



**TOWARDS DISASTER-RESILIENT URBAN DEVELOPMENT: A FRAMEWORK
FOR COST SHARING IN INFRASTRUCTURE INVESTMENT
TC-21 SEMINAR: EXPLORING THE SYNERGY: INNOVATION AND
TRANSDISCIPLINARY APPROACHES IN DRR
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INTRODUCTION

ACHIEVING DISASTER-RESILIENT CITY

requires substantial financial support beyond private and individual investments

necessitating collaboration among national and local governments, private sector, & individuals

1995 Great Hanshin-Awaji Earthquake exposed vulnerabilities of densely populated urban regions and underscored importance of rehabilitating affected communities



ACHIEVING DISASTER-RESILIENT CITY

1) Before disasters: subsidized disaster-resilient urban development projects

Issue: resident consensus and project profitability

2) After disasters: rehabilitating towns

Issue: Standards for ratio of public to private contributions is unclear

Special attention: to elderly and low-income groups unable to rebuild independently



THIS STUDY PROPOSES

approach to cost and responsibility sharing for

- 1) urban development and
- 2) housing reconstruction

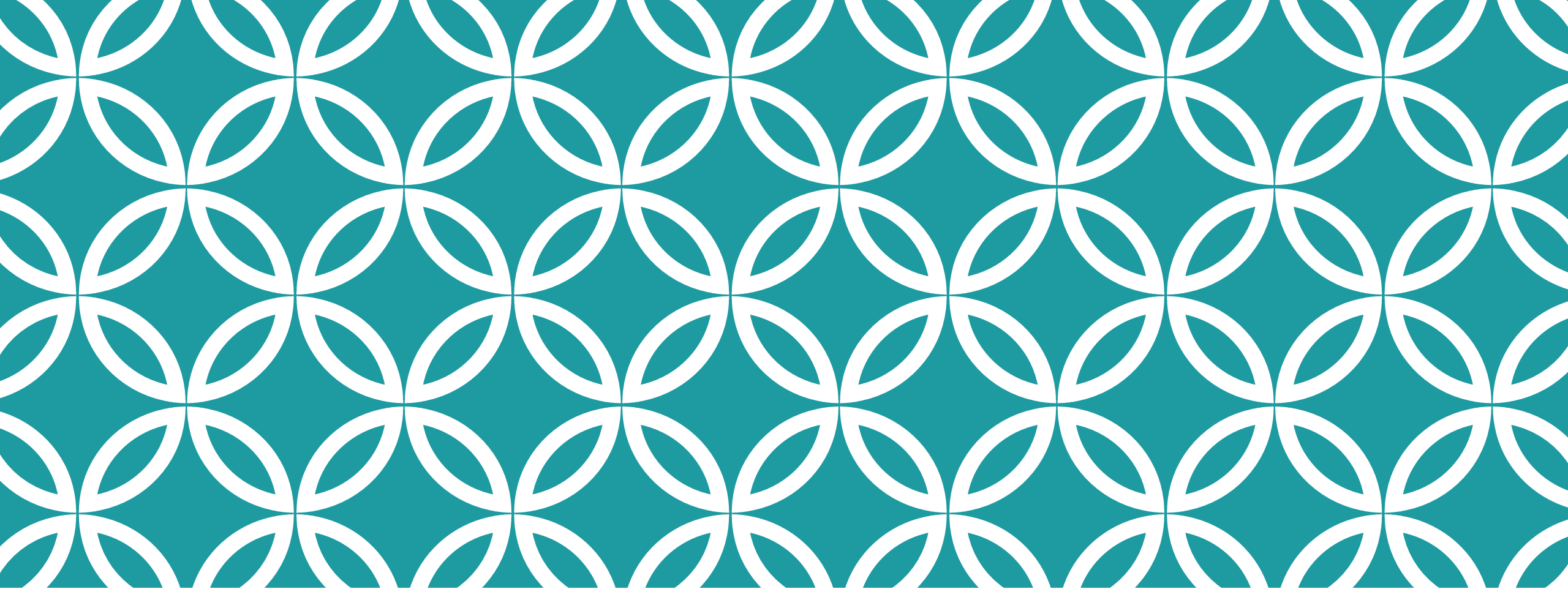
aimed at fostering disaster resilience in urban areas



