Experience from Japan

Best practices, technologies and capacity development tools for earthquake risk reduction from Japan

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CJK Education and Training Institutes Online Workshop

"Tools and Technologies for Earthquake Risk Management: Sharing Experience from Northeast Asia"

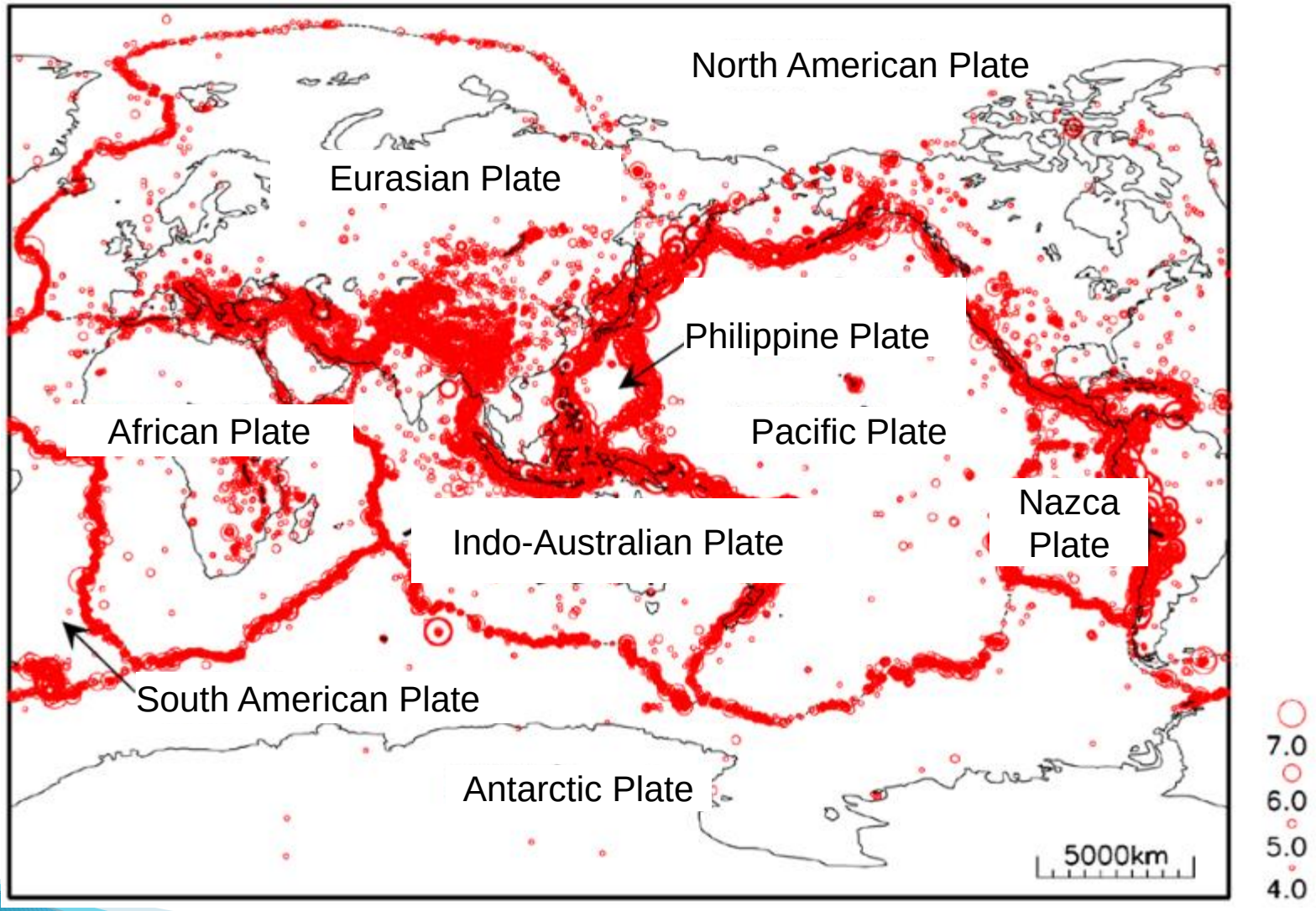
2 August 2023

Agenda

1. Geographical features of Japan
2. Disaster management in Japan
3. Good practices in Japan - Earthquake countermeasures -
    - *Case 1: Earthquake-proofing of schools in Hyogo*
    - *Case 2: Hyogo Wide-Area Disaster Prevention Center*
    - *Case 3: DRR activities at community level (Hirono-town, Iwate prefecture)*
    - *Case 4: Information sharing -National Early Warning System (J-Alert)-*
    - *Case 5: Residents in Need of Assistance for evacuation –Fukuoka city-*
4. Conclusion

