (25-40), and then the average level (15-25). Stress resistance at the beginning and at the end has been recorded with slight differences at the border level (200-299). Neurological stability first coincided with the lower scores of the NQC (29-32, = 2), followed by improvement of indicators (23-28, = 3). As you can see, the data in these two cities are similar, which proves the effectiveness of the methodology, regardless of territorial peculiarities.

The data from Stepanakert city researchers had the following picture: The level of disturbance at first, unlike in the previous two cities, was 15-25, which speaks about an average level of anxiety, and then a low level of low intensity (5-15). Stress resistance in both cases corresponds to the border level (200-299), but there is a delicacy. if at first the average value = 274.25 then then it = 215.21. Neurological stability was consistent with the low prevalence of the NRC conditional scale (29-32, = 2), followed by double improvement of indicators (18-22, = 4).

Gyumri researchers had the following picture: The disturbance first coincided with a high level (25-40), and then increased to an average (15-25). Stress-resistance has undergone significant changes. initially it was at low (300 and more), then at the border (200-299) level of stress. The neurological psychiatric outpatient initially showed a 29-32, N = 2, and then higher neurological stability, 23-28 = 3 at the NSC conventional scale.

*In summary, it should be noted that in all four cities surveyed improvement of indicators was observed, which allows us to conclude the effectiveness of proposed methods.*

- *We offer a methodology that can be used to mitigate the psychological trauma resulting from the earthquake. We also offer psychological nuances that should be used during training, awareness-raising and seismic protection. So, we offer the teaching methodology, the novelty of which is the following:*
  - A. the selected instructions are brief,
  - B. relevant accents are made,
  - C. free from excess information,
  - D. they are aimed at people with the ability to act independently, can be taught using advertising posters, runner lines.
- *In the application of the basic methodology we distinguish*
  - learning duration: after training, anxiety and excitement are organized.



- after anxiety, trainees visit a seismic protection service and get acquainted with seismic risk reduction activities on site.
- training periodicity: it is desirable to repeat several times a year.

Proposing A Multi-Hazard Approach to Disaster Management  
Education to Enhance Children's "Zest for Life":  
Development of Disaster Management Education Programs  
to Be Practiced by Teachers

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**(Shortened; Earthquake)**

*1.2. Current Status and Problems in Disaster Management Education*

Disaster management education is defined as the education aiming at prevention of disaster and minimization of damage through a swift and an appropriate response to disaster when the disaster already occurred [2]. After the Great East Japan Earthquake, the Ministry of Education, Culture, Sports, Science and Technology (MEXT) founded "the Council on Disaster Education and Disaster Management after the Great East Japan Earthquake" [3], indicating a "promotion of the disaster management education to enhance the capacities to forecast the risk and avoid it" as an orientation for the policies on disaster management education in schools in the future. The "Development of Disaster Management Education to Foster 'Zest for Life'" [4] and "Guidelines for Disaster Management in Schools in Preparation for Earthquakes Earthquakes and Tsunami Disasters," [5] which contain information on disaster preparedness and reference examples of evacuation drill, have been developed and distributed among schools. Since 2004, a number of experts on disaster management education have been operating the website on "Disaster Management Education Challenge Plan" [6], in cooperation with the MEXT, Fire Defense Agency, and National Institute for Educational Policy Research, among others. This website introduces several examples of highly motivated activities on disaster management education in schools, where disasters have already been experienced or the risk of disaster is imminent. Nishira et al. [7] and Fujioka et al. [8] proposed practical studies in schools, including the development of materials and games for disaster management education. Ichii [9] provided summaries of the books and picture books to be used as reference materials in carrying out disaster management education in schools and guides on ways to use these materials, such as games for disaster management education that have been developed by other researchers. Moreover, Kimura et al. [10] presented various methods of implementing "disaster management literacy." The author has also supported the disaster management education in schools, such as elementary, junior high, and high schools in the Kanto Region, especially since the Great East Japan Earthquake. The author has undertaken the disaster management education and drills in certain schools to learn not only the attitudes toward disaster but also the appropriate knowledge on disaster and capabilities to respond to potential risks for schoolchildren to protect

themselves from various natural disasters (for examples, see [11–13]). However, in essence, schoolteachers do not develop disaster management expertise in teacher training course, as they are only trained with respect to the challenges on schoolchildren’s psychological and physical health, such as bullying and refusal to go to school, and school safety, such as bicycle accident and problems caused by SNS. Accordingly, schoolteachers find it difficult to teach systematically the mechanism of occurrence of natural disaster and the appropriate behaviors to respond to it in their classes [14, 15]. For example, several schools in Tochigi Prefecture, which is the focus of this study, carry out evacuation drills regularly as part of disaster management education, but they do not consider specific local conditions, such as the natural environment surrounding each school.

## *2. Current Status of Risk Consciousness*

In May 2016, a “questionnaire on risks in the surroundings” was conducted to elementary students and teachers in Tochigi Prefecture to identify their risk consciousness of school safety at a time of natural disaster. The aim of the questionnaire was to know whether the proposal mentioned above would be accepted by the students and teachers and determine the current situation with respect to their risk consciousness.

The survey asked how vivid the students’ and teachers’ impressions are of each risk mentioned in the 20 question items regarding school safety, including disaster, traffic, and school life safety, and crime prevention. Referring to the “Development of Disaster Management Education to Foster ‘Zest for Life’,” which the MEXT developed, the risks mentioned in the 20 question items were selected from the “Miyagi Basic Guidelines for Disaster Management Education,” [20] which the Board of Education in Miyagi Prefecture formulated; such guidelines outline the concrete direction on school safety. Moreover, the 20 question items were selected based on whether the students could answer them within the reasonable time without excessive burden, according to the opinions of the concerned schools. These 20 question items were classified into 12 items on disaster safety and 4 each on traffic and school life safety (Fig. 1). The following instruction is provided at the beginning of the questionnaire: “If you have encountered the following events in your daily life and could imagine the situation vividly, what kind of damage would such situation cause and how you would be inconvenient by it? Please mark the applicable number with a circle.”

### *2.3. Concrete Image of Risk*

The extent of how each risk is imagined was derived based on the findings of the survey. The scores were calculated and arranged in descending order; the option “imagine vividly and clearly” was assigned with the highest score. Reviewing the findings on the students ( $n = 266$ ), the risk that was marked mostly with “imagine vividly and clearly” is “2. Earthquake” (78.3%). Hence, an earthquake is supposedly imagined vividly because it is experienced frequently in Japan, and thus evacuation drills for earthquakes are exercised regularly in schools. The risks with the next highest scores are “15. Intrusion of a suspicious person” (75.4%) and “16. Talked to or asked by a stranger about something” (67.6%). Such high results could be attributed to the schools being located in the residential areas and the regular implementation of

education that targets suspicious person. The following other risks are listed in decreasing order of scores: “5. Sudden heavy rain” (65.7%), “11. Typhoon” (63.3%), “9. Flooding” (60.4%), “1. Fire” (59.4%), “6. Thunder” (58.5%), “18. Bicycle accident” (57.0%), “12. Heavy snow” (57.0%), “13. Injury at school” (55.1%), “14. Injury outside the school” (53.6%), “17. Accident on school road” (53.6%), “10. Landslide” (53.1 %), “20. Minor collision” (52.7%), “8. River flooding” (52.2 %), “7. Tornado” (49.3%), “19. Accident while riding a vehicle” (48.8%), “3. Tsunami” (46.9%), and “4. Volcanic eruption” (32.4 %) (Fig. 2). As regards findings on the teachers ( $n = 573$ ), the risk with the highest score of “imagine vividly and clearly” is “2. Earthquake” (46.4%). The following other risks are listed in decreasing order of scores: “11. Typhoon” (45.7%), “13. Injury at school” (45.2%), “5. Sudden heavy rain” (42.9%), “20. Minor collision” (40.3%), “18. Bicycle accident” (40.0%), “12. Heavy snow” (38.4%), “17. Accident on school road” (38.0%), “1. Fire” (37.5%), “14. Injury outside the school” (36.0%), “16. Talked to or asked by a stranger about something” (30.7%), “15. Intrusion of a suspicious person” (26.5 %), “8. River flooding” (26.2%), “6. Thunder” (24.3%), “9. Flooding” (23.7%), “19. Accident while riding a vehicle” (19.2%), “7. Tornado” (15.7%), “10. Landslide” (12.2%), “3. Tsunami” (8.9%), and “4. Volcanic eruption” (4.7%).

In summary, an earthquake is the risk that can be imagined most vividly among all the 20 items, as both students and teachers have experienced it in their lives and evacuation drills for earthquakes are exercised regularly in schools. Other risks, which have high incidence and are highlighted frequently inside and outside the school, can also be imagined vividly to a certain extent. These other risks include the storm, flooding caused by heavy rain and typhoon, suspicious persons, and injuries. However, the risks, such as tornado, flooding, sediment disaster, and volcanic eruption, which has occurred in Tochigi Prefecture in recent years, can be imagined relatively less than the others.

