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# How can we Realize Resilient Infrastructure? From Nationwide Movement for DRR to Solid Pre-Disaster Investment, the Japanese Experience



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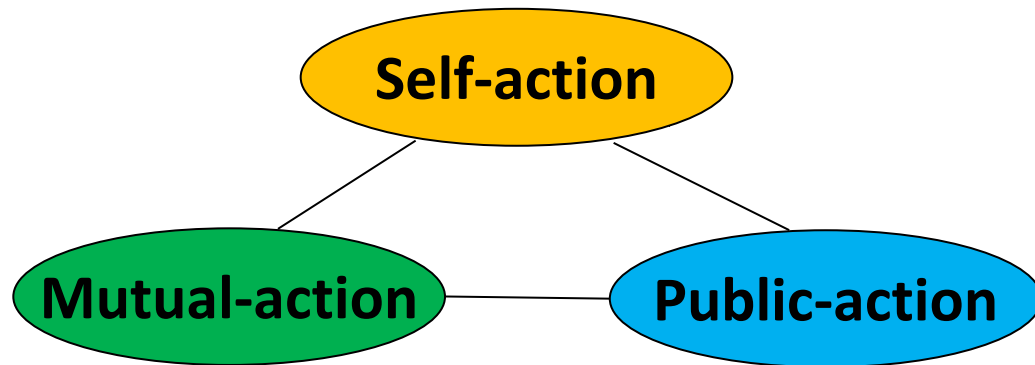


# Governance and Stakeholder Engagement for Resilient Infrastructure: How?

- Public Awareness to Multistakeholder Engagement
  - Institutionalization of Legal Norms and Regulations
  - Action on the Ground by Local Gov'ts & Local Actors
  - Secure Budget to Ensure Action on the Ground
  - Structural Measures to Stabilize Resilience beyond Short Human Memories
- 

# Paradigm shift after 1995 Hanshin-Awaji (Kobe) Earthquake

From Gov't centered Disaster Reduction to  
Multistakeholder approach for  
Disaster Reduction



- Self-help action by individuals, families and companies
- Mutual-help action at neighborhoods & local communities
- Public-action by governments

2004 was called “the Year of Disasters”  
(2018 also)

10 Typhoons landed on mainland Japan  
In Typhoon Tokage, an elderly group bus  
tour was stranded in floodwaters and the  
group spent a night on the bus rooftop.

(But why were they  
travelling despite the  
enormous rainfall?)



Oct. Niigata Chuetsu EQ  
Dec. Indian Ocean Tsunami

Year full of disaster lessons !  
But many of these disasters could have  
been avoided, if they have paid attention.



# How can we promote the Nation-Wide Movement for Disaster Reduction?

Initiated by S. Nishikawa in 2006



## ■ Involve various local groups in disaster reduction

- Community Groups & Community Center Managers
- Junior Chamber of Commerce Chapters
- Parent & Teachers Associations
- Local Shop Unions
- Consumer Cooperative Unions, etc.



## ■ Provide various opportunities for disaster education

- In Elementary & Secondary Schools
- At Social Education Facilities & Public Libraries



## ■ Develop various methodologies to attract different people

- Open a new portal website for sharing methodologies & knowledge
- Start “Ichi-Nichi-Mae (the day before the disaster) project” for personal disaster experience sharing for awareness

## ■ Involve the Corporate (Business) Sector

- Guidelines, Policy Incentives, Community of Practice

# New approaches to reach out to wider audience

Movie based on the story of a shop owner in Kobe who stood up to revive his shopping arcade from EQ and Later became a pro golfer, released in 2006

Disasters may suddenly strike you.  
But you still have time to prepare now!  
Your awareness & preparedness will save you!

Promotion poster by the Cabinet Office



Manga by a popular cartoonist, "How can you protect your girlfriend when an earthquake happens when dating?"