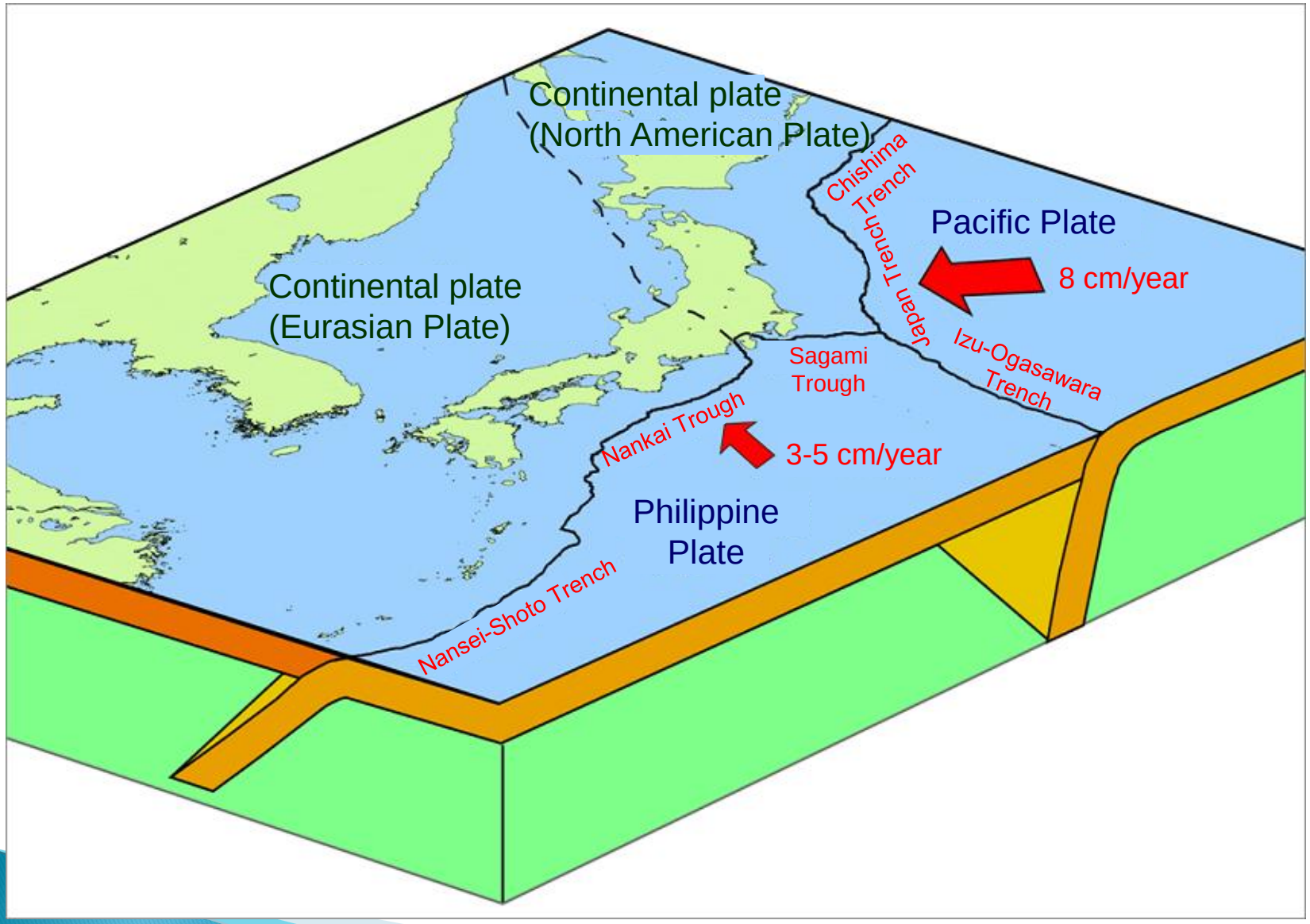
1. Geographical features of Japan

Geographical Features around the world



https://www.data.jma.go.jp/eqev/data/jishin/about_eq.html

Tectonic Plates around Japan



https://www.data.jma.go.jp/eqev/data/jishin/about_eq.html

Traditional “UKIYOE” drawing after 1855 October Ansei-Edo Earthquake

Edo (Old name of Tokyo) citizens beating the legendary Catfish Monster which was believed to cause earthquake

Modern Japan is still full of Tragedies & Lessons Learnt

Meiji Sanriku Earthquake and Tsunami (1896)

This disaster struck the same area as the Great East Japan Earthquake in 2011.
It was killing about 22,000 people.

Modern Japan is still full of Tragedies & Lessons Learnt

Great Kanto Earthquake (1923)

Modern Japan is still full of Tragedies & Lessons Learnt

Typhoon Isewan (1959)

- Hit Nagoya area during midnight on 26th September in 1959.
- 5,098 people died.
- 551 Billion yen lost (4.2% of GDP)

Source: Cabinet Office

Modern Japan is still full of Tragedies & Lessons Learnt

Great Hanshin-Awaji earthquake (1995)

- Hit Kobe area in the early morning on 17th January in 1995.
- Magnitude 7.3
- 6,434 people died.

Source: Cabinet Office, White paper on Disaster Management

Modern Japan is still full of Tragedies & Lessons Learnt

Great East Japan earthquake (2011)

Source: Ishinomaki City, "Great East Japan Earthquake Archive Miyagi"

Modern Japan is still full of Tragedies & Lessons Learnt

Kumamoto Earthquake (2016)

Source: Kumamoto Castle General Office (Distant view of the Small and Large Keep)

Source: Kumamoto Castle General Office (the East 18-Ken Turret)

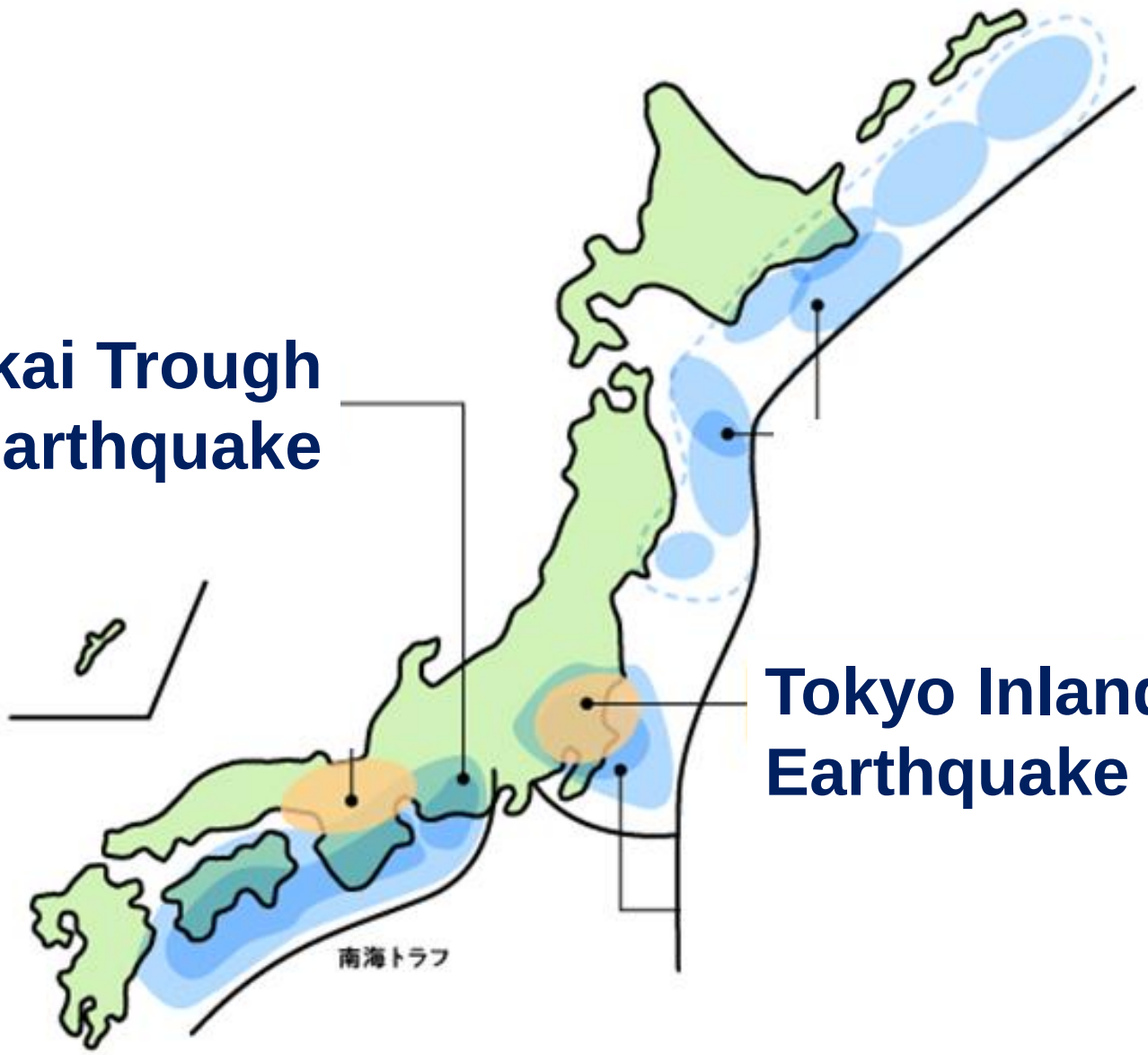
Source: Kumamoto City (A slope failure)

