

A Study on the Policy of Disaster Prevention for Housing Welfare Based on Mobile Environment

Youngwoo Nam¹

¹ Real Estate Dept., Nazarene University, 456 Ssangyong,
Cheonan, Chungnam, 331-718, Korea
ywnam@kornu.ac.kr

Abstract. Korean government has recently constructed the integrated database for disaster prevention under the participation of relevant agencies. But the government project has been delayed because local governments have not properly provided basic data necessary to construct the database. And to formulate an effective disaster prevention policy, it is necessary to analyze the acceptable level of disaster by region through the analysis of the association between the degree of disaster and the disaster prevention facility within the region. Finally, it is thought that it is possible to take the preventive measure for minimizing the damage resulting from natural disasters by providing disaster-related information for local residents on a real-time basis through the construction of the mobile system.

Keywords: Disaster prevention, Big data, climatic changes, DB linkage council

1 Introduction

The Korean disaster prevention policy has had some limitation in preventive response to disasters as information transmission has not smoothly occurred between relevant agencies for the years. Accordingly, to implement the effective disaster prevention policy, it is necessary to construct the integrated information system for agencies related to disaster prevention, national government and local government to share information on disasters and on disaster prevention and infrastructures on a real-time basis. Accordingly, this study attempts to investigate the realities of disasters such as damage from storm and flood and earthquake recently occurring in Korea and present the proper disaster prevention policy and the implementation plan through the analysis of big data. And it presents the scheme for transmission of disaster information using the mobile system for it to be effectively transmitted to residents.

2 Theoretical Investigation and Previous Studies

2.1 The Concept of Disaster Prevention

.The general concept of disaster prevention can be divided into the broad-sense

concept and the narrow-sense concept. The narrow-sense concept is defined as one stage of the procedures for emergency management related to disasters. In general, the procedure for emergency management can be divided into preparation, response, restoration, disaster prevention and the like. In a broad sense, disaster prevention includes prior vulnerability assessment with the types of disasters and all measures for preventing vulnerability.

2.2 Previous Studies Relating to Disaster and Mobile

Choi Choong-Ik(2003) presented that the disaster prevention policy considering the possibility of disaster at the time of urban planning would be needed as natural disaster damage is influenced primarily by the natural element but considerably much by the physical element of urban land use. Koh Jae-kyung and Choi Choong-Ik and Kim Hee-Sun(2010) identified the vulnerability of 31 cities and counties in Gyeonggi-do with a focus on natural disaster damage and presented that the disaster prevention policy of local government still uniformly determined by national government should need to differentiate regional characteristics. As for the use of database, Kim Chi-Yeon(2012) conducted a study of the method of range query using the index in the large-scale database system. As for the use of database related to disasters, Hwang Eui-Ho and Lee Geun Sang and Ko Deuk-Koo(2007) presented a need for the disaster prevention policy linking GIS with the mobile by presenting the scheme for Korean river map service based on the mobile.

3 The Recent Realities of Korean Natural Disasters and Disaster Prevention Measures

Flood damage has recently occurred at the central area of Seoul due to localized torrential downpour in summertime. An investigation of the trends of accumulated precipitation and localized torrential downpour in summertime in Korea for recent 30 years showed that they continually increased. Also people's attention to earthquake is mounting as damage due to large-scale earthquake is continually occurring in neighboring countries such as the large earthquake occurring in the Sichuan Province, China, in 2008 and the large earthquake of East Japan in 2011. And according to the recent research, the frequency of earthquake occurrence is gradually rising within Korea. The annual average frequency of earthquake occurrence was found to account for 43 times in the 2000s, the almost twofold increase compared to the first half of the 1990s.

