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"STRATEGIES ON PREVENTING FURTHER LOSSES OF LIVES AND DAMAGES TO PROPERTIES DURING EARTHQUAKES AND OTHER COMPLEX EMERGENCIES:

LEARNING THE JAPANESE EXPERIENCE"

ADRC Visiting Researcher Program 2018 B

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Office of Civil Defense –

Department of National Defense

Philippines

Scope of Presentation

I. Introduction

II. Research Methodology

III. Results and Discussions

IV. Summary, Conclusions and Recommendations

I. INTRODUCTION

Risk Profile

JAPAN and PHILIPPINES are both situated in the Circum-Pacific Mobile Belt.

PHILIPPINES is located along the Pacific Typhoon Belt.

Photo credit: Google Images

Legal Basis

(Provisional Translation)

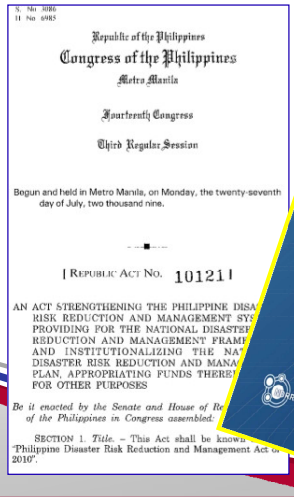
DISASTER COUNTERMEASURES BASIC ACT

June 1997
National Land Agency, Japan

DISASTER COUNTERMEASURES BASIC ACT
(Act No. 223, November 15, 1961)

Typhoon Ise-wan in 1959 was the turning point for the enactment of the Law in Japan.

Typhoon Ondoy (Intl name "Ketsana") in 2009 led to the enactment of the "PDRRM Act of 2010".


Republic of the Philippines
Congress of the Philippines
Metro Manila

Fourteenth Congress

Third Regular Session

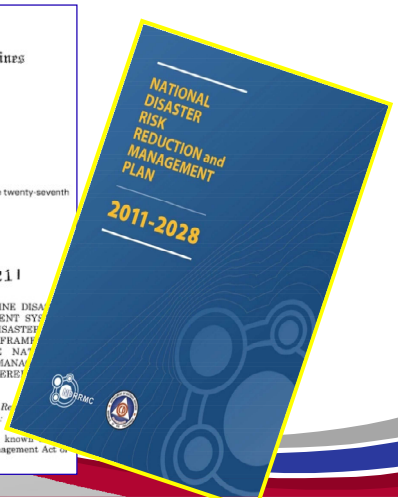
Begun and held in Metro Manila, on Monday, the twenty-seventh day of July, two thousand nine.

[REPUBLIC ACT NO. 10121]

AN ACT STRENGTHENING THE PHILIPPINE DISA... RISK REDUCTION AND MANAGEMENT SYS... PROVIDING FOR THE NATIONAL DISASTER... REDUCTION AND MANAGEMENT FRAM... AND INSTITUTIONALIZING THE NA... DISASTER RISK REDUCTION AND MANA... PLAN, APPROPRIATING FUNDS THERE... FOR OTHER PURPOSES

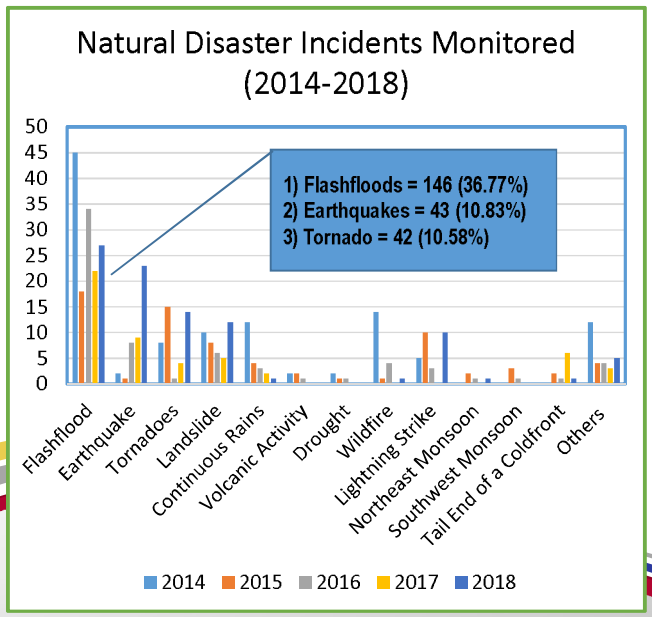
Be it enacted by the Senate and House of Re... of the Philippines in Congress assembled:

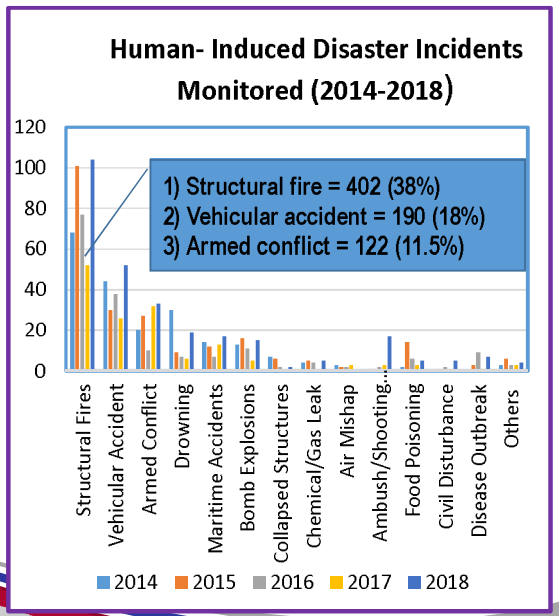
SECTION 1. *Title.* – This Act shall be known ... "Philippine Disaster Risk Reduction and Management Act o... 2010".



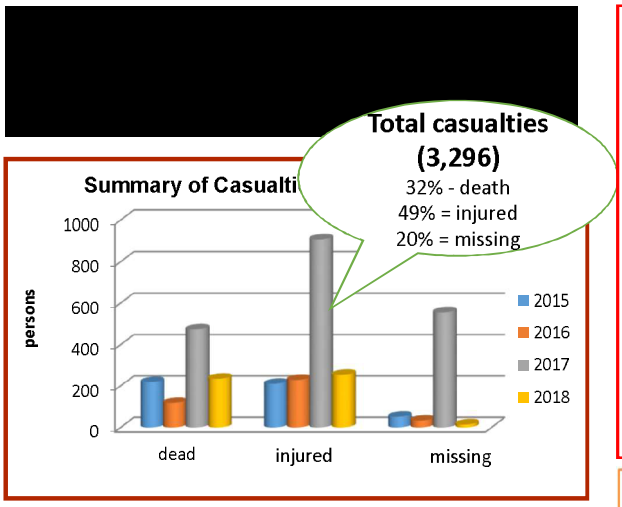
Incidents Monitored in the Philippines

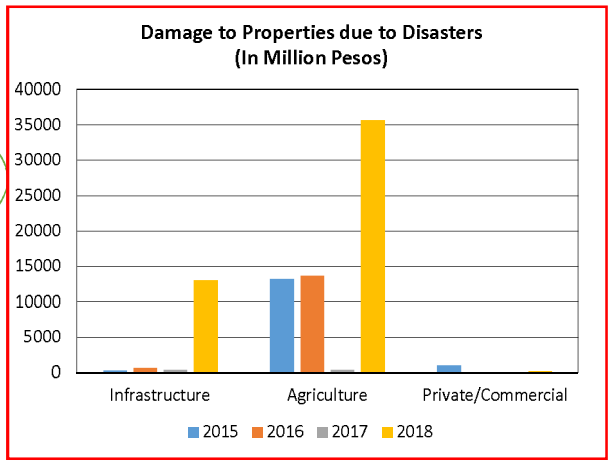
For the period CY 2014 to CY 2018, a total of **398 natural incidents and 1,057 human-induced incidents** were monitored, by the National Disaster Risk Reduction and Management Emergency Operations Center:

