Lesson from the 1995 Hanshin Awaji Earthquake and Japan's Disaster Management

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Purpose of the Lecture

1. **Japan has had many natural disasters. Especially, the Great Hanshin Awaji Earthquake in 1995 has given the society huge shock.**
2. **It changed disaster management system and created the concept of disaster resilient society.**
3. **The lesson from that disaster has become the base for Japan's disaster management, recovery and reconstruction.**
   - **(1) Immediate and flexible emergency response**
   - **(2) Long term and wide range of recovery and reconstruction (=build back better)**
   - **(3) Self, mutual and public support**
   - **(4) Disaster resilient society against future huge disasters**

Japan, a disaster country

	Disaster	Dead and missing
1932	Mikawa Earthquake	2,306
1932	Makurazaki Typhoon	3,756
1946	Nankai Earthquake	1,443
1947	Katherine Typhoon	1,930
1948	Fukui Earthquake	3,769
1954	Huge Rainfall in Kyushu, Shikoku, Chugoku	1,013
1954	Huge rainfall in Wakayama	1,124
1955	Toyamaru Typhoon	1,761
1958	Kanogawa Typhoon	1,269
1959	Isewan Typhoon	5,098
1995	Great Hanshin Awaji Earthquake	6,437
2011	Great East Japan Earthquake and Tsunami	22,010

Big disasters in Japan (dead and missing with more than 1,000 after 1932, Re : White Paper on Disaster Management, Cabinet Office 2020)

Year	Disaster	Dead and missing
2004	Typhoon No.16	98
2004	Chuetsu Earthquake	68
2006-07	Heavy snow	152
2010-11	Heavy snow	131
2011	Typhoon No.12	98
2011-12	Heavy snow	133
2012-13	Heavy snow	104
2013-14	Heavy snow	95
2014	Landslide	77
2014	Ontake Volcano Eruption	63
2014-15	Heavy snow	83
2016	Kumamoto Earthquake	267
2018	Heavy Rainfall	245
2020	Heavy Rainfall	86

Big disasters in Japan (dead and missing with more than 50 after 2000, Re : White Paper on Disaster Management, Cabinet Office 2020)

Great Hanshin Awaji Earthquake in 1995

(1) Date

5:46 am in January 17th, 1995

(2) Damage

- Number of dead and missing : 6,437
- Number of injured : 43,792
- Number of totally collapsed or burned houses : 111,054
- Number of partially collapsed or burned houses :144,341
- Cuts in water supply : more than 1.3 million houses (at the maximum)
- Failure of power supply : around 2.6 million houses (〃)
- Interruption of gas supply : around 860,000 houses (〃)
- Disconnected telephone lines : more than 300,000 lines (〃)

Five Key Words to Consider Disaster Risk Reduction

Disaster risk reduction ＞Disaster prevention

We cannot stop disasters (=no any damage), but we can reduce damage caused by disasters.

① **Hazard** ＝**Natural phenomenon** **like earthquake, tsunami, typhoon‥**

② **Disaster**＝**Damage caused by natural phenomenon**

Hazard is not always disaster.

（ex.）We have many typhoons and earthquakes every year. But unless they do not cause any damage, they are not called disasters.

Five Key Words to Consider Disaster Risk Reduction

③ Vulnerability

Less vulnerability leads to disaster reduction.

- **Weak people; The elderly people could not reach the hilly sites, while young people survived in the tsunami disaster.**

  →If the elderly could evacuate much earlier, we could reduce disaster.

- **Fragile structure; That house was collapsed by the earthquake.**

  →If the house would be anti-seismic, the family might have survived.

