

Flood and Drought Prevention with Using Green Roofs and Building Spatial Information

Gon Park (Republic of Korea)

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SUMMARY

Urbanization in South Korea has caused an increase in impervious surface areas in many dense cities that have many environmental problems from flood and drought. The government of South Korea has allocated funds to resolve these environmental problems. In 2015, the Daejeon Construction and Management Administration announced that they allocated approximately \$8 million in funds for the River Improvement Project that focuses on preventing flood and constructing waterfront facilities. But the government does not have plans to reduce impervious surface areas. Green roofs help to resolve variable environmental problems with changing impervious surface areas to green areas. Urban stormwater reduction is the main benefit of green roofs, and many dense cities in the United States and Europe are installing green roofs for reducing stormwater runoff. Thus, this study assesses environmental and economic benefits from preventing flood and drought with installing extensive green roofs on the 133 houses in the City of Daejeon, South Korea.

Data of the 133 houses were extracted from the Building Spatial Information System of the Korea Land and Geospatial InformatiX Corporation. Amounts of reduced rainfall and stormwater runoff with installing extensive green roofs on the 133 houses were analyzed for flood prevention with using the extracted data that contains locations and roof areas of the 133 houses. Cost-benefits from installing rainwater tanks for these houses also were assessed for drought prevention. Results show that installing extensive green roofs on the 133 houses causes environmental benefits with reducing rainfall runoff of 2,186 tons annually. The scenario also shows that these green roofs can reduce stormwater runoff of 366 tons that is calculated with using data from three days of the last flood in the City of Daejeon. Additionally, installing rainwater tanks for toilet flushing in these houses

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causes \$6,600 of private saving annually. Although the study area is confined to the City of Daejeon, the same methods can be applied to other cities in South Korea with using the Building Spatial Information System of the Korea Land and Geospatial InformatiX Corporation.

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