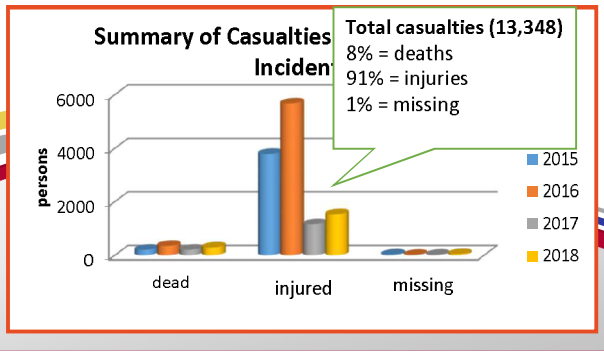


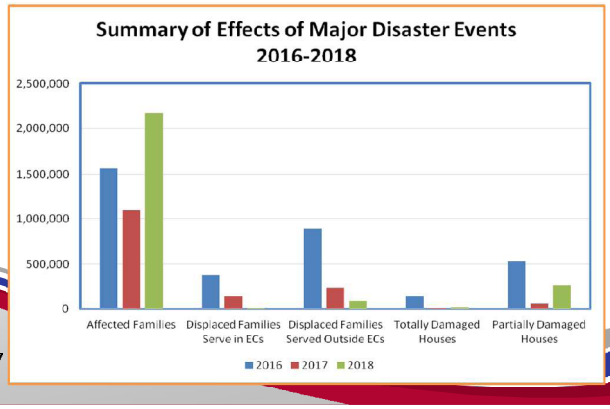


Effects of Disasters in the Philippines









Government Efforts

- Building their socioeconomic resilience by reducing the vulnerable people's exposure to risks and increasing their adaptive capacities is the focus of Chapter 11 of the Philippine Development Plan (PDP) 2017-2022.

- Collaborative efforts were made by the government and other organizations to align the PDP to the Sendai Framework for DRR 2015-2030.

- The Sendai Framework for Action shifted its focus on the prevention and mitigation of hazards, and has prioritized understanding of disaster risks, strengthening of disaster risk governance, and investing in disaster risk reduction for resilience.

- Japan, as compared with the Philippines as being a disaster prone country, has a lot to showcase their great efforts to prevent and mitigate the risks and vulnerabilities brought about by the climate change, progressive society and increase of human and ageing population.

STATEMENT OF THE PROBLEM

This study sought answers to the following questions:

1) What are the scenarios on the future disasters being undertaken by Japan and Philippines?

2) To what extent can these scenarios on the future disasters cause possible damages to properties, economic losses and losses of lives?

1) What are the innovations of disaster risk reduction strategies and countermeasures in terms of the following:

   3.1 Non-structural measures; and,
   3.2 Structural measures.

4) What are the best practices of Japan's learning experience from past disasters that can best replicate from a developing country?

5) What are the challenges faced by the government and community on future disaster risk management?

6) What are the goals and approaches on disaster risk reduction for the above-mentioned hazards?

SIGNIFICANCE OF THE STUDY

- This paper will give discussions on the various strategies and best practices of Japan's learning experience on disaster risk management (DRM) system and how they contribute in mitigating measures.

- Findings may give clear view or better appreciation on the importance of non-structural and structural measures. The examples of the non-structural and structural measures will be emphasized on how it contributed to the prevention and mitigation approaches from the past disasters recorded.

- This will help demonstrate the importance of the achievement and replication of these strategies and innovation and subsequently come-up with policy enhancements, more extensive approach on risk assessments and recommendations for the improvement of the Philippines' DRRM system.

- The researcher will endeavor to come up with proposals on addressing challenges and future approaches in promoting disaster risk governance and investment in DRR. It also helps future researchers by providing validated data on similar subject.

SCOPE AND LIMITATIONS OF THE STUDY

- The study is focused on the effects of disasters due to the occurrence of **typhoons and earthquakes** and the consequences of these hazards such as structural fires, storm surges, ground shaking, ground rupture, landslides, and tsunami for the recent years.

- The research enumerates the **best practices** and the **recent innovations** focusing on prevention and mitigation measures currently being undertaken by Japan in terms of **non-structural and structural measures.**

- Scenarios for the preparation of the future disaster to come are limited to the **Nankai Trough earthquake** throughout central to west Japan and **Tokyo Inland Quake** as well as the **Philippine scenario on the magnitude 7.2 earthquake** resulting from the movement of the West Valley Fault (WVF) or we simply call "The Big One". The scenario may yield a PHIVOLCS Earthquake Intensity Scale (PEIS) of VIII that will affect not only Metro Manila, but also the nearby regions of Central Luzon and CALABARZON.

- The discussion is limited only to the accounts of **actual experiences and learning** that the researcher has encountered in the various study tours, all over Japan, seminars, lectures and conferences with local and international experts, and personal readings of reference materials provided during the term under the Visiting Researcher Program of the Asian Disaster Reduction Center for the period January 09 to April 05, 2019.

II. RESEARCH METHODOLOGY

RESEARCH METHODOLOGY

Research Design

Descriptive-exploratory method was found by the researcher to be the most appropriate research design for this study. This research design is focused on collecting either secondary or primary data and using an unstructured format or informal procedures to interpret them. Interviews were conducted to validate and further expound the data gathered. This method is preferred for this kind of research because the expected responses and results are best presented by descriptions.

