E.ISSN.2614-6061 DOI: 10.37081/ed.v11i1.4190
P.ISSN.2527-4295 Vol.11 No.1 Edisi Januari 2023, pp.60-66

DISASTER IN SOCIOLOGICAL PERSPECTIVE

Dhanny Septimawan Sutopo
Faculty of Social and Political Sciences Brawijaya University
Email: sutopo_dhanny@ub.ac.id

Informasi Artikel
Riwayat Artikel :
Submit, 4 Agustus 2022
Revisi, 11 September 2022
Diterima, 20 Desember 2022
Publish, 10 Januari 2023

Kata Kunci :
Disaster
Sociological Perspective
Disaster Management

ABSTRAK

Various quite extreme natural disasters have hit various parts of the world this year. Starting from America, China, Indonesia to Greece and Spain. Even Al Jazeraa re-wrote the list of disasters that occurred in a long list in early November, 2021. There has been a change in the orientation of disaster studies in the last decade, if initially discussing more technical issues about disaster triggering events and handling disaster victims, an approach that emphasizes more on human and community approach. In this study, trying to provide an overview of the sociological perspective of disaster management, which discusses the diversity of understanding, responses and patterns of local communities in dealing with disasters as well as understanding, responses and patterns of external actors or organizations in disaster management. Disaster planning and preparedness activities are a continuous learning process, not an end goal. The sociological perspective is not just knowledge, but must be a guide in the preparation of programs of activities, priorities, and strategies for implementing sustainable disaster management.

Corresponding Author:
Dhanny Septimawan Sutopo
Faculty of Social and Political Sciences Brawijaya University
Email: sutopo_dhanny@ub.ac.id

1. PENDAHULUAN

Disaster management is a multidisciplinary approach to analysis from sociology, public administration and various other disciplines. In various events, disasters are related to how the pattern of knowledge of individuals or communities of a threat of disaster and how their pattern in dealing with the threat. Disaster planning and preparedness activities are a process of continuous learning to face a threat, not an end goal[1], [2].

Sociological perspective is not just knowledge, but a process of mutual understanding between related parties in preparing program activities, priorities and strategies for implementing the management of a threat in a sustainable manner. If disaster management strategies are a reference in responses to human behavior or social groups in the face of a disaster threat become more effective, then the strategy needs to be developed and applied into a part of human life or a group that experiences a threat of disaster in everyday life. In recent years, natural and non-natural events that trigger disasters have shown improvements in both characteristics and levels of risk, especially in developing countries [3].

Increased environmental damage due to increased human exploitation of nature is a trigger for an increased risk of disasters. The level of environmental damage is one of the important factors that affect the high risk of disasters in a region, especially in island countries such as Indonesia.

According to the World Risk Report 2018, published by the World Economic Forum (WEF) in Mid-January 2018. Natural disasters and extreme weather are two threats ranked one out of ten threats that may loom over the world for the next ten years. The WEF conducted the 2018 Global Risk Perception survey involving 1,000 experts and policymakers on what risks are most likely to occur and what risks are the most impacted in a 10-year period.

Environmental-related risks are highly likely and have a major impact. Since the last 13 years, this survey has always put environmental disasters at the top of the list. Hurricanes Harvey, Irma, and Maria

left a great trail of destruction. The FAO food organization also said there is a 20 percent chance of famine in the event of drought or flooding that damages corn production in China and the U.S. [4], [5].

Beck in Robertson (2015) formulated a shift in civilization first modernity to second modernity, which resulted in an increase in risk society, namely the shift of industrial society to late modern society. The shift is characterized by people's understanding of disasters, namely disasters caused by human activities that are not taken into account and known the impact of disasters that can trigger a growing crisis[6].

According to Giddens (1990) modernity is a risky culture; On the one hand it reduces the risk of a particular area and need for human life, but at the same time gives rise to a new form of risk that has been largely unknown in the past. The study of disasters in the last decade shows a change in orientation, which initially discusses more technical issues about events that trigger disasters and the handling of disaster victims into approaches that emphasize the human and community approach[7].

