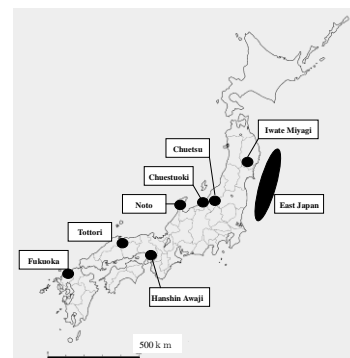


Housing Recovery from Great East Japan Earthquake 2011

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Character of the Great East Japan disaster

- 14:46, 11 Mar 2011
- M9.0
- Multiple disaster; earthquake, **tsunami**, fire, land slide and **nuclear power plant accident**
- Huge area; 500km length
From Aomori to Tokyo
- These characteristics make it different from the Hanshin-Awaji earthquake in 1995 in Kobe.



Damage by the Great East Japan Earthquake

(as of 14 Dec 2012)

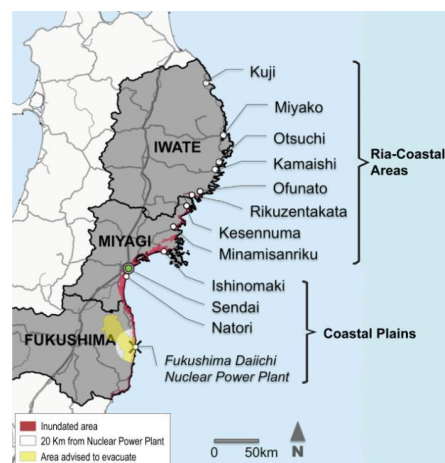
- Death 15,878
 - Missing 2,713
 - Secondary death 2,303
 - Evacuee 321,8433
- } — Total 18,591 person

House damage

- Totally damaged 129,714 units
- Half damaged 267,603
- Partially damaged 731,534

Major 3 types of damaged area

1. Ria-coastal area
Iwate, Miyagi prefecture
2. Coastal plain
Miyagi prefecture
3. Nuclear accident area
Fukushima prefecture



Damage in ria-coastal area

Ofunato city



Kesen-numa city

港内の重油タンクが破損し、燃え上がって火災を広げた。



消防艇も黒こげ

Onagawa town, Miyagi prefecture

One of the most heavily damaged areas. Almost 10% of the population was killed.



Building that fell down (tipped over) by tsunami



Hospital on the hill 15m high from sea level. Tsunami attacked the first floor.

Sendai plane



Rice field



Sendai airport



Arahama district, Sendai plane

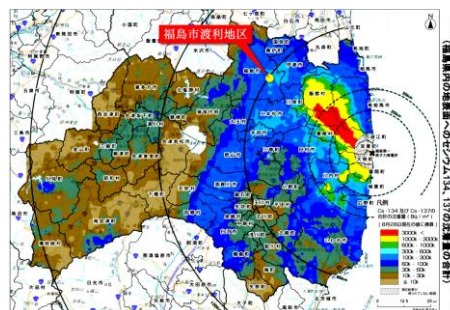


Elementary school, nearest to sea shore



Nuclear radiation contamination

- Nuclear contamination and tsunami damage
- Many local government offices moved to other city, town and prefecture.



They can not know when they can return to their home town.

It is difficult to discuss about reconstruction plan.