Research Locale

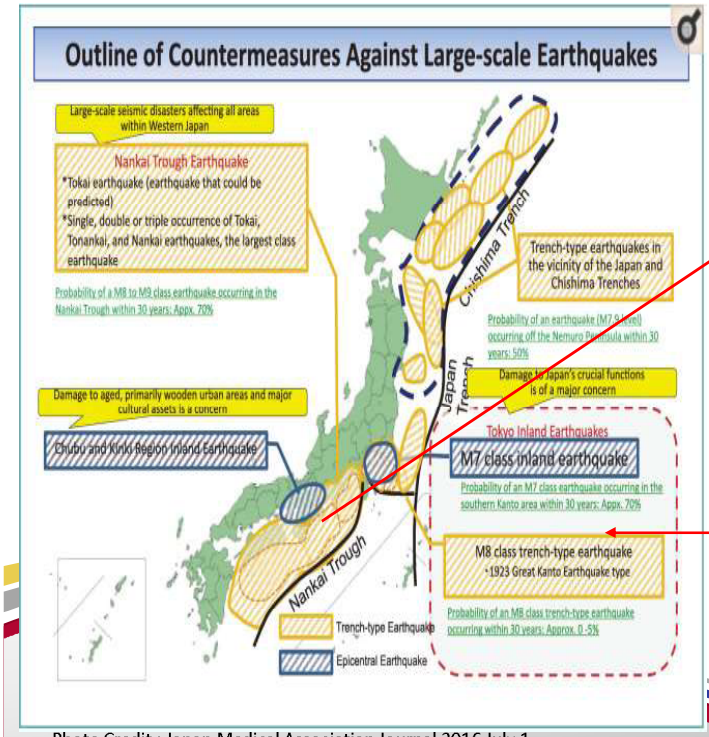
The researcher conducted her study in different strategic places at the Kansai Region. The **interviews and attendance to lectures and visits** were conducted at the Hyogo Prefecture Education and Training Institute, Hyogo Prefectural Government Office, Cabinet Office of Japan, CERD Osaka City University, Sendai City government, Universities of Kobe, Tokyo and Tohoku, Osaka City, Ishinomaki City, Onagawa town and Natori City, Miki City, Sojiji Temple from a monk leader and Tsurukabuto Community Welfare Council Office.

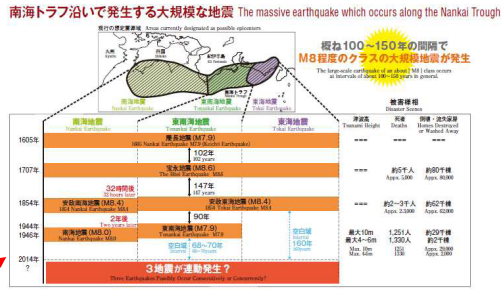
The **conduct of town mapping** with JICA participants was done at the Otani area in Kobe City. The group also conducted a tsunami hazard map at a small community in Kamakura City in Kanagawa Prefecture.

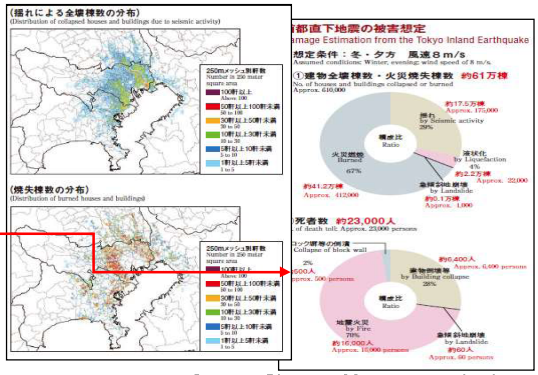
III. RESULTS AND DISCUSSIONS

Scenarios: Preparing for the next “BIG ONE”

❑ Japan’s Nankai Trough Earthquake and Tokyo Inland Earthquake





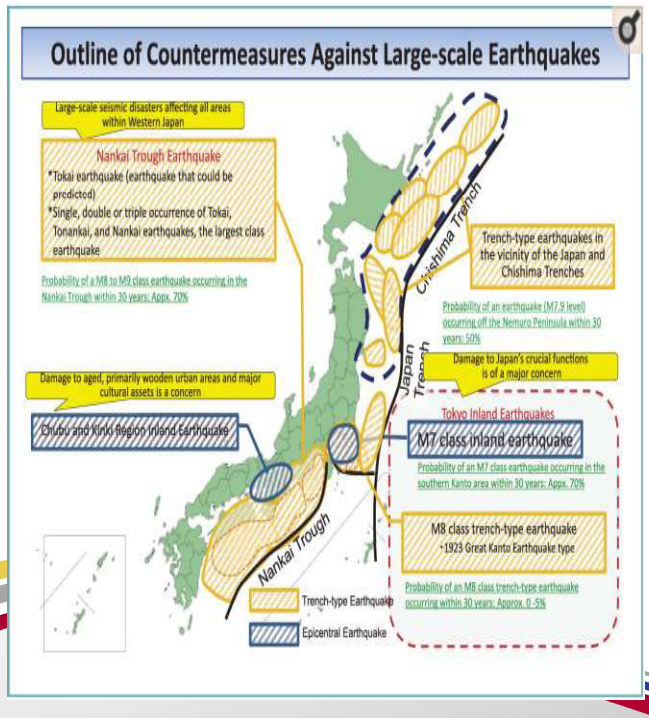


Source: Disaster Management in Japan, Cabinet Office

Photo Credit : Japan Medical Association Journal 2016 July 1

Scenarios: Preparing for the next “BIG ONE”

❑ Japan’s Nankai Trough Earthquake and Tokyo Inland Earthquake



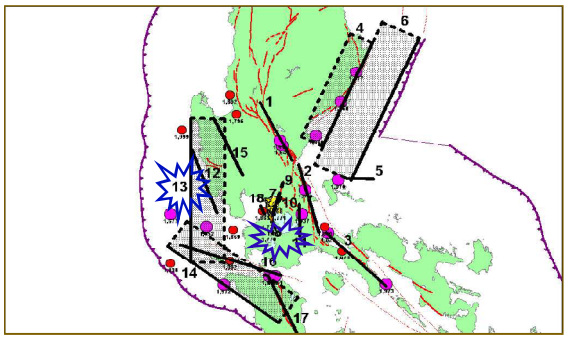
NANKAI TROUGH QUAKE ESTIMATED DAMAGES	
No. of death tolls	323,000 persons
No. of total collapse of buildings	2.5 Million units
Economic losses	170 trillion yen for assets
	45 trillion yen for degradation of production and services

TOKYO INLAND QUAKE ESTIMATED DAMAGES	
No. of death tolls	23,000 persons
No. of total collapsed or burned buildings and houses	610,000 units
Economic losses	47 trillion yen for assets
	48 trillion yen for degradation of production and services

Photo Credit : Japan Medical Association Journal 2016 July 1

Scenarios: Preparing for the next "BIG ONE"

❑ Philippines' West Valley Fault Movement (Scenario 8: Mag 7.2 Earthquake)



SCENARIO 8: Generated by the WVF, causing a 7.2 magnitude earthquake and leading to severe damage in Metro Manila

SCENARIO 13: Generated by the Manila Trench, causing a 7.9 magnitude earthquake and leading to the occurrence of tsunami

BUILDING DAMAGE ESTIMATES
Magnitude 7.2 Earthquake from the West Valley Fault
Metro Manila Earthquake Impact Reduction Study (JICA-MMDA-PHIVOLCS)

- ~ 40 % of the residential buildings
  - * 175,000 – heavily damaged
  - * 345,000 – partly damaged
- ~ 38 % of the 10-30 story buildings
- ~ 14 % of the 30-60 story buildings
- ~ 28-35 % of public buildings
  - * 8-10 % - heavily damaged
  - *20-25 % - partly damaged

REGION	DEAD	MISSING	INJURED	DISPLACED
Metro Manila	31,228	119,900	501,722	3,964,783
Central Luzon	15,000	20,000	50,000	340,650
CALABARZON	6,645	5,543	127,998	1,014,880
TOTAL	52,873	145,443	679,720	5,320,313

*Table 11: Summary of Estimates on Dead, Missing, Injured, and Displaced in Metro Manila, Central Luzon and CALABARZON

Innovations of DRR strategies and countermeasures

I. **Non-structural Measures** are measures not involving physical construction which use knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education.