- **Low income; If they were not so poor, they could have lived in a tough house at a safer place, have eaten nutritious food and have got medical check with good medicine.**

Five Key Words to Consider Disaster Risk Reduction

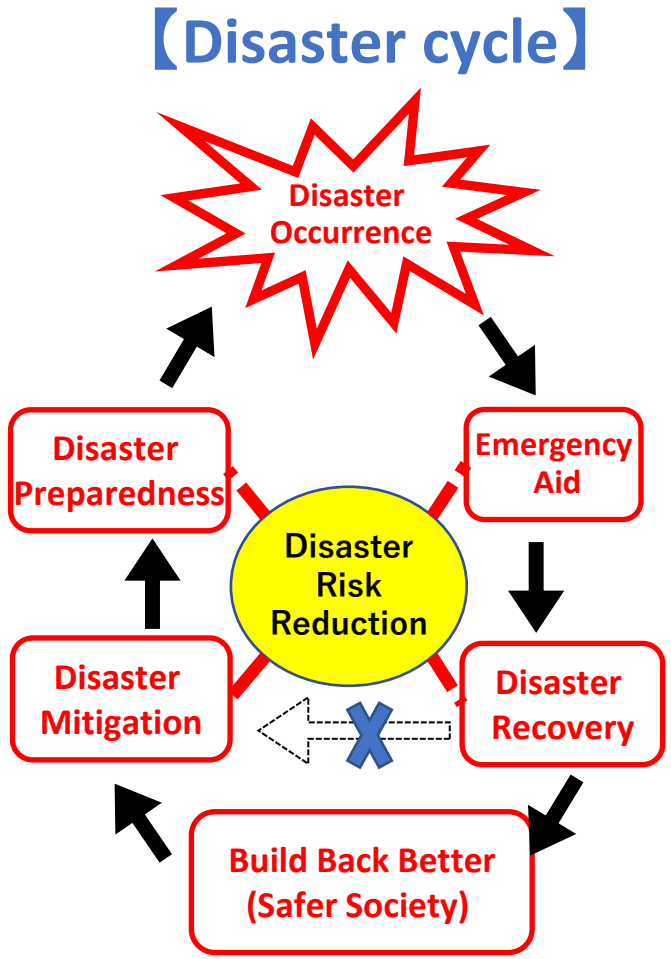
④ Exposure

- Population, Infrastructure, house and other tangible assets located in hazard-prone area.
- More exposure to hazard, more affected by disaster
- Same theory by covid-19 virus ?

“ Risk = Hazard × Exposure × Vulnerability ”

⑤ Sustainable development

- We should not focus on only emergency stage, but steadily take a step before and after disaster stages.
- Our daily lives are important to build a disaster resilient society.
- We should consider “what we can do” rather than “we should do” .



Overconfidence in Modern Technology and Lack of Disaster Management

1. Paralyzed urban infrastructure

(Damage)

- **Collapsed Hanshin Expressway(～Sep. 30th,1996)**
- **Railway service interruption (19 lines, 376.5km)**
- **Less anti-seismic buildings and houses (against Japan's intensity 5, old building code before 1981)**

(Lesson)

- **Anti seismic infrastructure, building code against Japan's intensity 7**
- **Public transportation, school, facility (=duty)**
- **Private house (= encouragement, subsidy)**

Overconfidence in Modern Technology and Lack of Disaster Management

2. Lack of preparation

(Damage)

- **Misunderstanding about earthquake disaster (= It had not hit in Kansai Area.)**
- **Overconfidence in technology and hard infrastructure (= It always can protect us.)**
- **Less emphasis on soft measures**
- **No preparation for post-disaster stage (= No idea of what to do, Much more confusion than we expected.)**

(Lesson)

- **Literacy for disaster risk reduction**
- **Public awareness and disaster education**
- **Community empowerment as well as government capacity building**

Significance of the Great Hanshin Awaji Earthquake

1. We have strengthened disaster management system.
   - Emergency assembly system
   - Collecting and disseminating information
   - Cooperation among relevant organizations (police, fire fighting agency, SDF, company for essential utilities and others)

2. We have learned the capacity limit of public support. Cooperation among self & mutual support is important.
   - 1.38 million volunteers got together at affected sites in 1995. It was called the first year of Japan's volunteerism.
   - Role of private sector was recognized (by community, NPO/NGO, business companies)

Significance of the Great Hanshin Awaji Earthquake

3. Various challenges appeared in recovery and reconstruction stages, which has extended beyond the field of disaster management.

