

Article

A Study on the Invigorating of Disaster Recovery Resource Sharing

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Abstract: Efficient disaster management is affected by how much damage and time are reduced in the event of a disaster, which is important to quickly input and respond to disaster management resources. In particular, since disaster management resources are insufficient in large-scale disasters, not only public and private institutions in the jurisdiction but also other local governments are required to support necessary resources. Accordingly, the government operates the Disaster Resource Sharing Service (DRSS) to systematically stockpile, manage, and utilize necessary disaster management resources in advance, which enables systematic access to resource information from other local governments and institutions. However, there is a limit to the joint use and support of practical and systematic resources as there are no specific implementation measures in place. Accordingly, this study aims to examine the current status of disaster management resources by local governments such as Daejeon Metropolitan City, Sejong Special Self-Governing City, Chungcheongbuk-do, and Chungcheongnam-do, and seek ways to revitalize the joint use of disaster management resources in the Chungcheong region.

Keywords: disaster management, recovery resource, DRSS, Chungcheong region,

1. Background and Purpose of the Study

Efficient disaster management is influenced by how much the scope and time of damage is reduced in the event of a disaster, and it is important that disaster management resources (manpower and materials) are quickly deployed and responded to. In particular, in the case of large-scale disasters, disaster management resources may be insufficient, so support is required from other local governments as well as public and private organizations. Therefore, the government operates the Disaster Resource Sharing Service (DRSS) to systematically stockpile, manage, and utilize necessary disaster management resources in advance, and systematic access to resource information from other local governments and institutions is possible.

However, the "Standards for Joint Utilization of Disaster Management Resources" requires that the interconnection and utilization (support) of resources, settlement and evaluation of resources, etc. be determined through the signing of a business agreement between each agency, so there is a limit to the practical and systematic joint utilization and support of resources because no specific implementation plan is in place. Therefore, this study examines the current status of disaster management resources by local governments such as Daejeon Metropolitan City, Sejong Special Self-Governing City, Chungcheongbuk-do, and Chungcheongnam-do, and seeks to find ways to activate joint utilization of disaster management resources in the Chungcheong region.

2. Discussion on Disaster Management Resource Management System

2.1. Significance of Disaster Management Resources

Disaster management resources have not yet been academically defined, and most researchers in Korea cite the definition stipulated by the current legal system (National

Institute for Disaster Safety, 2020: 9; Yi, 2020). However, a study by the Korea Disaster Management Association (2012, p. 7) defines "disaster management resources" as "a compound word of 'disaster management' and 'resources' and a general term for manpower, equipment, facilities, and goods to prevent or minimize disasters.

"The Basic Act on Disaster and Safety Management defines disaster management resources as equipment, supplies, materials, and facilities necessary for disaster recovery activities (Basic Act on Disaster and Safety Management, §34, ①). In addition, the Regulations on Classification of Disaster Management Resources and Use of the System define disaster management resources as equipment, supplies, materials, facilities, and personnel necessary for disaster recovery activities and emergency measures. Therefore, disaster management resources can be summarized as the equipment, supplies, materials, facilities, and manpower required by the disaster management organization in charge of disaster management (National Institute of Disaster Safety, 2020: 10).

2.2. Characteristics of disaster management resources

An(2022, p. 28) classifies the characteristics of disaster management resources as follows, considering the specificity of disasters and the contents of each stage of disaster management.

First, due to the uncertainty of disaster management resource utilization, it is difficult to accurately predict the type, quantity, and disaster area of disaster management resource demand. This is because disasters occur suddenly, making it difficult for disaster management organizations to identify the timing, intensity, and extent of damage in advance.

Second, due to the irreplaceability of disaster management resources, the use of disaster management resources is relatively unified, and they are used when a specific disaster occurs.

Third, the delayed nature of disaster management resources means that disaster management resources are deployed after a disaster has occurred, so the utilization of disaster management resources differs from the time of the disaster.

Fourth, the urgency of disaster management resources requires rapid disaster response to minimize disaster damage, and disaster management resources must be supplied to the disaster area within a certain time.

2.3. Mobilization System of Disaster Management Resources

When requesting support from disaster management resources for disaster relief activities, etc., it must be done by electronic methods or documents through the resource management system. However, if it is unavoidable for urgent emergency measures, it may be requested first and notified later by electronic methods or documents through the resource management system. When requesting support from disaster management resources, the date, time, location, contents of the request, and reason for the request shall be stated. The head of the organization or person receiving the request for support shall notify whether he/she agrees or not immediately upon receiving the request for support (Standard for Joint Utilization of Disaster Management Resources, 12.1).