CONTENTS

1. Before Disaster: Improving dense residential area
2. Reconstructing towns
3. Consideration and conclusion





I. BEFORE DISASTER IMPROVING DENSE RESIDENTIAL AREA



1. DENSELY POPULATED AREA OF WOODEN HOUSES

Fire rate triples when buildings collapse

Collapsed buildings block roads, making firefighting, rescue, and evacuation difficult

⇒ Need to build a disaster-resistant town



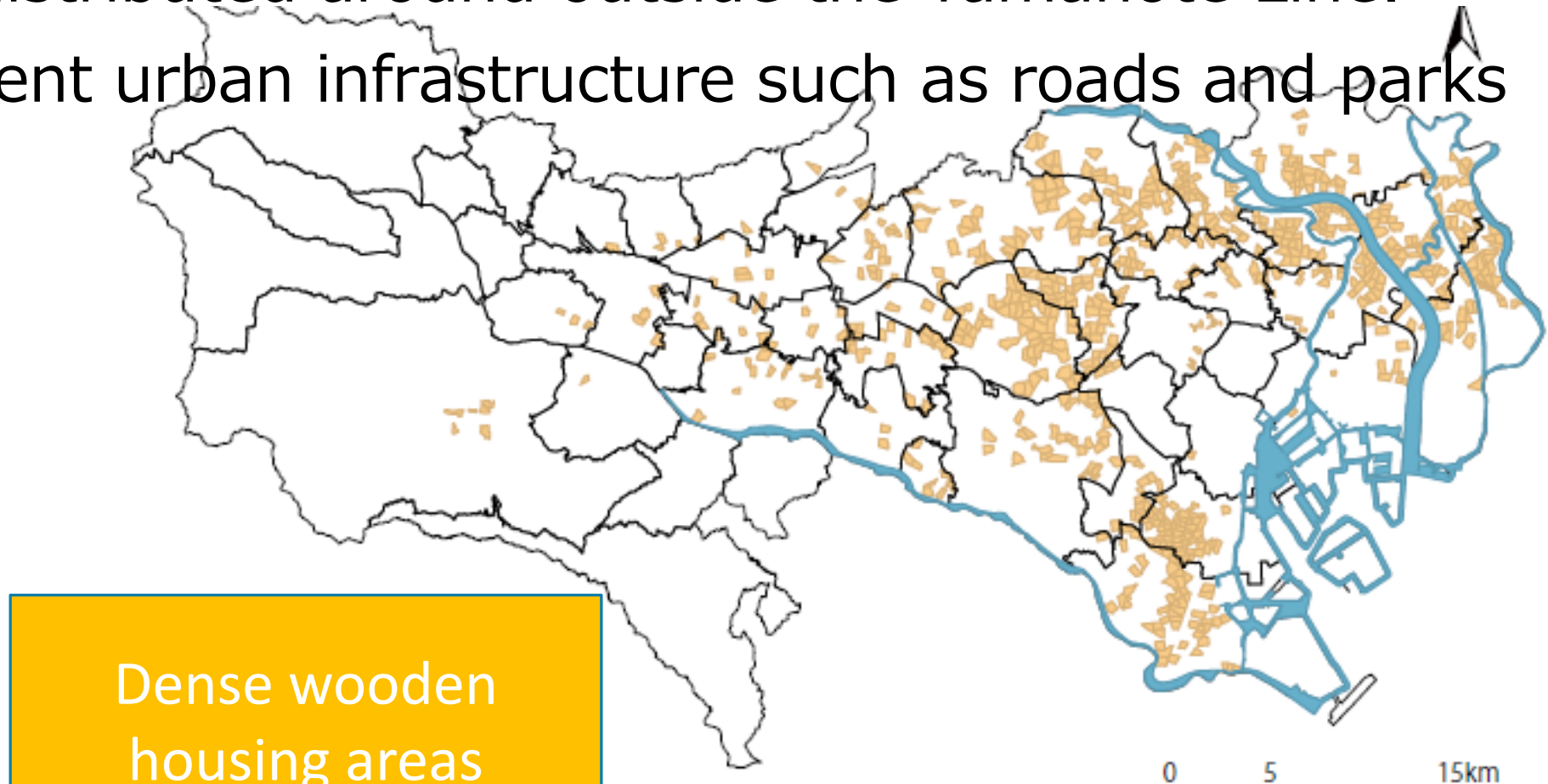
DENSE WOODEN HOUSING AREAS

- ✓ Rapid mass migration
 - ✓ Convenient for jobs and daily lives
 - ✓ Aging and decreasing population
-
- Infrastructure undeveloped
 - Aging low-quality houses