4 The Limitation of Currently Implemented Disaster Prevention Measures

4.1 The Scheme to Construct the Integrated System for Disaster Prevention

Currently, Korea is improving the national land use information system and constructing the Urban Planning Information System(UPIS) as part of the government 3.0 implementation scheme promoted by new government. It is the method of integrating and using currently generated information related to real estate, it is thought that the following development process is needed: First, it is necessary to integrate data related to real estate. The real estate-related information system is currently scattered in the Korea Land Information System(KLIS), the e-Architectural Information System(e-AIS), and the Urban Planning Statistic System(UPSS). Accordingly, the big data system can be constructed by collecting the data of each field, connecting them to the existing managed real estate space information system and the real estate attribute information system and finally integrating space information and attribute information. If big data constructed this way are made the information proper to the purpose of the user through diverse analytic methods, it is thought that the goal of the urban planning information system could successfully be attained.

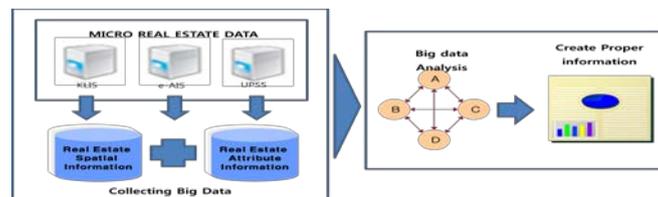


Fig 2. Process of Building UPIS

4.2 The Scheme to Use the Mobile System for Effective Disaster Prevention

It is expected that it will be possible to use the urban planning information system to prevent disaster damage and respond to the occurrence of the disaster by linking all sorts of disaster information on landslide and earthquake danger, flood danger and the like with each other. For this purpose, the process of integrating information on relevant fields into UPIS is needed. Information related to the infrastructure for disaster prevention is currently managed by the Ministry of Land, Infrastructure and Transport(MOLIT), information on landslide and so on is managed by Korea Forrest Service(KFS) and information on overall disasters such as flood damage is managed by National Emergency Management Agency(NEMA). It is necessary to analyze the association between data on several disaster-related fields to achieve efficient disaster management.

In case the disaster actually occurs, how fast its relevant information can be delivered to residents is indispensable to minimize the disaster-induced damage. It is possible to provide diverse information for people on a real-time basis because of the reduction of information processing costs and the supply of smart phones, which is thought to make it possible to implement a little more effective disaster prevention policy.



Fig 2. the concept map of mobile information system

4 Conclusion

The government is currently constructing the system that integrates and manages disaster information and real estate information. So it is expected to greatly reduce the time and cost required to achieve efficient disaster prevention management in a long-term period. But it is thought that it is necessary that government should provide budget support for data integration a little more actively as data construction is delayed because of basic data by region insufficiently stored up to now. And to achieve efficient disaster prevention by delivering constructed data to residents, it is necessary to elicit the possibility of disaster occurrence by region through the analysis of the association between disaster information and infrastructure. Especially, it is possible to induce residents to make a voluntary anticipation of the disaster by enabling them to confirm information relating to all sorts of disasters through the smart phone.

References

1. Choi, C.I.: A study on Natural Hazards Vulnerability in Urban Land Use Change: Journal of Korea Planner Association, V.38, No.2, pp.35--48 (2003)
2. Koh, J.K., Choi, C.I.: A Study on Adapting to Climate Change In Local Governments: Journal of the Korean Regional Development Association, V.22, No.1, pp.67--86 (2010)
3. Kim C.Y.: A Range Query Method using Index in Large-Scale Database Systems: The Korea Institute of Electronic Communication Sciences, V.7, No.5, p.1095 (2012)
4. Hwang, E.H., Lee, G.S., Koh, D.K.: A Study on the mobile-based service method of Korea river map, Korea Spatial Information Society, Spring Conference. pp.78--83 (2007)
5. Sim, W.B., Ji, S.H.: Vulnerability Analysis of Heavy rain disaster and Urban Disaster Prevention followed by climate change, KRIHS Policy Brief, No.388 (2012)
6. Jung, G.H.: Earthquake condition and disaster comprehensive countermeasure of Korea, Urban Problem, V.46, No.509, pp.28--33 (2011)
7. MLIT : Acquisition method of Earthquake resistant capacity of Small scale building (2010).
8. MLIT : Verify Information of Disaster in our town at a look (2013)