#### *2.4. Factor Analysis of Risk Image*

Factor analysis (maximum likelihood method with Pro max rotation), which is a kind of multivariate analysis and often used to search the relation among multiple variables, was performed to determine the relation among the risks based on the findings of the survey conducted to students and teachers. The following four factors were extracted as a result of the analysis of the students ( $n = 266$ ) (Fig. 4). The first factor represented by traffic accident and suspicious persons is termed “Risks coming from the world outside of home and school, such as traffic accident and suspicious persons.” The second is represented by tornado and volcanic eruption; it is termed “Risk of the natural disaster that is not clearly considered as ‘my concerns’.” The third one represented by earthquake and sudden heavy rain is termed “Risk of the natural disaster that is often observed and experienced in the surroundings.” The fourth one is termed “Risk of injury,” which occurs in daily life. Taking the findings of the analysis into consideration, the following guidance is regarded as effective to raise students’ and teachers’ risk consciousness in a comprehensive way. That is to say, the risk of an earthquake, which is classified under the third factor and has been experienced by the students in their lives including the evacuation drills in schools, is set as a starting point of learning. Then, the risk of tornado and volcano, which is classified into second

factor and is not so familiar for the schoolchildren, is associated as the possible risk in their surroundings. On the other hand, a similar survey was conducted with schoolteachers ( $n = 573$ ) and the following 4 factors were extracted (Fig. 5). The first factor, represented by traffic accident and suspicious persons, is termed “Risk for traffic safety and school safety.” The second one, represented by typhoon and flood, is termed “Risk of storm and flood disaster caused by typhoon, etc.” The third one, represented by tornado and volcanic eruption, is termed “Risk of natural disasters that are unfamiliar and cannot be imagined easily.” The fourth one, consisting of earthquake and fire, is termed “Risk of natural disasters that can be imagined, including how to respond to it.” Although the construction of the factors is different from the case of the students, the following guidance is regarded as effective to raise teachers’ risk consciousness in a comprehensive way. The disaster response exercise, which can be imagined easily and has already been targeted frequently for evacuation drills, is first practiced for earthquake and fire. Next, the volcanic and tornado disasters, which are difficult to be imagined, are associated as part of disaster management education.

### *2.5. Applicability of the Survey Findings to Tochigi Prefecture in Particular and Japan in General*

According to the “Opinion Poll on Tochigi Prefectural Government 2014” (covering the whole prefecture, two stage stratified random sampling, selection,  $n = 1,318$ ) as regards consciousness of disaster prevention of the residents of Tochigi Prefecture who seldom suffer from largescale disasters, the answers to the question “What kind of disaster do you feel most uneasy about in your daily life” are as follows: “Earthquake” (66.2%), “Damage caused by a tornado, etc.” (9.7%), “Fire” (8.5%), “Typhoon and flood” (5.6%), “Lightning damage” (4.4%), “Snow damage” (0.8%), “Volcanic eruption” (0.7%), and “Others or no answer” (4.0%) [21]. Although the questionnaire was not answered by multiple answers, less than 70 percent of all the residents of Tochigi Prefecture are conscious of the risk of an earthquake, but they are less conscious of that of a tornado disaster, a storm, and flooding. Meanwhile, according to the “Opinion Poll on Disaster Management 2013” (covering the entire country, multiple answers are allowed,  $n = 3, 110$ ), which was conducted by Japan’s Cabinet Office, the answers to the question “Have you ever imagined vividly that you would suffer from natural disaster” are as follows: “Earthquake” (80.4%), “Damage caused by a tornado, gust of wind, and typhoon, etc.” (48.1%), “River flooding” (19.6%), “Tsunami” (17.8%), “Landslide” (13.2%), “Heavy snow,” (9.7%), “Volcanic eruption” (5.9%), “High tide,” (3.5%) and “Others” (9.4%) [22]. The level of consciousness of the risk of a storm, flooding, and a tornado across the country is higher than that of the Tochigi Prefecture. The findings of the two polls indicate that earthquake crosses most Japanese’s minds when they hear the word “disaster.” Thus, setting earthquake as a starting point of learning to understand other natural disasters eventually is assumed to be an effective and a comprehensive way of raising risk consciousness in not only Tochigi Prefecture but also other parts of Japan.

## *3. Development of Disaster Management Education Programs*

### *3.1. Outline of the Programs*

The disaster management education programs developed in this study correspond to two kinds of natural hazards, namely, earthquake and tornado. The programs were developed based on the ADDIE process of instructional design, a learning theory. It was designed so that each educational program is not necessarily conducted by disaster management specialists, as the teachers themselves can teach the lessons in the regular learning process for students. The objective of the educational programs is to teach students of the correct knowledge on natural disasters and enhance their capacities to forecast the risks and avoid them; in other words, the programs aim to foster “zest for life” among the students. Moreover, the students can learn the “package of recognition, judgment, and action” through disaster response exercises. The intension of learning, ways on how to proceed in class and apply the educational materials, and notes on guidance are mentioned understandably. Word and PowerPoint files, with high versatility, are provided to incorporate teachers’ originality and ingenuity into the programs in accordance to the characteristics of the school and the students’ developmental stage. The programs allow much flexibility to be reproduced and redirected.

### 3.2. The Proposed Earthquake Disaster Management Education Programs

The “Earthquake Disaster Management Education Programs” developed in this study aim for students to learn the correct knowledge on Earthquake Early Warning and the voluntary and appropriate behaviors after an issuance of an Earthquake Early Warning. Earthquake Early Warning is a forecast and warning for seismic motion to be disseminated as quickly as possible. The process involves analyzing the data observed by the nearest seismograph to the epicenter, estimating the epicentre and the magnitude of the earthquake immediately, and forecasting the arrival time of the principal shock and the seismic intensity at each place. The Meteorological Agency issues such warning, which is considered an urgent information that must be gathered every second, and it takes only several seconds to several tens of seconds from its issuance to the arrival of a strong shock. Accordingly, it is required to respond to the Earthquake Early Warning instantly when hearing it. To be able to save one’s own life, it is essential that one learns how to respond similar to a conditioned reflex one this warning is issued. In “the Council on Disaster Education and Disaster Management after the Great East Japan Earthquake” and “Plan for Promotion of School Safety”, among others, the evacuation drill using Earthquake Early Warning is recommended as a method for disaster management education and drill to learn how to behave based on the initiatives of the learners.

This set of programs has the following three steps (structured by units), namely,

Step 1: Prior Learning: “Learn the correct behaviors when hearing the Earthquake Early Warning”;

Step 2: Disaster Response Exercise: “Disaster response exercise is performed by using the Earthquake Early Warning”; and Step 3: Review: “Review the behaviors when hearing the Earthquake Early Warning.” Then, the Teacher’s Guide formulates a flow of several guides that shows the ways and sequences on how to guide the learners and how to learn the learning objectives. The Worksheet comprises of teaching materials that contribute to the effective and efficient learning by formulating

the contents and points of learning clearly and briefly. The useful ideas can be arranged by “writing” and “summarizing” them on this Worksheet. The Program for Disaster Response Exercise is a plan showing a flow of the exercise performed by using the sound of chime of the Earthquake Early Warning. Two kinds of programs have been prepared; one is a “long exercise” for evacuation to a schoolyard, whereas the other is a “short exercise” for quick response in a short period. The Questionnaire has been developed to review the disaster response exercise (qualitative survey) and evaluate the degree of knowledge and behaviors acquired through the implementation of the programs (quantitative one). Next, the outlines of each step are described below. Prior learning of Step 1 aims to teach the basic knowledge on Earthquake Early Warning and allows the learners to imagine the movements of the objects caused by an earthquake (or the risks involved), consider the concrete measures to be taken when hearing the Earthquake Early Warning, and understand the rules for evacuation to safe place after an earthquake. A flow of guidance of Step 1 is described as follows. To begin, in the part of “Introduction,” it is intended to understand the fear of earthquake by reviewing previous earthquake disasters and knowing the sound of chime and the mechanism of Earthquake Early Warning. The next step of “Development 1” aims to know the movements of objects caused by an earthquake and consider measures to protect oneself when hearing the Earthquake Early Warning or feeling a strong shake of earthquake. In this step, students must understand the importance of evacuating to a safe place where any object would “never drop, never fall down, and never move,” which is a key phrase at a time of an earthquake. In this step, students must also deepen their understanding of the appropriate behaviors in schools by putting their ideas in the worksheet and creating a presentation mutually. In “Development 2,” the necessary response in evacuation expressed by the motto of “OKASHIMOCHI,” an acronym of “*Osanai, Kakenai, Shaberanai, Modoranai, and Chikazukanai* (don’t push, don’t run, don’t return, and don’t approach)” is learned. Finally, in the “Conclusion” of Step 2, Disaster Response Exercise is prepared by summarizing the contents of the prior learning of Step 1. Step 1 is recommended to be performed in one period of time in school, which corresponds to 45 minutes. In step 2, the objective of the Disaster Response Exercise is for students to use their prior learning described in Step 1, pay attention to the key phrase for evacuation, “(objects would) never drop, never fall down, and never move,” and behave to protect themselves based on their own judgment when hearing the sound of chime of the Earthquake Early Warning. The capabilities to judge on their own and behave as if it is a conditioned reflex action are acquired by practicing the exercise with assumed various situations, such as break time or time for cleaning, at the signal of broadcast of sound of the chime of the Earthquake Early Warning. The disaster response exercise, including the evacuation to a schoolyard and roll call, and review of the exercise are supposed to be performed in one period of time in school corresponding to 45 minutes. If the school could not allocate an enough time for such exercise, only the disaster response is conducted during break time in a “short exercise.” A “short exercise” can be repeated without reducing the school hours and eradicate training with script by performing the exercise without previous notice. In

Step 3, Review, the learning objective is for students to check the appropriate disaster response when hearing the Earthquake Early Warning and understand the importance of protecting themselves based on their own judgment at a time of an earthquake. By using the Questionnaire for Review on Exercise and Effectiveness Measurement, students can evaluate whether they have learned to behave on their own initiatives through prior learning and the practice of a disaster response exercise. A flow of Step 3 can be described as follows. First, in “Introduction,” the disaster response exercise is reviewed. In “Development 1,” the disaster response that has been practiced in the exercise is filled in the Questionnaire and those to be taken at various places are understood deeply through the mutual presentations of learners. In “Development 2,” the following important key phrase to protect students from an earthquake is reviewed: “(objects would) never drop, never fall down, and never move.” In the last part of the learning, “Conclusion” is intended to notice that similar disaster response can be applied to the other places other than school as well and understand the importance for students to behave based on their own initiatives. Step 3 is recommended to be performed in one period of time in school corresponding to 45 minutes. However, it can also be performed in combination with an alternative of Step 2, a “short exercise,” in one period of time in school corresponding to 45 minutes.