Damage by tsunami in nuclear radiation contaminated area

動物愛護団体がfacebookに投稿した写真より



Current scene of contaminated town

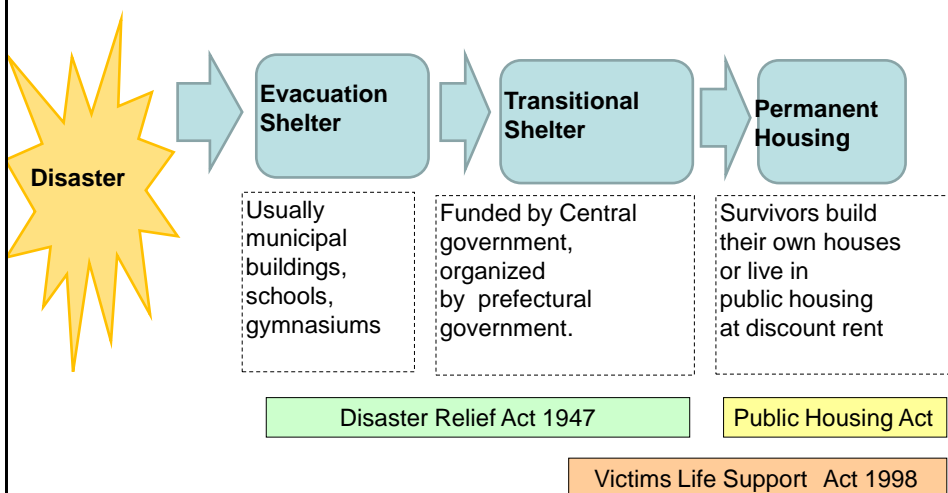
動物愛護団体がfacebookに投稿した写真より



Class room and Grave yard



Framework for transitional shelter



Three types of temporary housing

As of 14 Dec 2012

A) Temporary housing	48,447 units
(1) Prefabricated house	
(2) Wooden house	
B) Private apartment as temporary housing	61,442 units
C) Existing public housing & government-owned accommodations	10,824 units

Typical temporary housing



Prefabricated house



福島市北幹線第1仮設



大船渡市赤崎

Low quality ; biggest problem in prefab temporary housing

- Heat control, noise protection
- Small space <29m²
- Poor facility
- High cost
6 mill. yen/unit
+ additional work



Additional work to attach heat insulation panel.

We have had many experiences of low quality problem since Hanshin-Awaji earthquake 1995 in Kobe.



Wooden temporary housing

- 30m²、2.6 mill. yen/unit
- Good quality
- Permanent use
- Local material
- Local carpenter
- Good for local economy



Sumitacho town, Iwate pref.

Variation of wooden temporary house

Fukushima Pref.; 6000 units

Iwate pref.; 2500 units

Miyagi pref.; 250 units



60 m², 4.4 mill yen



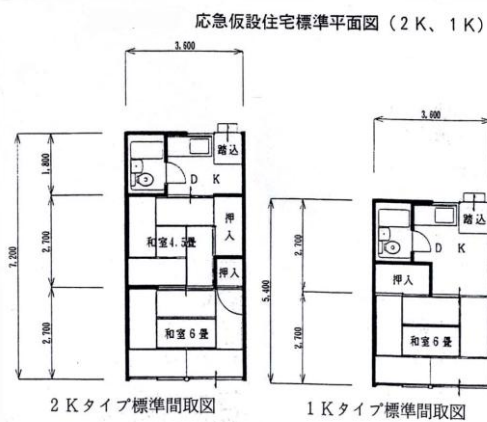
仮設住宅はいいけれど、(大熊町の住民)

Location & facilities

- Lottery system for allocation
- Far from town
- Difficult to go to shop, medical center and living facilities
- Losing community
- These problems are well known as important lessons from Kobe experience.

Temporary housing, Hanshin-Awaji case

山上(西宮市)



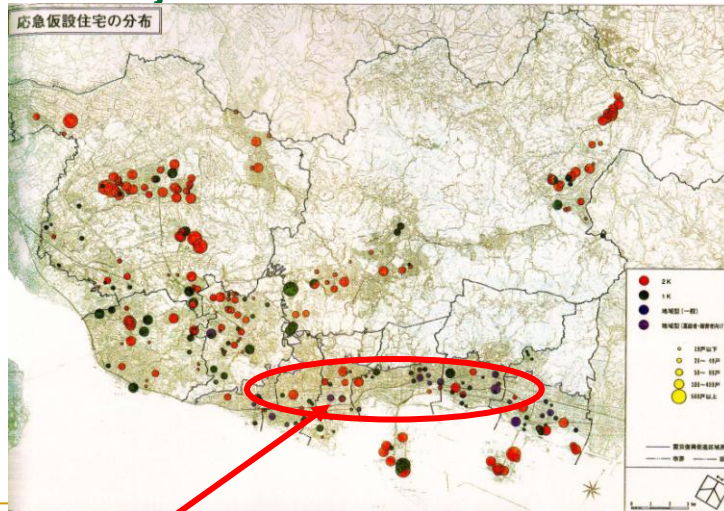
Building cost; 3 mill. Yen/unit

Demolishing cost ; 1 mill. Yen/unit

埋立地(芦屋市)

Location of temporary housing, Hanshin-Awaji case

Total number
of temporary
housing ;
48,300 units



Affected area

We can say that temporary housing in
GEJE is not products well learned from
Hanshin-Awaji earthquake.

