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DAMRONG SIAMMAI: THE SPATIAL FLOODING SIMULATION BY USING GEOGRAPHIC INFORMATION SYSTEMS; CASE STUDY: FLOOD CONTROL AND PROTECTED AREA OF EAST BANGKOK BANK. THESIS ADVISOR: RUNGCHARAT HUTACHAROEN, M.Sc., CHUKIAT SAPPHAISAL, M.Eng., PEERAPONG SIRIKASEM, Ph.D., PRAPEUT KERDSUEB, M.Sc. 90 P. ISBN 974 - 663 - 552-2

The objective of this study is to form spatial flooding simulation for display of flood problem on tangible condition. Due to the limitations of spatial data it is necessary to construct the spatial flood model in ideal scenario by using the Geographic Information Systems (GIS) as a tool for the study. This study was defined by four events of the daily rainfall and water level on 18 September 1998, 19 September 1998, 20 September 1998 and 1 October 1998. The study area was provided as main area and sub-area 01 and sub area 02. The criterion for area was provided on the linking of canal network system in study area, the integration between elevation and equivalent water level line in GIS operation for analysis of flood area, flood depth and flood volume. Flood depth analysis in model simulation is used for flood depth calibration with real events. The elevation in 1986 and 1995 were used for flood model simulation in this study.

The result of spatial flood simulation within elevation in 1986 in the event on 18 September 1998 dealt with a flooded area of around 134,406,400 square meters, 19 September 1998 was around 131,959,200 square meters, 20 September 1998 was around 114,432,800 square meters and 1 October 1998 was around 57,310,000 square meters. The result of flood volume is around 582,235 cubic meter, 611,272.00 cubic meters, 618,989 cubic meters, and 429,322 cubic meters respectively. The result of spatial flood simulation within elevation in 1995 in the event on 18 September 1998 dealt with a flooded area of around 95,246,000 square meters, 19 September 1998 was around 91,843,200 square meters, 20 September 1998 was around 75,585,600 square meters and 1 October 1998 was around 20,284,000 square meters. The volume of flood was around 422,871 cubic meters, 427,421 cubic meters, 422,807 cubic meters, and 44,886 cubic meters respectively. All the flooded areas and food volumes depended on the water level above elevation in each event. It was found from flood depth calibration within elevation 1986 that almost all of flood depth in the model was different from that in real events. When we used elevation 1995 and defined the assumption of elevation changing since year 1986 to 1995, as if it is really an occurrence of flood events, they must effect flood events both in real situation and model construction. It means that flood depths in model by use of elevation in year 1995 was more nearly the same as that in real situation, but it was found that in result of flood depth calibration was by contrast with the assumption, was at the same position that accorded with it. The hypothesis evaluation by use of the statistic method "paired-samples T test" for evaluation between interval of the mean of flood depth in real event and flood depth in model that was in same position. The result of study found that flood depth in model was different from flood depth in real events at 0.05 significance level or 95 % confidence.

This study can be summarized that the Geographic Information Systems (GIS) can simulate spatial flood condition on tangible scenario but it is not absolutely accurate or match with real situation. There are other variables, which are not used for model simulation such as polder system, pumping and timing etc. However, this study is an attempt for displaying a tangible scenario of flood condition and trend of flood problems. This research is a pilot study which is necessary to intensify the study in the future.