Components:

A. Current DRR laws, plans and policies
B. Public Awareness Raising
C. Community Empowerment
D. Implementation of Disaster Resilience Education
E. Investment in Disaster Risk Reduction

A. Current DRR Laws, plans and Policies

❖ **Disaster Countermeasures Basic Act in 1961**

2011
- **‚more comprehensive tsunami countermeasures** were being undertaken

2012
- *Act No. 41* - specifies the obligation of residents to hand down to younger generations the lessons of disaster resilience.
- each disaster prevention organization to implement disaster resilience education

❖ **Sendai Framework for Action 2015-2030**

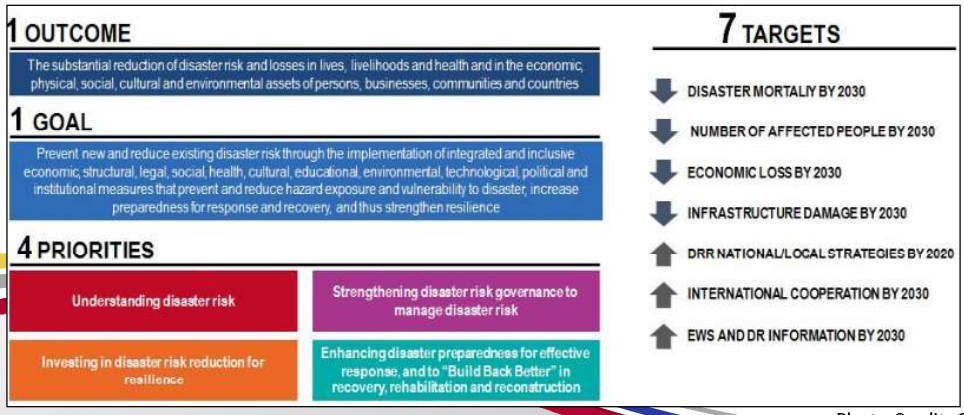


Photo Credit: Google Images, UNISDR

A. Current DRR Laws, plans and Policies

- ❖ **Policy Framework for Large-Scale Earthquake Disaster Prevention and Reduction**
- ❖ **Act on Promotion of Tsunami Countermeasures**
- ❖ **Act on Development of Areas Resilient to Tsunami Disasters**
- ❖ **"Urgent Countermeasures Guidelines for Promoting the Earthquake-resistant Construction of Houses and Building",** *(revised in 2013)*
- ❖ **Article 17 of the Law concerning Promotion of Seismic Rehabilitation of Buildings**
- ❖ **Act on Special Measures for Promotion of Nankai Trough Earthquake Disaster Management**
- ❖ **Act on Special Measures for the Tokyo Inland Earthquake**
- ❖ **Basic Policies for Metropolitan Area Large-Scale Water Hazard**
- ❖ **Japan's Basic Disaster Management Plan** *(revised in April 2017- in response to the issues that emerged at the Kumamoto Earthquake and Typhoon 10 in 2016)*
- ❖ **Act No. 110 on Law on Strengthening Regional Disaster Resilience with Volunteer Fire Fighting at the Core** (amended on December 13, 2013)

A. Current DRR Laws, plans and Policies

- **"Flood Control Act" in 1949,revised to improve flood countermeasures and reduce damage caused by severe weather disasters.**

  - ✓ Inundation risk areas are currently designated and published for 1,931 rivers (as of March 2014).
  - ✓ As non-structural countermeasures, the warning and evacuation systems for the possible inundated areas and landslide prone areas have been developed in accordance with the *Flood Control Act and the Sediment Disaster Prevention Act.*
  - ✓ Participation of diverse entities including river management organizations in flood control activities, acquisition of appropriate maintenance and management need in river management facilities, etc. (amended in 2013)

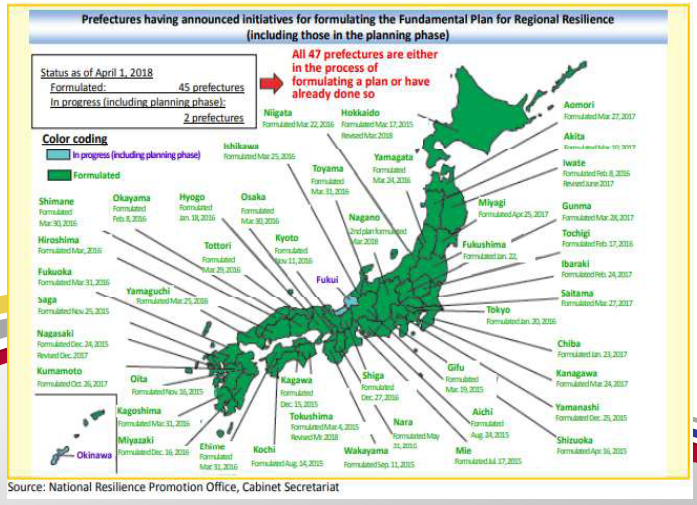
A. Current DRR Laws, Plans and Policies

Relationship between Philippines' RA 10121 and Mainstreaming of DRRM Plans to International Frameworks

A. Current DRR Laws, Plans and Policies

Promotion of National resilience

- Approval of *Action Plan for National Resilience 2017*
- *Formulation of local governments' Fundamental Plan for Regional Resilience*



Source: National Resilience Promotion Office, Cabinet Secretariat

- Issuance of Executive Order No. 29 dated 28 June 2017 renaming National Disaster Consciousness Month to **National Disaster Resilience Month (NDRM)**

Credit: civildefenseph

B. Public Awareness Raising

- Institutionalizing a Culture of Safety and Public Awareness through these institutions and programs established for DRR knowledge and learning from the past disasters

1) Disaster Reduction and Human Renovation Institution
2) Honjo Life Safety Learning Center
3) Tsunami and Storm Surge Disaster Prevention Station
4) Meteorological Science Museums
5) E-DEFENSE
6) Sendai 3/1 Memorial Community Center
7) Ruins of the Great East Japan Earthquake Sendai Arahama Elementary School
8) Ishinomaki Okawa Elementary School Memorial Monument
9) Izu! Kaeru Caravan
10) Influence of Disaster Imagination Games

Learning Experiences:

- Active participation of simulation/mock exercises stimulates the need to protect yourself from danger
- Understanding the importance of disaster risk reduction
- Strengthen community interaction and acquiring skills and knowledge from the lessons of past disasters

C. Community Empowerment

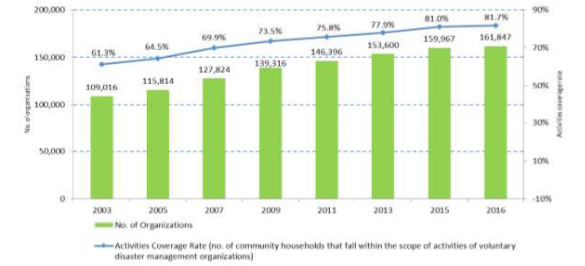
- Refers to the process of enabling communities to increase control over their lives.
- Contributes to the global call that *"no one can leave behind"* in every disaster that may happen in the future by using the three initiatives thought by **self-help, mutual help and public help.**

Creation of Voluntary Disaster Management organizations

FIGURE 2: **The Sanriku Expressway was built with tsunamis in mind**

Organization	*Hazard*	*Legal act*	*Supervising government organization*	*Date established*	*Number of staff or groups*
Suibo-dan	Flood	Flood Fighting Act	Ministry of Land, Infrastructure, and Transport	17th century	900,000 staff in two organizations
Syobo-dan	Fire	Fire Defense Organization Act	Fire and Disaster Management Authority (FDMA)	18th century	
Jisyubo	Earthquake	Basic Act on Disaster Reduction	Cabinet Office, FDMA	1970s	140,000 staff
NPO	All	Act to Promote Specified Nonprofit Activities	Cabinet Office	After the Kobe earthquake in 1995	> 2,000 groups

(Source: Cabinet Office)

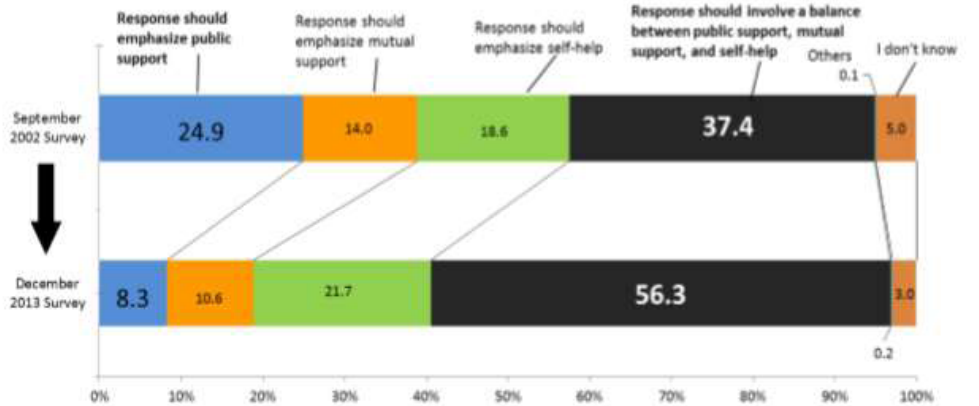


Source: Produced by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency. Figures as of April 1 each year.

Valuable support from the national and local governments in the creation of the organization and carrying out their activities through annual subsidies and protection from DRR laws and ordinances.

C. Community Empowerment

Sustainability of the community volunteer DM organization is often a challenge. But, in Japan, it has recognized the collaborative efforts of the three initiatives: self-help, mutual help and public help,



Source: Produced by Cabinet Office on basis of "Public Opinion Poll regarding Disaster Risk Reduction" conducted by the Cabinet

D. Implementation of Disaster Resilience Education

Objective: to bolster the disaster resilience of communities by heightening the disaster resilience awareness of each individual belonging to a community and by forging strong links within the community.

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 precise lifesaving and emergency aid.


Checking out goods in the local supermarket that you need when disaster strikes


Distributing "safe and sound" placards to residents *2


Creating picture story shows panels by painting acrylic onto the base pictures


A disaster resilience workshop convened in the local community center hall.


Using teaching materials to implement "outreach" classes


Experiencing torrential rain with a rain experience simulation, at a disaster resilience event.


Map freely created by children


Elementary school students enjoy participating, as the instructors teach naturally, with ease


Normally used as a bench

During disasters, doubles up as a cooking stove

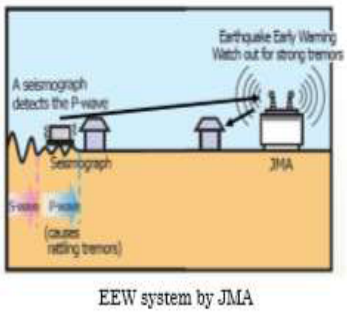

Tsunami evacuation support maps put up at road crossings

Source: Implementation Handbook for Disaster Resilience Education at the Regional Level. 2015/March

E. Investment in Disaster Risk Reduction

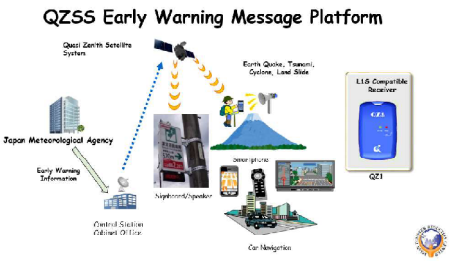
❖ Early Warning and Monitoring System

1) Presence of Early Warning and Monitoring System in Japan



EEW system by JMA

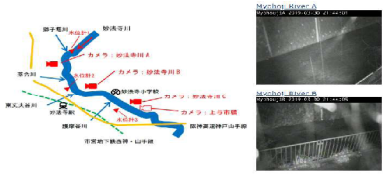
- to detect earthquake and issue a warning in seconds so people can prepare and had lead time for early evacuation



QZSS Application to Communities

- has capacity to send & receive early warning message/information using a small QZSS signal receiver

Tsukagawa downstream
(Image credit: Kobe City Webpage


Myohoji River Monitoriing Camera
image Credit: Kobe City Webpage

- monitoring footage is publicly available on a website so citizens can confirm the current situation using the image information and raise damage prevention awareness

E. Investment in Disaster Risk Reduction

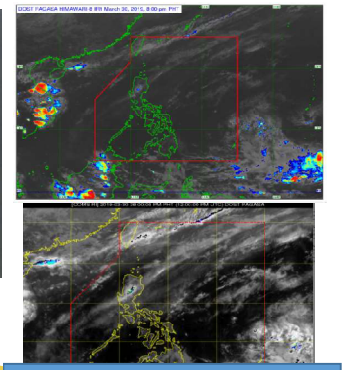
❖ Early Warning and Monitoring System

2) Presence of Early Warning and Monitoring Systems in Philippines

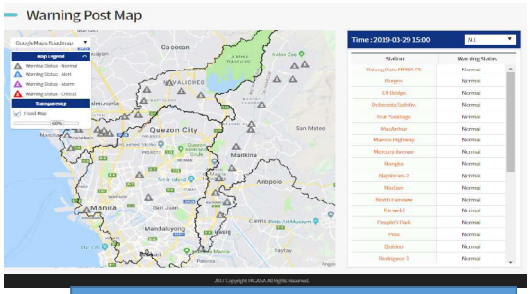
- Emergency Alert and Warning Messages (EAWM) by NDRRMC
- HIMAWARI-8 installed at PAGASA in December 2015
- FY-2G Fengyun Cast Receiving System installed in 2007
- COMS Data Analysis System inaugurated at PAGASA in May 2017
- Automation of Flood Early Warning System for Disaster Mitigation in GMMA installed at PAGASA

Operationalization of the IRR of RA 10639 for EAWM by NDRRMC

- messages sent should be hazard specific, area focused and time bound



- most utilized satellite imagery in real time weather forecasting, tropical cyclone analysis and for research purposes as it generates images every 10 minutes



- help minimize property damages and casualties since this will enable PAGASA to forecast way ahead of flooding incident.