This led to the proposal of disaster management in the development of integrated communities [8], [9]. Pande (2007) also stated that disaster management should not be addressed with a physical approach that is momentary, but also done in accordance with the socio-economic life of local communities that are vulnerable and affected by disasters carried out in a sustainable manner[10].

The study of disasters can be done from various disciplines, including geography, anthropology, engineering, health, development studies, and sociology. Geographic approaches (developed by Barrows, 1923 and White, 1945) conducted studies of human ecological adaptation to the environment primarily on the distribution of threat impacts on "spatio-temporal", vulnerability and human adjustment options to natural threats. Anthropological approach (Oliver-Smith, 1979 and 1986; Hansen &Oliver-Smith, 1982) emphasizes the influence of disasters in the socio-economic evolution of a population[11][12].

Anthropologists seek to explain why third-world communities fail to provide for their basic necessities for survival. In addition, they also discussed marginalization syndrome that causes the "impoverishment" of vulnerable groups in third world countries. Oliver-Smith (1996) developed three common themes in anthropological research in disasters: behavioral response, social change, and economic/political environment. Oliver-Smith argues that disasters in developing countries occur in the liaison of society, technology and the environment, as well as the results of interactions between these things[12].

From the technical aspect focused on geophysical disasters, including aspects of geomorphological seismology, volkanology, hydrology, buildings, and other technical aspects, as well as finding technical solutions in dealing with disasters and their impacts[13]. Approach to development studies discussed the issues of distributing aid and relief to third world countries and focusing on refugee management, logistics services, health, and reducing hunger. The medical and epidemiological approach (Beinin, 1985) focuses on the management of mass accidents, including the treatment of physical and psychological trauma as well as other diseases that occur after disasters. The sociological approach (Drabek, 1986) discusses vulnerability and the impact of disasters on patterns of human behavior and their effect on the functioning of the structure of society and organization[14][15].

In the event of a disaster, sociologists will ask "how does the human or group of people respond to a catastrophic event?" The Sociological Study of Disasters was begun by Prince's (1920) about the collision of two ships at Halifax Port on December 6, 1917. It was a key event on the sociological research agenda on disasters. Epistemologically, all disaster events are unique historical events[4]. Comparative analysis can be done to formulate common parts of the behavior patterns of individuals and their social units, ranging from families, organizations, to communities (Kreps 1984; Drabek 1986). Drabek (1996b, 2004) developed materials that focused on the social dimensions of disasters, a number of post-disaster study results, preparedness and mitigation, disaster causes, as well as a number of post-disaster assessments, including studies on disaster preparedness [7][16], [17].

2. RESEARCH METHODOLOGY

The method that the author used in this study, based on the literature study(library research). Library research itself is a series of activities related to the method of collecting library data, reading and recording and processing research materials. It is a study that utilizes library sources to obtain research data. In this study, the authors used critical descriptive research with more emphasis on the power of analysis of existing sources and data by relying on existing theories and concepts to be interpreted based on writings that lead to disaster studies.

3. DISCUSSION

In a sociological perspective, disasters are often understood based on human or societal perceptions, and on what they feel about emotional experiences in events that could threaten their survival. Disaster is one part of the definition that is arranged in a socio-cultural context of the life of people who experience disasters. Therefore, according to Sjoberg (1962), in an effort to collect

data and conduct data analysis in a research activity to get conclusions about what a disaster is, an understanding of people's past life patterns should not be ignored. Neglect of that context will result in the data collected will tend to disappear from the study if the object being tested is too complex for the researcher, so according to Oyane (1992) the results of the research depend on how humans as subjects see the existence or occurrence[18], [19].

According to Sjober, (1962) in Pravitolo (2011) the study of disasters focused on the behavior of individuals and groups in conditions of stress. Oliver-Smith (1999: 163) explains that disaster is a period when people experience mixed emotional turmoil, between anxiety, fear, terror, loss, sadness, gratitude, anger, frustration, freedom, surrender in all its shadows and intentions. Birkland (1996) also confirms the human horror of a disaster[20].