Source: Kumamoto Castle General Office (Survey of stone walls)

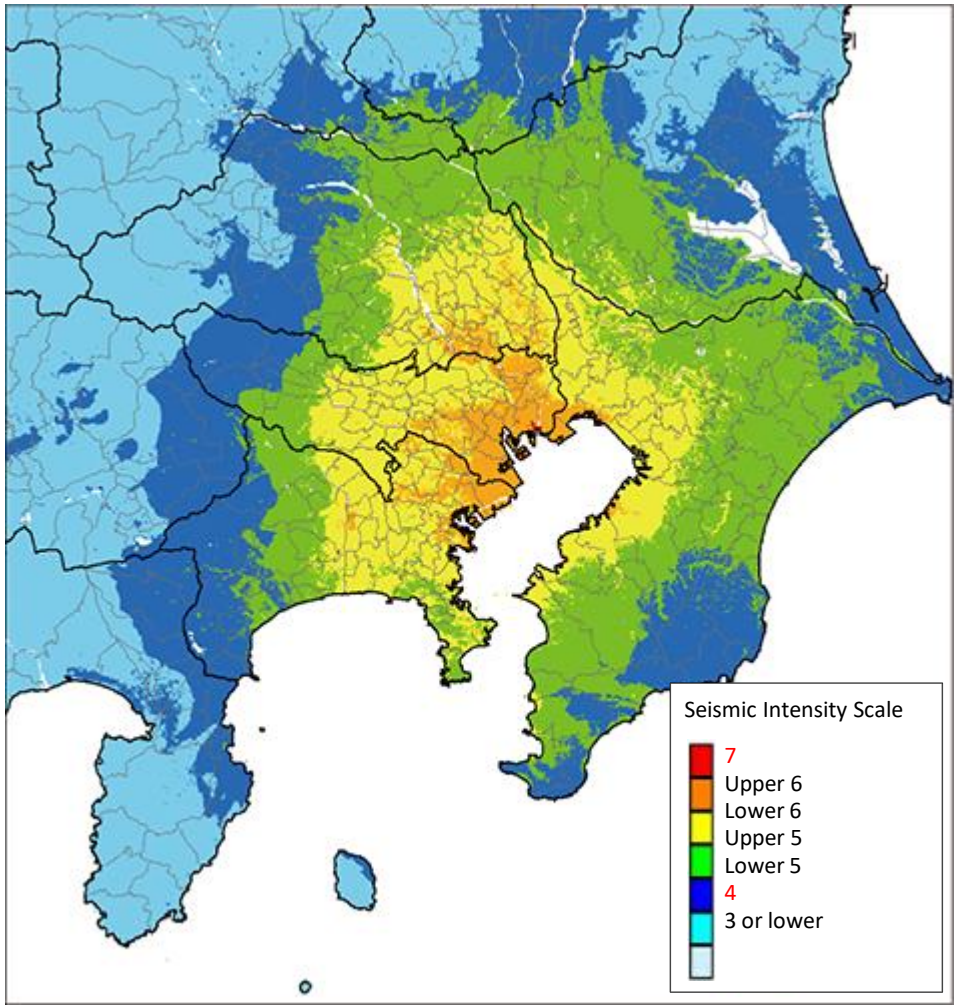
Major earthquakes in Japan (1923-2023)
*more than 100 Casualty

Date	M	Name of earthquake	
1923/9/1	8.3	Great Kantō earthquake	大正関東地震
1927/3/7	7.6	Kita Tango earthquake	北丹後地震
1933/3/3	8.4	Sanriku earthquake	昭和三陸地震
1943/9/10	7.2	Tottori earthquake	鳥取地震
1944/12/7	8.1	Tōnankai earthquake	昭和東南海地震
1945/1/13	6.8	Mikawa earthquake	三河地震
1946/12/20	8.1	Nankai earthquake	昭和南海地震
1948/6/28	7.1	Fukui earthquake	福井地震
1995/1/17	7.3	Hanshin-Awaji earthquake	兵庫県南部地震
2011/3/11	9.1	Great East Japan earthquake	東北地方太平洋沖地震

Possibility of next earthquakes in Japan



Tokyo Inland Earthquake



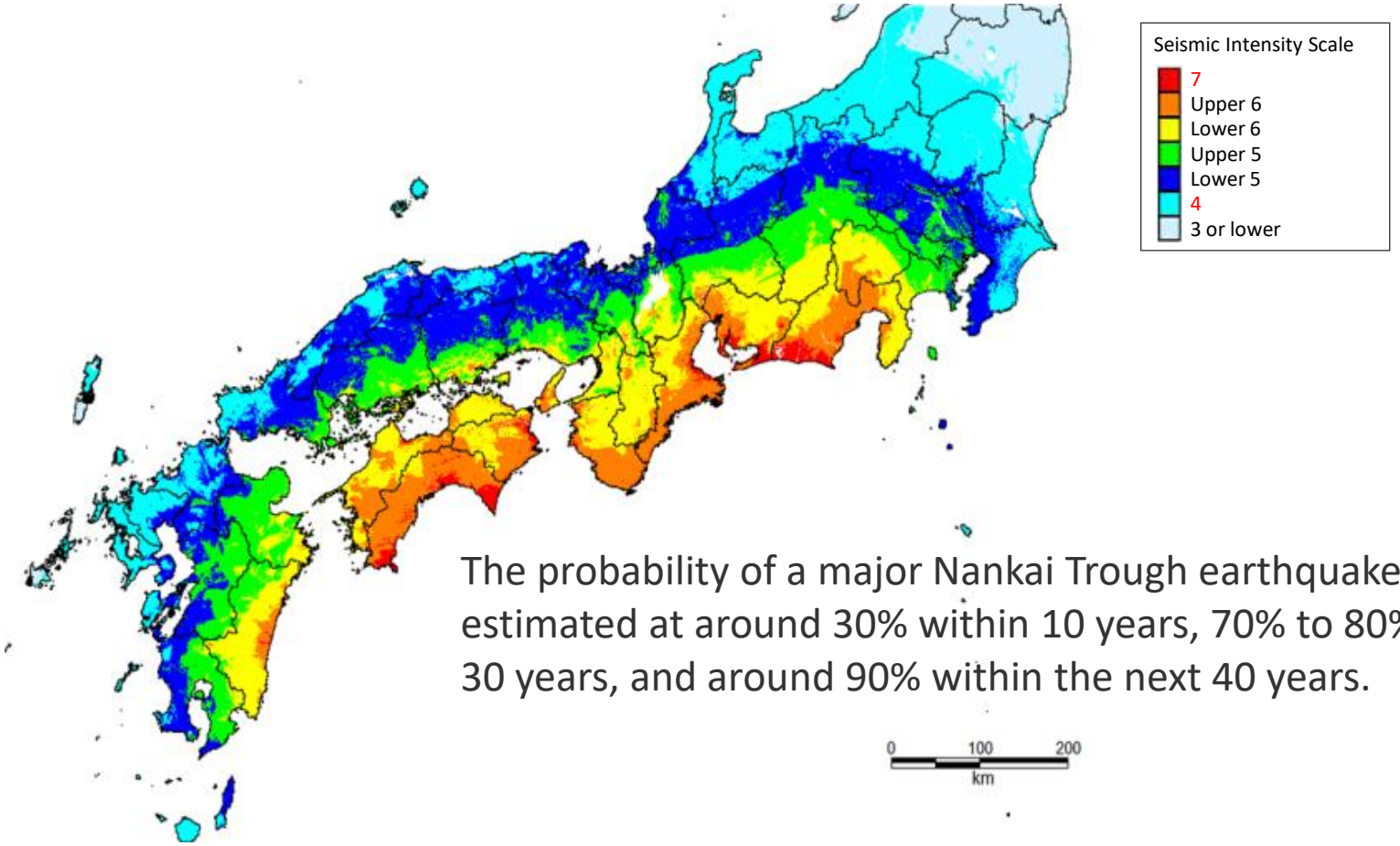
https://www.bousai.go.jp/kohou/kouhoubousai/h25/74/special_01.html