#### *4. Implementation, Evaluation, and Improvement of the Proposed Programs*

##### *4.1. Implementation*

In this study, it is verified how the learning objectives could be attained for the teachers who are not the experts on disaster management by practicing the Earthquake and Tornado Disaster Management Education Programs. The teachers distributed the questionnaire to the students before and after the implementation of the programs, and then evaluated their effectiveness in terms of the degree of attainment of the learning objectives, as measured by self-evaluation. The survey was conducted at three schools in Kanuma City, namely, Niregi Elementary School, Minamioshihara Elementary School, and Minamioshihara Junior High School, which have been designated as the model school for disaster management education in the MEXT’s Project for Comprehensive Support for Safety [24].

The program’s effectiveness was measured in the following order: 1) Earthquake Questionnaire no.1 “Effectiveness Measurement” (before the implementation of the program); 2) Earthquake Learning “Step 1: Let us learn the ‘correct behaviors’ when hearing the Earthquake Early Warning”; 3) Disaster Response Exercise for the Earthquake Early Warning no.1 “Disaster Response Exercise”; 4) Earthquake Learning “Step 2: Review the correct behaviors when hearing the Earthquake Early Warning”; 5) Earthquake Questionnaire no.2 “Effectiveness Measurement” (after the implementation of the program); 6) Tornado Questionnaire no.3 “Effectiveness Measurement” (after the implementation of the program); 7) Tornado Disaster Response Exercise no.2 “Disaster Response Exercise”; 8) Earthquake Questionnaire no.3 “Effectiveness Measurement”; 9) Disaster Response Exercise for the Earthquake Early Warning no.2 “Disaster Response Exercise”; 10) Earthquake Questionnaire no.4 “Effectiveness Measurement”; 11) Earthquake Questionnaire no.5 “Effectiveness Measurement.”

The same method of evaluation is adopted to evaluate the availability of the programs. In “Questionnaire on Earthquake” for effectiveness measurement of the proposed “Earthquake Disaster Management Education Programs,” eight questions are set. The first four items, from 1 to 4, ask about the degree of knowledge in terms of earthquake phenomena and Earthquake Early Warning. The other four items, from 5 to 8, ask about the degree of understanding on the disaster response when an earthquake occurs or the Earthquake Early Warning is heard. These items correspond to the learning objectives of the proposed “Earthquake Disaster Management Education Programs.” They are also used as criteria for evaluating the educational programs; students evaluate the degree of attainment of the learning objectives in five stages. As for the concrete contents of the learning objectives in terms of knowledge, the following four items are evaluated by the students themselves in five stages, from “I know well” to “I don’t know”: “(1) Know how to protect yourself correctly if an earthquake occurs,” “(2) Know what is the Earthquake Early Warning,” “(3) Know that it takes only a short time between the issuance of the Earthquake Early Warning and the arrival of a strong shake,” and “(4) Know what to do when hearing the Earthquake Early Warning (sound of chime).” As for understanding the correct behaviors when an earthquake occurs or the Earthquake Early Warning is heard, students evaluate the following four items in five stages, from “I think so” to “I don’t think so”: “(1) Any place where an object would drop, fall down, or move is dangerous if an earthquake occurs,” “(2) Drop your body low, cover your head and body, and hold on until the shake ceases, in cases when an earthquake occurs,” “(3) Protect yourself in the same way as in the case of an earthquake if you hear the Earthquake Early Warning (sound of chime),” and “(4) Think and act on your own to protect yourself if you hear the Earthquake Early Warning (sound of chime).”

#### *4.3. Implementation and Evaluation of the Proposed Programs at Elementary Schools*

The Earthquake and Tornado Disaster Management Education Programs were conducted by the teachers to students from the third to the fifth grade of Niregi and Minamioshihara Elementary Schools in Kanuma City (n = 115–116). The effectiveness of the programs was measured. As for the degree of knowledge in terms of earthquake phenomena and the Earthquake Early Warning in the first four items of the Earthquake Disaster Management Education Programs, the degree of attainment of the learning objectives is evaluated as the average of evaluation in five stages (where five is the maximum and one is minimum) before the implementation of the programs. The average scores are as follows: 4.10 for the item “(1) Know how to protect yourself correctly if an earthquake occurs”; 3.70, “(2) Know what is the Earthquake Early Warning”; 3.85, “(3) Know that it takes only a short time between the issuance of the Earthquake Early Warning and the arrival of a strong shake”. As a result of the *t*-test analysis, a statistical significant difference is recorded at 1% standard under all the items. As for the other four items on understanding of the correct behaviors when an earthquake occurs or the Earthquake Early Warning is heard, the degree of attainment of the learning objectives expressed as the average of evaluation in five stages (where five is the maximum and one is minimum) is evaluated at 4.46 to 4.83 before the



implementation of the programs, and 4.47 to 4.83 after it. It is confirmed that all the four items have attained the learning effectiveness with more than 4 scores. As a result of the *t*-test analysis, there is no significant difference under all the items. Thus, it is confirmed that the learning effectiveness and the efficacy have been improved by the teachers' implementation of the Earthquake Disaster Management Education Programs. A problem has been revealed that for the 4 items on understanding of the correct behaviors, which had already attained a high score because of the previous evacuation drills, the understanding on this theme needs to be deepened by a continuation and a review of the disaster response exercise.

#### *4.4. Implementation and Evaluation of the Proposed Programs at a Junior High School*

The Earthquake and Tornado Disaster Management Education Programs were implemented by the teachers to students of Minamioshihara Junior High School in Kanuma City ( $n = 110$ ). The effectiveness of the programs was measured. As for the degree of knowledge in terms of earthquake phenomena and Earthquake Early Warning in the first four items of the Earthquake Disaster Management Education Programs, the degree of attainment of the learning objectives expressed as the average of evaluation in five stages (where five is the maximum and one is minimum) has improved, from 4.28 to 4.60 before the implementation of the programs to 4.70 to 4.79 after it. Thus, the effectiveness of learning can be confirmed. As a result of the *t*-test analysis, a statistically significant difference can be recognized under all the items (Fig. 15). As for the other four items on understanding of the correct behaviors when an earthquake occurs or the Earthquake Early Warning is heard, the degree of attainment of the learning objectives expressed as the average of evaluation in five stages (where five is the maximum and one is minimum) is evaluated at 4.16 to 4.91 before the implementation of the programs and 4.35 to 4.80 after it. Thus, the effectiveness of learning can be also confirmed generally. As a result of the *t*-test analysis, there is a statistically significant difference under the item 8) at 5% standard, but no significant difference under the other three items. As for the reason why the degree of attainment under the item of "7) Protect yourself in the same way as in the case of an earthquake if you heard the Earthquake Early Warning (sound of chime)" is lower than the other items, the system receiving the Earthquake Early Warning in school is used in the exercise and the arrival time of the principal shock, S wave, is announced after the sound of chime. Accordingly, recognizing more time left than in the case of a sudden shake, students would judge that they could move to a safer place. For this reason, certain students would answer "I don't think so" to the item 6). There is a room for improvement to add a new item to the questionnaire, which asks whether the students recognize more time left in the case of the Earthquake Early Warning or not.

#### *5. Maintenance of the Acquired Knowledge and Improved Capabilities through Educational Programs*

To verify whether the acquired knowledge and improved capabilities through the educational programs for students could be maintained, the effectiveness is measured repeatedly. The survey was conducted at the three schools, namely, Niregi Elementary School, Minamioshihara Elementary School, and Minamioshihara Junior

High School, where the educational programs were implemented for the elementary students from the third to the sixth grade (n = 115–116) and all junior high school students (n = 110).

### *5.2. Method of the Survey*

To confirm the maintenance of the acquired knowledge and capabilities through each program, the continuous effectiveness measurement is required. For this reason, in the study, the disaster response exercise for the Earthquake Early Warning and that for tornado were performed when about two months had passed since the implementation of the Earthquake and Tornado Disaster Management Education Programs. The questionnaire for effectiveness measurement was distributed among the students before and after the exercise; it was answered in five stages, which can be evaluated quantitatively.

### *5.3. Verification of Maintenance of Acquired*

#### *Knowledge and Capabilities*

To survey the maintenance of acquired knowledge and capabilities through the implementation of the Earthquake and Tornado Disaster Management Education Programs, the same students conducted a self-evaluation. This is a statistical method to survey how the scores on the degree of attainment of the learning objectives of the students have been changed. An analysis of variance (with correspondence) of repeated measures is conducted. Reviewing the general tendencies among the elementary school students as for the verification of the maintenance of the acquired knowledge and capabilities through the Earthquake Disaster Management Education Programs, despite of certain increase and decrease, the knowledge and capabilities, which were acquired through the first learning, have been maintained. There is no item in which the degree of attainment of the learning objectives decreases remarkably. After students are allowed to imagine the risk of an earthquake through learning activities, such as a disaster response exercise for the Earthquake Early Warning, the degree of attainment of the learning objectives under four items in terms of knowledge on the phenomena of earthquake and the Earthquake Early Warning has increased with statistical significance. As for the four items on understanding of the correct behaviors, only the degree of attainment of the learning objectives under the item “7) Protect yourself in the same way as in the case of an earthquake if you heard the Earthquake Early Warning (sound of chime)” has increased with statistical significance. Next, reviewing the general tendencies among junior high school students, despite certain increase and decrease, the knowledge and capabilities acquired through the first learning have been maintained. There is no item in which the degree of attainment of the learning objectives decreases remarkably. By implementing the learning to allow the students to imagine the risk of an earthquake, such as a disaster response exercise for the Earthquake Early Warning, the degree of attainment of the learning objectives under all the items has increased. Under all the four items on the degree of knowledge on the phenomena of earthquake and the Earthquake Early Warning, a statistical significance can be recognized in both cases of the elementary and junior high school students. Meanwhile, a statistical significance cannot be recognized under the four items on understanding of the correct behaviors

when an earthquake occurs or the Earthquake Early Warning is heard. Certain items in which the degree of attainment of the learning objectives has not increased through the implementation of the programs follow a similar transition as the other items. There is no item in which the degree of attainment of the learning objectives decreases remarkably.