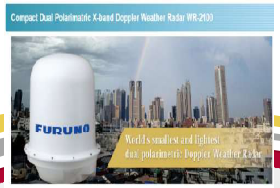
(Images Credit: PAGASA webpage)

E. Investment in Disaster Risk Reduction

❖ Promotion of Public and Private Sectors Partnerships

1) *Oyo International Corporation (OIC)*
2) *Furuno Electric Co. Ltd*
3) *Takuwa*
4) *Challenge Co Ltd*
5) *Takeda Cardboard Co., Ltd.*
6) *Mitsubishi Corporation Insurance Co., Ltd.*

Photo credit: http://www.oyointer.com/english/



(Photo credit https://www.furuno.com/en/

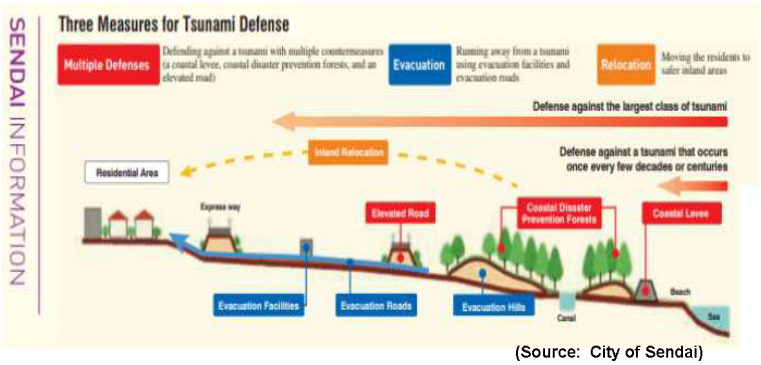
Please note: research purposes only (no advertisement intended)

Points to Consider:

- "Governments can attract private sector partners who can provide financing for infrastructure investment, management skills, and expertise to address the challenges of natural disasters".
- The national government communicates with the Private Sectors to encourage in their engagement in DRR.
- Private Sectors in contributing to the DRR initiatives and innovation can also protect their own business thru BCP.
- Strengthens strong relationships between the national and local level partnerships.

Innovations of DRR strategies and countermeasures

Countermeasures for Tsunami and Storm Surge Defense



(Source: City of Sendai)

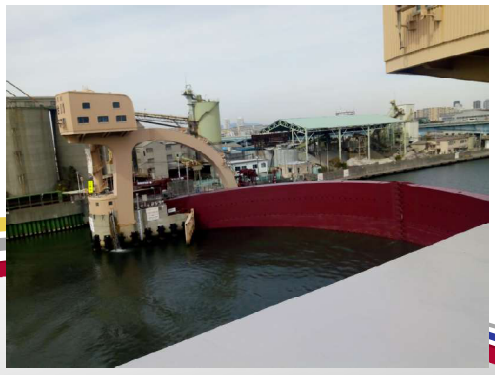
Even so, areas where safety cannot be secured, the City of Sendai promotes measures including home relocation that places importance on "disaster mitigation" and minimizing damage.

A visit to Tsunami Tower in Nakano 5-chome in Sendai City, 20 March 2019

Structural Measures are any physical construction to reduce or avoid possible impacts of hazards, or the application of engineering techniques or technology to achieve hazard resistance and resilience in structures or systems.

Innovations of DRR strategies and countermeasures

Ajigawa River Flood Gate in Osaka City



One of the best innovations of Osaka City, known as the city below sea level with potential risks.

In September 2018, Typhoon Jebi, the most powerful storm in twenty five (25) years hit Japan greatly, to include Osaka Prefecture. As a preventive measure, the Osaka Government closed the Ajigawa flood gates prior to the threatening storm surges and water overflow due to the typhoon.

The Osaka residents are lucky enough to be benefited as they successfully braced the danger causing zero casualties in 2018.

Best Practices of Learning from Japan's experience

A. Strict implementation of the Building Code and its importance of regular seismic diagnosis of structures

Particulars	平成１５年 (CY2003)	平成２０年 (CY2008)	平成２５年 (CY 2013)	平成３２年 （目標） (CY 2020)	平成３７年(目標) (CY2025)
Total	47M	49.50M	52M	52.50M	耐震性を有しない住宅ストックの比率→おおむね解消
With EQ resistance	35.50M	39M	43M	50M	
w/o EQ resistance	11.50M	10.50M	9M	2.5M	
Shockproof Rate	**75%**	**79%**	**82%**	**95%**	**Houses without resistance ratio is almost eliminated**

Table13: Earthquake Resistance Rate of Houses (Source: FDMA)

Japanese Building Code has required structural calculation in considering seismic force since 1924

Japan's earthquake-resistance technology is at a high level and has been recognized all over the world.

Particulars	平成１５年 (CY2003)	平成２０年 (CY2008)	平成２５年 (CY 2013)	平成３２年 （目標） (CY 2020)
Total	0.36M	0.41M	0.42M	0.44M
With EQ resistance	0.27M	0.33M	0.36M	0.42M
w/o EQ resistance	0.09M	0.08M	0.06M	0.02M
Shockproof Rate	**75%**	**80%**	**85%**	**95%**

Table 14: Earthquake Resistance Rate of Buildings (Source: FDMA)

Best Practices of Learning from Japan's experience

A. Strict implementation of the Building Code and its importance of regular seismic diagnosis of structures

Specific Approaches for Implementation:

- Tokyo Metropolitan Government provides **technical assistance to owners** such as establishment of a consultation system; provision of information on seismic retrofitting methods and selection; registration and introduction of offices fulfilling conditions necessary to conduct seismic evaluations; and opening a portal site for central provision of information on earthquake resistance.
- advance seismic resistance of wooden framed houses in closely-packed housing districts, condominiums and buildings along emergency transportation roads by **subsidizing seismic inspection and retrofitting costs.**
- **TMG's own Seismic Certification System has been established** so that the people can be reassured about the safety of buildings through the wide availability of information on the seismic resistance of buildings

Best Practices of Learning from Japan's experience

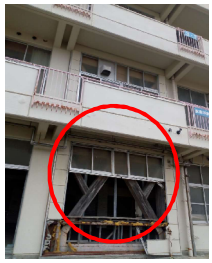
A. Strict implementation of the Building Code and its importance of regular seismic diagnosis of structures

Specific Approaches for Implementation:

- **Using the E-Defense facility** on testing the seismic analysis helps the construction companies to test the strength of their model houses before selling out to the market.