There is a 70% probability of a major earthquake occurring directly beneath the metropolitan area within the next 30 years.

[Damage Forecast]

- Mw 7.3
- Num. of damage houses (totally collapse): Approx. 175,000
- Casualties: Approx. 11,000

Nankai Trough earthquake



The probability of a major Nankai Trough earthquake is now estimated at around 30% within 10 years, 70% to 80% within 30 years, and around 90% within the next 40 years.

Number of houses completely destroyed or burned down: Approx. 2,386,000

Estimated death toll: Approx. 323,000

Total economic damage: Approx. 220 trillion yen

2. Disaster management in Japan

Disaster Countermeasure Basic Act

- Enforced in 1962
- Formulates comprehensive and strategic disaster management system

Main Contents;

1. Definition of responsibilities for disaster management
2. Disaster management organizations
3. Disaster management planning system
4. Disaster prevention and preparedness
5. Disaster emergency response
6. Disaster recovery and rehabilitation
7. Financial measures
8. State of disaster emergency

Progress in Laws and Systems

Disaster Events		Disaster Management Acts	
1959	Typhoon Ise-Wan	1961	・Disaster Countermeasures Basic Act (DCBA)
1964	Niigata Earthquake	1966	・Act on Earthquake Insurance
1978	Miyagi-Ken-Oki Earthquake	1981	・Amendment of Building Standard Law
1995	Great Hanshin-Awaji Earthquake	1995	・Amendment of DCBA ・Act on Promotion of Earthquake-proof Retrofit of Buildings
2011	Great East Japan Earthquake	2011 2012 2013	・Tsunami Resident City Development Act ・Amendment of DCBA ・Amendment of DCBA

Central Disaster Management Council

The Central Disaster Management Council

- chaired by the Prime Minister.
- consists of Ministers, heads of public institutions and experts.

The Roles of the Council are…
to formulate and promote implementation of the **Basic Disaster Management Plan**, etc.

to be put appropriate picture

Structure of Basic Disaster Management Plan in Japan

Natural hazards

Earthquake	Tsunami	Water hazard	Volcanoes	Snow hazard

Accidental hazards

Maritime Disasters	Aviation Disasters	Railroad Disasters	Road Disasters
Nuclear Disasters	Hazardous materials D.	Large-scale Fires D.	Forest Fires D.

Presented according to the order of disaster management phase

Prevention / Preparedness ⇨ Emergency Response ⇨ Disaster Recovery

Stipulated concreate countermeasures by each stakeholder

National Government ⇔ Local Government ⇔ Residents

JAPAN's Administrative System

3 Layers of Government

National Government

(**Prime Minister** is elected by the National Diet)

Population 126,1million

47 Prefectural Government

(**Governor** is elected by the residents)

Largest Prefecture: Tokyo 14.0 million

Smallest Prefecture: Tottori 0.6 million (cf. Hyogo 5.5mln)

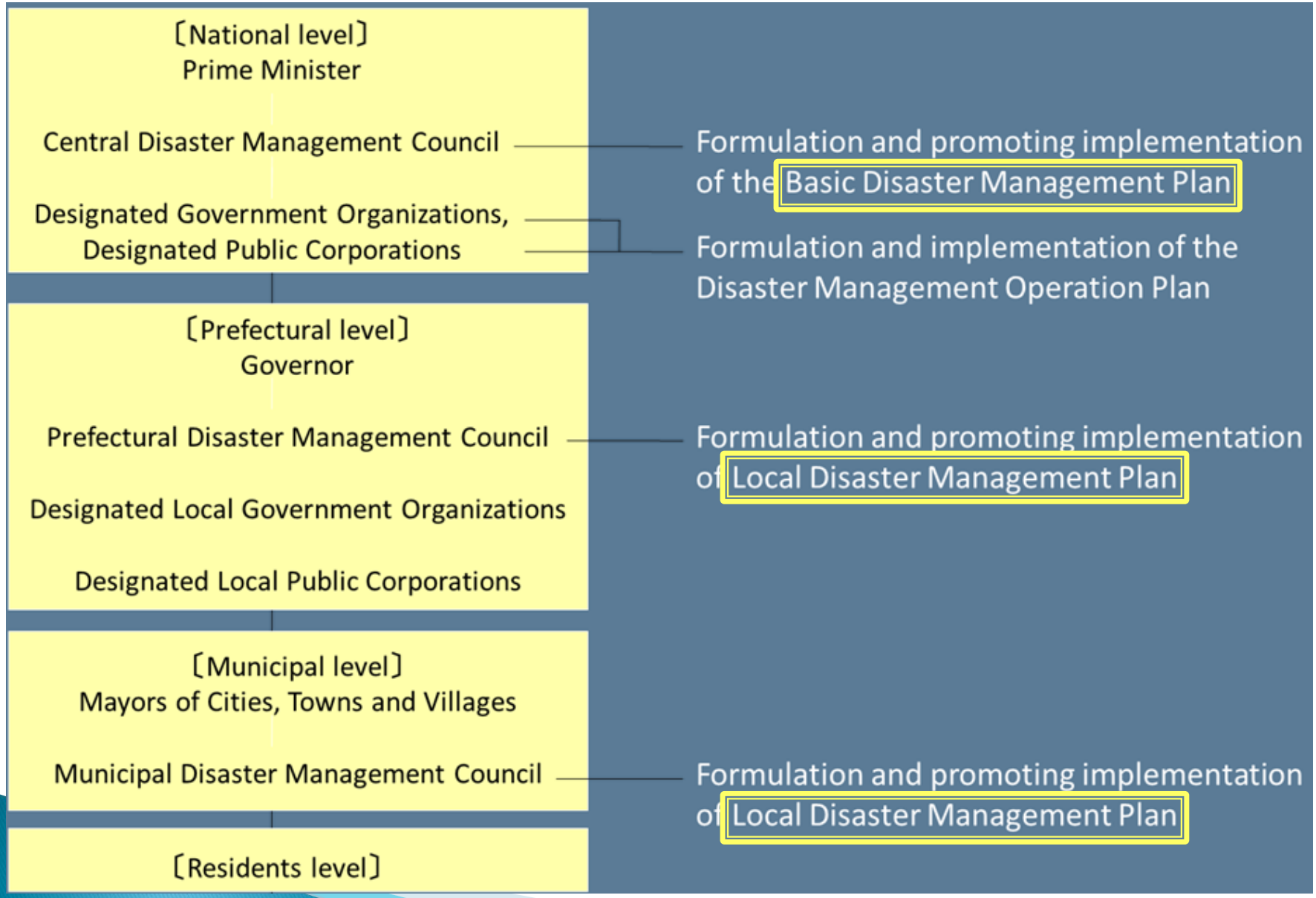
1,718 Cities, Towns, Villages Municipal Government

