Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)


U01-10 会場:419 時間:5 月 1 日 11:45-12:00

# レジリエントでサステイナブルな国土デザインのための環境情報活用フレームワーク
# Framework of Applications of Environmental Information for Realizing Resilient and Sustainable National Land Design

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**1. Introduction**

This research project, GRENE-City, aims to construct a methodology to design and realize ”resilient and sustainable national land” with mitigation and adaptation measures against vulnerabilities of national land and society. This ”resilient” concept is derived from an understanding of ”natural providence”. The proposed system takes advantage of a broad range of information includes disaster risk caused by meteorological phenomena and others from DIAS (Data Integration and Analysis System) by the Earth Observation Data Integration and Fusion Research Initiative (EDITORIA), the University of Tokyo. As such the system will be developed as a ”Progressive Integrated Database” based on various environmental information infrastructures provided by DIAS. In addition, this project aims to cultivate experts who can construct and utilize this database in actual policy making fields.

To achieve this goal, a re-design of national land and society for a reduplicative system in both normal and emergency situations is necessary. Both a ”safety and security” concept, which takes account of damage reduction, and a ”sustainability” concept which tackles low carbon, energy saving, and prevention of climate change, are needed in order to keep pace with the threats of predicted huge earthquakes and climate change.

**2. Contents**

Natural hazards caused by climate change, earthquakes and other disasters may be increasing, and could strike in the near future our vulnerable society which is characterized by with declining birth rate and a growing proportion of elderly people, population decline, urban sprawl and etc. Based on the common recognition on these problems, this research project sets out to construct a methodology to lead to safer peaceful mind and sustainable national land and society by using DIAS.

The system needs to use data on natural and social situations. The data on natural situations includes earthquakes, climate change and disasters. The data on social situations include population structure, economic conditions, infrastructure, and land use. Additionally, not only the present data, but also historical data, such as land use and infrastructure change, record of disasters, population structures, and other information, are collected. Therefore ”four-dimensional GIS” will be constructed to allow quantitative prediction and to evaluate policies considering historical faces, past place names, and other qualitative information.

In consequence, the system will analyze the vulnerability of national land and society caused by social, geographical, and other conditions, and natural variations and disaster risks. This system supports the examination of various policies, especially, the effectiveness of ”Smart shrink” which could stop urban sprawl.

**3. Results and future works**

1) Information archives

This project collected historical data on earthquakes, tsunamis, and other natural disasters from old documents and other resources. In particular, records of tsunami damages of the Great East Japan Earthquake are stored. A prototype Web-GIS is developed to show these photos and tsunami height with map information.

2) Analysis and design

This project offers the evaluation of national land and cities with a view to safety, security, and sustainability. The system introduces QOL (Quality of Life) indicators. Data about accessibility, amenity, and disaster vulnerability to calculate QOL indicators are collected and added to the system. This will be utilized to illustrate conditions of residential amenity and disaster vulnerability in each area of the national land.

3) Utilization and deployment

This evaluation system will be applied to case study cities and regions. The problems and demands of the system will also be clarified. As a result, the system and database will be developed to accommodate requests from policy planning of city and national land.

Keywords: resilient national land, sustainability, natural disaster, triple bottom line