DENSE WOODEN HOUSING AREAS

widely distributed around outside the Yamanote Line.
Insufficient urban infrastructure such as roads and parks



Dense wooden housing areas

LAW FOR DISASTER RESILIENT DISTRICT IN DENSE WOODEN HOUSING AREA 1997

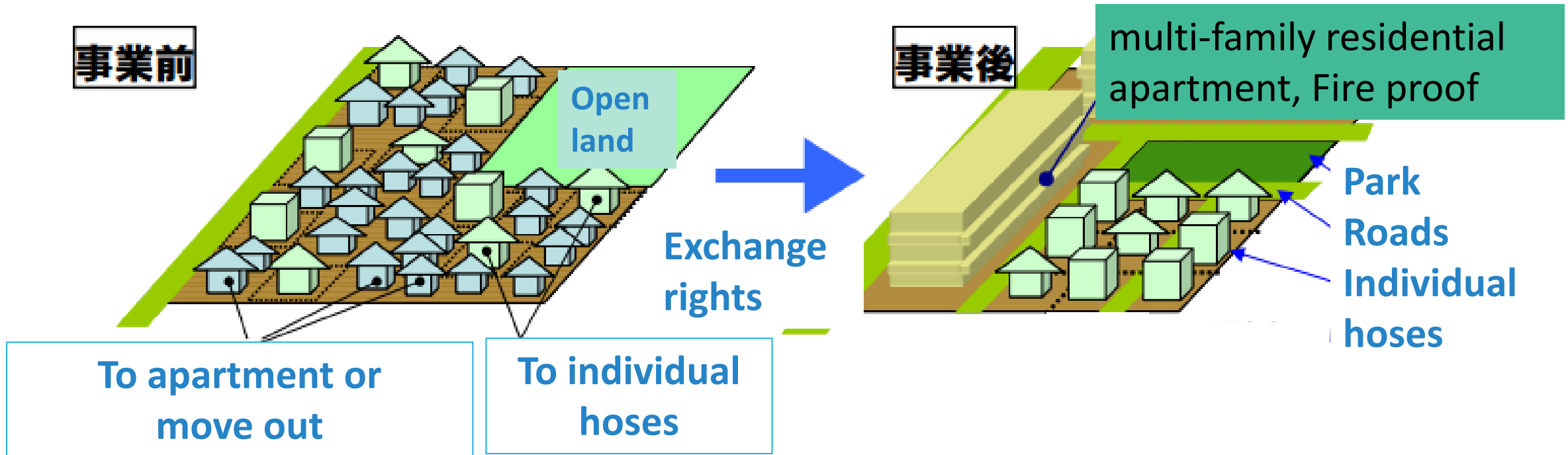
Following the Great Hanshin-Awaji Earthquake in 1995,

Redevelop to disaster-resilient districts in densely populated urban areas that are at risk for fire hazard in large-scale earthquakes

To support voluntary efforts by land owners.



2. DISASTER-RESILIENT DISTRICT PROGRAM



JOINT RECONSTRUCTION OF OLD INDIVIDUAL BUILDINGS



ROADS

- Widening roads and undergrounding power lines
- Improve difficult areas for firefighting
- Securing evacuation roads during disasters



PARK

- Secure a base for disaster management activities
- Prevention of fire spread
- Installation of earthquake-resistant water tanks, etc.
- Improvement of living environment



3. COST AND RESPONSIBILITY SHARING

- ❑ Government subsidy: 1/3
- ❑ Revenue for selling new lots: 2/3
- ❑ Residents: 0 changing land rights

Private sector:

- ✓ can expect profits
- ✓ know-how



4. ISSUES

Consensus building:

- the elderly,
 - unagreed owners
-

Periods unseen

- Ave 10 years from planning, including 3 years for construction
- Unseen periods: Difficult for the private sector



□ Flexible scheme

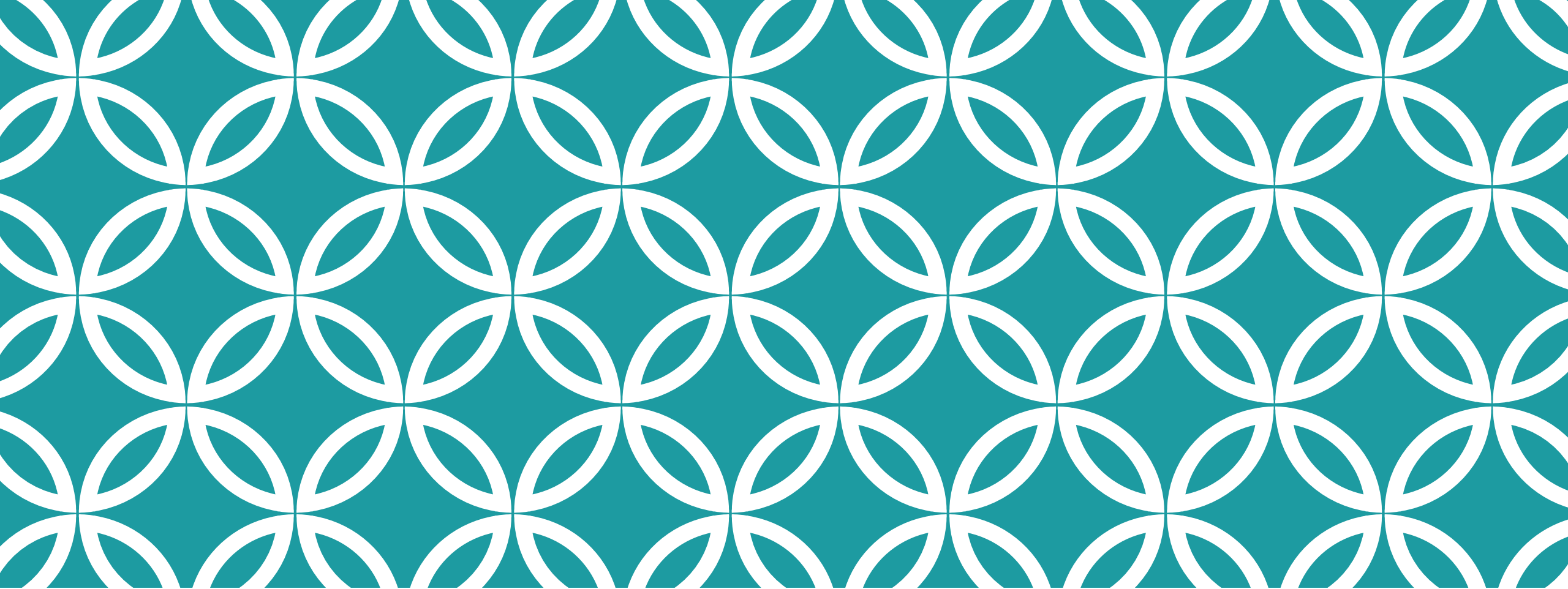
✓ Land pooling + redevelopment (exchanging rights to lands or apartment units)

✓ Only agreed owners, excluding owners unagreed

Involving the private sector

□ Further issues

integrating social welfare



II. RECONSTRUCTING TOWNS



SHOULD GOVERNMENT SUPPORT TO REHABILITATE HOUSING?

