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Adapting the Earthquake beneath Tokyo Metropolitan Based on a Demographic Analysis of Future Demographic Transition

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1. Introduction

For decades, Japan has witnessed a remarkable decline in fertility and became most aging country in 2005. The demographic transition had resulted in an obstacle to past disasters (Ishikawa et al., 2008), and turned into an inevitable in disaster management framework (Ikeda et al., 2008). Examining its impact in the Tokyo Metropolitan beneath Earthquake, this paper aims to conduct demographic analysis in future population for reinforcing the adaptation strategy comprehensively.

2. Research method and area

According to Central Disaster Prevention Council (2003), the active period has begun since 2000, yet more precise span of estimation is not found. Here, we set 2005 as initial time for estimating 1 km^2 mesh-based population 2030 in a cohort component analysis (IPPS, 2007; Chen, et al, 2010a). Northern Tokyo Bay scenario (Suzuki & Hayashi, 2008) is projected in 9 capital prefecture cities and generated with population estimation in GIS to collect population exposure (density, age and family), and disaster resilience .

3. Population exposure and demographic transition

Population 2030 nearly remain same as in 2005, yet a remarkable difference is found in term of distribution and population pyramid (Table 1). Due to immigration in 23 Ward, Yokohama and Kawasaki, seismic scale 6 exposed population even grows in future of population decline. Baby boomers would bring 2.5 million aged 75+ population. Collapse of core family implies most are single living. Thus demographic transition leads to vulnerable structure of population exposure, and self-help (age), mutual help (family) are much critical.

4. Disaster resilience and demographic transition

Demographic transition is regarded as one essential characteristic of a place (Chen et al., 2009), and also related to disaster resilience in disaster recovery (Chen et al., 2010b). Here, Fig. 1 shows its distribution that represent transformation of disaster resilience (2005-30). Contrast to above mentioned core areas, Chiba, suburban Saitama (sustainable → dependent) become less capable to return to previous situation in disaster recovery unless private support or recovery project .

5 Conclusion: developing adaptation strategy

Wherever is intensively exposed, Business Continuity Planning is suggested in core metropolitan due to population growth and its vulnerable structure. And community capability reinforcement is important in certain suburban for decaying resilience resulted from future demographic transition (Chen et al., 2010c).

Table 1 Estimation of population exposure (2030)

Seismic scale	Aged Population			Household with Elders	
	Total	65~	75~	Single	Husband wife
6	2,579	744	439	161	124
	△17	△309	△265	△84	△43
5	826	259	162	52	42
	▲47	△98	△94	△32	△14
All	3,390	1,006	604	213	166
	▲31.5	△408	△360	△117	△58

△▲means increase/decrease to 2005 (Unit: 10,000)

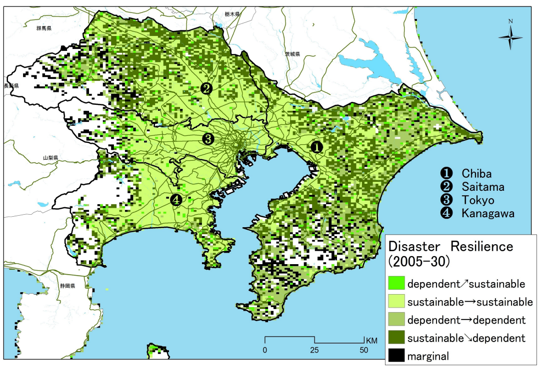

Fig. 1 Transformation of disaster resilience (2005-30)