The reason must be clear why the same
errors has been brought.

Private apartments as temporary housing

- National government money for rent
- 60,000 yen/month for two years
- This system fit for victims needs because they can chose their living location.
- There are many problems.
 1. Moving of victims to urban areas
 2. Lack of support for victims in private apartments
 3. Complicate system to provide rent through national, prefectural and municipal governments.
- The system should be improved before next major disaster in the near future.

Permanent house

- Next stage after temporary housing is getting permanent house.
- There are two options for victims to get the permanent house.
 - ① Public housing; important option for low income victims
 - Iwate pref. : 4,000~5,000 units
 - Miyagi pref. : 15,000 units
 - Fukushima pref. : 2130+1000 units
 - ② Self reconstruction

Public housing after Hanshin-Awaji earthquake

- Total number; 38,600 units
- Far from home town
- Lottery system for allocation
- Losing community



Downtown area



Mountainous area

Solitary death

Important lesson from Hanshin-Awaji earthquake is that public housing without community brings social isolation for residents and sometimes it occurs solitary death.

During 18 years since 1995 there has been 1011 persons solitary death because of losing community.

In temporary housing ; 233

in public housing ; 778

Total number ; 1011 persons

Community oriented planning and design for public housing

- Based on community
- Close to original villages
- Small scale, wooden house



Niigata pref.



Iwate pref.

Disadvantage of Public housing

- Public housing system is important as safety net for victims, particularly for low income peoples.
- However it is not necessarily best solution.
- Small space, fixed plan, high rise tower block (sometimes), no garden, no farm
- Many victims in Tohoku area had big house with garden and farm where they made flower and vegetable and they could keep health and enjoyed the life.
- Public housing can not afford them these conditions.
- In terms of management of public housing, in future local government should be suffer from heavy work under many number of new public housing.

Self reconstruction

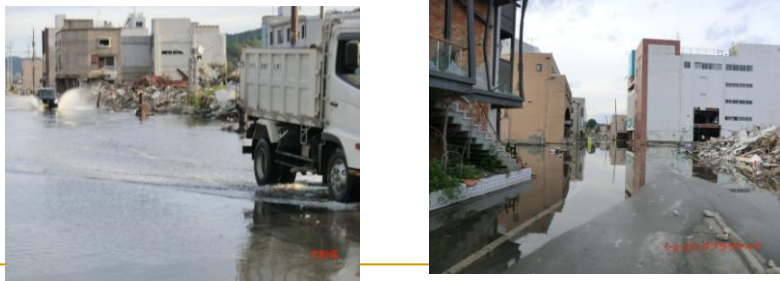
- It is best way for victims to reconstruct their house as before earthquake on their own land, if it is possible.
- In this sense main measure to get permanent house should be support for victims to construct their own housing.
- So it is better way to decrease the number of public housing, and promote the victims to make self reconstruction by financial support.

Finance support for self reconstruction

- Finance support is very important, but it is quite limited.
- National government support is ¥3 million in maximum case depend on damage level.
- This system has been created after Hanshin-Awaji earthquake, Victims Life support Act 1998.
- National government scheme must be improved.
- Local government should provide additional support.
- In Noto earthquake 2007, central and local government support money was up to ¥7.7 million and in Niigata Chuetsuoki case 2007 was ¥6.5 million.

Land use and urban planning issues

- Wide area is covered by sea water.
- Wide area has future risk attacked by tsunami.
- In those areas victims can not reconstruct on their own land.
- Relocation program from coastal area to inland or highland area is strongly suggested.

