

DECISION SUPPORT SYSTEM USING GIS FOR FLOODPLAIN MANAGEMENT OF YEOUJU IN HAN RIVER BASIN, KOREA

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Economical estimation of floodplain after flooding is a long-standing problem in water resources planning and management. A two-stage linear programming formulation of this problem is proposed and demonstrated which provides an explicit economic basis for developing integrated floodplain management plans. The approach minimizes the expected value of flood damages and costs, given a flow or stage frequency distribution. A variety of floodplain analysis can be examined in the method, and interactive effects of options on flood damage reduction can be represented.

The most common economic framework for floodplain analysis is minimization of expected annual damages and flood management expenses (structural and non-structural flood control options) (WRC 1983; Goodman 1984). This form of probabilistic benefit-cost analysis largely has replaced older forms of economic analysis performed by examining only a particular design flood, such as a flood of record or an estimated 100-year event. However the limitation of this method in terms of forecast inundated area by various frequency floods is that there is no visual tools of finding inundated area for calculating some economic estimations. Within this newer form of analysis, great deal of research has been devoted to the assignment of probabilities to the range of flood event discharges and flood stages. The assignment of graphical development has received considerable attention. In addition, the estimation of damages associated with inundation to a given stage/elevation also has received considerable attention (USACE 1988).

Direct flood damage estimation by designed flood is necessary in floodplain management. In the study Decision Support System (DSS) using Geographical Information System (GIS) is developed to evaluate the direct flood damage. The DSS evaluates the possible economical damages by integration of hydraulic, hydrologic, topological, and economic database. The hydraulic model, HEC-RAS is used to modeling the flood flow. ArcGIS is used to show flood maps. The floodplain of the Yeouju of Kyunggi-Do, located in South Han River Basin, KOREA, served as research area. The aim of this paper is to identify, determinate and represent direct flood damage caused by various sizes of flood with using ArcGis. Overall, the results of the study indicate that

DSS using GIS is proven to very useful and efficient for the automatic generation of flood maps, and an effective environment for estimating, mapping, and analysis of economic value of direct flood damage.

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