

A Study on Providing Land and Building Information Considering Climate Change Adaptation

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I . Introduction

⊙ Background and necessity of research

- ◆ Increase in frequency of disaster occurrence, magnitude of damage, and uncertainty due to extreme weather events caused by climate change
- ◆ Due to intensive use of land and buildings following the population concentration and urbanization, the development of semi-underground houses and steep slopes has increased, resulting in damage from climatic disasters

⊙ Domestic ministries and major relevance

- ◆ The necessity of implementing the Second National Climate Change Response Plan ('16-'20) (I-4-4) has been raised
 - Institutionalization of land and buildings' climate change adaptability, resilience assessment, and proof trading was proposed for the 2020 plan

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- ◆ The Ministry of Environment and the Ministry of Land, Infrastructure and Transport implemented the Joint Order on Integrated Management of National Land and Environmental Conservation Plans
 - Matters to be linked and reflected in both plans for integrated management (Article 8): Climate Change and Energy

⊙ Purpose of research

- ◆ Build a foundation to include information on climate change adaptation in land and building information to enhance the adaptability to climate change and lay a foundation for mainstreaming climate change
 - Investigate and analyze factors that land and buildings require in terms of adaptation to climate change and related data
 - Propose providing information on climate adaptation factors of land and buildings in consideration of policy acceptability

II. Climate Change Impacts and Adaptation Information of Land and Buildings

1. Impact of climate change and research trends in land and buildings

⊙ Climate change impacts in Korea

- ◆ Analysis on climate change impacts in Korea based on press releases
 - Establishment of a history database of the climate impacts based on press releases over the past 27 years ('90-'16) (5,601 articles in total)
 - Vulnerable to heavy rain and typhoons in the category of 'society and economy' (architecture, infrastructure, property, etc.) and vulnerable to heavy rain, typhoons, and heat waves in the category of '(human) health'

⊙ Literature on providing and adopting climate change adaptation information

- ◆ A systematic frame for measuring basic information is needed to collect and use information used to reinforce resilience

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- Constructing basic data to apply the natural circulation system of a city at the urban planning level and analyzing it spatially using quantitative indicators
 - ※ Green Infrastructure Spatial Planning (GISP) in Detroit, USA
 - Necessary to have a comprehensive database of physical and social information for continuous evaluation of basic information related to resilience which has been accumulated regularly
 - ※ Sustainability and Resilience Assessment (SRBA), U.S. Climate Resilience Toolkit, Property Flood Resilience (PFR) in the UK

2. Implications and research direction

⊙ Implications

- ◆ Little research has been conducted on how to utilize, apply, and provide the information displayed in the current system in operation
- ◆ Korea also needs to make efforts to provide climate change adaptation information and establish related laws
 - e.g. Providing proper insurance prices to property owners connecting with the insurance companies or developing an information system that allows home and property owners to participate in action

⊙ Distinctive features and research direction of this study

- ◆ Increase national acceptability by selecting land and building adaptation factors and setting up stages to review existing information related to adaptation elements
- ◆ Set the scope of research through analysis of research trends related to climate change adaptation of land and buildings
 - The range of climate change impacts: Heavy rain, heat wave
 - The spatial scope of land and buildings: Limited to residential and non-residential buildings in urban areas and the land area consisting of parcels where the buildings are located

III. Determining Climate Change Adaptation Factors and Related Information of Land and Buildings

1. Climate change adaptation factors in land and buildings

○ Selecting climate change adaptation factors

- ◆ Identify climate change adaptation information of land and buildings and elements influenced by climate change based on the cases in which measures of urban planning were used among the projects for enhancing adaptability to climate change-related disasters.

※ Climate change adaptation factor: Factors that help to reduce and respond to the negative effects of climate change

2. Information on climate change adaptation of land and buildings

○ Present indicators of climate change adaptation factors and available information

- ◆ Review the existing system to determine what variables can be substituted for each element to determine the practical applicability when providing information on adaptation to climate change of land and buildings

IV. Establishing Methods for Providing Land and Building Information Considering Climate Adaptation Factors

1. Recognition and acceptance of providing climate adaptation information of land and buildings

○ Recognition and acceptance of climate adaptation information of land and buildings

- ◆ Conduct a national policy acceptance survey to grasp the public's perception and experiences in regards to providing climate adaptation elements in land and building information in order to lay the groundwork for mainstreaming climate change adaptation policy

2. Plans for providing climate adaptation information of land and buildings

⊙ Direction

- ◆ Provide within the existing system that has been in operation for land and buildings
- ◆ Determine the level and method of providing information in consideration of the accuracy and reliability of ‘information’
- ◆ Provide in a more desirable way reflecting the perspectives of owners and users
- ◆ The system should be developed taking into account each goal or both goals of land information provision and building information provision for continuous management of information and the goals should correspond to the existing system

⊙ Information provision method

- ◆ Differentiate ways in which the information is provided, including the scope, level, and presentation of information and the provision procedures
- ◆ Discussions are needed to determine information that can be provided now and information that needs to be newly provided in the future
- ◆ Information that can be used directly in the land and building-related systems (primary information), information that can be verified in the Web system but needs processing (secondary information), and information that requires additional data (tertiary information) are required

V . Conclusion and Suggestions (Achievements)

⊙ Policy suggestions

- ◆ Specifying information provision methods for each factor of climate change adaptation according to the information provision method and disclosure level is needed
- ◆ Provide information using an appropriate information provision method, specifically information on factors showing a high approval rate for full disclosure and partial disclosure

Table 1. Information provision method for climate adaptation

Risk	Provision method	Climate change adaptation factor	
Land	Land use plan confirmation (Full disclosure)	Green space and tree planting	Green space and tree planting
	Brokerage object guide confirmation (Partial disclosure)	Embankments, buffer zones, and separation distances for flood prevention	Building plans considering the direction of the sun and wind
	⋮	⋮	⋮
Building	Building ledger (Full disclosure)	Drainage system maintenance, repair status and leakage	Ventilation system for improving indoor air quality
	Brokerage object guide confirmation (Partial disclosure)	Raising the 1st floor considering flood levels in the habitually flooded area (Piloti)	Building surfaces (roof, wall surface) using bright colors with high reflectance
	⋮	⋮	⋮

Source: Prepared by the author.

⊙ Application

- ◆ Use as basic data for the 2020 Second National Climate Change Response Plan (I-4-4-4)
- ◆ Contributes to the 3rd National Climate Change Response Plan and Detailed Implementation Plan, Regional Climate Change Adaptation Measures, Climate Adaptation Impact Assessment, and Foundation for Adaptation Policy Mainstreaming
- ◆ Information on factors related to climate adaptation included in land and building information can be used for disaster vulnerability analysis

○ Future research

- ◆ Consider acceptance of when expanding the scope to include land and areas outside urban areas
- ◆ Conduct empirical research on how the climate change adaptation factors are applied to the land and buildings in Korea that differ in the climate environment
- ◆ Policy consultation with relevant government departments or local government departments and staff
- ◆ Taking follow-up measures step by step such as enacting and amending relevant laws and regulations is needed
- ◆ By monitoring the effects of land and building information provision, it is possible to consider providing different information according to users and classifying information according to the climate change situation

Keywords Climate Change Impacts, Climate Adaptation Information, Awareness of Climate Change Adaptation, Land, Buildings

Key References

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