- Ex. aged society, less relationship at community, We have faced challenges behind the society before the earthquake.
- Challenges covered not only issues in crisis management, but also ones in all areas of the society (ex. welfare, health, medical, industry, environment, education and others).
- "Build back better" rather than "back to pre-disaster stage" is important to make a disaster resilient society.

Lesson : Evacuation Place

1. Evacuation center (school, public facility)

(1) Lack of space and privacy

(Challenges)

- **317,000 evacuees at 1,138 places (at maximum, 2 weeks after that quake)**
- **Much stress, especially for women, children, aged, disabled and other vulnerable people**
- **Easy to cause infectious disease**
- **Long period (at maximum 8 months)**

(Lesson)

- **Keep privacy separately by cardboard or curtain**
- **Special care service to each individual in need**

(New challenges)

- **Staying at private car (economic syndrome)**
- **Going back to their collapsed houses**

Lesson : Evacuation Place

(2) Lack of consideration on elderly or disabled people (vulnerability)

(Challenges)

- Number of toilets were not enough. Elderly refrained from drinking water, which caused dehydration and other illness.
- Family with disabled gave up staying at the place to go back to their collapsed house

(Lesson)

- Care by medical staff
- Special evacuation place by making use of welfare facility

Lesson : Evacuation Place

(3) Ensure food and daily commodities

(Challenges: Lack of know-how for delivery)

- **Slow delivery (heavy traffic jam or road collapsed)**
- **One pattern food (bento or bread)**
- **Difficult to sort out piles of commodities**

(Lesson)

- **Hot cooked meal by volunteers or SDF (Self Defense Forces)**
- **Ensure from food makers, supermarkets or convenience stores (agreement)**
- **Manpower by delivery company**
- **Mass delivery by the national government and detailed sort by the local government.**

Lesson : Temporary House

2. Temporary House

- 48,300 houses in 634 places
- Rental fee is free, but pay for use of essential utilities (electricity, gas and water supply)

(Challenges)

(1) Difficult to ensure spaces for temporary houses

- Less space in urban or flat areas, some sites were in remote areas

(2) Difficult to complete many temporary houses in short term

- It took seven months to complete all of temporary houses

(3) Divided community

- Many applications, Drawing lots to decide who will reside and where they will be located.

(4) Full of stress

- Loss of family, property or job
- Relocation, new relationships, uncertainty about future
- Sleeplessness, alcoholism, isolated death, suicide

Lesson : Temporary House

(Lesson)

(1) Community center

- Exchange among residents
- Tea room, karoke, craft, seasonal event

(2) Special care

- Life support advisor, social worker, health nurse, volunteer
- Barrier free

通常の仮設住宅とは異なり入口が対面型に配置された仮設住宅。ウッドデッキリアフリーにし、屋根をかけて人々の交流が進み、笑顔が生まれるように工夫した。

(3) Basic facility

- Shops (food, electric appliance, beauty parlor) and restaurant
- Daycare center and medical clinic

(4) Make use of apartments as designated temporary houses

- Merit : rapid to move, basic facility (toilet, bath), cost-effective for government
- Demerit : isolation

Lesson : Permanent House

1. Rebuild houses for themselves

(Challenges)

- **No compensation for the loss of private house (no intention, no fault by government)**
- **Indirect support with interest subsidy, instead of no public grant to rebuild house**
- **Double loan (for both collapsed house and new house)**
- **Dispute over rebuilding vs repairing condominium (friction among residents)**
- **Many residents gave up reconstruction**

(Lesson)

