USING DEA THEORY AID SPATIAL ANALYSIS TO ESTIMATE URBAN DISASTER

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ABSTRACT:

Disaster estimating is the foundation in urban disaster management works. Its main aim is to estimate and predict the loss for the areas which possibly suffer from disaster with the help of many means of spatial information technique, as well as to analyze the cost, which is possibly produced in the course of carrying the control schemes for disaster protection into execution.
This paper integrates spatial information technique with mathematic theory organically. The research results can be evaluates efficiency of integration of different methods such as geographic information system (GIS), photogrammetry, etc., and estimate and predicts the loss accompanying with urban disaster by spatial overlap, spatial statistic with the support of Data Envelopment Analysis(DEA) model and converse-DEA model in operational research field.

The conceptions of DEA model and DEA efficiency are introduced. As a typical example, the floodwater disaster is discussed mainly. The situation of the floodwater disaster can be imitated by using historical floodwater information or emulated by using real-time information in the current environment. Those historical and real-time information had been gathered by remote sensing , photogrammtry or other methods, then been handled in GIS. It can provide important basis for the selection of the control schemes in each decision-making stage. The floodwater disaster estimate model was established and the evaluation indexes are given. The basic data in outburst of floods are quantitatively analyzed by using the model. The floodwater information of disaster areas from all kinds of collecting approaches before, during and after disaster are analyzed and evaluated synthetically. And the decision-making support for the whole estimating process is provided. Some countermeasures for solving the problems at present are proposed.