The knowledge and capabilities acquired through the Earthquake Disaster Management Education Programs can be maintained by incorporating the learning to allow the students to imagine the risks of a disaster into the programs. Moreover, comparing the phenomena of earthquake, it is recognized that a higher degree of attainment acquired through the learning process can be maintained in the Earthquake Disaster Management Education Programs.

#### *6. Desirable Cooperation Between Disaster*

##### *Management Organizations and Educational Institutions*

Only the effort to deliver the lessons to individual schools by experts cannot easily lead to a spread of the disaster management education to other schools. This problem occurs because the educational institutions have a hierarchy from the Prefectural Board of Education, Municipal Board of Education to the schools, and then teachers; each layer has its own independence. Thus, in Tochigi Prefecture, the Meteorological Observatory plays a role of adviser on disaster management, and the mechanism to exercise the disaster management education, according to each level, has been built to take advantage of the schools, Municipal Boards of Education, and Prefectural Board of Education. To spread the disaster management education to all the other prefectures the fruits acquired through the exercises are provided as feedback to the boards of education and the schools by taking the opportunity to train teachers under the sponsorship of the Board of Education. This mechanism follows the recommendation to “urge the cooperation among schools and their founders, the disaster management departments, the local meteorological observatory, and the fire department in the relevant region to promote especially the disaster management education in schools.” This recommendation is referred to in “Plan on Promotion of School Safety,” which was submitted by the Central Education Council based on the lessons from the disasters, such as the Great East Japan Earthquake, and endorsed by the Cabinet in 2012. In Tochigi Prefecture, the disaster management education is now rapidly spreading among schools through the new mechanism, in cooperation with different disaster management organizations and educational institutions. For example, the spread of the disaster management education has been promoted to the teachers through the opportunity of training under the sponsorship of the Board of Education. The Earthquake Disaster Management Education Programs are already promoted in Nasu Town, Tochigi City, Sano City, and Nasushiobara City. In summary, to realize a cooperation with disaster prevention organizations and educational institutions, proposes that not only specific educational institutions but also three different actors, namely the Prefectural Board of Education, the Municipal Board of Education, and the model schools, which are willing to implement the programs, must be urged to cooperate.

#### *7. Conclusions and Vision*

In the study, the current situation and problems in Japanese schools were reviewed, systematic disaster management education programs were proposed for students to learn the correct knowledge on various natural disasters and enhance their capacities to forecast the risk and avoid it based on their own initiatives, and then the proposed programs were verified and evaluated in these schools. The proposed programs need not be implemented by disaster management specialists, as teachers can practice the disaster management education as part of the ordinary learning process for elementary and junior high school students. Prior to the development of the programs, an awareness survey was conducted to both elementary students and teachers regarding “their consciousness of the crisis of school safety caused by natural disasters, among others.” The results of the survey indicated that “the disaster management education based on earthquake disaster was effective for students and teachers as a starting point of learning, as they had already experienced an earthquake and a disaster drill targeting an earthquake.” Thus, the proposed education programs was designed that the disaster management education for earthquakes and other natural disasters are practiced not separately but jointly to foster children’s “zest for life” at a time of natural disasters. The proposed two programs corresponded to earthquake and tornado, and each program consisted of three parts. The teaching materials, such as the proposed guidance and worksheet, were prepared using editable files to allow teachers to edit the content by themselves. A survey method based on ADDIE process of instructional design, a learning theory, was adopted. In the ADDIE process, effectiveness of the proposed education program was measured through students’ self-assessment on the extent to which the learning objectives had been attained.

For this reason, the proposed programs in this study was evaluated by measuring the degree of attainment several times, before, during, and after the implementations. As a result of the evaluation, the combination of earthquake and tornado disaster management education programs was proved to be highly effective for education. The results also indicated that the acquired knowledge and improved capabilities could be maintained by repeating the practice of the programs. In carrying out the study, cooperation with disaster prevention organizations and educational institutions was indispensable. However, to realize such cooperation, it is proposed that not only specific educational institutions but also three the different actors, namely, *the Prefectural Board of Education, Municipal Board of Education*, and the model schools, which are willing to implement the programs, must be urged to cooperate with one another. The conditions to spread the proposed disaster management education programs in Tochigi Prefecture are now improving. Such education programs have become widespread in schools in Tochigi Prefecture. For example, the disaster management education using such programs are obligated to be implemented in schools in certain municipalities in Tochigi Prefecture. To promote further the introduction of practical disaster prevention education all over the country, the “Support for Disaster Management Education” [27] has been established in the homepage of the Utsunomiya Local Meteorological Office. In certain municipalities in Tochigi Prefecture, the disaster management education programs are now exercised

under the sponsorship of the Boards of Education. However, such proposed programs are yet to be standardized to be applied to all prefectures. Tochigi Prefecture participates in the MEXT's "Comprehensive Support Project for Practical Safety Education." The results of this study is distributed to schools in other prefectures. In the future, the disaster management education programs will be promoted further by making use of this mechanism. Moreover, the preparation for the disaster management education programs for volcanic eruption, which is supposed to be among the characteristic natural disasters in Tochigi Prefecture, is underway. Such future programs will also be implemented and verified in different schools.

### **Preparing for the worst: disaster education in Japan**

As a country prone to natural disasters, especially earthquakes, tsunamis and typhoons, Japan has a long history of disaster education. But what does Japan's public disaster education look like and how should it be further developed?

Broadly speaking, disaster education fits within two categories: publicly funded and voluntarily organized education. Currently, voluntarily organized disaster education is rapidly outpacing its publicly funded counterpart.

It is the responsibility of the government and its agencies — at the municipal, prefecture and national level — to provide public disaster education. The framework of this education program is set out in the Basic Disaster Management Plan, which is in turn broken down into regional, prefectural and municipal plans. This means that disaster education can be discussed while taking specific risks and local needs into consideration.

As many as 24 government organizations and 56 public corporations are also obliged to have Disaster Management Operation Plans. These plans not only set out protocols, arrangements and areas of responsibilities in emergency situations, but also define disaster education for the organization.

The Meteorological Agency, for instance, offers a workshop called 'what to do if you experience torrential rain' to communities which are likely to be hit by heavy rain and typhoons. Another example is the Stranded Commuters Measures Ordinance, which was introduced following the 2011 triple disaster when a large number of commuters were stuck in Tokyo.

In memory of the 1923 Kanto Earthquake, which killed more than 100,000 people in Tokyo, the Japanese government has also established 1 September as 'Disaster Prevention Day' (*bosai no hi*) and the week commencing 30 August as 'Disaster Prevention Week' (*bosai shukan*). During these events, governments at the national, prefectural and municipal levels offer awareness-raising events and practical training drills. A range of information regarding disaster-related laws and policies, educational materials and event information are also made available to the public via government websites.

In schools, disaster education is regulated under the School Health and Safety Act, within a multi-hazard policy framework called 'School Safety'. The act requires every

school, with guidance from the Ministry of Education, to develop and implement a School Safety Plan. Requirements for school preparedness in the face of various hazards are also defined within the national curriculum, with individual schools being obliged to implement suitable safety initiatives. Disaster education is also a necessity for school staff, through which they gain scientific knowledge on disasters as well as first aid and counselling skills.

Historically, volunteer organised disaster response in Japan has taken on a different role than the publicly funded form. One critical aspect is mutual cooperation between local neighbourhoods. Most of the wards in cities and towns have a volunteer disaster prevention organisation (*jishu bosai soshiki*) along with a neighbourhood association (*chonaikai*), which are usually led by retired firemen and community leaders. Working together with the municipal government, volunteer organisations arrange awareness-raising events as well as disaster drills for the community.

On top of such traditional forms of volunteer organisations, there has also been a recent surge in interest for civic participation and community support. The 1995 Hanshin/Awaji Earthquake originally triggered this interest and, as a consequence, 1995 is referred to as 'the start year of volunteering' in Japan. Given the increasing numbers of volunteers, a not-for-profit and independent organisation called the Council of Social Welfare (*shakai fukushi kyogikai*) was established to organise training, develop guidelines to clarify the roles of volunteers and promote a culture of volunteering.

What is interesting about voluntarily organised disaster education is its two-dimensional nature. Volunteers are educated about disasters both through formal and informal training and through the process of volunteering itself.

Overall, Japan's disaster relief and disaster education looks to have a promising future, though it has not yet reached its goal of reducing the damage of natural disasters by 50 per cent. For instance, collaborative work among different stakeholders, including voluntary sectors, is continuing to increase. This trend has partly stemmed from cuts in public funding for disaster education. While such austerity measures are of concern, this does provide an opportunity for Japan to consolidate the development of its civil society — a central actor in disaster relief.

Another positive trend has been the emergence of the notion of 'everyday preparedness' (*seikatsu bosai*). Originally advocated by Kyoto University's Professor Katsuya Yamori, its aim is to embed vigilant thinking and behaviour in everyday life, rather than treating disaster education as an additional activity. Everyday preparedness is promoted as being developed by citizens, for citizens. Such trends in disaster relief improve Japan's ability to live with disasters, rather than be a victim of them.



