

Development of integrated index for flood resilience

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(a) Purpose of study or research hypothesis

The aim of this study is to provide objective measures to establish policy decision and project backgrounds. Additional challenge of this study is to offer diversified information for better understanding of the current situation in water resources vulnerability.

(b) Key issue(s) or problem(s) addressed

World widely, water scarcity and floods mainly result from climate change, localized torrential downpours, and rapid urbanization. These water-related disasters cause a large number of casualties and enormous property losses. For the prevention, mitigation, and recovery against these serious disasters, most of the countries have invested a huge national budget. The existing indicators developed by international organizations are mostly designed to analyze the national status and characteristics, eventually to concentrate international supports on the significantly vulnerable countries.

(c) Methodology or approach used

This study analyzes and develops flood risk indices suitable for Korea reflecting regional characteristics. Study area was divided into standard catchment and data was investigated to establish a database of the related proxy variables and potential indicators from 1990 to 2009. Detailed indicators were set by regression analysis and statistically based factor analysis. The grouped indicators by factor analysis were used as thematic indicators, and both drought and flood indices were finally developed based on 4 thematic indicators, respectively. In further detail, thematic indicators include hazard, exposure, vulnerability and capacity. Developed risk indicators were compared and were analyzed by implementing normalization methods. Final index was determined from min-max normalization, and aggregated 20-year average indices were evaluated and change of these indices was analyzed.

(d) Results or conclusions derived from the project

The results show that as time goes by, the vulnerability for indicators: loss weighting element, hydro-meteorological feature, and defence capability has increased; while the vulnerability of factors like: flood defence and internal drainage has reduced significantly. The results can be explained by the fact that the regions are undergoing rapid urbanization and industrialisation, experiencing localized torrential downpours and typhoons under the effect by climate change, as well as having a significant increase in the population density.

In the actual situation, the flood defence policies introduced by the government are said to have reduced the vulnerabilities.

(e) Implications of the project relevant to congress themes

The proposed FVA method aims to provide support for policy-making decision of flood management in national water resources where it can provide comprehensive information about the watershed status. In addition, it can be used as a basis for future research on the watershed vulnerability assessment.

Keywords : *flood risk assessment, watershed management, risk index, standard catchment, future risk*