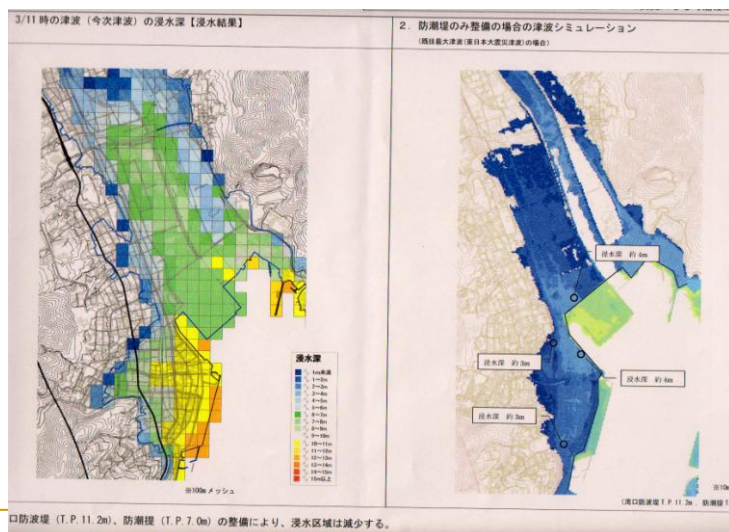


Ofunato city, Iwate pref.

Tsunami risk assessment

Tsunami simulation

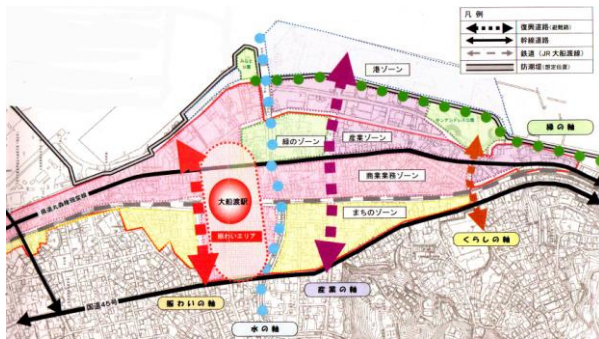
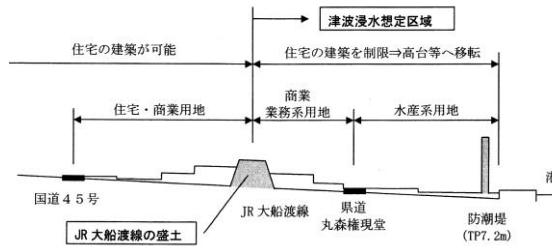
Ofunato city, Iwate pref.



Land use plan

Tsunami protection by three guards.

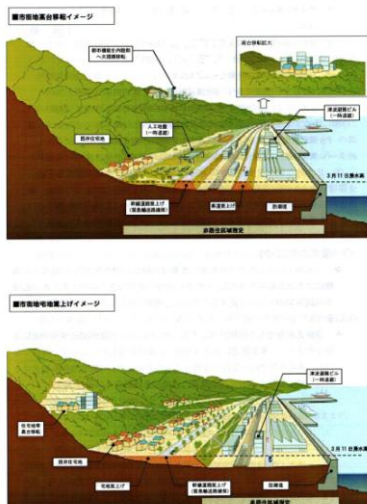
In the area in front of third guard people should not live and have to move to high land.



Ofunato city, Iwate pref.

Relocation from low land to high land

Ofunato city, Iwate pref.



Many problems

- Consensus making
- Merit and demerit for relocation ?
- Job in new area ?
- Money to build new housing in new area

- Relocation project needs long time, three or five years.
- During those time how can they earn the money to live ?
- Each local government lacks the man power to promote making consensus.

Relocation experience in Banda Aceh, Indonesia



Vacant housing



Empty classroom and market

Far from home town,
No job, vacant house
It seems to provide many
lessons to Japanese
current situation.



Temporary shopping center

- Local people have to struggle to make a micro business and to find out better reconstruction way.



Ofunato city, Iwate pref.



Kesen numa city, Miyagi pref.

FINE

Thank you for your attention