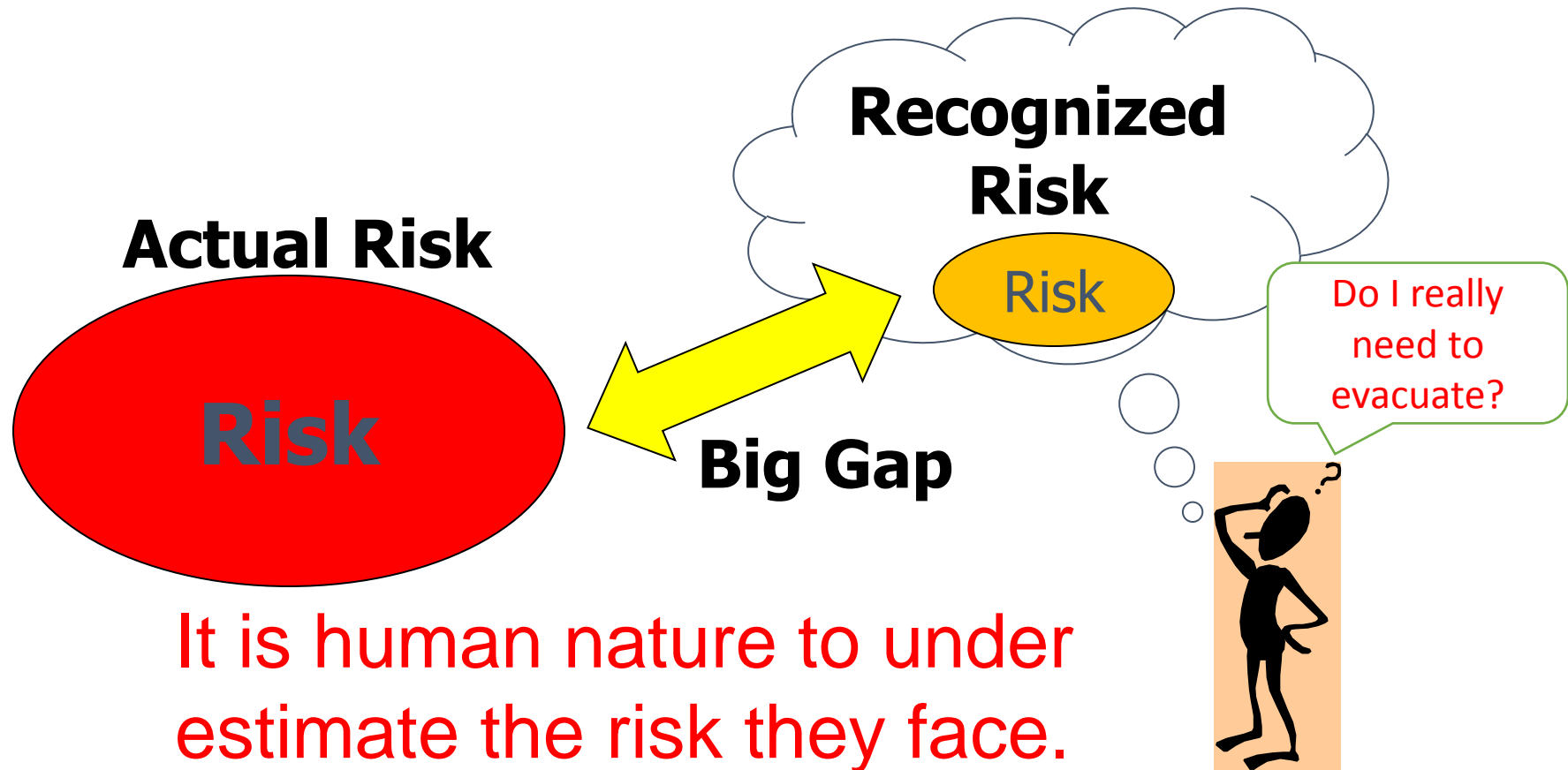


災害はいつも突然にやってきます。  
でも、あなたはまだ間に合います。  
災害による被害を少なくするための国民運動の輪をひろげましょう  
「ひごろからの備えがあなたを守ります！」



# *The Pitfall in Human Response!*

## **Risk Perception Gap**



Bear in mind: Human beings are lazy and forgetful!<sub>6</sub>



# How can we motivate individuals to take preventive action ?

- Disasters are not somebody else's affair.
- Do's and Don'ts preaching style educational materials do not attract adult's attention.



The tragic footages are not isolated events, it may be right behind you !

(the award winning poster of the 2005 competition)

## 'Ichi-Nichi-Mae (the Day Before) Project'

### Application of Psychology

Initiated by S. Nishikawa in 2005

- Sincere personal stories generate sincere empathy to individuals in similar circumstances.
  - This empathy will make them aware that they do have a possibility to be personally affected by a disaster.
  - Once they recognize this risk, they will feel that they do not want to suffer similarly.
  - This will work as a wake-up call for their preventive action.
- Interview people who were seriously affected by a disaster, who have responded to a disaster, by posing the question;  
**“ What would you do if you were back the day before the disaster (Ichi-Nichi-Mae) ?””**
  - Edit the most impressive personal stories into 200 to 600 word short stories; Add an indicative illustration
  - Publish it on the Cabinet Office Disaster Management Website <http://www.bousai.go.jp/kyoiku/keigen/ichinitimae/index.html>
  - **Free to download and us**

## A Single facing Starvation after Earthquake

### I Really Regret Unprepared Single's Life

(The Great East Japan Earthquake, March 2011)

(Story by a company employee in the 30s, Sendai City)

The Earthquake came when I was working in my office. Everything in the office turned over and fell down. Fortunately nobody was injured in my office.