Hazards are as important as disasters to study in the sociology of disasters, because basically every hazard always carries a risk of disaster. Krep (2012) defines disaster as a nonperiodic event in society or a larger subsystem (regional, global, etc.) that causes social disruption and physical damage. Disasters have common characteristics including: (1) The presence or absence of warnings; (2) The intensity of the destructive effects caused; (3) The scope of such destructive effects; and (4) The duration of the destructive effect [21].

The government as an external human or community party that is affected by how disasters are defined and viewed by the community. Dyer and McGoodwin (1994), stated that the government often lacks understanding certain parts of society in understanding disasters so that they are less sensitive and concerned about the needs of individuals and communities in dealing with disasters from a community perspective. This causes some decision-making authorities who determine the impact and respond to disasters tend to ignore the perspective of the community, so that the responses made become inappropriate in answering community problems[22].

Thegovernment does not always have to be responsible for all the consequences of all events that lead to a disaster. According to Subedi (2011), the impact of disasters varies according to social classes. Often people fail to see the issues that existed before the event occurred. Communities must critically recognize the nature of disasters, then act according to social systems when risks are placed in relation to one another, their environment, mutual relationships that can be understood as individual, household, community or community vulnerabilities[23]–[25].

A catastrophic event is characterized by the occurrence of damage to the social and economic patterns of a normal community that existed before. Britton in Easthope (2014) also points out that crises equal disasters and disasters from a sociological perspective are events beyond all social crisis events that cause maximum community damage and dislocation. Stallings (1991) also explained that disasters have functional and dysfunctional consequences[26].

However, who determines when an event is called a disaster? Hoffman (1999) explains that the view from outside the community in seeing disasters is not affected by it[27]. Something may seem normal, or return to normal, post-disaster. Shelton in Yousouf (2020) describes another barrier to defining disaster then into the study of individual behavior in society. There is a tendency for social scientists to be biased and follow the rationality of their views and goals. There are also problems in command and control of human living systems, as Fischer (2001) said that members of the affected community often resist attempts to rule or control them[28], [29].

The media is one of the parties that also participated in the disaster. News not only concerns how events or disasters are described at the time of the event, but also affects how they will be remembered. They can frame events in a show(fashion)then re-emphasize the mistake that ends by bringing up a "scapegoat" for an event.

The media also has a way of influencing everyone's attention to "how bad an event is" through in-person interviews with people directly affected by the disaster. The media then concluded how bad the incident was. Media can also make disasters seem to have an impact on one area only and not on another. Button also sees the media as being able to frame disasters as having a devastating impact on the environment, ignoring their impact on people and the health of those affected by disasters [27].

Sociologists often conduct disaster studies by blending reflective theories and methodological frameworks with other disciplines in their work. The emergency management work written by Drabek and Hoetmer (1991) shows the mixing of concepts, conclusions, and analysis from sociology, public administration, and various other disciplines. Some of the relevan relevan respects of literature in response to disasters are divided into the following stages.

Response stage, the main theme in disaster response analysis is the concept of "emergence", such as, Drabek and McEntire 2002, 2003. Quarantelli (1996) summed up the key concepts of social dynamics. Mendoça and Wallace (2004) combined these concepts with social psychology perspectives such as Weick (1993), based on detailed observations and interviews of disaster victims. They then developed a specific methodology on the required "where, when, and how" types of data, although variations occurred during disaster response[12]

Figure .1 Dynamics of Social Psychology in Disasters

Source: Zunin & Myers in DeWolfe (2000)

The Recovery stage, an assessment of the long-term impact of disasters on individuals and communities involves close relationships between sociology, psychology, economics, and other disciplines. Drabek (2004) presented a number of studies with theoretical frameworks used on psychic suffering due to the pollution of Exxon Valdez oil (Arata, et al., 2000), Hurricane Disaster (Willigen, 2001), earthquakes (Siegel, et al., 1999), bomb explosions in Oklahoma in 1995 (Benight, et al., 2000), and other disasters. While the debate occurred regarding alternative treatment therapies carried out [27].