The “Kamaishi Miracle” was not a miracle at all. Evacuation drills and DRM education are fixtures in Japan’s schools. In Kamaishi City, where the tsunami claimed 1,000 members of the population of 40,000, the casualty rate among school children was low: only 5 out of 2,900 primary and junior high school students lost their lives, a rate 20 times lower than for the general public. Regular practice drills, education in the schools, and hazard maps are the keys to preparedness. DRM education saves the lives of children and other members of the community.

## LESSONS

National and local governments in Japan have distinct and complementary roles in DRM planning. The national level is in charge of defining the overall DRM strategy, coordination and legislation, allocation of funds, and deployment of the government budget. In local-level disaster management plans, governments are

focusing on coordination of administrative and operational functions; preventive measures, such as education, safety drills, and issuing and transmitting of information and warnings; evacuation and rescue activities and primary goods supply and distribution in emergency situations; and overall coordination of reconstruction and restoring livelihoods during the recovery phase. The central government provides substantial funding for emergency response and reconstruction. The lessons learned from the Great Hanshin- Awaji (Kobe) Earthquake in 1995 had already prompted improvements to Japan's DRM legislation and government policies. In recent years, high priority has been given to developing countermeasures for largescale earthquake disasters. Legislation has been passed on countering large- scale ocean trench-type earthquakes, plans for large cities where damage is likely to be wide- ranging have been established, and the overall legislative framework on DRM and disaster countermeasures has been improved. After the GEJE, these kinds of countermeasures have been emphasized even more, and the Disaster Countermeasures Basic Act was revised in June 2012. The main drivers of the latest revision were the need to account for low- probability, high- impact, and multilocation hazards and to strengthen the local government's role in providing training and planning emergency measures and evacuations.

#### The Education Sector

Although the education sector sustained considerable damage in the Great East Japan Earthquake (GEJE), it also played a key role in protecting lives. Importantly, it provided both civil protection "hardware" and "software": school buildings served as evacuation shelters and transition shelters, and the school curricula ensured that children knew how to prepare for and react in emergencies. The performance of schools in responding to the GEJE provided a number of important lessons about the role of the education sector in disaster risk management.

### **Damage to the education sector**

The Great East Japan Earthquake (GEJE) caused severe structural damage to schools. In total, 6,284 public schools were damaged. The Ministry of Education, Culture, Sports, Science and Technology classified the schools into three categories according to the level of damage they sustained: 193 schools were completely destroyed (level 1); 747 schools sustained heavy damage and needed structural repairs (level 2); and over 5,000 schools had minor, mostly nonstructural damage (level 3).

Seven hundred and thirty-three students and teachers were killed or are missing. The proximity of the schools to the coastline was a contributing factor. The students and teachers in the Okawa Elementary School building in Ishinomaki City died tragically because they did not evacuate to higher ground (box 11.3). Where students in coastal schools survived, the school structure, disaster risk management (DRM) education, and linkages to community preparedness played critical roles.



## Oshima Elem. School Imaginary Drill



### The role of DRM education in community preparedness

DRM education conducted effectively and in cooperation with other local community preparedness efforts saved many lives after the GEJE. For example, in Kamaishi, where the number of casualties reached 1,000, there were 5 deaths reported among 2,900 school children, and not a single child present in school that day was killed. The so-called Kamaishi Miracle is attributed to strong DRM education, including a longstanding local tradition of teaching children the culture of *tendenko*, which means to evacuate to higher ground on their own without searching for relatives or friends (see box 8.1). This practice resulted from many years of experience with disasters, and is based on a strong mutual understanding and trust that family members will also evacuate to safety. Kamaishi City has been conducting DRM education programs since 2005 in cooperation with Gunma University. The programs are not mandatory, but are being implemented in selected schools in vulnerable coastal areas. Two such schools are Unosumai Elementary and Kamaishi-Higashi Junior High School. The program engages the local community in preparing disaster risk maps and holds evacuation drills four times a year—one joint drill with the elementary and junior high school and one annual drill with the local community. Kesennuma City provides another excellent example of how DRM is integrated into school curricula, where education for sustainable development (ESD) has taught students for years about local environmental issues and how to value and protect natural resources, the environment, and cultural heritage assets. ESD also includes a strong focus on DRM. In Kesennuma, students at the Hashikami Junior High School are taught DRM as part of the ESD program. The school served as an evacuation center for more than 1,500 people after the GEJE, which occurred just before graduation. A graduation ceremony took place in the gymnasium, and was attended by the evacuees. During the ceremony, a student gave a speech in which he honored two students who had lost their lives in the tsunami *“People are talking about Hashikami Junior High School as the ‘School of disaster prevention education,’ and we are being praised around the world. We trained ourselves thoroughly and have*

*been doing disaster prevention drills regularly. But our power as human beings was dwarfed by nature's violence, and nature deprived us mercilessly of some of our most important things. This disaster was too cruel to simply be called a trial sent from heaven . . . I feel angry and hardened. But our future lies not in blaming God but in helping each other and persevering, as difficult as that may be."* His words reflect the anguish of the community, and at the same time the recognition, gained from the ESD curriculum, that the community's responsibility is not to despair, nor to consider the disaster an "act of God," but to rely on one another for support and to improve their risk management capacity.

### **The role of Educational Facilities in Disaster Response and Recovery**

As noted earlier, schools played a critical role in the immediate response to the GEJE (as evacuation shelters) and in the recovery process (as transition shelters). Balancing the need to provide evacuation centers for communities and the need to reconvene classes for students has been a challenge, particularly where limited availability of suitable land has made housing reconstruction difficult, and the move from transitional shelter to permanent housing has been delayed. Another challenge relates to the future role of school buildings in civil protection as demographics shift. While schools have traditionally been the most important public facilities in local communities, declining birth rates and a rapidly aging population make it difficult to justify rebuilding them in the same numbers and sizes. Considerable resources are required if the education sector is to recover fully. Funds need to be allocated for temporary schools, followed by site selection and construction of new schools, and repairs to buildings that remain structurally sound. An aging population and declining numbers of students presents a special challenge, as communities balance using school facilities for both education and civil protection purposes.

### **LESSONS**

- Key lessons from the GEJE experience for the education sector are as follows:
- *Importance of DRM education.* As exemplified by the "Kamaishi Miracle," DRM education played an important role in determining the students' evacuation behavior. The role of teachers in implementing DRM in schools should be emphasized.
  - *Structure, location, and layout of schools.* The location of school buildings is a crucial issue. In most cases, the buildings were located in close proximity (within 100–200 meters) of the coastline. Newer schools have slanted roofs to avoid water logging and structural decay. However, this prohibited people from taking shelter on rooftops. Also, it has been observed that schools that were parallel to the coast sustained greater damage than those set perpendicular to the coastline.
  - *Function of schools and educational continuity.* While schools were to be used as evacuation centers, in several cases people from local communities remained sheltered in schools for more than six months. This has serious implications for the

restoration of educational services and children's educational development. This issue needs to be considered in future school-level contingency planning.

- *Human resources and training.* In the aftermath of the GEJE, schools face a shortage of teachers, which has affected the continuity of education. Students from the education faculties of local universities have tried to fill this gap; however, this also needs to be addressed in planning for educational continuity in postdisaster situations.
- *New role of schools and multistakeholder dialogue.* Given the changing demographic conditions, schools need to play a bigger role as community facilities. Therefore, a broader range of stakeholders, including community members, needs to be included in reconstruction decision making.

### **Recommendations for Developing Countries**

*The education sector plays an important dual role in the provision of civil protection hardware and software.* School buildings serve as evacuation shelters and transitional shelters, and school curricula help instill a culture of DRM and preparedness in the community. The recovery of the education sector is directly linked to the recovery of the entire community. *DRM education saves lives, as the “Kamaishi Miracle” shows.* Students save their own lives and the lives of others when they lead evacuations in communities. DRM in the education sector should not be limited to the education curriculum, but should also include related issues such as structural and non-structural safety measures; legislative measures supporting the integration, implementation, and funding of DRM in the education sector; risk assessments and early warning systems; and DRM training for school staff *Include community members in planning.* The postdisaster reconstruction process offers an opportunity for communities to reconsider their future needs regarding both the education of their children and their community facilities. A multi stakeholder dialogue can help determine the optimal arrangements and design reconstruction plans accordingly.

#### **“123 of Disaster Education”:**

**Kyoto University**

**(Shortened; Earthquake)**

KYOTO UNIVERSITY

The national planning, local government planning, civil society participation, interventions of donors and international agencies are all important to create the enabling atmosphere. However, within that enabling atmosphere, it is of utmost importance to generate activities in the individual level, family level, and community level. To do this, education is the first and foremost vehicle. Two key issues in Disaster Risk Reduction Education (in this publication, it is mentioned as Disaster Education) are important: Disaster education should not be an event (like an evacuation drill), it

should be a process. Disaster education should break the school boundary, and be linked to the community and family. The importance of linking school education with family and community education is gradually recognized and currently practiced in some countries, engaging students in more pro-active partnership with the neighborhood. However, there are few tools and workbooks available for this type of disaster education. This workbook makes a modest attempt to provide a rather comprehensive disaster education program linking the school, family, and community. The 1-2-3 Concept is innovative and original, which has been put forward by a team of researchers in Kyoto University in cooperation with NIED/ EDM (Earthquake Disaster Mitigation Research Center, National Research Institute for Earth Science and Disaster Prevention).