- **National grant to totally or heavily collapsed house (maximum 3 million JPY)**
- **Local government grant**
- **Public donation**

Lesson : Public Housing

2. Relocate to public housing with low rental fee (Challenging issue)

(1) Rebuild new community

(2) Aging and Isolation (as of 2015. Hanshin-Awaji)

- **50.8 % of households were over 65**
- **46.9 % of households were single-occupant**

(3) Solitary death

(Lesson)

- **Watch over aged people**
- **Life support advisor, health nurse, volunteer**
- **Community plaza**
- **Not only collective but also detached house**

Variety of Needs

- Each person has its own need. There are many kinds of vulnerability.
- “Common needs” vs “Small but many unmet needs”. Small needs are easily to be left behind.

(ex.1) Aged people

(ex.2) Physically, intellectually or mentally challenged people

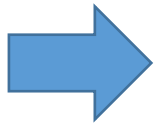
(ex.3) Women with small children, pregnant lady, infant, baby

(ex.4) Low incomed people

(ex.5) Working people, school children

(ex.6) People who lost their family, orphan

(ex.7) Foreign people



- Government service is tend to be standardized.
- Needs should not be treated in the same way (not unified, not standard).
- We should give detailed support.

Self Support and Community Development

1. Self support

- **Protect us for ourselves**
- **“Anti-seismic housing” and “immediate evacuation” are key issues to decrease the number of death toll (=disaster risk reduction).**

(Challenges)

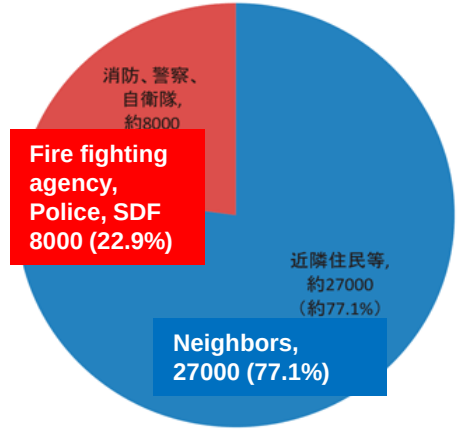
- **Raising awareness is not easy. Natural disaster does not come often.**
- **Anti-seismic housing costs much.**
- **Children do not succeed parents house. There are many vacant houses because of depopulation.**

2. Community development

- **We cannot live alone. Community is important to spend our lives together.**
- **Relief activities are mainly implemented by neighbors. (for short term)**
- **Each member is a main actor for community development. (for long term)**

Community

Who rescued the people buried in the debris ? (from Disaster Management White Paper)



(Challenges)

(1) Poor interpersonal relationship, especially, in urban city

(2) Young generation are not interested in community activities.

(3) New community at both temporary and permanent housing sites

(Lesson)

(1) Community development association (at post disaster stage)

- Not only residents, but also land owners, other stakeholders who are engaged in community
- They themselves decide its development with the assistance from experts and government.

(2) Community disaster management plan (at pre disaster stage)

- Community members make their plan to prepare for future disaster.
- Storage for rescue and relief equipment, food, water and daily commodities
- Disaster drill and training

Mutual Support by Volunteer, NPO/NGO and Other Supporters

(Emergency aid stage)

1.3 million volunteers got together from all over Japan

→ First year of volunteerism in Japan

1. Take care of affected people at evacuation center

(ex. prepare hot meals / deliver relief goods / take care of children)

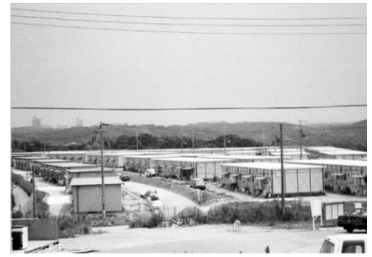
2. Professional volunteer (ex. medical doctor, nurse, architect, lawyer, researcher)