(**Mayor** is elected by the residents)

Largest City: Yokohama 3.8 million cf. Kobe 1.5mln

(as of April 2022)

National and Local Disaster Management Plan



Disaster Reduction Drills and Exercises

Comprehensive Disaster Reduction Drills "Disaster Reduction Day (1 Sep)"

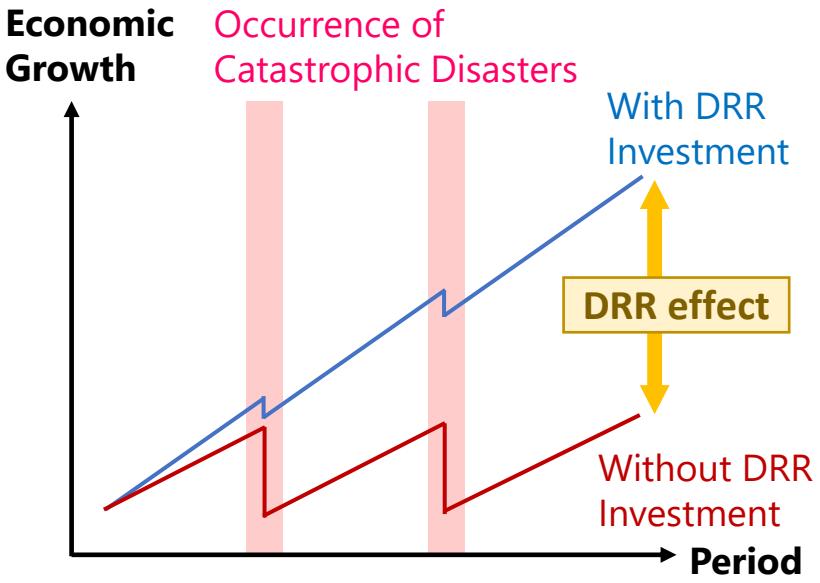
- Target: Simulating response to the Major Nankai Trough Earthquake, conducted drill with Prime Minister and his Cabinet
- Contents: Holding a meeting of Extreme Disaster Management Headquarters, extraordinary Cabinet meeting, report from Governors of affected prefecture, press conference by Prime Minister and Minister of State for Disaster Management

to be put appropriate picture

3. Good practices in Japan

– Earthquake countermeasures –

Importance of Disaster Risk Reduction Investment



Concept of DRR Effect

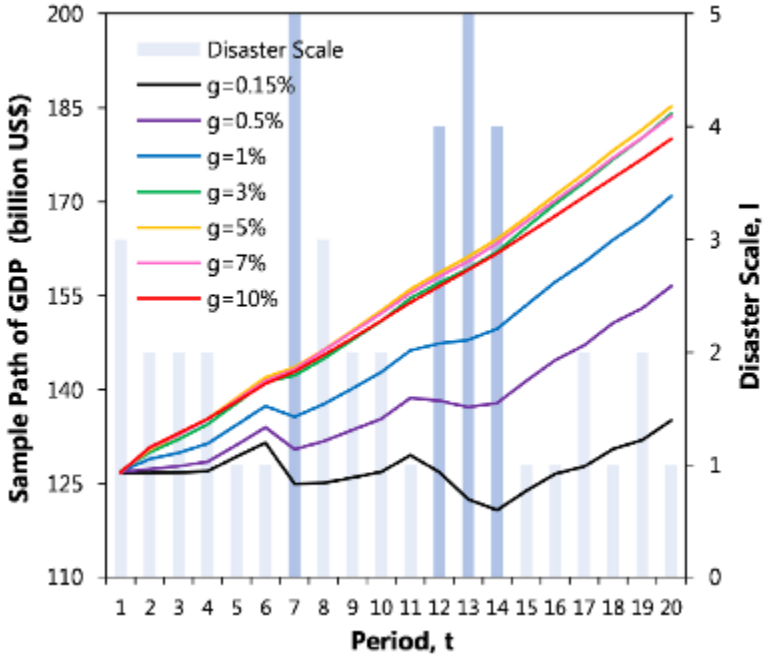


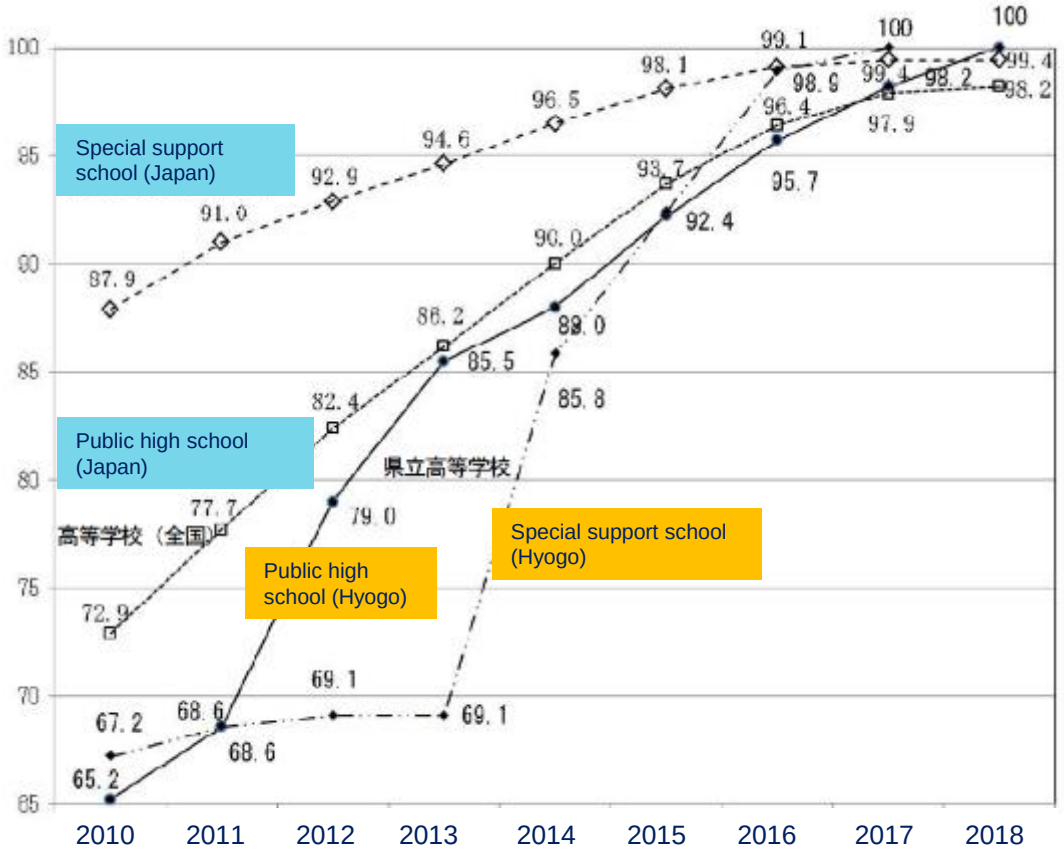
Image of Simulation

- Appropriate DRR investment expect to reduce disaster damage
- Need to invest for Structural measures Non-structural measures
- Need to have a certain budget each year.