### Earthquake Preparedness Level One

ACTIVITIES	MECHANISM	PREVENTION	LOCALITY
Short lecture and movie watching	Knowledge from other experience	Individual	
Reading newspapers and discussion with parents		Individual + home	Local history
Drawing and Essay Competition		Individual	
Town Watching		Individual + Community	Geography of Community
Group Diary		Individual	Local History
Neighborhood Meeting		Individual + Community	Indigenous Knowledge
Mapping Your House and Preparing an Emergency Supply Kit		Home	

### Earthquake Preparedness Level Two

ACTIVITIES	MECHANISM	PREVENTION	LOCALITY
Earthquake Evacuation Drill		Individual	
Family Outdoor Cooking		Individual+ Home	Indigenous Knowledge
Survival / Disaster Preparedness Sports Meet		Individual + Community	Indigenous Knowledge
Organizing and Acting in a Play		Individual + Community	Local history
Neighborhood Survey		Individual + Community	Local history + Indigenous Knowledge

Family Conversation and Household Checklist		Individual+ Home	
Arranging and Securing Furniture for Safety		Individual+ Home	

### Earthquake Preparedness Tree Level One

<b>ACTIONS</b> EL1-G. Mapping Your House and Preparing an Emergency Supply Kit		
<b>KNOWLEDGE</b> EL1-A. Short Lecture and Movie Watching EL1-B. Reading the Newspaper and Discussion with Parents	<b>INTEREST</b> EL1-C. Drawing and Essay Competition EL1-D. Town Watching EL1-E. Group Diary	<b>DESIRE</b> EL1-F. Neighborhood Meeting

### Earthquake Preparedness Tree Level Two

<b>ACTIONS</b> EL2-F. Family Conversation and Household Checklist EL2-G. Arranging and Securing Furniture for Safety		
<b>KNOWLEDGE</b> EL2-A. Earthquake Evacuation Drill	<b>INTEREST</b> EL2-B. Family Outdoor Cooking EL2-C. Survival / Disaster Preparedness Sports Meet	<b>DESIRE</b> EL2-D. Organizing and Acting in a Play EL2-E. Neighborhood Survey

## **Prepare Before the Earthquake**

Disasters can strike quickly and without warning. In case of an emergency, being prepared and knowing what to do can save time, property and lives. Simple actions can make a difference in the survival of our family, our students, and our neighbors. So let's start by getting ourselves prepared today.

### **What are Earthquakes?**

An earthquake is a sudden, rapid shaking of the earth caused by the release of energy in the earth's crust. Earthquakes may cause loss of life and destruction of property. During a strong earthquake the ground shakes violently. Buildings may fall or sink into the soil. Rocks and soil may move downhill at a rapid rate. Such landslides can bury houses and people.

### **What is the purpose of this workbook?**

This workbook describes the educational program for earthquakes. It contains activities that students can perform to help themselves, their household, their school and their community prepare for earthquakes. It also includes information of the disaster as well as safety tips. The goal is to increase earthquake awareness and help the students to be prepared and be able to protect themselves during an earthquake. Hopefully, this workbook can help promote understanding that disaster preparedness is not accomplished overnight and it is never complete.

### **Before we begin, do you know...?**

Q1: Have you experienced an earthquake before?

YES NO

Q2: Do you know what are the effects or impacts of earthquakes?

YES NO

Q3: Does your school have earthquake drills?

YES NO

Q4: Does your family have a disaster plan?

YES NO

Q5: Do you know how to prepare an emergency supply kit?

YES NO

Q6: Do you know your community condition and residents well?

YES NO

## Level One Activities and Guidelines

Level One	Monthly/ Bi-Monthly	Semi-Annually	Annually
Level One	HOME EL1-G, Mapping Your House and Preparing an emergency Supply Kit		
	COMMUNITY COMMUNITY	EL1-D, Town watching	
	SCHOOL	EL1-A, Short Lecture and Movie Watching	EL1-C, Drawing and Essay Competition
	HOME EL1-B, Reading newspapers and discussion with Parents		
	COMMUNITY COMMUNITY	EL1-F, Neighborhood Meeting	
	SCHOOL	EL1-E Group Diary	
	Priority Activities		
	Optional Activities		

### EL1-A Short Lecture and Movie Watching

#### Rationale

Children can visualize an actual full-scale earthquake by watching movies. Visual tools are often more effective in creating an impact or leaving an impression to the one receiving it. Through movie watching, students may have a clearer image of what they can expect during the actual situation.

#### Procedure

Discuss with your classmates earthquake-related movies you know. Which one attracts you best? Exchange your ideas with other groups of classmates and list the titles of the films. Submit these titles to your teachers for their final selection.

#### Duration

2 Hours

After selecting the movie, teachers should prepare a short lecture as an introduction to the movie.

## Suggested topics

What is an earthquake?  
Why does an earthquake occur?  
Recent earthquake disasters.  
Places most likely to be destroyed by earthquakes.  
The severe impacts of earthquakes.

**Students may write a short memo of their thoughts after the session**

### **MEMO (Date, What I saw)**

e.g. 30 Sep,2009. Today, I saw a very impressive earthquake disaster movie. It showed how an earthquake destroyed Los Angeles. Before watching the documentary, the teacher gave us a simple explanation to help us understand the movie.

## **EL1-B, Reading newspapers and discussion with Parents**

### **Rationale**

It is difficult for school children to imagine the impact of a disaster without having actual experience. Considering the tight curriculum, children may not acquire adequate earthquake knowledge. Families can play a role in addressing this deficiency teaching children at home.

### **Procedure**

Children will be required to read newspaper and magazines, regularly. If daily is difficult, weekly will be fine. This helps to improve reading ability as well as to cultivate the habit of being aware of public issues, especially earthquakes.  
Keep newspaper clippings.  
Choose the most interesting information and talk with family members.

### Duration

At least 1 hour per session.

## **Suggested topics**

- The latest earthquake that happened in my country, surrounding regions, etc.
- What's the most famous earthquake in history and how many people were killed?



- When and where did the most severe earthquake occur?
- Generally, what kind of newspaper or magazine do you read?
- Lately, are there any striking news that caught your attention?

**Paste your newspaper clippings in the box**

## **EL1-C, Drawing and Essay Competition**

### **Rationale**

Competitions can be used to raise earthquake awareness and promote children’s understanding of earthquakes. At the same time, it gives teachers or the local officials the opportunity to see from the students’ perspective and understand the impact that the disaster have on the students.

### **Procedure**

Students are free to use their imagination. Students can either draw or write an essay to express their thoughts.

#### Duration

1 Week

#### Possible themes:

- Imagine and describe the situation before, during, and after an earthquake.
- Depict what may happen to you and your family after an earthquake.
- Think of how you can help to reduce the damage and mitigate the losses due to an earthquake.

#### Brainstorming Time:

*Do you have some good ideas to share with your friends?*

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All the students’ drawings and compositions can be exhibited in school and good ones can be selected and published in the school journal. Meanwhile, excellent ones can be recommended to be published in newspapers or magazines to encourage the students and also heighten the interest of the public.

## **EL1-D, Town watching**

### **Rationale**

To understand and develop concrete images of your community a field survey is necessary. This activity can help you prepare an evacuation route. Be sure to involve as many community members as possible.

### **Materials**

Base map, Digital camera, Sticky notes, Double-sided tape. If you don't have digital camera, what can be use to take evidence?

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Writing materials (pens, pencils, different colored marker pens), clip board.

- If needed, you may also bring snacks or lunch. What food and drink will you prepare?
- 

### Participants

In order to involve more stakeholders, who would you expect to invite?  
List possible participants and ask your teachers for advice.

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### Procedure

Preparation (venue, equipment) where would you suggest to gather the people and equipment for the presentation? Why?

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### Duration

1 day

### **Reference**

*Orientation or explanation should be given to the participants before the field survey, providing students an idea of the survey site and what to look for during their field survey. Such as:*

- Potentially dangerous places and safe places. What may hinder escape (e.g., waste dumped by the roadside)?
  - Students to be divided into groups (approximately 6-8). A short meeting will be carried out whereby students can allocate the tasks among themselves.
- What else do you think should be discussed? Why?
- 

*Orientation or explanation should be given to the participants before the field survey, providing students an idea of the survey site and what to look for during their field survey. Such as:*

- Potentially dangerous places and safe places. What may hinder escape (e.g., waste dumped by the roadside)?

- Students to be divided into groups (approximately 6-8). A short meeting will be carried out whereby students can allocate the tasks among themselves. What else do you think should be discussed? Why?
- 
- 
- 

- Field survey (observe the place, take pictures, keep notes)
- Lunch
- Mapping (mark the spots with explanation and pictures)
- Presentation (explain your group's map and answer questions)
- Wrap up

#### Things to consider

- Identify potential problems in the community (e.g., narrow roads, crumbling buildings, wire poles, dams, fire hydrants, etc.)
  - Concerning this town watching, what can be improved?
- 
- 

## **EL1-E Group Diary**

### **Rationale**

This activity can be used to raise earthquake awareness. It is also a good way of enhancing cooperation and teamwork among the students.

### **Procedure**

- Group the students (5-10 students in a group)
- Each group will make its own diary
- Each group member will take turns to write one entry per day. They can be anything related to earthquake (e.g., paste pictures, newspaper clippings, proverbs, stories, even songs)
- Every 2 months students will select top 2 entries within their group and share with other groups.
- Teachers can ask all students to vote and select the best 3 among all the entries shared.

### **DURATION**

- 1 hour

### **Suggested topics:**

- My plan to learn about seismology, the causes and effects of earthquakes.
- What I have heard about earthquakes today.
- What I did at home about earthquake preparedness.
- What's the news related to earthquakes in the newspaper or on TV.

**MEMO (Date, What I saw, what I thought)**

e.g. 12th May, 2009. Today is the anniversary of Wenchuan, China Earthquake, tens of thousands of people died due to the disaster and still many people are homeless or living very poorly without proper housing. I am in deep sympathy, especially to the children.