3. Amateur volunteer (ex. university student, businessman, housewife, retired person)

(Recovery & reconstruction Stages)

1. Take care of affected people at temporary and permanent housing (prevent isolation / build new community)

Mutual Support by Volunteer, NPO/NGO and Other Supporters



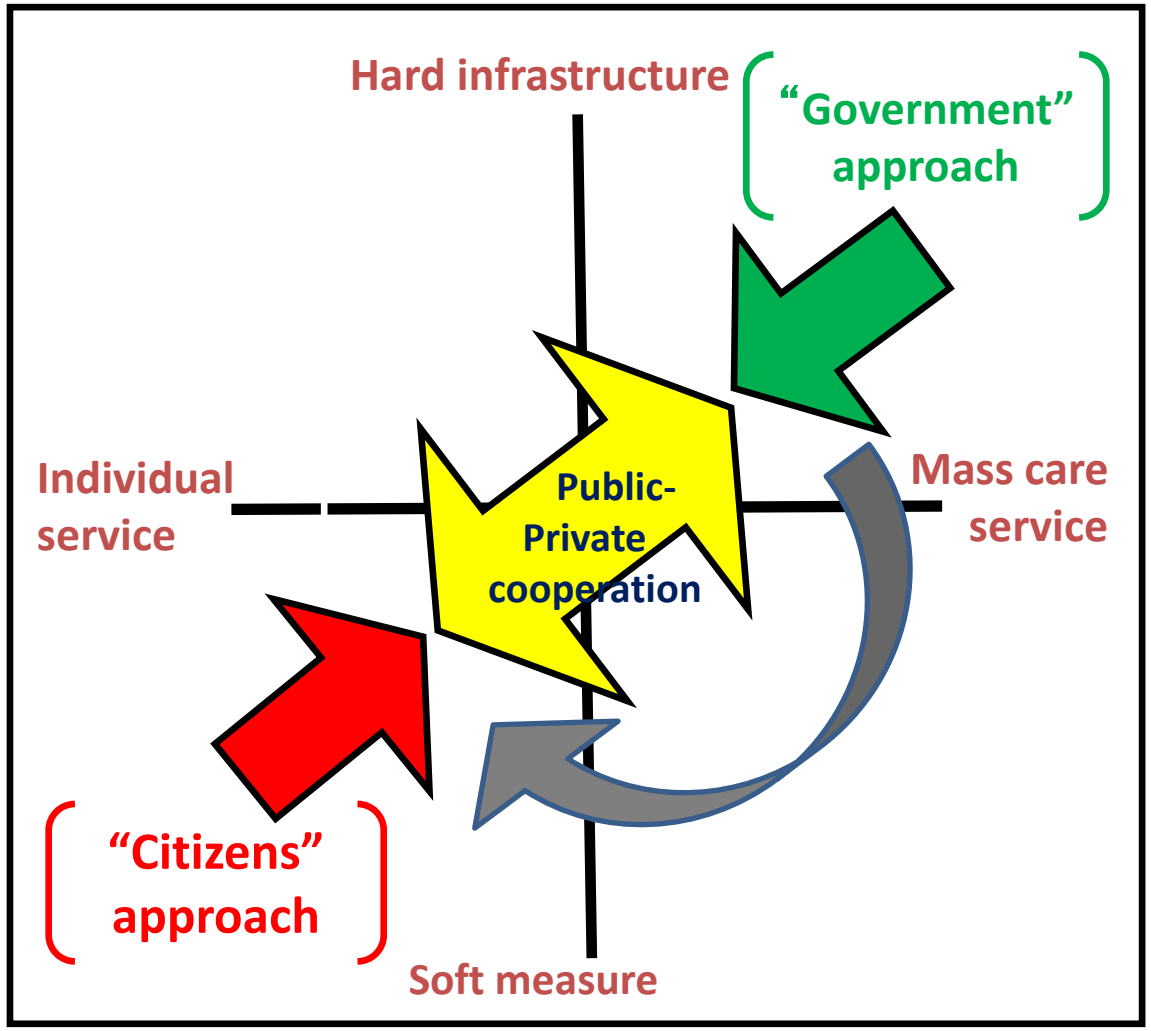
(Characteristics)