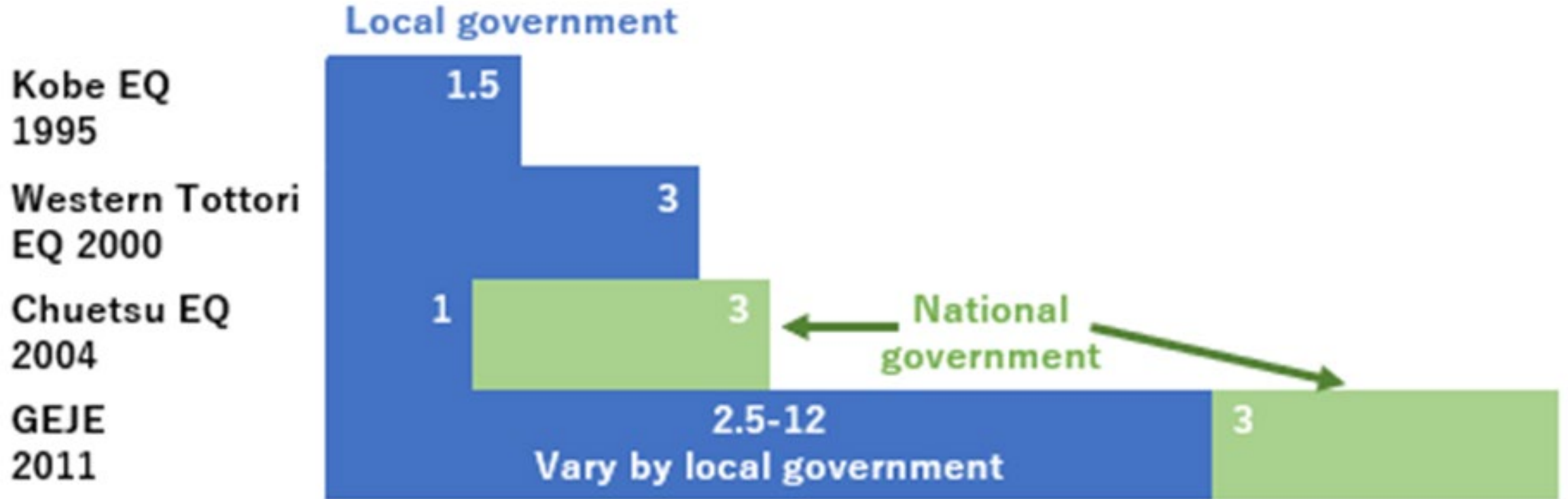
no clear criteria how governments and affected people share responsibility and costs of housing reconstruction

Q1 Is it fair to support people affected by large-scale disasters while not to victims of other shocks of traffic accidents and fires?

Q2 Should government support to create private assets of houses and properties?

clarify factors that affect cost-sharing between governments and affected people for housing reconstruction

TREND OF GOVERNMENT FINANCIAL SUPPORT TO HOUSING RECONSTRUCTION (MILLION JPY)



Before Kobe EQ 1995

National government insisted not support recreation of personal assets and had no responsibility for damage

West Tottori EQ 2000

3 million JPY support to house owners
prefectural governor recognized housing reconstruction as key to rehabilitating local communities in aging and depopulating rural area

Law revision 2007

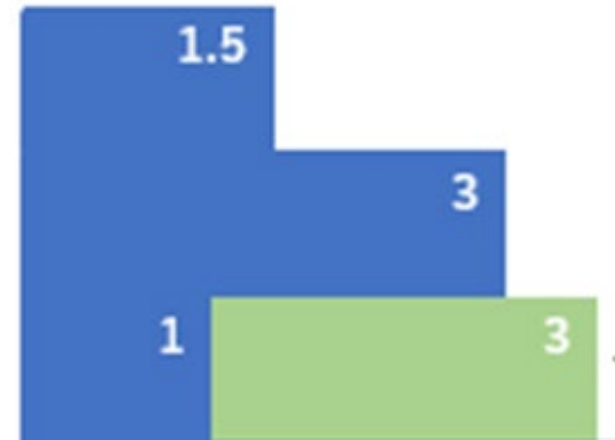
Nat. Gov. support 3 million JPY for housing reconstruction, SUPPORT to rebuilding daily lives but NOT COMPENSATE.