3. Good practices in Japan

Case 1: Earthquake-resistant of schools in Hyogo

Earthquake-resistant of schools in Hyogo



- Based on the experience of past large-scale disasters, Japanese government and prefectures promoted the earthquake-proofing of public schools. To promote the earthquake resistance of public schools, “the Ministry of Education, Culture, Sports, Science and Technology (MEXT)” provided government subsidies for earthquake reinforcement and renovation projects, and made efforts to provide financial support to local governments.
- At present, 100% of public schools have been made earthquake resistant.

Earthquake-resistant of schools in Hyogo

https://www.kobe-np.co.jp/news/bousai/202101/0013997285.shtml

https://www.ikeuchi-koumuten.co.jp/government_archive/%E6%92%AD%E7%A3%A8%E8%BE%B2%E6%A5%AD%E9%AB%98%E7%AD%89%E5%AD%A6%E6%A0%A1%E7%AC%AC%EF%BC%91%E6%9C%9F%E8%80%90%E9%9C%87%E8%A3%9C%E5%BC%B7%E5%B7%A5%E4%BA%8B/

Earthquake-resistant of schools in Hyogo

https://sd-arc.jp/works/ikedajhs_gym_retrofitting/

https://www.nippon-foundation.or.jp/what/projects/activity/26404

Many gymnasiums are used as temporary evacuation site during disasters

Earthquake-resistant of schools in Sendai

Sendai City Hall built in 1965 (before the 1981 seismic standard)
Earthquake Resistance Analysis done in 1996 ⇒necessity for seismic retrofit
Seismic retrofit work done in 2007 to 2008

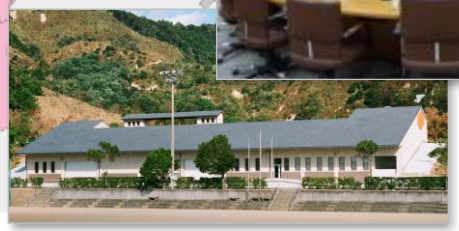
Photo by Tobishima Cooperation

3. Good practices in Japan

Case 2: Hyogo Wide-Area Disaster Prevention Center

Hyogo Wide-Area Disaster Prevention Center

Operation of wide-area disaster prevention bases in Hyogo Prefecture



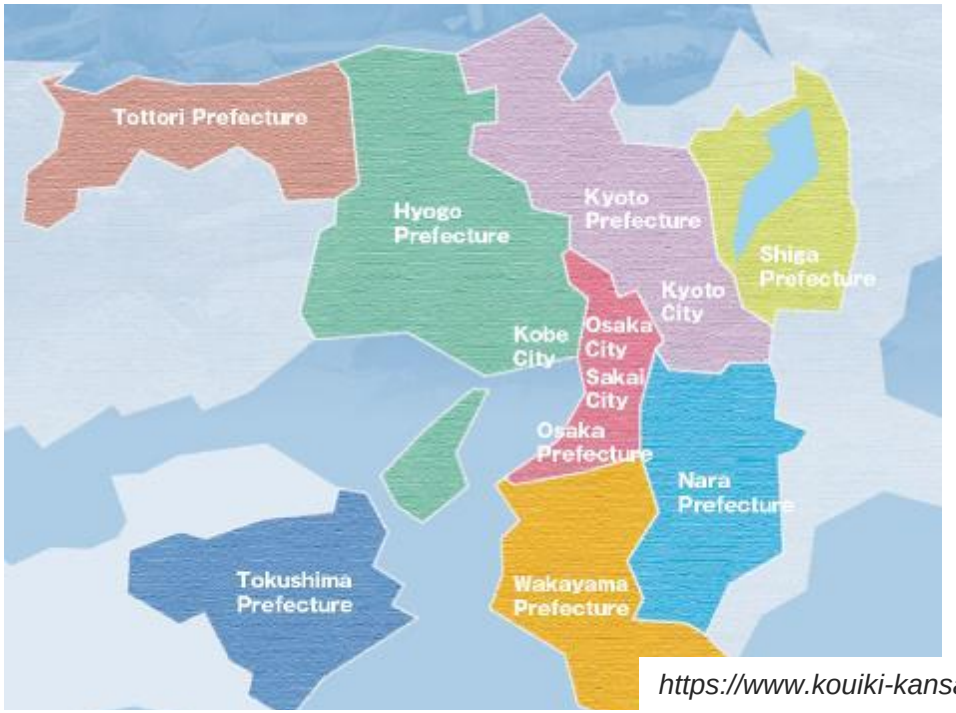
Network wide-area disaster prevention base
(1) Storage of food and supplies
(2) Gathering and accommodation of disaster response personnel
(3) Accumulation and distribution of relief supplies

Hyogo Wide-Area Disaster Prevention Center

Operation of wide-area disaster prevention bases in Hyogo Prefecture

Union of Kansai Governments

The Union of Kansai Governments (UKG) was established in December 2010 as Japan's first region-wide union of prefectural governments. We aim to deal with the challenges that spread beyond prefectural borders, thus establishing foundations of the decentralization of authority.



https://www.kouiki-kansai.jp/material/files/group/4/bosaipe.pdf

The Merits of Region-wide Disaster Prevention Efforts

1. With the UKG as a leader/coordinator of the entire region, it is possible for the UKG to make quicker decisions and provide faster disaster response for the Kansai region.
2. With excellent know-how shared by member governments, it is possible for the UKG to offer a higher quality disaster response.
3. It will become easier to cooperate with the private sector and national agencies based in the Kansai region and also be possible for the UKG to provide disaster response more smoothly.
4. It will become easier to conduct region-wide disaster prevention/mitigation projects with other member governments beyond prefectural borders.