The obvious events all faced individually are events that are considered bad experiences. Nevertheless, for some people, the loss and fear persists even though some therapies are performed, such as critical event stress therapy may be done to recover (such as Mitchell &Everly, 2000). Economic and demographic changes followed disasters such as typhoons (such as Peacock, et al., 1987). Short-term impacts include social phenomena on marriage patterns (such as Cohan &cole, 2002), changes in transportation patterns (such as Edwards, et al., 2000) and other social phenomena such as increasing injustice in certain ethnicities such as in the Andrew hurricane disaster (Morrow & Peacock, 1997), wasior landslide, and so on. Multidisciplinary cooperation in the future is needed if disaster recovery processes and outcomes are better understood.

Table .1 Social Change due to Disasters

Routine Patterns	Appears During a Disaster
Interaction with the familiar	Interaction with the unknown
Common tasks and procedures	Unknown tasks and procedures
Coordination in groups/organizations	Coordination within and between organizations
Roads, telephones, other facilities available	Roads, telephones and other facilities were damaged or not functioning optimally
Frequency and communication tools are adequate	Frequency and means of communication exceed capacity
Communication, especially in organizations	Sharing infromation between organizations
Use the term communication that has been Known	Communication with people whose terms different
Related to local media	Related to media, local, national, and international
The management structure is sufficient for coordination.	Available resources often exceeds existing management capacity
a number of resources involved	

Source: Heide (1989)

According to Sylves (2004) emergency management aims to develop new theories or adapt theories so that they can produce manageable policies so that everyone can choose to learn from the event. These basic recommendations, like others, are being applied in disaster management agencies at both the regional and national levels and are associated with other government units more often than in previous periods that are more likely to be bureaucratic and rigid. Some studies show the increasing pace of response of institutions facing change due to catastrophic events such as Brian Sharkey (2004). Some of the steps taken include:

Develop a plan based on the input of all relevant parties involved, the people responsible for carrying out the plan, so that they can get involved and participate in owning.

Involve local disaster management agencies in the development of joint plans with affected communities to integrate plans and actions.

Develop planning not as a final product, made actively according to the work environment, and not rigid.

Of course, vulnerability and risk will increase in the rate of exceeding the increase in all existing capacities both in social, demographic, technological, and political factors and so on. However, through the application of sociological study findings in disaster management in communities that experience increased risk will be able to produce better management of the expected situation.

Disaster management shows a mixture of concepts, conclusions, and analysis from sociology, public administration, and various other disciplines.

In all disaster events it is important to understand how the pattern of knowledge of individuals or communities of a threat of disaster and how their pattern in dealing with the threat. Disaster planning and preparedness activities are an ongoing learning process, not an end-ended goal. Sociological perspective is not just knowledge, but should be a guide in preparing program activities, priorities, and strategies for sustainable management implementation.

Disaster management strategies are needed to be a reference in responses to human behavior or groups in dealing with disasters effectively, should be developed and applied into part of human life or daily groups.

Environmental Problems and Risk Society

The efforts of the Frankfurt school to criticize the development of science and technology in the modern era that create natural imbalances, continued by sociologists today.

Madzab Frankfurt refers to a group of scientists working at the Fur Socialforschung Institute (Institute of Social Research) in Frankfurt. Some of the scientists at this institution – Max Horkheimer, Theodore Adorno, Herbert Marcuse and Jurgen Habermas.

Max Horkheimer, who led the institute at the time of its golden age, called the theory produced by scientists at the institution a 'Critical Theory'. (Bertens, 1983:198-200). 'Critical' in Critical Theory has four characters, namely: 1) Historical, meaning that critical theory is developed based on concrete societal situations; 2) Critical theory is also critical of itself by criticizing and evaluating itself; 3) Critical theory has suspicions about the actual problems of society; 4) Critical theory is a 'theory with practical intentions', which is a theory that does not separate itself from praxis. Thus Critical Theory is built to drive transformation in society.

Anthony Giddens questions how technology and science affect human life that have risks of creating and unintended consequences for the environment, health and well-being.

