

The Utility of The Landscape Planning Principle for The Natural Disaster and Climate Change

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I .The validity in the prevention process before disaster

The method of the landscape planning is useful for a preliminary measure of the disaster.

We focus on the ecological planning method (E · P) of Ian McHarg and environment evaluation data of the Japanese National Land Agency in 1980(photo.1).

1980's Data of National Land Agency was prepared to apply E · P process for country level planning. It were became clear by our

environmental evaluation research using E · P process and the 1980's environment evaluation data in 2011's Tohoku earthquake and tsunami disaster areas.

1. Points of highway collapsed in 2011 earthquake also was weak points for overall disaster by an overlays analysis at country scale using the 1980's data(Fig.1).
2. By our research analysis, the ground retention and flood risk vulnerabilities could be pointed out at Fukushima's beachfront where two nuclear power plants were constructed (Fig2)1).

The method of the landscape planning is useful for reconstruction planning process after the disaster.



Photo.1 the ecological planning method and environmental evaluation data of the Japanese National Land Agency in 1980

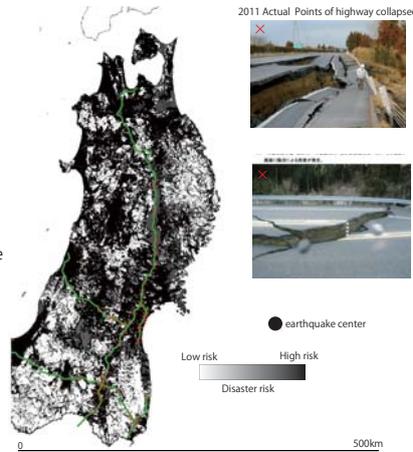


Fig.1 Matching Points of highway collapsed in 2011 earthquake (X) and weak points for overall disaster evaluation ■ .

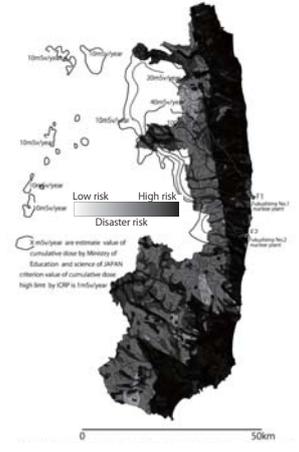


Fig.2 The evaluation result of Fukushima nuclear plant site' overall disaster risk

II .The validity in the reconstruction process after disaster

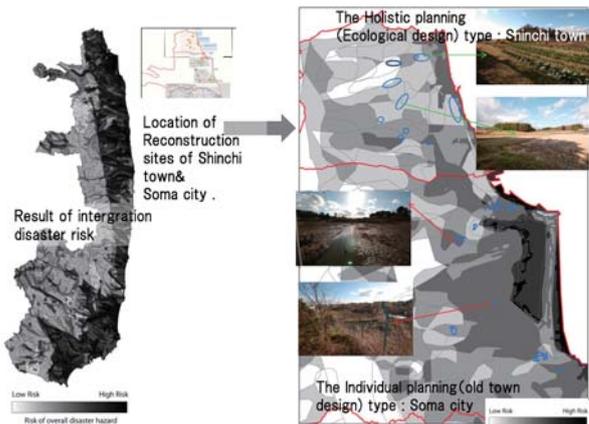


Fig.3 Comparison of house-relocation site's disaster risk of Shinchi-town and Soma-city



Photo.2 Comparison of house-relocation of Shinchi-town (upper) and Soma-city (lower) after 5 years from 2011 disaster

Disaster vulnerabilities of house-relocation site's were evaluated using the method (E · P) and the date. these relocation planning sites for residents who loosed house by tsunami attack.

As a result,Shinchi-town could select a safer area.It wasn't achieved by many other municipalities(Fig.3).

Although Shinchi-town decided about an area by polite resident conference 2),this town has completed housing relocation earliest at a Tohoku disaster area(Photo.2).

In addition, this town's population recovered to same level of before disaster."

III .The social cost-effectiveness of the landscape planning

The landscape planning method has a possibility that avoid social loss by climate change and natural disaster.

It was conducted that above environment evaluation of the Great East Japan Earthquake and tsunami disaster area using E · P (1969) of Ian McHarg and environment evaluation data of the Japanese National Land Agency (1980).

"As a result, it became clear that appropriate environment evaluation was possible by the landscape planning method and Japanese Government data beforehand. Weak point of a main transit infrastructures (Ex. express highway), and natural disaster resilience of site of important facilities (Ex. nuclear power plant)."

The method of the landscape planning and environment evaluation data also is useful for reconstruction planning after the disaster. Only Shinbetterchi-town politely discussed by many workshops with resident, could plan better reconstruction and has finished reconstruction process earliest in this disaster area. In addition, the population of Shinchi-town recovered, and the population is increasing. On the other hand, after disaster, 34 municipalities' population recovering were failed by reconstruction process. As a result, the 160 thousand peoples decreased in disaster area (Fig.4).

Surprisingly, our environment evaluation of Shinchi-town using E · P and environment evaluation data(1980) can indicate same suitable land for reconstruction process in short time analysis. In 2012, early stage of Shinchi-town reconstruction planning, Dr.Uehara and his laboratory offered this environment evaluation result to Shinchi-machi actually. This investigation data is also utilized for the next regional plan of this town at present.

Amounts of social cost(loss) of the Fukushima Dai-ichi nuclear power plant accident exceeded about 11 trillion yen. At most 15 thousand people was forced to emigration after disaster. In addition, 200 trillion yen rehabilitation cost were invested for reconstruction in an area. However, in many city's population outflow couldn't be evaded. Our research can indicate a possibility of reducing of social loss above-mentioned by utilizing basic landscape planning method(E · P) and holistic environment evaluation data.

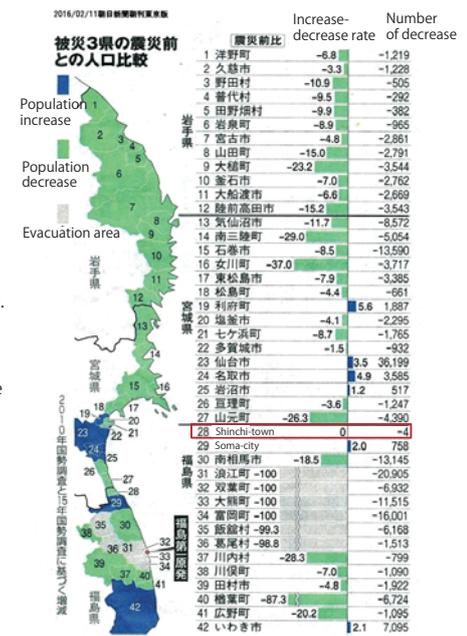


Fig.4 Population comparison, 5 years from an earthquake disaster
Population increased area :Sendai-city,Iwaki-city and Natori-city
These increase by Fukushima nuclear power plant and decontamination worker's temporary inflow.

1)Misato uehara(2012) Could Ecological Planning Data Base on Land Agency Report in 1980 Prevent the Actual Disaster of Fukushima Nuclear Plants Caused by the Tohoku Earthquake and Tsunami?,Landscape Research Japan Online 5, P 28-32

2)Misato Uehara, T Inoue, G Shintaku(2015)The Favorable Settlement Relocation Process After the 2011 Earthquake and Tsunami Disaster in Japan by Evaluating Site Environments and Accessibility- International Review for Spatial Planning and Sustainable Development, Vol.3,Issue.1,p119-130

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