3. Good practices in Japan

Case 3: DRR activities at community level (Hirono-town, Iwate prefecture)

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

Hirono Town is a municipality located in the northernmost coastal area of Iwate Prefecture, with population of 15,903. (as of April 2021)

**18,107 (as of January 2015)*

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

Hirono town

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

- **Monument of Showa-sanriku earthquake in 1933**

- ✓ Need caution when you feel earthquake
- ✓ Need to escape to height place when tsunami coming
- ✓ Do not construct house in low place

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

Yagi minami community leader, Hirono town

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

Maintenance for evacuation site and route by community

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

Maintenance for warehouse in case of disaster

DRR activities at community level (Hirono-town, Iwate)

Lesson learned from the Great East Japan Earthquake

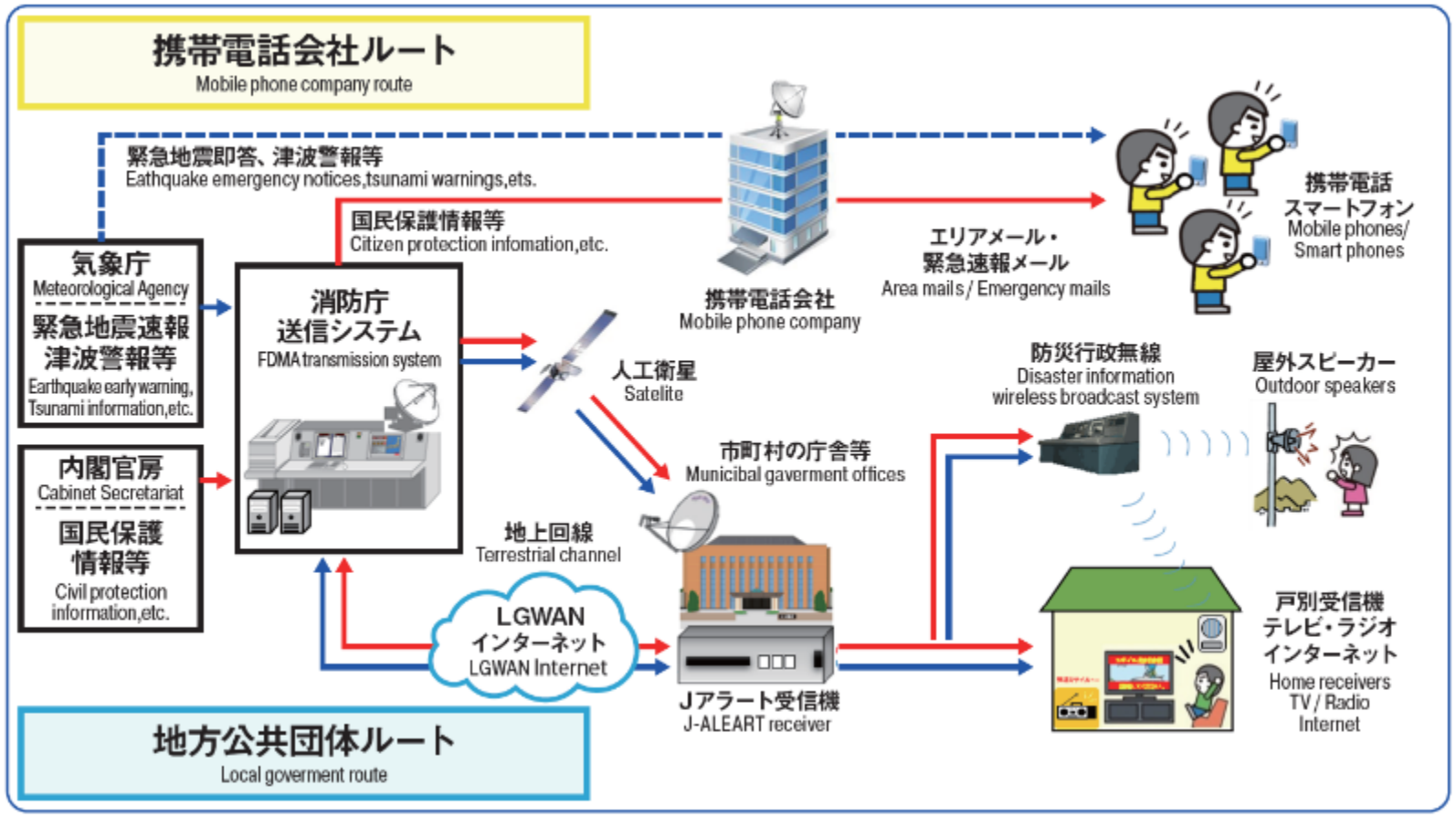
Developing community hazard map and listing personal information for mutual support

3. Good practices in Japan

Case 4: Information sharing -National Early Warning System (J-Alert)-

National Early Warning System (J-Alert)

- J-Alert is a system which can send emergency information such as earthquakes, tsunami and any other bad weather through an artificial satellite and the terrestrial line to prefectures, cities and towns.



https://www.cao.go.jp/en/doc/saigaipanf.pdf

National Early Warning System (J-Alert)

Residents can receive an information via J-Alert

(1) Earthquake Early Warning
(2) Tsunami Warnings
(3) Emergency Warnings
(4) Hazard / Evacuation Information

3. Good practices in Japan

Case 5: Residents in Need of Assistance for evacuation -Fukuoka city-

Local Disaster Management Plan (Fukuoka-city)

Section 3. Preparation for residents in Need of Assistance

↳ Part 3. Countermeasure of residents in Need of Assistance

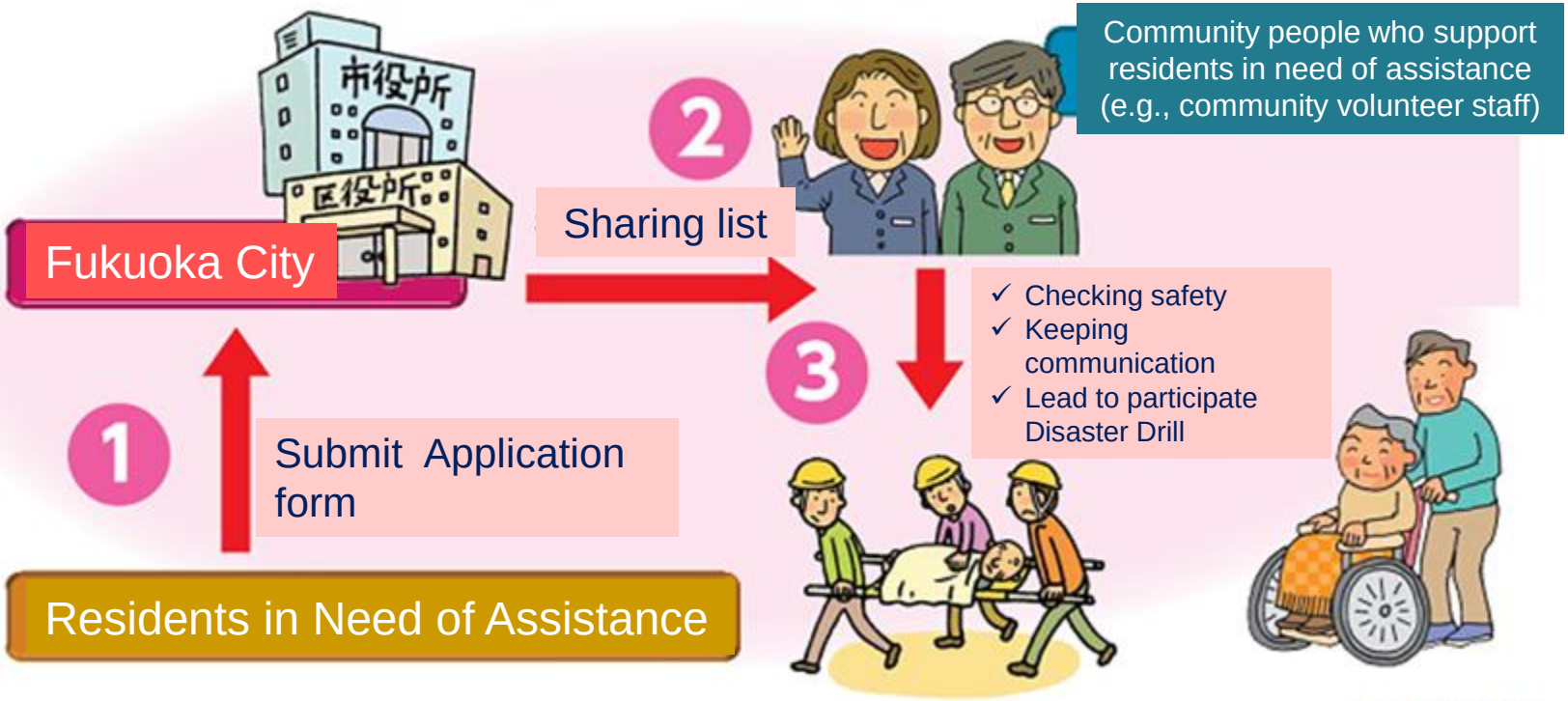
↳ 1. **List of residents in Need of Assistance for evacuation**