Giddens in his public lecture in Hong Kong on "Risk" (downloaded from http://news.bbc.co.uk) stated that the idea of risk is strongly related to modernity. "Traditional cultures don't have the concept of risk because they don't need one", "Traditional cultures did not have a concept of risk because they didn't need one". The concept of risk arises in a future-oriented society where danger is seen in relation to the possibility of the future. Risk stands in modern capitalism that calculates the gains and losses of the future. It is understood that modern humans today are no longer successful in controlling the future. Giddens therefore advises to continue to monitor technological changes in managing these risks.

In order to explore environmental debates in the perspective of risk society, it must be considered the extent to which available claims are accompanied by accountable evidence. Beck's arguments about risk society are – undoubtedly – strong in the field of institutional criticism, but his thesis on risk society is incomplete without processes and practices that cause environmental imbalances. "Nor is scientific evidence about the extent of environmental risk debated in any detail. To separate the insightful from the short sighted, it is worth comparing the risk society thesis with current scientific and academic knowledge about the environment" (Beck, 2004:40-41)

In a daily perspective, the detrimental impact produced on risks to the environment is constantly increasingly visible. In cities around the world, people use respiratory gauze regularly to combat air pollution, and flooding is becoming routine in many areas. Meanwhile, a series of diseases afflicted agricultural and livestock areas in many countries. All of this shows the consequences of capitalist expansion that was predicted to be disastrous and regarded as exaggerated 40 years ago, now a reality. The detrimental impact of human action on the environment, now accepted by scientific experts and policymakers[27]

The risk society's perspective provides an understanding of the environment in a way: First, Beck's thesis is aimed at one of the most pressing and significant problems of modern times. Increased environmental hazards are difficult questions to answer, with much depending on data and comparisons.

To the extent that scientific technology has allowed us to 'uncover' environmental threats, many dangers have been ongoing for years. By taking a macro view, it is possible that environmental risks have increased, both in terms of their geographic reach, and the scale of potential effects that will occur. Simply put, if the journey of capitalist development is not changed, the longevity of the planet will be limited.

4. CONCLUSION

In the foreseeable future, environmental hazards look riskier; the ozone hole is larger, climate change trends, more land is under threat, infrastructure and industrial development or certified, and the state of the world's oceans is declining. Second, the risk society thesis in accordance with epat extends to the economic sector, political and scientific parties involved in the production and management of environmental risks. On a practical level, the public arguments risk highlighting significant weaknesses in institutional procedures in law, politics and science. It is highly likely that references to Beck's work in highprofile documents have served to correct political attention to the inadequacy of existing environmental regulations.

5. REFERENCE

[1] S. L. Becker and D. E. Reusser, “Disasters as opportunities for social change: Using the multi-level perspective to consider the barriers to disaster-related transitions,” International Journal of Disaster Risk Reduction, vol. 18. Elsevier BV, pp. 75–88, 2016, doi: 10.1016/j.ijdrr.2016.05.005.

[2] K. Van Zyl, “Reducing Disaster Risk through Vulnerability Assessment: An Agricultural Perspective,” Jàmbá: Journal of Disaster Risk Studies, vol. 1, no. 1. AOSIS, 2006, doi: 10.4102/jamba.v1i1.4.

[3] S. Nath, “A Sociological Perspective on ‘Institutional Coordination’ for Disaster Risk Reduction in India,” Disaster Risk Reduction. Springer Singapore, pp. 157–172, 2018, doi: 10.1007/978-981-10-8845-2_10.

[4] E. Lindquist, “Disaster diplomacy and planetary defense: a policy perspective on low probability events.” Copernicus GmbH, 2020, doi: 10.5194/egusphere-egu2020-9958.

[5] K. T and S. S, “Smart Technologies for Emergency Response and Disaster Management,” Emergency and Disaster Management. IGI Global, pp. 939–979, 2019,

doi: 10.4018/978-1-5225-6195-8.ch044.

[6] G. Robertson, "Disaster recognition, declaration procedures and crisis management," Disaster Planning for Libraries. Elsevier, pp. 51–60, 2015, doi: 10.1016/b978-1-84334-730-9.00006-5.