Kobe EQ
1995

Western Tottori
EQ 2000

Chuetsu EQ
2004

Local government



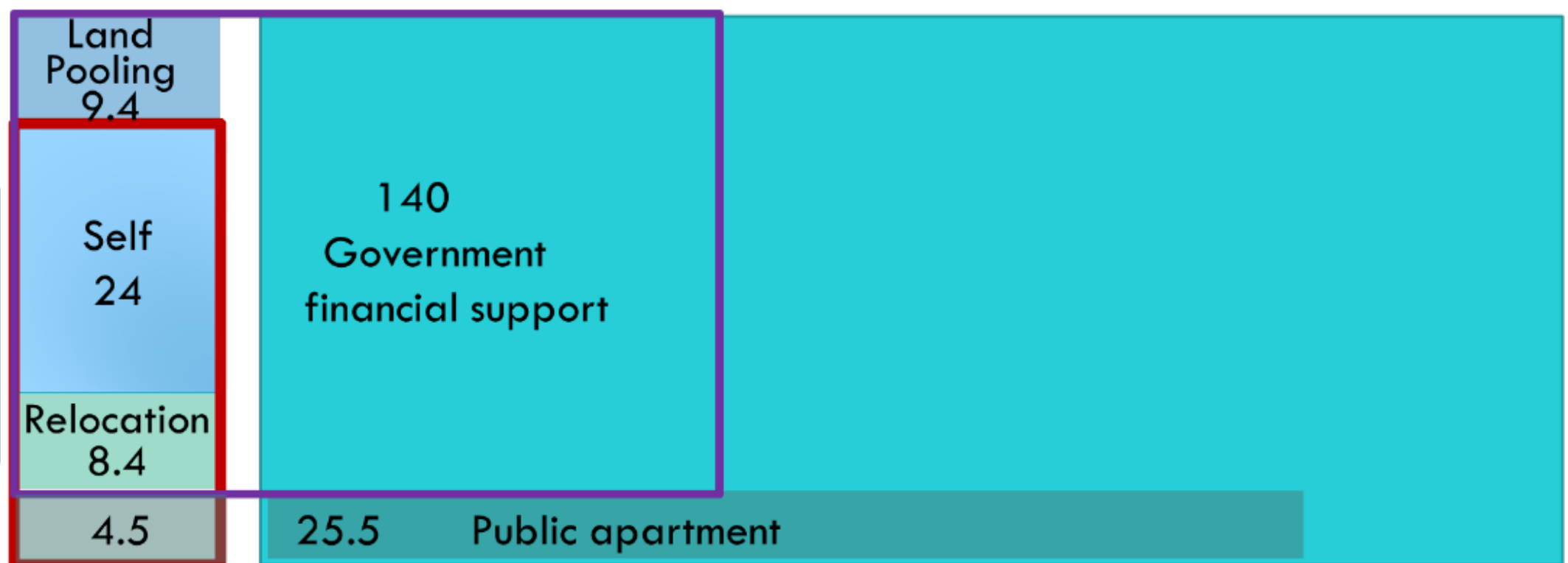
GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI 2011



Concept of group relocation in Japan

Damaged houses 350 thousands (,000)

Risk area
46



Group Relocation program 37

COSTS FOR RELOCATION SITES

Cost for relocation and land pooling

61 million JPY/ lot (440,000 USD)

Exclud. housing cost

24 to 73 million JPY by city

City	Units	Average costs per housing lot (million JPY)
Higashimatsushima	1285	23.6
Ishinomaki	2639	33.3
Iwaki	54	37.4
Minamisoma	304	65.4
Namie	142	50.2
Naraha	36	48.9
Ofunato	366	38.9
Onagawa	220	72.7
Shinchi	224	41.6

