What is the Appropriate Operation Plan of Disaster Management Resources for South Korea?

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A B S T R A C T

Unlike the types of disasters in the past, disasters in modern society are complex and vague. It is difficult to estimate or compute the scale or amount of damage. Specifically, disaster management uses the term 'redundancy' and diverges considerably from economics, contrary to general administration. However, the public concern must be focused on operating disaster management resources by surpassing 'redundancy' and wasting the resources. Therefore, this study suggests a Korean-type operation plan to operate disaster management resources more effectively. This study suggests a measure of operating disaster management resources through a resilience base during the occurrence of disasters. In particular, this study classifies the responsibilities and roles of cities/districts by reinforcing the support of resources from the nearest disaster prevention stockpile warehouse.

Key words: disaster management resources, disaster management, crisis management, operation plan, redundancy

1.Introduction

In the past, the term 'disaster' was used comprehensively to refer to incidents that harmed or could harm the lives, physical conditions, and wealth of the citizens or the country, and before the period of industrialization, it referred to natural disasters like earthquakes, floods, typhoons, and tsunamis. However, industrialization led to the development of the economy, transportation, and communication together with globalization and sociocultural diversification, and the scope of damage from social disasters, including human disasters, surpassed natural disasters (Shaluf, 2007; Quarantelli, 2006; Quarantelli, et. Al, 2007).

In the case of natural disasters, continuous management and plans were practiced from the past and the system is established more elaborately compared to social disasters through the learning process and research has been conducted on it (Noji, 1991; Alexander, 1997; Guha-Sapir, et. Al, 2004). However, more detailed management is needed for disasters that were not experienced and with extremely low predictability in line with the advancement of the industrial society (Tierney, 2006; Pidgeon & O'Leary, 2000; Leonard & Teitelman, 1991).

Social disasters can be understood as a phenomenon that occurred with the advancement of technology. Through the convenience of technological progress and new technology, problems occur inevitably during the process of enhancing, reducing, or alleviating them. Technical risks are disasters that are artificially created by humans, and they can be perceived as risks that appear together with the technological development of the industrial society (Marshall, et. Al., 2020; Tarn, et. Al., 2008; Gherardi, et. Al 1999).

Modern society is always at risk of disasters and disasters will continuously affect society even in the future. The occurrence level of disasters could be alleviated through technology development, but natural disasters from climate changes or social disasters from technology development will not disappear completely (Lizarralde, et. Al., 2009; Brauch, 2019).

In addition, there are always possible threats of new risks in regards to introducing or applying new technology to relieve the present risks. Moreover, financial costs involving the risk problems and life are always in a mutual trade-off relationship. This means that financial costs are complemented since a safety device is needed to avoid risks to safely protect individuals' lives (Seddighi & Seddighi, 2020; Eftekhar, et. Al., 2018; Heo, et. Al., 2020). Therefore, taking prompt measures during the occurrence of disasters became an important element of disaster management. In particular, disasters

require immediate responses on the spot instead of a centralized action by the central government.

To this end, this study will establish appropriate operation methods and a model of disaster management resources in the occurrence of disasters to provide the most sustaining disaster management countermeasure under the restricted human rationality.

2. Theoretical Background

2.1. The importance of disaster management resources during disasters

Disasters are characterized by numerous properties. According to Rochford Jr, et. Al(1991), Ricciardi, et. Al.(2011), and Perry(2018), disasters lead to situations that are difficult to solve by applying available systems or manpower. In other words, it is characterized by a low possibility of control.

In accordance with Chen & Ji(2021), Shimoyama(2003), and Gao(2014), disasters are instantaneous and accidental situations that are unreceptive to the confrontation of stable conditions without responsive conditions or opportunities, so it causes changes in the conditions that form the society, cultures, norms, systems, values, relationships, and reliability.

As stated by Mattietto(2021), Onigbinde(2018), and Saito(2014), strictly managing new disasters and neglecting the recovery process from the disasters will likely cause a repetitive occurrence of accidents similar to previous types of disasters.

Farinella & Saitta(2019), and Gugg(2021) asserted that disasters do not restrict time, space, or affected subjects, and there is a tendency for the damage from the disasters to expand unconditionally.

According to Coleman, et. Al(2012), Managi & Guan(2017), and Ray-Bennett(2010), there are various causes of disasters, and disasters are mostly caused by complicated reasons, not just a single cause. Accordingly, it is difficult to prevent disasters perfectly and the interaction with the environment displays complexity that includes the relationships between individuals, regions, and communities.

As asserted by Santos & Aguirre(2007), Baker, et. Al(2020), and Reghezza & Rufat(2015), disasters disclose uncertainty. This is the reason why there are numerous cases of large disasters that occur from not securing the preventive measures perfectly against the disasters. The uncertainty could be pushed aside by efficient administration and reduce the scale of the disaster management system, the system itself, the law, and organizations but this strategy is not advisable.

