

Study on Site Selection of Village Flood Disaster Refuge Based on Bi-level Programming Model —Take Shuitou Town of Pingyang County as an example

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Abstract: As we all know, a large number of buildings destroyed by the serious natural disasters, property loss and threatening the human safety, and there will be a large number of displaced people. At this time, the site selection of disaster prevention shelters is particularly important. Reasonable location and layout can not only realize the fairness of shelter services, but also ensure the rapid and orderly evacuation of asylum personnel and organization of rescue activities. However, most of the domestic disaster prevention and shelter location problems are comprehensive shelter, lack of pertinence, and there is still a certain non-applicability with the current economic environment background.

This paper will study the location of disaster prevention shelters for flood disasters. Taking Shuitou Town of Pingyang County as a case area, the network analysis of ArcGIS, entropy method and analytic hierarchy process are applied to obtain the relevant data and corresponding weight values of the alternative shelters. Finally, a bi-level programming model is established to consider the location problem from the two aspects of the government of the upper decision-making bodies and the asylum personnel of the lower decision-making bodies, taking into account both the whole and the part, so as to solve the optimize the location of disaster prevention shelters. By analyzing the calculated data and results, we can get the important degree of the factors affecting the suitability of flood disaster prevention and shelter, and the adaptability of the bi-level programming model proposed in this study. Also, this study will provide some basic and applied information for the future task of location planning of flood disaster prevention and shelter.