HOUSING RECONSTRUCTION

GEJE
2011



Ave. construction cost: 25 million JPY

Public assistance: at maximum 15 million JPY

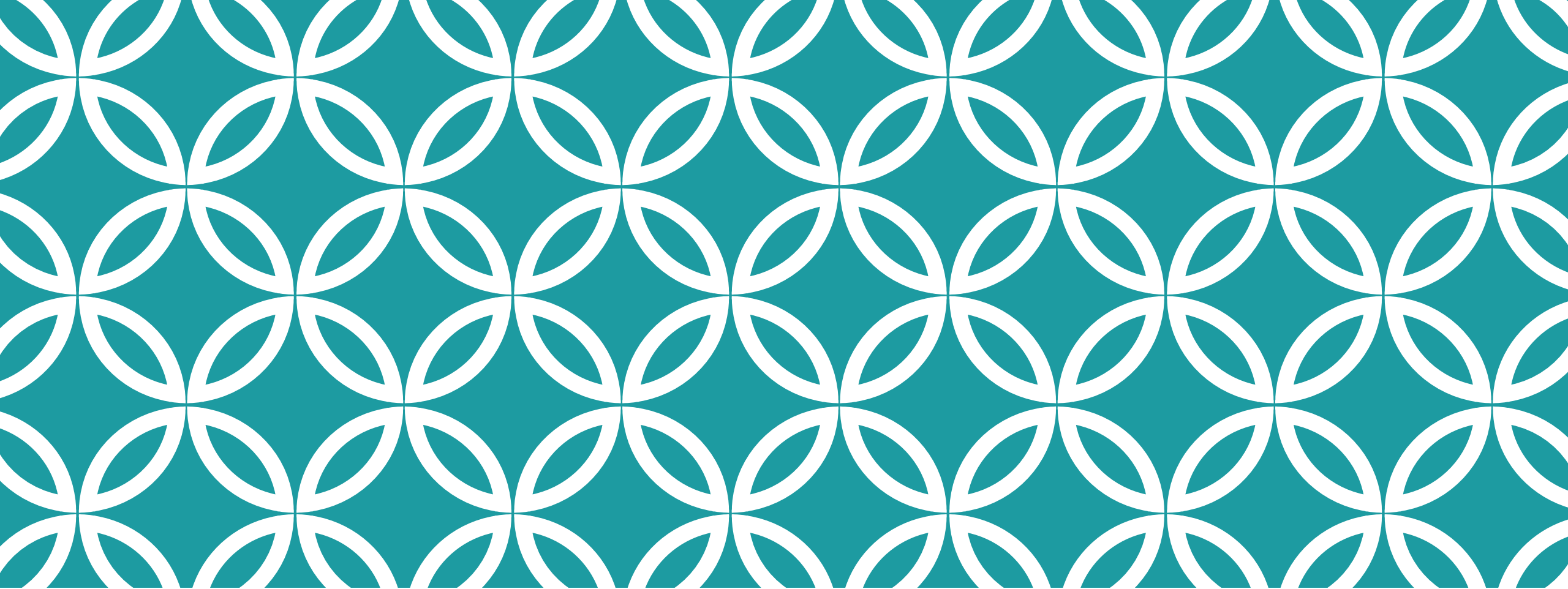
Competition among cities: Attracting affected people.

PUBLIC APARTMENT

For the vulnerable families, such as low-income people and the elderly, could not afford to reconstruct houses. rent is subsidized for 10 years.

The programs: 900 billion JPY, 6.4 billion USD, for 30,000 houses, some 30 million JPY per house.





3. CONSIDERATION AND CONCLUSION





COST AND RESPONSIVITY SHARING IN JAPAN NATIONAL GOVERNMENT, LOCAL GOVERNMENT, RESIDENT, PRIVATE SECTOR

Housing is private asset: Resident should cover housing construction by themselves in principle

people should prepare for disasters by constructing resilient houses and paying insurance

government not financed creating personal assets of houses nor compensating economic damage caused by natural hazards.

Financial support can be justified only to support protecting or rehabilitating local communities. To destroy or collapse of communities.

There are no clear criteria of cost-sharing between governments and victims.

LESSONS IN BUILDING RESILIENT CITIES

National government support is essential

Local governments facilitate processed

Flexible mechanism

Voluntary efforts by residents

Engaging private sector

LOCAL GOVERNMENT'S PERSPECTIVE AFTER GEJE

Local governments provided financial assistance to reconstruct houses in original cities.

Some groups, especially younger generations, wanted to move to larger cities, such as Sendai city, to seek better job opportunities and stronger children's education.

NATIONAL GOV.
COVERING ALL
RECONSTRUCTION COSTS
MAY LEAD TO BOTH
1) OVER-PLANNING AND
2) MAJOR COST
INCREASES.

Local governments could plan relocation sites on higher ground in hilly areas even with high costs

Mayors did not prefer recovery plans of decreasing population

Local communities unnecessarily decided to merge communities

FURTHER STUDIES

Comparison study with Taiwan

- disaster-resilient district
- town reconstruction

謝謝大家



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