Reconstruction in Response to the Great East Japan Earthquake

～With Concept of “Disaster Reduction”～

28 Jan 2020
OCHI Kengo
Great East Japan Earthquake

Date: March 11, 2011 at 14:46 JST
Scale: Magnitude 9.0
(The largest earthquake ever recorded in Japan)

⇒Wide-area and complexed disaster of earthquake, tsunami and nuclear accident

Damages (As of 1 March, 2019)

Human casualties
- Deceased: 19,689
- Missing: 2,563

Damaged buildings
- Completely destroyed: 121,995
- Half destroyed: 282,939
- Partially destroyed: 748,109

Flooded areas: 560km²

⇒The Government formulated budgets, modified laws and orders, and established “Reconstruction Agency”.
Lesson:
Exist tsunami that are physically impossible to defend against.

Concept:
“Disaster Reduction”
- Not loose human life.
- Minimize economic damage as much as possible.

Source of Reference: “Towards Reconstruction - Hope beyond the Disaster -”
25 June 2011,
the Reconstruction Design Council in response to the Great East
Japan Earthquake
Tsunami Defense Measures

Level 1 Tsunami (with more frequency)

- Construction of coastal dike and other hard countermeasures

Level 2 Tsunami (the largest possible with low frequency)

- Reconstruction of housing on safe lands
- Restriction of housing and utilization of lands for industry or agriculture in low-lying areas
- Evacuation

Coastal Dike

1896 Meiji Sanriku quake
1933 Showa Sanriku quake
1960 Chile quake

2011 Great East Japan quake

L2 Tsunami

L1 Tsunami

1896 Meiji Sanriku quake
1933 Showa Sanriku quake
1960 Chile quake
Types of Reconstruction Planning

Various types in accordance with regional features

ex.

A Relocation of housing sites to higher lands

B Elevation of land level

C Multiple defense by double embankments
Before the disaster (2003)

Houses are being built on a new higher land area.
(November, 2016)

Private housing = 230
Public housing = 71

(Source: Miyako City)
Progress of Housing Reconstruction

(as of Sept. 2019)

**Public Housing**

- Approx. 30 thousands units

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<tr>
<th>Year</th>
<th>Total (8 prefectures)</th>
<th>Iwate</th>
<th>Miyagi</th>
<th>Fukushima</th>
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**Private Housing Sites by Relocating Project**

- Approx. 18 thousands sites

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(Source: Reconstruction Agency)
Changes in Population

3 prefectures (million)

Population (100 years)

Japan (million)

Iwate  Miyagi  Fukushima  Japan

(Source: National Population Census)
Challenges at the Current Stage

Challenges:
- Sustainability
  (Community, Economy, Facility Management, etc.)
- Land Use
Thank You!
App. Scheme of Promoting Group Relocation

Private housing
Actor: Individual
or
Public housing
Actor: Admin (Municipality, Prefecture)

Other area

Zone to promote relocation

Restriction of residence by ordinance

Acquisition of land by municipality
Actor: Admin (municipality)

Construction of housing sites on higher lands for relocation
Actor: Admin (Municipality)

+ Private housing
actor: Individual
or
Public housing
Actor: Admin (Municipality, Prefecture)
App. Example of Reconstruction Project
(Tamaura-West and Sangenchaya-West District, Iwanuma City, Miyagi Pref.)

Promote relocation and protect by double embankments.

Second embankment

Tide embankment

Estimation of tsunami inundation by a simulation

Area for relocation
Private housing = 171
Public housing = 111

Zone to promote relocation
App. Example of Reconstruction Project
(Central District, Onagawa Town, Miyagi Pref.)

Elevate land level, 5 to 10 meters higher.

Reconstruct commercial area earlier.

APP. Example of Reconstruction Project
(Ofunato Station District, Ofunato City, Iwate Pref.)

(Aug. 2018)
Develop various types of public housing in accordance with regional features.

Terraced houses
(Otsuchi Town, Iwate Pref.)

Apartment houses
(Kesennuma City, Miyagi Pref.)

Detached houses
(Iwaki City, Fukushima Pref.)