The mobilization of disaster management resources is based on the availability of resources held by the disaster management agency in charge of disaster management and the exact needs for support (equipment, materials, etc.). The resources are then deployed to the disaster site upon mutual consent of the volunteer agency and the requesting agency. To mobilize disaster management resources, first utilize your own resources, and if resources are insufficient, request mobilization from related organizations (public and private) within your jurisdiction, neighboring organizations (city, county, district), regional organizations (city, province), and the central government (overall and lead agency). Mobilized resources (non-consumable and consumable) shall be fully returned by the using agency or appropriately compensated through inter-agency business agreements. If emergency measures are implemented by an organization other than the disaster

management agency, the cost shall be borne by the disaster management agency. Each organization shall secure a budget for expended and lost resources and carry out regular restocking and management in accordance with the standard of adequate reserves of resources.

3. Analysis of Major Disasters in Chungcheong Province

3.1. Scope and Content of Analysis

The status of major disasters in the Chungcheong region was analyzed by dividing the disaster damage caused in Daejeon Metropolitan City, Sejong Special Self-Governing City, Chungbuk Province, and Chungcheongnam-do into natural and social disasters. The period of analysis for natural disasters and social disasters was set from 2001 to 2020, and the analysis data was utilized from the disaster annals (natural disasters) and disaster annals (social disasters) published by the Ministry of the Interior and Safety.

For the analysis of natural disasters, we targeted four natural disasters, including typhoons, floods, heavy rains, strong winds, windstorms, tsunamis, large snowfalls, cold waves, lightning strikes, droughts, heat waves, earthquakes, yellow dust, algae blooms, tidal waves, and volcanic activities, which occurred frequently and caused large damages. Next, we analyzed six social disasters, including road traffic, fire, wildfire, railroad (subway, high-speed rail), explosion, marine, guided ship, environmental pollution, facilities in industrial parks, mines, electricity (electric shock), elevator, aircraft, collapse, water disaster (water play, drowning, etc.), climbing, fall, agricultural machinery, bicycle, amusement facility, and leisure (living sports) accidents, which have a high number of occurrences and a relatively large number of deaths and injuries. Of the social disasters analyzed, road traffic, fire, forest fire, explosion, and environmental pollution, except for collapse, were included in the analysis because they are managed by the central government or utilize local government disaster management resources.

3.2. Disaster Status in Chungcheong Province

The table below shows the status of natural and social disasters in Daejeon Metropolitan City.

연도	태풍	호우	대설	강풍
2001			5,415,074	
2002	399,751	13,500		
2003	36,502	4,589,846		
2004	945,938	251,690	66,953,105	
2005		40,464		
2006		68,291		62,308
2007		288,172		71,463
2008				
2009		1,086,121		
2010			55,531	
2011	2,587	3,480,468		
2012		12,607	43,577	
2013			3,591	
2014				
2015				
2016				
2017		1,200		
2018		2,980,897		
2019	1,466	5,100		
2020	79,904	7,044,403		
합계	1,466,148	19,862,759	72,469,878	133,771

The status of natural and social disasters in Sejong Special Self-Governing Province is shown in the table below.

세종특별자치시 주요 자연재난 피해 현황(2001-2020)					세종시 주요 사고 발생 현황(2001-2020)						
단위: 천원					단위: 건						
연도	태풍	호우	대설	강풍	연도	도로교통	화재	산불	붕괴	폭발	환경오염
2012	217,312	51,785	798,722		2012		66				
2013				2,763	2013		194	4			
2014					2014		223	4	2		1
2015					2015		262	1			3
2016					2016	521	300	1		1	2
2017		32,360			2017	746	316	2	3		
2018		758,601			2018	792	236	6			
2019	9,900	2,700			2019	917	191	7			2
2020	23,488	1,209,740			2020	813	203	4	12		
합계	250,700	2,055,186	798,722	2,763	합계	3,789	1,991	29	17	1	8

자료: 행정안전부 재해연보(2001-2020) 자료를 바탕으로 재구성

자료: 행정안전부 재난연감(2001-2020) 자료를 바탕으로 재구성

The status of natural and social disasters in Chungcheongbuk-do is shown in the table below.

