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Designing Resilient Cities and National Land - An Application of Environment Information Technology -

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Objective:

This research project aims to construct a methodology to realize ”Resilient cities and national land” with mitigation and adaptation measures for vulnerability of national land and society. This ”resilient” concept is derived from an understanding of ”natural providence” as much as possible. Proposed system takes advantage of broad range information with disaster risk caused by meteorological phenomena and others from DIAS (Data Integration and Analysis System) by the Earth Observation Data Integration & Fusion Research Initiative (EDITORIA), the University of Tokyo. Therefore the system will be developed to ”Progressive Integrated Database” based on various environmental information infrastructure 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, re-design of national land and society for reduplicative system both normal and emergency situations are necessary. Both ”Safety and security” concept which takes account of damage reduction and ”Sustainability” concept which tackles low carbon, energy saving and prevention of climate change are restriction to keep pace threat of predicted huge earthquake and climate change.

Contents:

Natural violence caused by climate change, earthquake and other disasters may be increasing and strikes our vulnerable society with declining birth rate and a growing proportion of elderly people, population decline, urban sprawl and etc. in near future. Based on the common recognition on these problems, this research project sets out to construct a methodology to lead more safe, peace of mind and sustainable national land and society by using DIAS.

At this time, the system needs to use the data on natural and social situations. The data on natural situations include earthquake, climate and disasters. The data on social situation include population structure, economic condition, infrastructure and land use. Additionally, not only present data but also historical data, for example land use and infrastructure change, record of disasters, population structures and other information are collected. Therefore ”Four-dimension GIS” will be constructed to utilize quantitative prediction and to evaluate policies with considering historical facts, past place name and other qualitative information.

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

Results and future works:

1) Information archives

This project collected historical data on earthquake, tsunami and other natural disasters from old document and other resources. Especially, records of tsunami damages of the Great East Japan Earthquake are stored. Prototype WebGIS is developed to show these photos and tsunami height with map information.

2) Analyze and design

This project makes the evaluation system about vision of national land and city with a view of safety, security and sustainability. The system introduces ”QOL (Quality of Life)” indicators required data about accessibility, amenity and disaster vulnerability to calculate QOL indicators are collected and stocked to the system. This will be utilized to illustrate a condition of residential amenity and disaster vulnerability in each areas of national land.

3) Utilization and deployment

This evaluation system will be applied to case study cities for verifying its effectiveness. Therefore, the problems and demands of system will be clarified. As a result, the system and database will be developed to accommodate a request from policy planning with city and natural land.

Keywords: resilience, land and city plannning, environment, safety and security, sustainability

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