I reported to the main office that we were all safe. I informed my parents that I was safe. I was lucky to get my e-mail messages through and felt relieved.

Then I went home to my dormitory room. It was a terrible mess! Since I am single and living alone, I do not cook. I always dined outside or bought lunch boxes at nearby convenience stores. My refrigerator was always empty.

I asked my parents in the countryside to send me some food. But immediately after the earthquake, the package delivery service was not available.

So my relief food supplies did not reach me. Supermarkets and convenience stores had empty shelves. I nearly starved to death.

I really recognized the importance of food stockpiling.

If I was back the day before the Earthquake, I would buy canned food.



## She Evacuated 2 Days Ago, But Not This Time

### Died with the young bride who was persuading

(March 2011 Great East Japan Eq & Tsunami)

(Story by a man in the 50s)

On 9 March, two days before the Great East Japan EQ & Tsunami, an earthquake happened off the Sanriku coast, and a Tsunami warning was issued. My aunt, aged over 80, resident of Miyako city, followed the tsunami evacuation advisory and went to high ground. The tsunami on this day was only 50cm high.

I was shocked to hear that, she did not evacuate on 11 March! Her daughter in law tried to persuade her to evacuate, emphasizing that the tsunami this time is far dangerous than 9 March. But she was stubborn and refused to evacuate and she died with the young bride as her companion.

On that day, the local radio first broadcasted that the initial wave of tsunami was observed in Ofunato, 20cm high at 2:46. Some say that this is why she did not evacuate. But that does not justify her misdoing. I really wish that, anyone who felt an earthquake in the coastal area, should evacuate, no matter what.