충청북도 주요 자연재난 피해 현황(2001-2020)					충청북도 주요 사고 발생 현황(2001-2020)						
단위: 천원					단위: 건						
연도	태풍	호우	대설	강풍	연도	도로교통	화재	산불	붕괴	폭발	환경오염
2001		4,161,504	65,286,580		2001	10,572	1,250	62	3	3	6
2002	160,499,852	98,919,641			2002	9,151	1,097	46	2	3	4
2003	38,451,320	14,663,095			2003	8,807	1,136	22	5	4	4
2004	24,445,082	108,358,584	191,783,351		2004	8,068	1,190	21	1	2	2
2005	7,034,267	2,142,581			2005	7,673	1,167	36	2	1	2
2006		94,883,349		151,247	2006	7,922	1,226	23	5	2	4
2007	16,900	5,886,699		1,828,563	2007	7,991	1,474	25		5	2
2008	280,633	6,032,447	9,913		2008	8,393	1,518	25	6	2	4
2009		18,525,439	767,505		2009	8,640	1,443	41	2	2	1
2010	97,152	1,241,234	18,855,316		2010	8,652	1,351	34	2	3	7
2011	487,604	7,776,378			2011	8,732	1,376	14	5	1	4
2012	15,011,758	1,720,309	5,142,606	537,103	2012	8,684	1,377	14	28	1	3
2013		84,401	1,376,137	300,797	2013	8,573	1,345	14	2	1	36
2014		600			2014	9,009	1,316	18	12	5	20
2015			3,794,806	9,754	2015	9,420	1,373	31	2	7	15
2016		2,445,971			2016	9,434	1,379	19	7	1	3
2017		57,717,484			2017	9,317	1,554	46	11	4	2
2018	5,355	9,117,959	428,901		2018	9,676	1,414	33	3	4	7
2019	863,491	5,063			2019	9,600	1,594	28	14	3	22
2020	2,335,127	249,745,393			2020	8,398	1,523	13	104	2	18
합계	249,528,541	683,428,131	287,445,115	2,827,464	합계	176,712	27,103	565	216	56	166

자료: 행정안전부 재해연보(2001-2020) 자료를 바탕으로 재구성

자료: 행정안전부 재난연감(2001-2020) 자료를 바탕으로 재구성

The status of natural and social disasters in Chungcheongnam-do is shown in the table below.

충청남도 주요 자연재난 피해 현황(2001-2020)					충청남도 주요 사고 발생 현황(2001-2020)						
단위: 천원					단위: 건						
연도	태풍	호우	대설	강풍	연도	도로교통	화재	산불	붕괴	폭발	환경오염
2001		9,334,302	213,442,359		2001	12,491	1,502	47		2	8
2002	36,434,443	39,399,909			2002	10,303	1,333	45		8	6
2003	432,247	38,698,775			2003	10,061	1,324	8		10	1
2004	6,335,030	5,864,234	352,862,877		2004	9,336	1,390	14	4	3	2
2005	15,377,745	608,069	21,049,743		2005	8,646	1,376	27	7	5	6
2006		15,298,139	1,555,154	5,850,225	2006	8,419	1,357	28	2	8	3
2007	79,400	4,202,150		700,565	2007	8,618	2,698	15	2	5	3
2008	272,029	388	1,223,377		2008	8,551	2,899	9		4	3
2009		9,926,806	4,567,040	832,157	2009	8,817	2,927	13		1	1
2010	109,725,023	21,394,700	1,247,155	172,588	2010	9,299	2,994	8	15	4	10
2011	1,077,885	21,525,965			2011	8,887	3,089	14	1	2	5
2012	44,914,772	14,943,934	3,130,856	7,209,881	2012	8,560	3,219	18	18	3	16
2013		69,153	401,044		2013	8,406	2,657	17	3	5	19
2014		286,340	13,333,774		2014	8,910	2,838	23	5	5	27
2015		192,226	1,604,317	32,745	2015	10,027	3,031	23	19	1	9
2016		3,122,794	500,592		2016	9,027	2,825	15	10	2	3
2017		24,481,916			2017	9,323	2,775	52	8	3	6
2018	9,591	1,726,145	264,626		2018	8,885	2,605	29	12	4	9
2019	5,663,282	49,560			2019	9,471	2,193	39	11	1	23
2020	896,670	89,485,462			2020	8,952	2,075	35	173	2	22
합계	221,218,117	300,670,967	615,182,914	14,798,161	합계	184,989	47,107	479	290	78	182

