

## Optimization for Flood Evacuation Shelter Location-Allocation Problem with Difference Priority Levels Constrains

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**Abstract.** A natural disaster is a major adverse and harm event to the earth. Flood is a common natural disaster that damage affects to the environment, economic losses, deaths, and homelessness. In recent years, flood affects highly on humanity when compared to other disasters in Asia. Although disasters cannot be avoided to encounter, we can develop an encounter plan to from disaster problems. However, resources are limited for preparation, capital, time, and employees. This paper aims to solve the location-allocation problem in a humanitarian aid catastrophe case by planning and managing the evacuation of victims from affected areas to safe locations. The mixed integer programming model is used to determine the number of shelters and to assign the victim to the appropriate shelters by the facility location and allocation model. The model consists of the number of populations in each affected areas, travelling distance, victim's priority score, shelter's priority score, shelter's capacity, fixed cost for opening shelter, transportation cost and staff wage. To approach the real-world issue, we expand some constraints in the mathematics model concerning the priority victim's level and capacity limit facility. To estimate the validity of the proposed approach, an experiment was designed to compare several scenarios in different problem scales. The results have shown practical viability of the proposed approach.

**Keywords:** Location-allocation problem, Optimization, Cost Structure, Priority Score