# The Sendai Disaster Reduction Expo in 2005

Co-organized by Sendai City, Cabinet Office and the DR week promotion committee



Exhibition booths at Sendai Terminal Hall



Vice-Minister of Cabinet Office Disaster Management

President of Japanese Red Cross Society

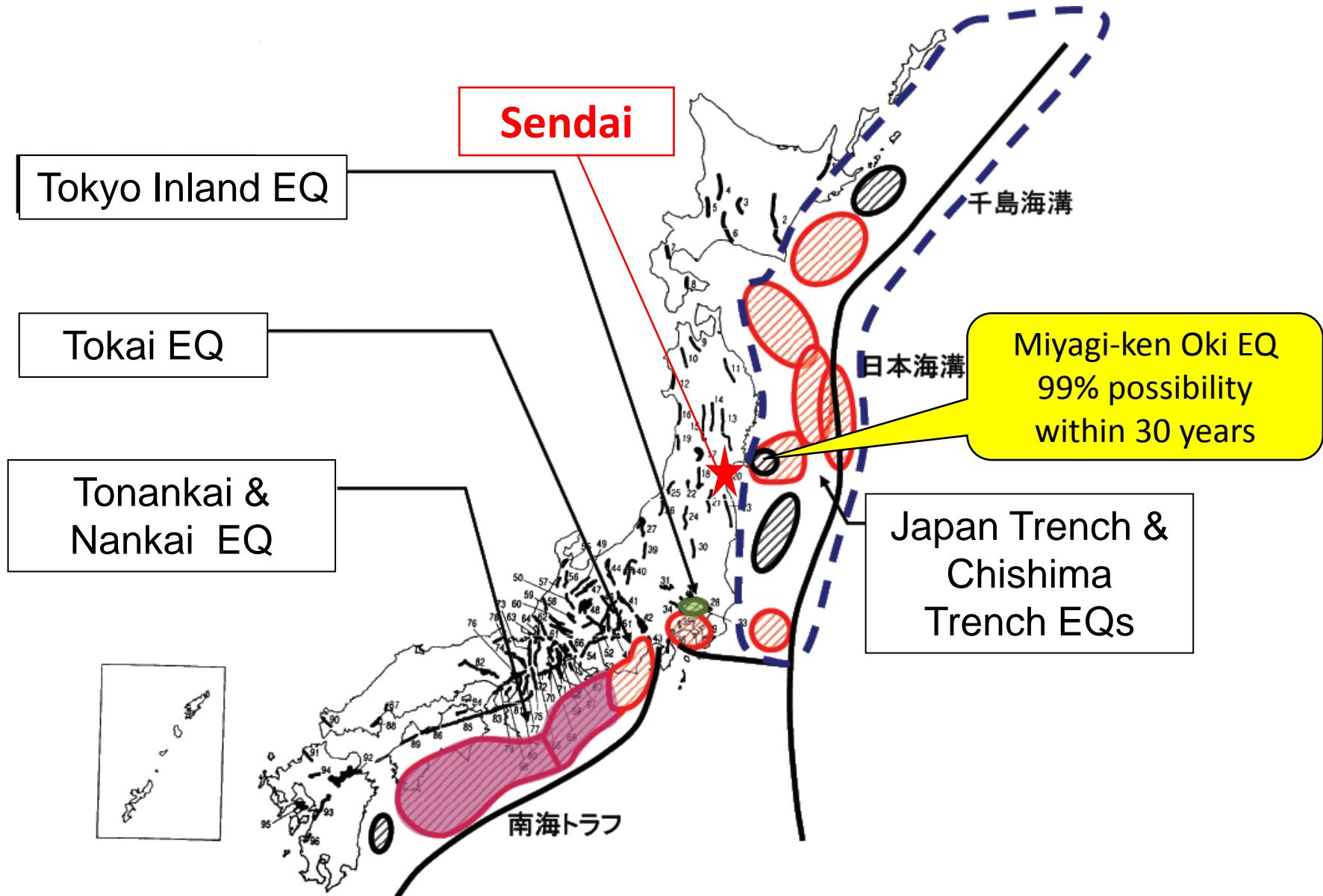
Mayor of Sendai City



Various Demonstrations

Opportunity to boost citizen's awareness and propagate the Nation-Wide Movement at local level.  
Laid the foundation for Sendai City DR Policy Implementation.

# Recognized Possibilities of large-scale M8 earthquakes and tsunamis in Japan (pre-2011)



# Risk is identified! ⇒ What Next?

## Hints from the Sendai City Experience.

Sendai City : population 1,046,000 (2010 census)

Previous experience of 1978(M7.4), 2003(M7.0), 2005(M7.2) earthquakes

Probability of another Miyagi-ken Oki EQ estimated as **99% within 30 years !**

**Risk is imminent!** ⇒ **Policy & Action by Sendai City**

Nov. 1999 “Sendai City Building Assets Seismic Safety Target”

Sept. 2005 “Sendai Disaster Reduction Expo” with Cabinet Office of Japan

**April 2008 “Sendai City Earthquake Resilience Policy”**

Examples of Action

- Seismic Retrofit of Schools
- Seismic Retrofit of Sendai City Hall
- Seismic Retrofit of Fire Stations
- Subsidy to Earthquake Resistance Analysis of Private Housing
- Subsidy to Earthquake Retrofitting of Private Housing & more



**Minimized human casualties by the Great East Japan EQ (M9.0)**



# Seismic Retrofit of Sendai City Hall

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



Seismic Brace with vibration damper inserted.



Seismic Brace & Seismometer installed on ground floor hall.

M9 Earthquake Came ! 11 March 2011



Structural safety of City Hall confirmed in 1 hour.  
City hall served as temporary shelter for stranded commuters & visitors.

Photo by Tobishima Cooperation

# Seismic Retrofit of Schools

Seismic retrofit of schools based on Sendai City Earthquake Resilience Policy April 2008



Progress of school seismic retrofiting : 99.6% done by April 2010

M9 Earthquake Came ! 11 March 2011

No structural damage to Sendai schools.  
Not a single child killed in Sendai school.

# Seismic Retrofit of Fire Stations

Seismic Retrofit of Sendai City Fire Stations based on  
Nov. 1999 “Sendai City Building Assets Seismic Safety Target”  
April 2008 “Sendai City Earthquake Resilience Policy”

## M9 Earthquake Came ! 11 March 2011



None of the Fire Stations structurally damaged by earthquake.  
Functioned as Emergency Operation base.