To be clear;

- ✓ **Description of people involved in the formulation of the plan**
- ✓ **Understanding the actual status of activities**
- ✓ **Enlist the cooperation of local residents**

Local Disaster Management Plan (Fukuoka-city)

List of residents in Need of Assistance for evacuation



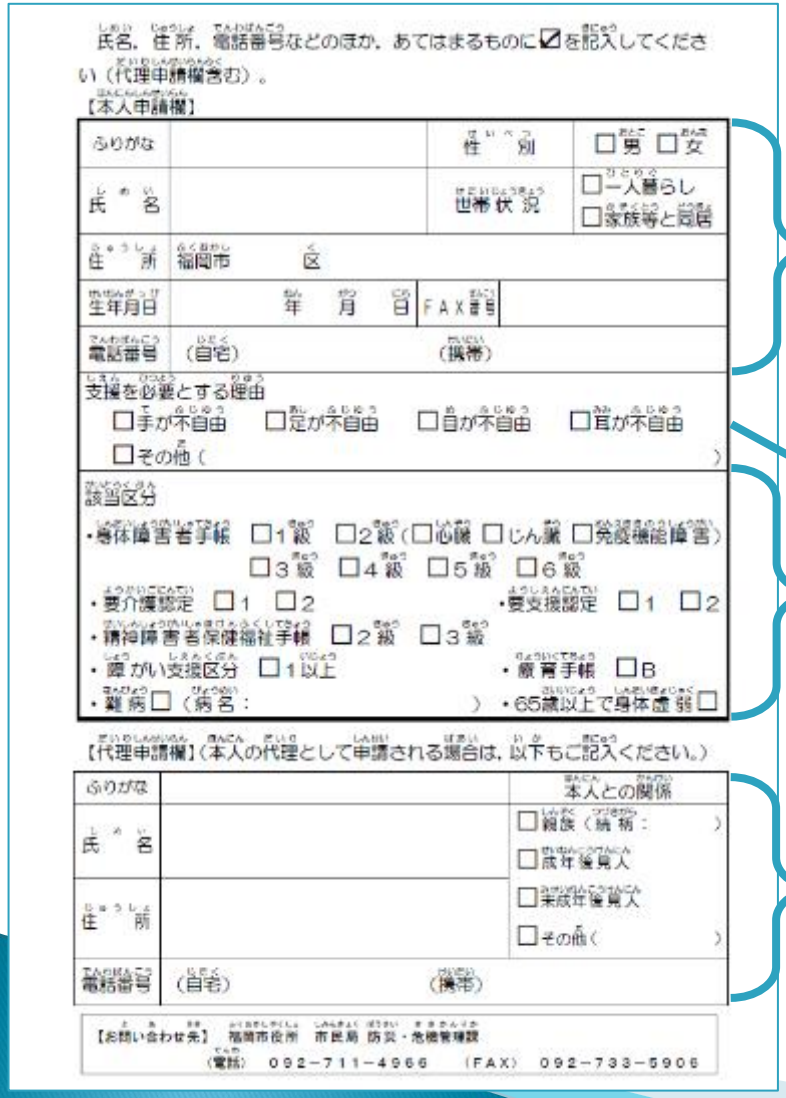
(https://www.city.fukuoka.lg.jp/shimin/t_bousai/bousai/yousiensya.html)

Need to;

- **Consider an appropriate management of list**
- **Consider system for updating latest information**
- **Save a list by electric data and printing data**

Local Disaster Management Plan (Fukuoka-city)

List of residents in Need of Assistance for evacuation



氏名，住所，電話番号などのほか，あてはまるものに☑を記入してください（代理申請欄含む）。

【本人申請欄】

ふりがな		性別	□男 □女
氏名		世帯状況	□一人暮らし □家族等と同居
住所	福岡市　　区		
生年月日	年　月　日	FAX番号	
電話番号	（自宅）	（携帯）	

支援を必要とする理由

□手が不自由　□足が不自由　□目が不自由　□耳が不自由

□その他（　　）

該当区分

・身体障害者手帳　□1級　□2級（□心臓　□じん臓　□発達機能障害）

□3級　□4級　□5級　□6級

・要介護認定　□1　□2　・要支援認定　□1　□2

・精神障害者保健福祉手帳　□2級　□3級

・障がい支援区分　□1以上　・療育手帳　□B

・難病□（病名：　　）　・65歳以上で身体虚弱□

【代理申請欄】（本人の代理として申請される場合は，以下もご記入ください。）

ふりがな		本人との関係
氏名		□親族（続柄：　　） □成年後見人
住所		□保佐人 □その他（　　）
電話番号	（自宅）　（携帯）	

【お問い合わせ先】福岡市役所　市民局 防災・危機管理課

（電話）092－711－4966　（FAX）092－733－5906

Application Format for list

- **Name**
- **Gender**
- **Date of birth**
- **Address**
- **Tel and mobile number**
- **FAX**

Reasons (why do you need support?)

Classification in the Physical Disability Certificate (*e.g., level 2 on official document*)

Application by proxy
If the person is unable to fill out the form

4. Conclusion

- Basic Act on Disaster Management was enacted in 1962. Having experienced various large-scale disasters, various committees have been established and disaster management plans have been formulated in Japan.

- As good practices of earthquake countermeasures taken by the government, activity of “the earthquake-resistant for school buildings” and “Union of Kansai Governments” were introduced.

- “Efforts to provide disaster information to residents” and to manage “evacuation site/routes at the community level” were also introduced.

- **Assuming a large-scale earthquake that is feared to occur in the future, wide-area cooperation beyond national borders and technical cooperation are necessary.**

ADRC promotes disaster risk reduction through multi-national/multi-stakeholder/multi-lateral cooperation in the Asian region.

http://www.adrc.asia

Thank you very much