

Safe and Sustainable City: Spatial Autocorrelation of the Distribution of Snatch Hot Spots and Cold Spots

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In Taiwan, the number of snatch-and-run (street theft) cases has increased rapidly over the past decade, resulting in a sense of insecurity in people and lowering the quality of life in the urban setting. Identifying the degree and cluster areas of crimes is a challenge for police officials and researchers. This study utilizes the spatial autocorrelation method to analyze the characteristics of “hot spots” and “cold spots” of street snatches. This study collects 1,082 street snatch cases from the Police in Seatwen district, Taichung, Taiwan from 2001 to 2004. The results shows that there is a spatial cluster of street snatch cases. The clustering degree and distribution in different time periods are related to daily activities and the change in hot spots is higher than in cold ones. The hot spots are in certain locations with higher population density, land use intensity and convenience of transportation. The results generate recommendations for police forces undertaking improvements in crime preventive strategies and help build safer cities in future.

Disaster Prevention and Rescue System Planning on Harbor Areas: An Empirical study of Kaohsiung Port

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Harbors are designed for exporting and importing in Taiwan. Functions of harbors are influential on economic activities. An efficient disaster prevention system can reduce negative consequences of disasters and minimize potential losses. From the perspective and integration, management principles across levels of governmental authorities (i.e., from towns, counties to central government) should be incorporated into the disaster prevention and rescue system on harbor areas. Environmental factors, hazard potentials and socio-economic variables should be considered when the locations harbors are different. A planned customized system would increase its effectiveness and efficacy in independent management of prevention system.

This research proposed a disaster prevention and rescue system with aforementioned variables. The system was built on database of harbor areas across different regions in Taiwan. Geographical Information System (GIS) was utilized in system planning. Current regulations of disaster prevention and rescue and related literature were reviewed. Furthermore, resource distribution of disaster prevention and rescue was taken into consideration. An empirical study of Kaohsiung Port was then conducted. The results provide guidelines for bureau of harbor in disaster prevention and rescue system planning.

The Applications of DEA Method to Evaluate the Vulnerability of Typhoon Disasters in Taiwan

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Taiwan has been greatly affected by typhoon disasters, so that it is of great importance to analyze the impact of typhoon disasters on national economy. Usually, the frequency of disasters or absolute loss inflicted by disasters is the first priority to be considered, while the capability of regions to overcome disasters is ignored. The concept of vulnerability is used to measure the capability to overcome disasters in different regions with distinctive economies. Traditional methods for vulnerability analysis calculate sub-indices based on disaster frequency, loss, the economic

impact and the population of each region, and then add the sub-indices to get a composite index for regional vulnerability. But those methods are sensitive to the weights selected for sub-indices when multi-indexes are added up to get an index of total vulnerability. The analytic results are less convincing because of the subjectivity of different weighting methods. A data envelopment analysis (DEA)-based model for analysis of regional vulnerability to typhoon disasters is presented here to improve upon the traditional method. This paper systematically describes the DEA method to evaluate the relative severity of disasters in each region of Taiwan. A model for regional vulnerability analysis is developed, based on the annual governmental statistics from 2001 to 2005. The regional vulnerabilities in Taiwan are illustrated as a case study, and a new method for the classification of regional vulnerability to typhoon disasters in Taiwan is proposed.

The study of applying logistics management mechanism to the rescue material supply system for seismic disaster

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Taiwan locates on the west-Pacific earthquake sensitive zone. For a long period of time, the people and the government have accumulated tremendous lessons from many seismic disasters. However, the 921 earthquake still had taken away many lives and properties from these areas. Although both local and central governments had done many disaster relief plans, those injured and survival victims always lacked of enough rescue material in the first-aid time. Many religious groups, public welfare organizations, and individuals would automatically donate and transport the rescue materials to the disaster areas. According to past experience, the material collection and distribution pattern seemed not work so successful. Some situations became even worse in the remote areas.

This study tries to introduce a mechanism to mitigate this problem. The key concept is to focus on to meet the balance of both material supply and demand sides. With the changing pattern of consumption of the people in recent years, the revolution of channels happens between suppliers and retailed outlets. The domestic logistics grows fast with advanced stuffing and stripping, classifying, packing, and transportation functions, and a convenient management model of logistics and storage has emerged. This situation could be found in many existing wholesale markets and retail stores in the neighborhood. They are always equipped with sufficient groceries. Whenever a large earthquake occurs, they can play the role of supplying needed materials for the victims lived in the near-by.

The study is based on reviewing the bibliography of relevant theories and technical reports, and interviewing the people who were involved in the rescue events of the 921 earthquake. The outcomes of the study are to explore the real situations of both demand and supply sides about rescue materials, and to suggest the framework of the logistics management mechanism.