My diary entry

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**EL1-F, Neighborhood Meeting**

**Rationale**

Students must know more about the neighborhood and community. Students must learn about historical experiences and lessons learned from national or regional earthquakes.

**Procedure**

- Assemble the neighbourhood to meet regularly (e.g., every 2 months). Do you know your neighbors well? Who are they? How many family members do they have? List these information and try to visit them one by one
- Acquire basic information through a questionnaire. Keep this data as a file in a portfolio. (Please prepare a questionnaire in advance. Think about what information you want to know about your neighbors.)

**My own Questionnaire (What kind of information are important and helpful?)**

Duration

1 hour

Know the health condition of your neighbors. Also, know who are pregnant, who are handicapped, who are new to the area, and who would need special assistance in case there is an earthquake.

- What would be your suggestions to help the community?
- Establish sound and friendly relationship with your neighbors.

Things to consider

- Identify potential problems in the community (e.g., narrow roads, crumbling buildings, wire poles, dams, fire hydrants, etc). Discuss these with your neighbors to seek solutions.
- What else should be paid attention to and what can be improved from now on?

Information box	
Name:	Special Need
Name:	Special Need
Name:	Special Need

- What would be your suggestions to help the community?
- Establish sound and friendly relationship with your neighbors.

Things to consider

- Identify potential problems in the community (e.g., narrow roads, crumbling buildings, wire poles, dams, fire hydrants, etc). Discuss these with your neighbors to seek solutions.
- What else should be paid attention to and what can be improved from now on?

**EL1-G, Mapping Your House and Preparing an emergency Supply Kit**

**Rationale**

Develop a concrete image of your house. Learn to work and discuss with family members to protect you and your family in case of an earthquake.

**Procedure**

Know your house. When was it built? If the building is old and run down, escape right away when the earthquake strikes. If it is strong enough, you can conduct the “drop, cover and hold on” at home.

Sketch our bedroom, living room, and layout of furniture. Items include: Hanging objects, heavy furniture, breakable glass wares, electrical appliance, gas burners, etc.

- When was our house built?
- 

- Do your parents consider your house strong enough? If not, please work together to find a solution. What can you and your parents do?
- 

- Others?
- 
-

**Note:**

**For the Emergency Kit, families should prepare the most applicable and available items according to the local situation**

Duration

2 hours

Sketch your bed room and living room here
<ul style="list-style-type: none"><li>• Find safe place in your home ( e.g., bed, interior wall, sturdy table, etc.)</li></ul> <b>Mark them in Blue.</b> <ul style="list-style-type: none"><li>• Identify potential dangerous places and objects near your house which may hinder your evacuation. <b>Mark them in Red</b></li></ul>

Example of disaster supply kit at home

Are important documents, list of contact names and phone numbers, and valuable items placed in a safe and easily accessible place.	<input type="checkbox"/>
Is there an emergency kit for your family? If yes, are the items in good condition? For food items, are they within expiry dates?	<input type="checkbox"/>
List the items most useful to your whole family. Make sure you can get them locally.	<input type="checkbox"/>

Suggestions for home emergency kit

Water ( ) Food ( ) Radio ( ) Flash light & extra batteries ( ) First-aid kit ( )  
Whistles ( ) Cash ( )

Put a tick ( ) after checking and updating your Emergency Kit

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Level one evaluation: Poster Presentation

Level	Activity site	Frequency	Activity type
1	School	Annually	Priority

**Rationale**

In this whole year, students have learned many useful earthquake safety tips and conducted several activities. Requiring students to present and show what they have learned can trigger critical thinking among them as well as sharing information about what they have learned with other students. It is a good chance for the students to review on their whole year's work and how it has helped them.

### Procedure

Presentation can be done in a scrap book or poster with the following:

- What I have learned (like new knowledge, safety tips, etc.)
- What I have done (like mapping my house, etc.)
- Which is my favorite activity? Why?
- Which skill can help me, my family, and my friends the most?
- Paste your drawings and pictures to make your posters more attractive and interesting (like picture of the activity you conducted, snapshots of the movie you watched, picture of your emergency kit, picture of you and your friends surveying in the field, etc.)
- Present your poster to the class. See if you have space in the classroom where you can display your and your classmates' poster for a few days. Comment on each other's work.

I've done it: Level One

Activities	Date Completed	Comments, if any	Reviewer's Comments
Priority Activities			
EL1-A. Short Lecture and Movie Watching			
EL1-C. Drawing and Essay Competition			
EL1-D. Town Watching			
EL1-G. Mapping Your House and Preparing an Emergency Supply Kit			
Optional Activities			
FL2-G. Ensuring that Electrical Appliances are Unplugged			
EL1-E. Group Diary			
EL1-F. Neighborhood Meeting			
Level One Evaluation Poster Presentation			

## Level two Activities and Guidelines

Level two	HOME	EL2.F. Family conversation and Household Checklist	Monthly/ Bi-Monthly	Monthly	EL2.B. Family Outdoor Cooking	Annually
	COMMUNITY				EL2.D. Organizing and Acting in a Play	
	SCHOOL				EL2.A. Earthquake evacuation drill	Semi-Annually
	HOME				EL2.G. Arranging and securing Furniture for safety	
	COMMUNITY				EL2.E. Neighborhood Survey	
	SCHOOL				EL2.C. Survival / Disaster Preparedness Sports meet	
	Priority Activities					
	Optional Activities					

### EL2. A. Earthquake evacuation drill

#### Rationale

Students need to learn skills to survive an earthquake. These skills must be reinforced regularly so that students will not panic when an earthquake hits. Students can apply the knowledge gained in Level 1 by designing their own evacuation plans and conducting them. Everyone has to be reminded of disasters so that we don't forget easily and become too lax.

#### Procedure

1. If your place already has an earthquake memorial day and a date to conduct drills, please go to step 3. Otherwise conduct a group discussion and vote on an earthquake evacuation drill day.

Please consider 2 dates. The interval should be half a year.

**Your suggestions and reasons:**

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2. Teachers can collect the suggested dates and make the decision on the dates. Keep it in mind that school should conduct this drill twice a year.

**What's your Teacher's decision?**

**What dates are they?**

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3. Based on the learning in Level 1, students should have knowledge already about how to react when an earthquake strikes. Assume that an earthquake hits when you are in different locations (e.g., classroom, play ground, public area, or home).

*Based on your assumed location, draft a drill plan on the next page.*

### EL2-A Earthquake Evacuation Drill

Duration

2 hours

**Sketch a map of your evacuation route below:**

Which drills are decided to be conducted in your class?

Take notes about these drills.

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### EL2. B . Family Outdoor Cooking

**Let's boil hot water with empty cans.**

#### **Rationale**

People many have to face the situation when there is no way to prepare food the usual way, like after an earthquake. So students have to be prepared for this situation. Enjoy this good opportunity to learn something with your family.

#### **Materials**

Two aluminium cans, three empty 1L milk cartons or wood sticks, aluminum foil, 180ml of water, work gloves, lighter, scissors, a metal cutter, and a can opener. What else can you prepare as boiling container and fuel? Make sure they are easy to get after an earthquake.

#### **Procedure**

- Aluminium cans:

- 1. STOVE: Take off the upper lid and make 4 holes (3 x 2 cm each).
- 2. KETTLE: Take off the upper lid of another can.
- Milk carton box or wood sticks :FUEL: Cut them into 2 cm wide rectangular strips as fuel

Put water into the KETTLE can, cover the can firmly with the foil, ignite the strips for 8-10 minutes and you will have hot water for cooking instant noodles, porridge, or rice.

Duration

1 hours

**Things to consider**

Imagine your city is suffering from an earthquake. What would you eat?  
How would you save water and make the best use of limited food?

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Discuss with family members how to get local food after disasters?

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Come up with another way of preparing food in case of disasters:

**Materials**

(Make sure they are easy to get after an earthquake.)

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**Procedure**

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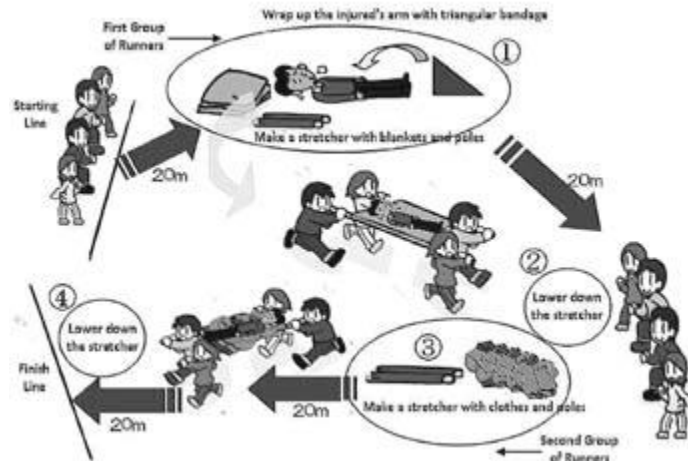
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**Take some pictures**



**Rationale**

In order to conduct self-protection and mutual rescue, simple medical care knowledge and team work are necessary. Students can get education and fun at the same time



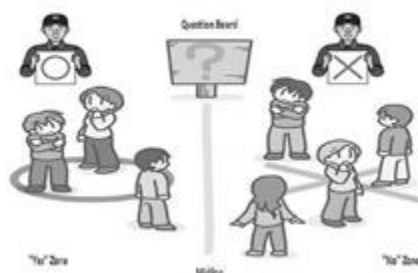
**1. Stretcher Carrying Games:** 9 students per team.

- First, 4 students run for 20m and stop to make an emergency stretcher using poles and blankets to carry an injured person.
- They will carry the injured person and run for another 20m to their team members.
- The 4 team members will make another emergency stretcher using poles and clothes
- The injured person is transferred to the new stretcher
- They run the last 20m to end the relay.
- The time is noted.