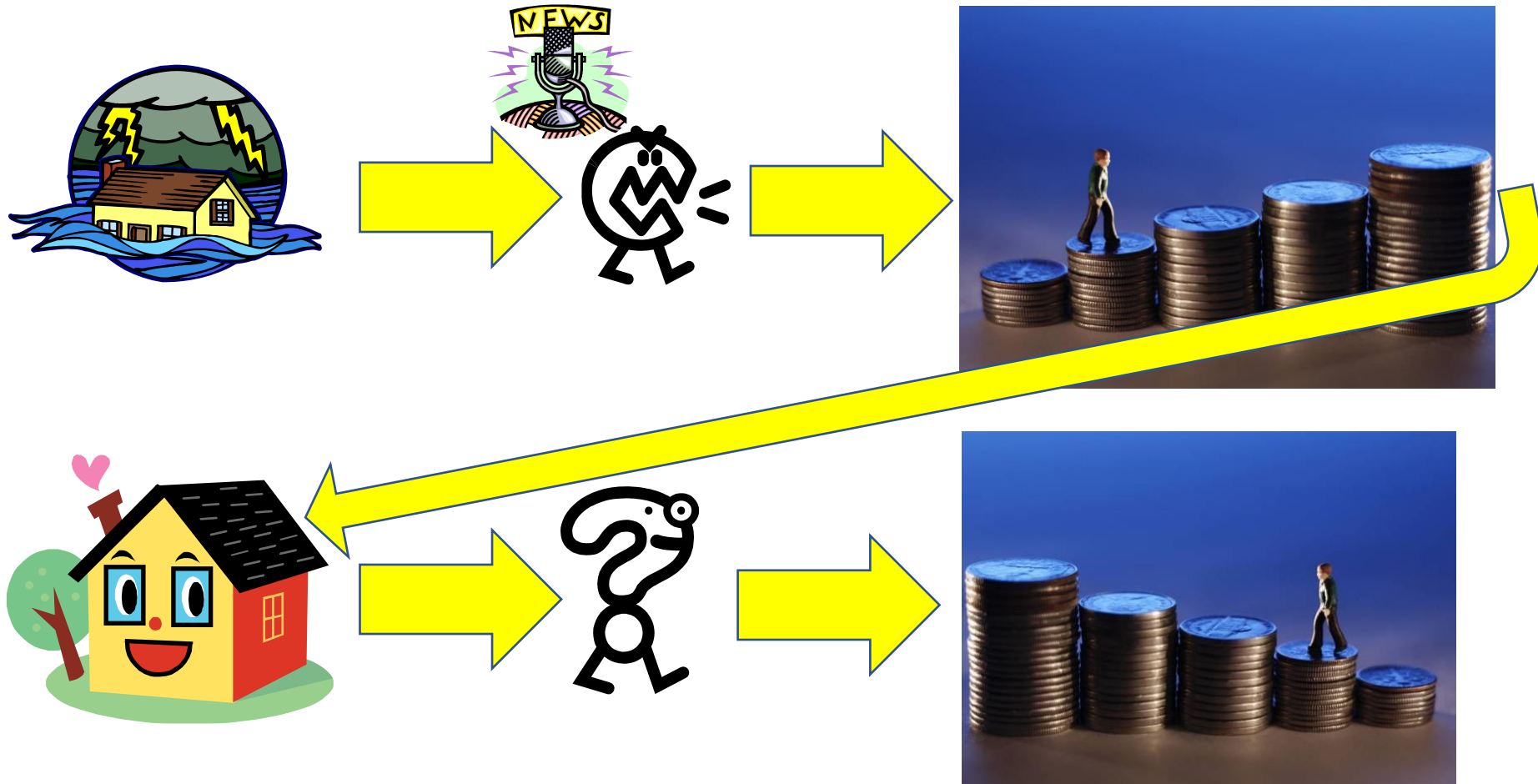
# Which do you prefer ?



Will the family who lost their beloved ones be happy with insurance money?



# The Paradox of DR Administration



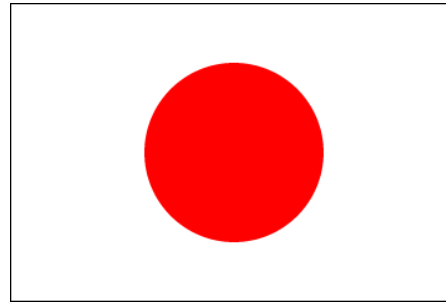
How can we sustain DRR efforts at National/Local Levels ?  
How can we secure the budget for investment in resilience?  
How can we Stabilize Resilience beyond Short Human Memories?

PROVERB BY JAPANESE PHYSICS SCIENTIST  
DR. TORAHIKO TERADA (1878-1935)  
WHO INVESTIGATED THE DAMAGE BY 1923  
GREAT KANTO EARTHQUAKE



**“Natural Disasters will hit us by the  
Time people have forgotten about it”**

How to foster & inherit the Culture of Prevention



***Thank you for your attention!***