Based on the global flow, it is difficult and realistically impossible to accurately analyze the characteristics, aspects, methods, and scale of damage of the disasters. This being so, the ability to promptly respond to the outbreak of disasters is a vital element in disaster management.

2.2. Previous Literature

The preceding research about disaster management resources can be classified largely into policy research about the distribution of resources (Boostani, et. al., 2020; Masudin, et. al., 2021; Seraji, et. al., 2019) and the research about the program development for the optimization of disaster management resources (Mamashli, et. al., 2021; Roh, et. al., 2018; Haeri, et. al., 2020; Yahyaei & Bozorgi-Amiri, 2019).

First, as for the research about the distribution and utilization of disaster management resources, the research by Zhan, et. al(2021) developed a new decision making model and rectified the imbalance of demands and supply that appeared in the past after disasters occurred.

The newly developed decision making framework intended to carry out research about the amount of required resources and supply method and distribute it through practical analysis after the occurrence of disasters based on the supply route and methods of previous relief supplies

In the research by Akbari, et. al.(2021), cooperation plans about the relief logistics operation was performed through a case study about Teheran region under uncertainty about the demands. Through cooperative game theory, a scenario based optimization model for relief logistics network was developed.

In the research by Owusu-Kwateng, et. al(2017), an empirical analysis was conducted about the local government in Ghana for the effective adjustment of disaster management resources during relief activities and management mechanism analysis, and the research findings confirmed that resource availability, the total amount of disaster management resources, and the conflicts among the rescuers affect the disaster management efficiency.

Second, by examining the research about program development for the optimization of disaster management resources, a research by Safaei, et. al(2018) conducted TOPSIS modeling to optimize relief expenses in the event of floods to consider the requests of the victims as much as possible. The framework suggested by the research aimed to select businesses with low risks when selecting a supplier of the disaster management resources, and systematize the supply and distribution network that follows.

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3. Operation plan of disaster management resource support

Currently, disaster management organizations (central administrative agency, local government in provinces, relevant public institution·organization) like the local government in South Korea base on the 'framework act on disaster and safety management' and stockpile·manage disaster management resources to be prepared for various disasters but most only stockpile·manage resources that are needed within the cities·districts·boroughs. In addition, there were constant criticisms that there is a shortage of resource stockpile every time there is a disaster, the resource supply is not amicable, and the excessive stockpile is not managed properly so a tremendous amount of resource stockpile becomes useless every year (Heo, et. Al., 2018; Kim, et. Al., 2020).

Thus, this study intends to suggest a disaster management resource operation model for a wide area base to improve and supplement the problems by reinforcing the roles of cities and districts and applying the expertise of private sectors and resources effectively.

The operation of a wide area base centered model requires the following. First, it should be equipped with a phased support system.

About the management of the Gyeonggi-do Province wide area base stockpile implemented by Gyeonggi-do Province in South Korea, the measures to the occurrence of disasters are classified between regular measures and the outbreak of large-scale disasters, and support of supplies is provided. Short-distance stockpile warehouse is used during emergencies, and the stockpile is supported in line with the phased situation such as utilizing the base center. In the case of the outbreak of disasters, the scale of damage from the disasters and urgency are considered to manage resources by classifying from stages 1 to 3. In stage 1, the resources in the stockpile warehouse nearby the place of disaster are used. In stage 2, the resources of the wide area prevention base center are urgently transported. In the final stage, which is stage 3, the resources of all the stockpile warehouses are urgently transported and used.

Second, it is unifying the operational process of relevant organizations. The management resources of disaster management resources in South Korea are classified variedly by the categorization of each item, and various competent agencies manage the operations separately. Accordingly, it is necessary to unify the operation for the efficiency of the disaster prevention resources.

Third, the roles of the wide area prevention base center and small prevention stockpile warehouse must be classified. Presently, final resources of the cities/districts are used as the measures for minor disasters, and the prevention resources of wide area prevention base centers are used to respond to major disasters, but it is ideal to support from the nearest prevention resource stockpile warehouse during the outbreak of disasters.

In accordance with this, in the occurrence of major disasters, the primary necessity is to maintain the role of supporting resources from the prevention stockpile warehouse, and the cities/districts, where the stockpile warehouse is located, should inspect and operate the warehouse to manage them. In exceptional cases with regular disasters that occur in each city/district, it is suggested to construct a contact system with a wide area to support resources and improve the applicability of the stockpile warehouse.

4. Summary & Implication

The modern disaster management paradigm is gradually changing into collaborative governance and integrated management so the roles of the local government organizations became vital. Moreover, disaster management resources to prevent disasters are understood at a level that exceeds economics, but there is an earnest need for effective operational plans.

Therefore, this study suggests the operation of a prevention base for the effective operation plans of disaster management resources. The aim is to improve the issues that arise from the low applicability of small prevention stockpile warehouses. Especially, the supply of resources in the nearest prevention stockpile warehouse from the outbreak of the disasters will be reinforced to classify the responsibilities and roles of cities/districts.

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