- Pick up individual needs, closed to affected people, heart to heart
- Immediate and flexible (⇔Government must follow the law, formal)
- Complement public support
- Flexible, specified, new idea, depending on variety of needs

(Ex.) Big temporary housing site（120 buildings with 1060 houses）

- Give building number to identify their houses easily
- Write the manual to use electricity and water supply in big letters
- Set watering time for flowers every morning (=for greeting with each other)
- Friendly center building to prevent isolation for relaxation
- Build face to face relationship between volunteers and affected residents

Cooperation among public, mutual and self supports （Both “bottom-up” and “top-down” approaches)



Sharing roles between public and private sectors

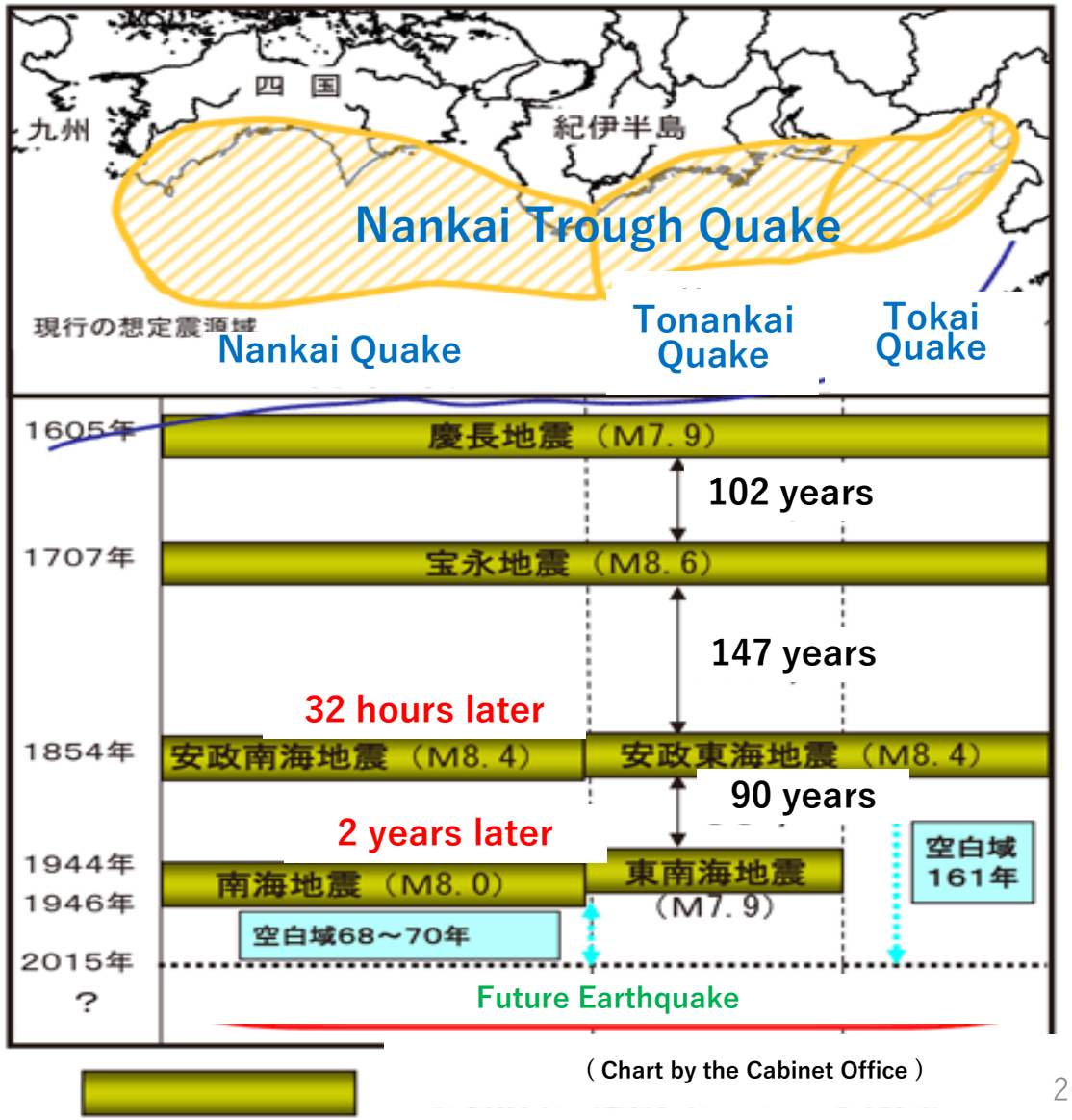
1. The government puts high priority on institution building for public interest (mass care service).
2. Hard infrastructure also should be developed by the government.
3. Citizens (volunteers) launch support individual service (soft measure) to each victim.
4. They can get access to privacy of victims when they build personal relationship.
5. Approach by both sectors lead to “public-private cooperation”.

