Flood Risk Assessment using Analytical Hierarchy Process: A Case Study in Pua Subdistrict, Pua District, Nan Province

Phaisarn Jeefoo[1*] Watcharaporn Preedapirom[2] and Chatchadawan Chinkeeree[3]

Abstract

Flood disasters are a global problem and have caused tremendous damages. The main objective of this research is to assess flood risk areas, a case study of Pua subdistrict, Pua district, Nan province. For an operation method, we used an expert interview form as a scorer for the weight of 6 related factors consist of rainfall, slope, elevation, stream distance, land use and soil series and analyzed by analytical hierarchy process (AHP) model by dividing the risk areas into 5 levels comprise of very high, high, moderate, low and very low. Results were achieved by AHP calculation for most contributing factors to flooding. The most contributing factor is rainfall at 0.328, the second being slope at 0.285, the third being elevation at 0.144, the foruth being stream distance at 0.114, the fifth being land use at 0.082 and the least contributing factor being soil series at 0.046. The consistency ratio (CR), consistency Index (CI), and Random Index (RI) were accepted with values of 0.0035, 0.043 and 6.0216, respectively. The high risk level of damaged area was 10,380 Rai, or 71% of the study area. The moderate risk level of damaged area was 2,681 Rai, or 18% of the study area, the very high level was covered 1,380 Rai, or 9% of the study area, and the low and very low was 191 Rai or 1.30%. Security personnel can use the information and results of this study to prepare for future defence.

Keywords : Flood risk area, Geographic Information Systems, Analytical Hierarchy Process

[1] Research Unit of Spatial Innovation Development (RUSID), Geographic Information Science, School of Information and Communication Technology, University of Phayao

[2] Physiology, School of Medical Sciences, University of Phayao

[3] Geographic Information Science, School of Information and Communication Technology, University of Phayao

* Corresponding author, E-mail: phaisarn.je@up.ac.th / p.jeefoo@gmail.com