Structure of Post-Earthquake Recovery Process After the 1999 CHI-CHI Earthquake - A Case Study of CHI-CHI -

Osamu MURAO/ Japan

An objective methodology and systematic scheme are necessary for research into post-disaster recovery. Despite numerous researches related to urban reconstruction, researchers had seldom discussed the type of research that should be conducted and the way in which it should be undertaken until the 1995 Hyogoken-Nanbu Earthquake. Two reasons for this lack of open discussion are that the importance of the research is self-evident, and that research topics in this field are diverse and the recovery phenomenon itself is complicated. This paper aims toward a comprehensive theory of post-disaster recovery from the viewpoint of physical environment, and proposes the following important schemes as research topics: (1) general/detailed research questions, (2) systematized structure, and (3) viewpoints for evaluation. This paper first describes interviews with 70 people conducted following the 1999 Chi-Chi earthquake, Taiwan. Following the interviews, oral descriptions were recorded and coded as field notes. Then, general research questions

were formulated based on a conceptual chronological model of seismic resilience that indicate the topics that researchers should discuss and the way that the topics should be discussed in terms of the social recovery phenomenon at each recovery stage. In addition, 20 themes and detailed research questions were formed from the interviews. Following this, the post-earthquake recovery process is represented as a systematic structure. This visual schema, together with the research questions, helps to realize a comprehensive recovery study from the viewpoint of urban planning. Finally, using recovery curve for 255 victims in Chi-Chi, viewpoints are proposed that should be considered in recovery research and related investigations (duration, support system, and quality of life as a result of supported housing at each recovery stage). Although many research projects and investigations are carried out following disasters, a comprehensive scheme of post-disaster recovery has yet to be widely adopted. Various recovery processes have been devised over recent decades. These proposals provide fundamental schemes for utilizing accumulated knowledge for future recovery processes, and they enable comparative studies related urban planning among different types of post-disaster recovery processes throughout the world.

Automatic Generation System of 3-D Urban Models for Urban Planning and Disaster Prevention

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A 3-D urban model is an important information infrastructure that can be utilized in several fields, such as landscape evaluation, urban planning, disaster prevention simulation, etc. When a real urban world is projected into 3-D virtual space, buildings are major objects in this space. To realize a 3-D urban model, it is important to generate building models efficiently. However, in order to realize a 3-D urban model, enormous time and labor has to be consumed to acquire the spatial data and to design the models. In this paper, I proposed the GIS and CG integrated system that automatically generates a 3-D building model from building polygons on a digital map stored by GIS. Most building polygons' edges meet at right angles(orthogonal polygon) and varies in the number of the vertices. The algorithm for dividing orthogonal polygon into rectangles is presented. After dividing, the integrated system is placing 3-D building models on these polygons. The system automatically generates a 3-D urban model so quickly that it meets the urgent demand to realize another alternative plan. In the last chapter, the examples of the application of the system for urban planning and disaster prevention are shown.

R-T Model as a Sustainable Urban Renewal Process: A Study of 921 Earthquake Rebuilt Program

Kun-Jung HSU & Chun-Ho PAN/ Taiwan

The urban renewal strategy for a sustainable development is formally introduced in Taiwan since Nov. 1998. Strategy, the right-transformation model (R-T Model) as a sustainable urban renewal tool is performed to negotiate the disputes between ownerships of the property. As a basic tool, R-T Model was applied to restore the urban function, to improve the living environment after 921-Earthquake disasters event, and to speed up the re-development of the disaster area. Base on the case study of R-T Model used by the community-rebuilt programs in the disaster area. By introducing the regulations, implementation, and strategy of R-T Model, the paper clarifies the new trend of Urban Renewal in Taiwan. The real estate market surrounding the disaster area, the agents of the community-rebuilt programs were analyzed. The mechanism of R-T Model for the community-rebuilt action then was explored. Finally, The policy implications for sustainable urban renewal strategy were discussed.

A Study on the Assessment Criteria and Weight Distribution of Seismic Hazards in

the Urbanized Areas of Taiwan

Kuang-Hui PENG & Shu-Mei LIN/ Taiwan

The motive of this study is on the basis of the painful lessons learned from and implications gathered from an island wide efforts to relieve, restore and recover from the catastrophe in the aftermath of the 921 Earthquake. The study therefore aims to prevent and minimize the potential disasters by understanding the hazards and through careful establishing a model of assessment criteria and weight distribution of seismic hazards. It can be used as a reliable database for investigating, analyzing potential relatively hazardous areas and reducing the potential damaging effects to properties and people in the urbanized areas of Taiwan. The study categories three assessment groups, viz natural environment, artificial substantive environment and humanities (socio-economy) environment. Then the possible categories and indexes of leading to disasters gathered, through a group of professional-oriented questionnaires and FDAHP analytic approach to establish an assessment model of seismic hazards. In conclusion, the research sums up assessment criteria and relative hazardous areas of factors including soil liquefaction, average gradient, geology, soil plate, epicenter, active fault, flooding and erosion of river bank, stories of building, strength of enduring earthquake, structural conformation, types of use, structural frame, covering ratio, illegal building ratio, bases of operation for disaster prevention, installing standard of fire hydrant, buildings easily to lead to disaster, buildings difficultly to get rescue, width of roads, rescue spaces, temporary settlements, extensive refuges, population density, average age, education, location, public facilities, disaster prevention education, rescuing training, and disaster prevention education of the community. Finally the study suggests the necessity of viewing the implementation of disaster prevention, mitigation and rescue plan by following a grade of hazards from 1 to 4 which should be ranked by indexes system, weight distribution, and relative importance of factors.