Recent Earthquake Disasters in Japan (Except for the 1995 Hanshin Awaji and the 2011 Great East Japan Earthquakes)

1. Tottori West Quake (Jun. 2000, M7.3)
2. Geiyo Quake (Mar. 2001, M6.7)
3. Miyagi Offshore Quake (May 2003, M7.1)
4. Tokachi Offshore Quake (Sep. 2003, M8.0)
5. Niigata Chuetsu Quake (Oct. 2004, M6.8)
6. Fukuoka West Offshore Quake (Mar. 2005, M7.0)
7. Noto Peninsula Quake (Apr. 2007, M6.9)
8. Niigata Chuetsu Offshore Quake (Jun.2008, M6.8)
9. Iwate/Miyagi Inland Quake (Jun. 2008, M7.2)
10. Great East Japan Quake (Mar.2011, M9.2)
11. Kumamoto Quake (Apr. 2016, M7.3)
12. Northern Osaka Quake (Jun. 2016, M6.1)
13. Hokkaido Eastern Iburi Quake (Sep. 2018, M6.7)
14. Fukushima Offshore Quake (Feb. 2021, M7.3)
15. Fukushima Offshore Quake (Mar. 2022, M7.4)

- Japan has entered seismic activity period.
- Many inland earthquakes are said to be signal before huge disasters in the ocean trench.

Japan’s Destiny against Earthquake Disaster



（Chart by the Cabinet Office）

Future Huge Earthquake Disasters in Japan

Nankai Trough Earthquake (Event probability: 70-80% within the next 30 years)

- **Estimated deaths/missing: 323,000**
- **Estimated totally collapsed or burned houses: 2,500,000**
- **Estimated damage: 1.7 trillion USD**

Tokyo Metropolitan Earthquake (Event probability: 70% within the next 30 years)

- **Estimated deaths/missing: 23,000**
- **Estimated totally collapsed or burned houses: 610,000**
- **Estimated damage: 1 trillion USD**

We aim the damage would be reduced by 50 to 80% through disaster risk reduction activities, mainly through early evacuation and earthquake-resistant building.

