**ABSTRACT**

**A MULTI-CRITERIA SPATIAL DECISION SUPPORT TOOL FOR FLOOD RISK MANAGEMENT IN QUEZON CITY, PHILIPPINES**

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The occurrence of flood, especially in urban areas, brings huge damages to properties and infrastructures and loss of human lives, thus it is considered one of the major hazards in the country. A Spatial Multi-Criteria Decision Analysis (SMCDA), integrated with the Geographic Information System (GIS) and a system dynamic simulation program were used to analyze the relationship of flood risk parameters and to provide geographical information on various flooding scenarios given the set of hazard and vulnerability variables. The study aimed to develop a decision support tool for flood risk reduction and mitigation in Quezon City, the most populous city in the country. The generation of the tool required the identification of flood risk parameters and decision criteria which are both input to simulation and scenario-making process. Five factors were taken into consideration in generating the flood hazard - these are rainfall amount, land use, elevation, river buffer, and road density. Through the Analytical Hierarchy Process (AHP), the individual weights of the five factors were computed. The relative weights for flood hazards namely; rainfall, land use, elevation, river buffer, and road density were 46.25%, 9.47%, 22.64%, 13.93% and 7.71%, respectively. The weights were reliable and reflected consistent rating or judgment with a Consistency Ratio (CR) < 0.10 or 10%. In a similar fashion, two factors were considered in generating the flood vulnerability - these are land use and population density. The Rank Sum Method (RSM) was used to generate the weights of the two vulnerability factors, which provided the values of population density (66.67%) and land use (33.33%). Flood hazard, vulnerability and risk were examined at the barangay level. In terms of flooding risks (indicated by Flood Risk Index (FRI)), the best, average and worst locations were identified through system dynamic simulation. The generated FRI for best, average, and worst conditions are, and 1, 5.93, and 14.96 respectively. These are areas with parameter values of rainfall (7.5-15 mm/hr), elevation (> 150m), high infiltration areas, river buffer (>601m), road density (<0.18 m/sqm), population density (<15,000 persons/sqkm), areas with low economic value. During typhoon Ondoy, high flood risk barangays were Santo Niño, San Isidro, Escopa, Unang Sigaw, and Dioquino Zobel, among others. The data and information generated from the study can be used as input into flood–responsive local plans and sound management actions for flood risk reduction in Quezon City.