E-defense presentation

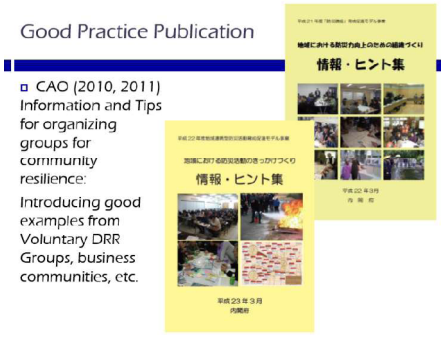
- Japan has achieved its 100% target goals for earthquake-resistant buildings for public schools (elementary and junior high).

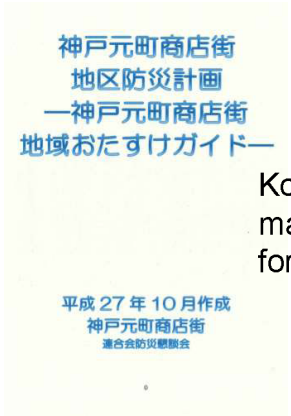


Braces installed in elementary schools

Best Practices of Learning from Japan's experience

B. Promoting Widespread Adoption and Awareness of Community Disaster Management Plans (CDMP)





Kobe City has made a template for the CDMP

Cabinet Office implemented a three-year model project.

- 27 of the 44 districts drafted CDMPs
- Six districts'

successfully revised the municipal disaster management plans and reflect their plans in the CDMPs.

Several Guidebooks from Local Government

Best Practices of Learning from Japan's experience

C. Manifestation of Self-Help and Mutual Support Initiatives

- On March 11, the community-level response (and community-based warnings) was the key that saved countless human lives. The **volunteer fire corps—which are community-based organizations (CBOs) trained in disaster management - used various tools** such as handheld loud speakers, fire bells, sirens, and fire engine loud speakers **to warn communities throughout the affected areas.**

- Cabinet Office published and circulated the Evacuation Center Management Guidelines, the Guidelines for Securing and Managing Toilets at Evacuation Centers and the Guidelines for Managing and Operating Welfare Evacuation Centers, to **facilitate appropriate operation of evacuation centers by affected local governments.**

- **Voluntary DM organizations have been increasing in numbers** and were able to sustain "Bosai" community initiatives in their own backyard

Challenges

❑ Failure to receive early warning messages on near real time when and where those communication infrastructures are out of service or unavailable

The EWM is important in contributing to managing the risks and reducing impact due to disasters. However due to limitations is becomes a challenge.

- Application of QZSS in Japan and its capacity of sending message is not large for now. The message needs to be coded to make the volume short.

- In the case of the EAWM in the Philippines, it has to address on how to send the message to all networks and receive by the receiver on a real time basis. Sending and receiving messages due to the volume of messages sent to network subscribers is very crucial especially in the decision making process and careful planning for contingencies if there is an impending danger to come.

Challenges

❑ Difficulty of maintaining the continuity of initiatives through public awareness raising campaigns and measures which may connect "awareness" to "preparedness" to "prevention" .

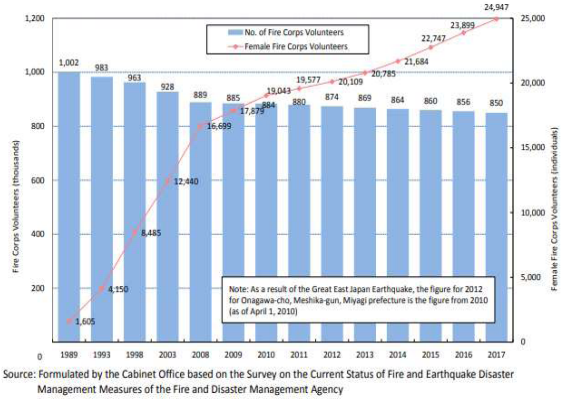
- ➢ indifferences of some cultural diversity in areas which preservation of the culture is high
- ➢ laws or ordinances on the protection of the privacy of household is also another challenge between the government and the "BOSAI" leaders.
- ➢ pointed out the need to familiarize the citizens of surrounding districts with the content of the plans and to make sure of the active participation of all community people from all walks of life.

"It has always been very difficult to carry out DRR activities in the community since not everyone spontaneously cooperates in such activities especially from the young population. However, the good thing is that BOKOMI receives assurance of everyone's help as necessary."

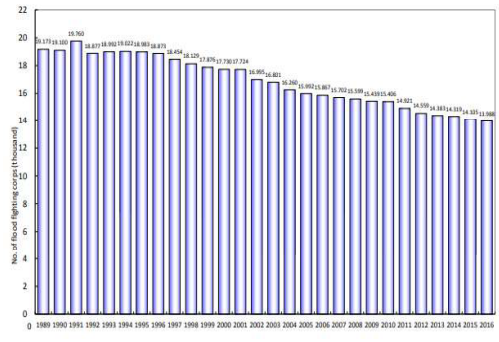
- A statement from a Bokomi member, Mr Hatori in Tsurukabuto, Nada Ward, Kobe City (27 March 2019)

Challenges

❑ Emerging shortage of disaster management leaders has been a challenge in an ageing society like Japan.



Source: Formulated by the Cabinet Office based on the Survey on the Current Status of Fire and Earthquake Disaster Management Measures of the Fire and Disaster Management Agency



Note) Number of full-time flood fighting corps personnel
Source: Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Trends in Numbers of Fire and Flood Fighting Corps Volunteers

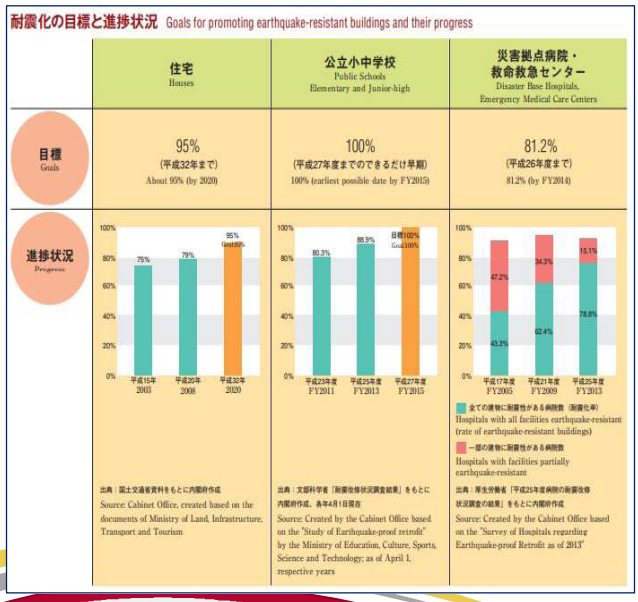
Source: Cabinet Office

Challenges

- **Reluctance of affected households for pre-emptive evacuation and leaving their homes for fear of losing their valuables and livelihood or they may feel uncomfortable to the alternate location**. The safety of these numerous number of affected families is the primary consideration but the readiness and available resources for this purpose is constantly an issue of every local government depending on the magnitude of the disaster. Evacuation planning management is regarded as the most difficult tasks to undertake and manage when done only during emergencies.