**2. Buckets Relay:** 16 students per team.

- 8 people will pass the bucket that is full of water, crossing 3 hurdles, to put out the fire
- The other 8 members pass the empty bucket back, crossing 2 obstacles.



### 3. Common Sense Quiz:

- 2 teachers hold a board with Circle (correct) and Cross (wrong) respectively .
- 10 questions regarding earthquakes will be asked and students will determine if its correct or wrong.
- They will leave the game if they answered incorrectly.
- At the end of the 10 questions, whoever is still in the game wins.

EL2

Survival / Disaster Preparedness Sports Meet

C

### 2. Buckets Relay: 16 students per team.

- 8 people will pass the bucket that is full of water, crossing 3 hurdles, to put out the fire
- The other 8 members pass the empty bucket back, crossing 2 obstacles.

Duration: 2 hours

Refer to <http://www.city.himeji.lg.jp/syoubou/plaza/undoukai/index.html>

## EL2.D. Organizing and Acting in a Play

### Rationale

After students are well prepared and are proficient with earthquake knowledge, they should try to share what they know with their neighbors. This way they can contribute to reinforce the social capacity against future disasters.

This can be an opportunity to involve the community more in earthquake preparedness activities.

### Procedure

Each class has to organize a play which can be a drama, comedy, thriller, musical, dance, etc. There is no limitation on the style but it has to relate to earthquake.

Discuss with your classmates your topic and preferable elements to put into the play. Please outline the story below.

Duration

1 Month

<b>Topic:</b> _____
<b>Style:</b> _____

Teachers may help create or select the play (e.g., what might happen before, during, or after an earthquake) Conceive some good stories with this topic.

### Teacher's opinion

If you need to invite 2 persons in the community to watch the play, who do you want to invite? Why?

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Choose the public theater, school studio, or assembly room so you will have enough room for a large audience. You can sell tickets and the revenue can be used as earthquake fund or to contribute in reinforcing and retrofitting the school building or local cultural heritage sites.

#### Things to consider

- After the play, discuss with friends what they learned.
- 
- 

- Give your suggestions for improvement on how to incorporate disaster elements and procedures applicable to local condition in your class's play.
- 
- 

## EL2. E. Neighborhood Survey

### Rationale

Identifying structural and non-structural risks can help the community prepare for earthquakes. Knowing about existing risks will allow residents to take the necessary precautionary and corrective actions.

### Procedure

Develop a questionnaire to collect information from families in the neighborhood. You may consult with your teachers, construction engineers, architects, geologists, rescue workers, etc. on what details are important to know. Visit your neighbors and together you list down the risks in your neighbors' house and discuss how they can be addressed. Risks include things that can fall in an earthquake and hurt someone, block an emergency exit, or damage other belongings. Take note of your neighbor's proposed measures and share also what you have learned in school.

Survey Questionnaire



Duration 1 day

After surveying the neighborhood, hypothesize the effects of a major earthquake based on the information you have gathered. Would a major earthquake affect the entire community the same way, or would the effects be different depending on the location of houses (type of soil in the area, whether the area is hilly or flat, etc.), the construction materials used, the preparedness of household members, etc.?

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Also, evaluate your neighbors on a scale of one to five, using these questions as criteria:

Did the neighbor participate actively in the survey?

Does the neighbor know about earthquakes and their possible impacts?

Can the neighbor correctly identify earthquake risks inside and outside their house?

Do you think the neighbor is at risk to earthquakes?

Write your own criteria here:

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What are the things you need to include in your next neighborhood survey?

Can you suggest ways on how you and your neighbors can better prepare for earthquakes?

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## **EL2.F. Family conversation and Household Checklist**

### **Rationale**

Knowledge about earthquakes and disaster education in schools can be disseminated by students to their family members. This can contribute in building a culture of safety and disaster resilience.

### **Procedure**

1. Identify potential hazards in your home (e.g., hanging objects, objects on open shelves and table tops, furniture and electronic appliances in the kitchen, water and gas pipes, storage areas, etc.)
2. Create a disaster-preparedness plan. Decide on two places to meet after a disaster. After determining these meeting places, learn lifesaving actions, stay informed, consider buying earthquake insurance, develop a business recovery plan if you have a family business, keep separate copies of important records, etc.
3. Protect yourself during an earthquake. What should you do (a) if you are indoors, (b) if you are outdoors, (c) if you are commuting?

### **Things to consider**

Let's try to make our own check list. For instance

1. Place beds so that they are not next to large windows, below hanging lights, below heavy mirrors, below framed pictures, below shelves with lots of things that can fall, etc.
2. Replace heavy lamps on bed tables with light, non-breakable lamps.
3. Use closed hooks when hanging plants, lamps, etc.
4. Remove all heavy / breakable things from high shelves.
5. Take glass bottles out of medicine cabinets and put on lower shelves. How many items can you think of? Please list them below thoroughly, discuss them with your parents, and check them annually.

Duration: 1 hour

## **EL2.G. Arranging and securing Furniture for safety**

### **Rationale**

Students have gained basic safety knowledge from Level One and the priority activities in Level Two. Let's apply our knowledge to create a safer home.

### **Procedure**

Read home activities in Level One and Two again. First of all, identify the potential non structural hazards in your own bed room, according to the map of your room you sketched in Level One.

*In the bedroom*

- Notice the hanging objects such as ceiling lamps, etc.

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- Place beds so that they are not next to large windows.
- What else should be moved?

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- Attach or fasten furniture that fall easily, e.g., book shelves
- What else should be fastened?

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- Transfer breakable things like mirrors to safer areas.
- What else should be transferred?

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- Move materials that can easily catch fire or explode so they are not close to heat sources, e.g., fireworks, etc.
- What else should be kept away?

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*In the living room*

- What should we pay attention to?

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*In the bath room*

- What should we pay attention to?



**Re-sketch your bed room and living room after the rearrangement.  
Compare it with the original one in LEVEL ONE**

Duration: 1 hour

## **Level Two Evaluation: Poster Presentation**

### **Rationale**

In this whole year, students have learned many useful earthquake safety tips and conducted several activities. Requiring students to present and show what they have learned can trigger critical thinking among them as well as sharing information about what they have learned with other students. It is a good chance for the students to review on their whole year's work and how it has helped them.

### **Procedure**

Presentation can be done in a scrap book or poster with the following:

- What I have learned in Level Two (like new knowledge, safety tips, etc) Please tell us something different from what you learned in Level One.
- What was I able to do? (For example, the home conversation and coming up with household checklist)
- Which is my favorite activity?  
Why?
- Which skill can help me, my family, and friends the most?
  - Paste your drawings and pictures to make your posters more attractive and interesting (like picture of the activity you conducted, snapshots, picture of your emergency kit, picture of you and your friends doing the neighborhood survey, comments from your teacher and neighbors, etc.)
  - Present your poster to the class. See if you have space in the classroom where you can display your and your classmates' poster for a few days. Comment on each other's work. You may select good posters to be exhibited in other schools or in the community's hall. The students whose product received best comments may be selected to give a speech to other students in school.

I've done it: Level Two

Activities	Date Completed	Comments, if any	Reviewer's Comments
Priority Activities			
EL2-A. Earthquake Evacuation Drill			
EL2-B. Family Outdoor Cooking			
EL2-D. Organizing and Acting in a Play			
EL2-F. Family Conversation and Household Checklist			
Optional Activities			
EL2-C. Survival / Disaster Preparedness Sports Meet			
EL2-E. Neighborhood Survey			
EL2-G. Arranging and Securing Furniture for Safety			
Level Two Evaluation Poster Presentation			

## Conclusion

As a country prone to natural disasters, especially earthquakes, tsunamis and typhoons, Japan has a long history of disaster education. Broadly speaking, disaster education fits within two categories: publicly funded and voluntarily organized education. Currently, voluntarily organized disaster education is rapidly outpacing its publicly founded counterpart.

Volunteers are educated about disasters both through formal and informal training and through the process of volunteering itself. The education sector plays an important role in the provision of civil protection hardware and software. School curricula help instill a culture of DRM and preparedness in the community. DRM education saves lives, as the “Kamaisi Miracle” shows. Students save their own lives and the lives of others when they lead evacuations in communities.

Each Prefecture's school's disaster education is based on the Prefecture and City Board of Education.

The choice of tools and methods for conducting disaster education depends on the decision of the school and the teacher.

The tools ensuring education, in particular booklets, banners, books, game-exercises and their contents are in general the same.

Major attention is paid to the assimilation of each other's support model. Disaster education is not a major school subject in Japan and Armenia. Pupils study about disaster in the textbooks of Earth science subjects of both of the countries. Volunteers are educated about disasters both through formal and informal training and through the process of volunteering itself.

The Japanese model of Disaster Management psychological work and research is implemented particularly by the National Information Center for Disaster Mental Health, Hyogo Institute for Traumatic Stress (HITS) and by several Universities, which have different types of trainings.

It is worth to note that the social-psychological work on Disaster Education is involved in the operations of CAP and in the Psychological Service of MES of RA. Another fundamental difference that exists between Armenia and Japanese disaster activities is the absence of Disaster museums and Experimental facilities in Armenia, which are effective tools for ensuring psychological-perceptual preparedness on disasters.

The specialists offer a methodology that can be used to mitigate the psychological trauma resulting from the earthquake. They also offer psychological nuances that should be used during training, awareness-raising and seismic protection. The study offers the teaching methodology, which is the following:

the selected instructions are brief,

relevant accents are made,

free from excess information,

they are aimed at people with the ability to act independently, can be taught using advertising posters, runner lines.

In the application of the basic methodology specialists offer

learning duration: after training, anxiety and excitement are organized.

training periodicity: it is desirable to repeat several times a year.

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