Various Types of Disasters

	Earthquake	Typhoon or Rainfall	Volcanic Eruption	Snowfall	Tornado or Strong wind	Others	Total
FY2012	0	3	0	1	1	0	5
FY2013	1	4	0	1	1	0	7
FY2014	1	4	1	1	0	0	7
FY2015	0	4	3	0	0	0	7
FY2016	2	4	0	0	0	0	5
FY2017	0	4	1	1	0	0	6
FY2018	3	3	1	0	0	1	8
FY2019	0	1	0	0	0	0	1
FY2020	1	6	0	1	0	0	8
FY2021	1	3	0	3	0	0	7

Heavy Rainfall Disaster

1． We might have looked down on disaster caused by heavy rainfall.(ex. river flooding, landslide)

① **We should change ideas about heavy rainfall due to weather fluctuation.**

② **There are many people living in landslide risk areas.**

③ **Because of urbanization, many people have their houses along valleys.**

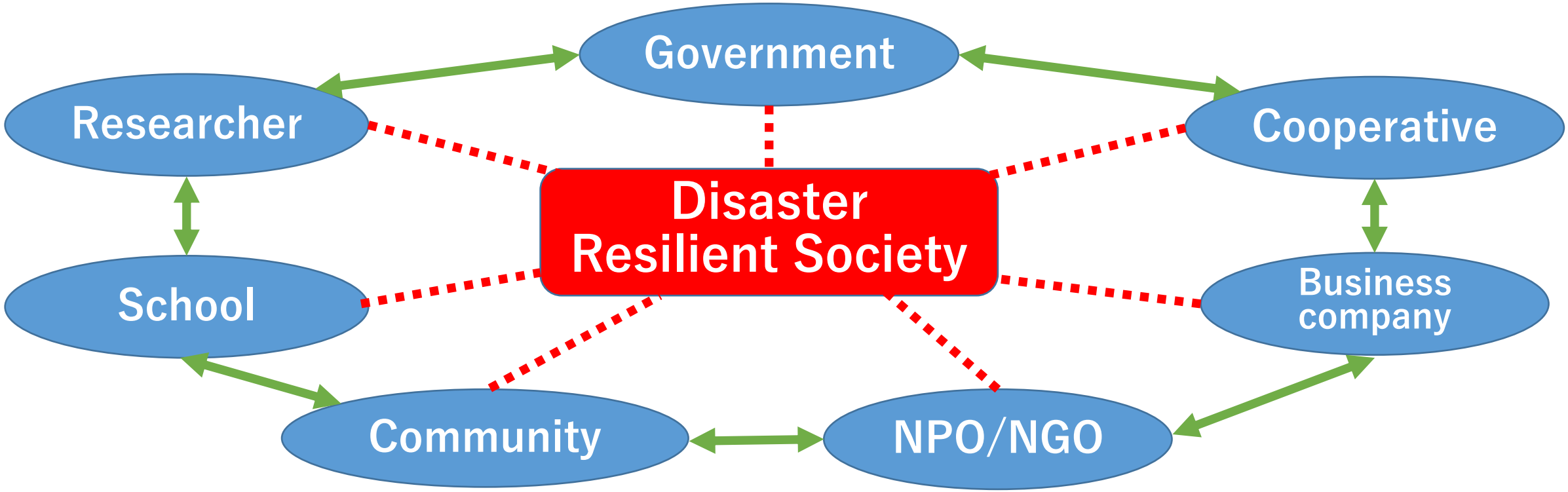
2． We should be more sensitive about evacuation.

① **Many residents have not evacuated in advance.**

② **Evacuation announcement by government was not always effective for residents.**

We can forecast when the disaster comes !

Collaboration among Various Stakeholders in the Society



- **“What we can do > What we should do” is a key to keep disaster risk reduction and sustainability.**
- **Each resource is limited/**
- **Combined resources among stakeholders lead to disaster resilient society.**

Aiming for Disaster Resilient Society against Future Disasters

1. Overconfidence in advanced technology and lack of disaster management

（Short term and long term）

2. Immediate and flexible emergency response

＋

3. Wide range of recovery and reconstruction (=build back better)

＋

(Stakeholder)

4. Variety of needs and lack of government capacity

＋

5. Cooperation among self, mutual and public supports

6. Disaster resilient society against future huge disasters

Thank you for your attention.

Please contact to me when you have any questions or need further information

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