Goals

- **Japan as a "Disaster-Resilient Country" by 2025**



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Goals for Promoting Earthquake Resistant Buildings and Progress

(Source: Cabinet Office, March 2015)

In 2020, **95%** achievement on EQ-resistant buildings

Goals

- Based on the policy for the Nankai Trough **Earthquake Disaster Management, the Plan set clear goals to be achieved within ten (10) years:**

"More than 80% in the number of deaths and more than 50% in the economic value of damage to houses and buildings".

- The policy also defines concrete measures and target dates to accomplish the goals, such as promoting earthquake-proof or fireproof buildings, developing tsunami hazard maps, and improving the capacity for disaster management for local communities.

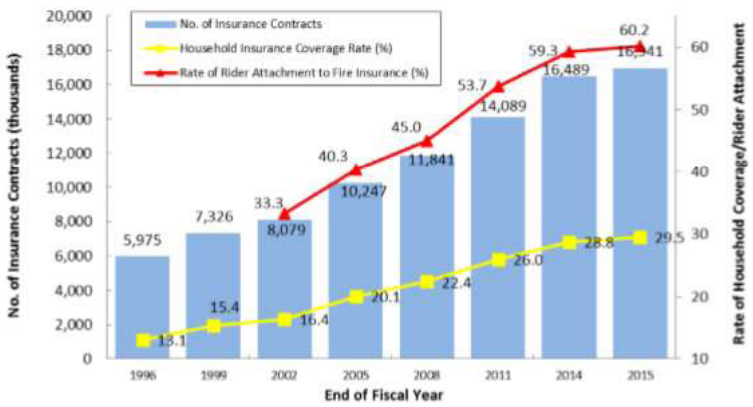
Approaches

Concept of Risk Management concerning natural disasters

(Source: Cabinet Office)

"A well prepared Business Continuity Plan is essential in any organization to prevent disruptions and resume critical operations"

Approaches



Source: Produced by the Cabinet Office based on materials from the General Insurance Rating Organization of Japan

(Source: Cabinet Office)

A key concept in risk finance is that desire to utilize these insurance mechanisms and encourage individuals to enroll in the method.。

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of Findings

The findings of the study are summarized as follows:

- Learning from the past disasters is a key point to improving and coming up with possible solutions to the issues and problems. The trend on the formulation and revision of these rules and regulations is traced back to what hazard or disaster that triggered it.

- Effective legislation, regulation and enforcement of the basis disaster management laws and systems manifest Japanese cultural mindset and discipline which is inherent in every people's lives. Japan's has strict and rigorously enforced building codes generate almost all earthquake-resistant buildings. Seismic retrofitting of houses was supported partially through government subsidy in order to encourage homeowners.

Summary of Findings

- Importance of public awareness raising measures can save lives. It is every government's goal to never again fall victim to any disaster, to pass on the lessons learned and to show the real threat of these disasters to future generations. For these reasons, Japan had kept this advocacy as part of their culture and discipline. Lastly, existence of DRR institutions is one of the best strategy for increasing public awareness, a venue for research and a haven for DRR knowledge.

Summary of Findings

- Several events in the past tested the capacity of these structural and non-structural measures.

An E5 series shinkansen on a *Hayabusa* service in March 2011

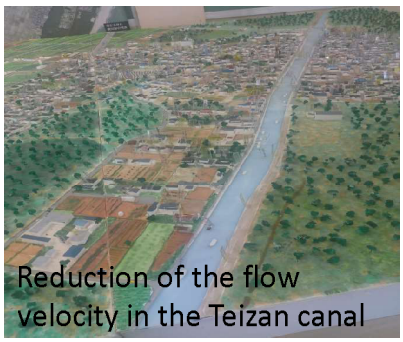
Shinkansen bullet trains shut down after seconds of EEW during GEJE

(Credit: Google images)

Osaka Ajigawa flood gates closed during TY Jebi , 2018 (zero casualties recorded)

Tsunami gate in Fudai caused zero casualties

(photo credit: Dr Anawat Suppasri)

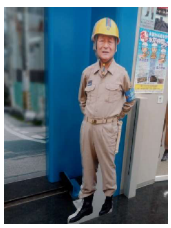


Reduction of the flow velocity in the Teizan canal

Summary of Findings

- "BOSAI" (Disaster prevention) is a Japanese culture. One realization from the study is that hazards and risks has been part of Japanese historical, cultural and emotional aspects of their lives. It has long been part of history and since then they have been accustomed to these hazards and risks.

Inside Sojiji temple where walls are made of indigenous materials – Japanese traditional way for mitigation measures



A suibo-dan member and considered one of the "heroes" by closing the tide protection gates

A fire hydrant installed at Nanzenji temple in Kyoto

A fire hydrant installed outside DRI

神戸元町商店街
地区防災計画
―神戸元町商店街
地域おたすけガイド―

Kobe City drafted CDMP template

平成 27 年 10 月作成
神戸元町商店街
連合会防災懇談会

Conclusions and Recommendations

Based on the findings of the study, the research draws the following conclusions and recommendations:

1) The importance of **investment for disaster risk reduction** has already been recognized in the SFDRR 2015-2030.
SFDRR guiding principles says *"Addressing underlying disaster risk factors through disaster risk-informed public and private investments is more cost-effective than primary reliance on post-disaster response and recovery and contributes to sustainable development"*, while one of the four priorities for action indicates *"investment in disaster risk reduction".*

Conclusions and Recommendations

2) The need for voluntary disaster management organizations is an important **investment for human capability.**

Community empowerment is the first line of defense for immediate survival and safety, so, while local and national authorities have key responsibilities for civil protection in hazard events, communities are always the first responders and should be empowered in that role.

They can be empowered if they have the skills through DRR training and knowledge, active involvement from the planning, implementation and execution of the DRRM initiatives and most especially have enough resources that they can get from the government's support for sustainability of their own initiatives.

Conclusions and Recommendations

The promotion of the **development of community disaster management plans** is also a tool for community empowerment which serves as a good strategy in minimizing death tolls in a catastrophe. Local and national governments should develop legislation on and institutionalize the role of the community people through the implementation of such plan.

3) Japan uses lessons learned from the past disasters and recognizes the structural and non-structural limitations of the risks from natural hazards in order to improve its policies, laws, plans and regulations.

Resolving the issues of the problems encountered from the disaster helps in the decision making process and investment patterns thus, continues to develop a more effective disaster risk management system.