자료: 행정안전부 재해연보(2001-2020) 자료를 바탕으로 재구성

자료: 행정안전부 재난연감(2001-2020) 자료를 바탕으로 재구성

3.3. Analysis Results and Implications

When we examined the status of natural disasters in the Chungcheong region, we found that the most frequent disaster was heavy rain. Daejeon Metropolitan City and Chungcheongnam-do provinces had relatively large damages compared to the frequency of natural disasters. In the case of Chungcheongbuk-do, snowfall damage was second only to heavy rain. Therefore, local governments in the Chungcheong region need to prioritize resources for heavy rain and snowfall when securing disaster management resources related to natural disasters. Resources related to heavy rain include backhoes, wheeled and tracked excavators, dump trucks, aerial lifts, crane-mounted trucks, submersible pumps, and engine pumps. Resources related to snowfall include backhoes, wheeled and tracked excavators, dump trucks, and sand spreaders.

According to a study of social disasters in the Chungcheong region, road traffic accidents were the most common in all regions, followed by fire accidents. Therefore, local governments in the Chungcheong region need to prioritize securing disaster management resources related to rescue and first aid in order to effectively respond to social disasters. Resources related to road traffic accidents and fire accidents include ambulances, rescue vehicles, tow trucks, and medical or rescue helicopters. In addition, facility emergency response resources related to fire accidents include tracked excavators, dump trucks, and aerial lifts.

The most damaging types of natural and social disasters in the Chungcheongbuk-do region are heavy rain and snowfall, traffic accidents, and fires, and the main disaster management resources needed to respond to these disasters are equipment and materials for rescue and first aid and emergency restoration of facilities. Among the disaster management resources related to rescue and emergency, joint utilization of fire ladder trucks, rescue work vehicles, and oximeters is required. In addition, among the disaster management resources for facility emergency recovery, it is important to jointly utilize excavators and bulldozers in the Chungcheong region.

4. How to activate joint utilization of disaster management resources in the Chungcheong region

4.1. Scope and Contents of the Analysis on Establishing Human Networks Related to Disaster Management Resources

Since joint utilization of disaster management resources is based on inter-agency cooperation in disaster management, it is necessary to establish a human network among those in charge of managing disaster management resources. The information obtained through the joint disaster management resource utilization system or integrated management system can only confirm the existence and quantity of disaster management resources, but it is not possible to determine whether joint utilization is actually possible. Therefore, it is necessary to form a '(tentative) Disaster Management Resource Joint Utilization Council' that can share information on the possibility of joint utilization of disaster management resources stockpiled by local governments and private organizations in the jurisdiction and adjacent areas, the location and quantity of resources, transportation time for each organization, and the procedures and costs required to acquire or settle resources in advance.

4.2. Establish a dedicated organization and strengthen support for disaster management resources

In local governments, disaster management resources are often handled by a single person in the disaster safety department, who also performs other duties, resulting in overload and decreased professionalism. In particular, expertise in disaster management resources is very important due to the specificity of disasters. Therefore, it is necessary to establish a dedicated organization and expand the workforce to strengthen the professionalism and efficiency of disaster management resources. In addition, since the disaster management department has a strong perception as a shunned department, it is necessary

to strengthen support such as prioritizing the budget and giving extra points in personnel evaluation to boost the morale and motivation of the members of the dedicated organization.

4.3. Encouraging and rewarding private organizations to register disaster management resources

In the event of a large-scale disaster, there is a need to mobilize disaster management resources held by private institutions and organizations, as the resources secured by local governments are not enough to provide sufficient disaster management resources. In order to mobilize disaster management resources from the private sector, it is necessary to register the resources in the joint disaster management resource utilization system. Therefore, measures should be taken to encourage private institutions and organizations to actively participate in the registration of disaster management resources.

4.4. Securing common disaster management resources among neighboring regions through sharing disaster management experiences

The joint utilization of disaster management resources between neighboring local governments can be activated when the disaster management resources required by the local government where the disaster occurred are in a state that can be supported by neighboring local governments. For this purpose, neighboring local governments should share each other's disaster management experiences, problems caused by the lack of disaster management resources in the disaster response process, and the solution process. In addition, in preparation for possible shortages of disaster management resources in the future, local governments should focus on securing highly utilized disaster management resources in common between neighboring regions through consultation and coordination processes..