[7] S. A. A. Basri, S. A. S. Zakaria, T. A.Majid, and Z. Yusop, "Exploring awareness and application of disaster risk management cycle (DRMC) from stakeholder's perspective," International Journal of Disaster Resilience in the Built Environment. Emerald, 2021, doi: 10.1108/ijdrbe-09-2020-0105.

[8] I. H. Sawalha, "A contemporary perspective on the disaster management cycle," foresight, vol. 22, no. 4. Emerald, pp. 469–482, 2020, doi: 10.1108/fs-11-2019-0097.

[9] S. K. Rheem, W. J. Choi, C. J. Kwak, and K. H. Oh, "A Cooperative Emergency Response System based on the Disaster Response Activity Plan," Crisis and Emergency Management, vol. 12, no. 4. Crisis and Emergency Management: Theory and Praxis, pp. 1–15, 2016, doi: 10.14251/crisisonomy.2016.12.4.1.

[10] R. K. Pande and R. Pande, "A model Citizen's Charter for disaster management in Uttaranchal (India)," Disaster Prevention and Management: An International Journal, vol. 16, no. 5. Emerald, pp. 755–760, 2007, doi: 10.1108/09653560710837046.

[11] I. Burton, R. W. Kates, and G. F. White, "The human ecology of extreme geophysical events," Nat. Hazard Res., pp. 1–33, 1968, [Online]. Available: http://www.colorado.edu/UCB/Research/IBS/hazards/publications/wp/wp1.pdf:pdf.

[12] R. Pramono, "Perspektif Sosiologis Dalam Penaggulangan Bencana," J. Masy. dan Budaya, vol. 18, no. 1, pp. 81–96, 2016, [Online]. Available: http://jmb.lipi.go.id/index.php/jmb/article/view/342.

[13] M. Nasreen, "Disaster research: exploring sociological approach to disaster in Bangladesh," Bangladesh e-journal Sociol., vol. 1, no. 2, pp. 21–28, 2004.

[14] N. W. Chan, "Impacts of Disasters and Disasters Risk Management in Malaysia: The Case of Floods Impacts of Disasters and Disaster Risk Management in Malaysia: The Case of Floods," ERIA Res. Proj. Rep., no. December, pp. 503–551, 2012.

[15] C. Bradfield, M. Lou Wylie, and L. G. Echterling, "After the Flood: The Response of Ministers to a Natural Disaster," Sociological Analysis, vol. 49, no. 4. Oxford University Press (OUP), p. 397, 1989, doi: 10.2307/3711225.

[16] E. Y. Y. Chan and S. D. Koo, "(A109) Systematic Literature Review on Pediatric Sleep Disturbance Management Post-Disaster: Implications of Post-Disaster Pediatric Clinical Management in Developing Countries," Prehospital and Disaster Medicine, vol. 26. Cambridge University Press (CUP), 2011, doi: 10.1017/s1049023x11001269.

[17] Y. Rahmayati, "Reframing 'building back better' for post-disaster housing design: a community perspective," International Journal of Disaster Resilience in the Built Environment, vol. 7, no. 4. Emerald, pp. 344–360, 2016, doi: 10.1108/ijdrbe-05-2015-0029.

[18] B. Lucini, Disaster Resilience from a Sociological Perspective. Springer International Publishing, 2014.

[19] J. OYANE, "A Perspective of Sociological Disaster Resaerch," The Annual review of sociology, vol. 1992, no. 5. Kantoh Sociological Society, pp. 131–142, 1992, doi: 10.5690/kantoh.1992.131.

[20] D. Provitolo, E. Dubos-Paillard, and J.-P. Müller, "Proceedings of EPNACS 2011 within ECCS'11 Emergent Properties in Natural and Artificial Complex Systems EMERGENT HUMAN BEHAVIOUR DURING A DISASTER: THEMATIC VERSUS COMPLEX SYSTEMS APPROACHES," pp. 1–11, 2011, [Online]. Available: https://agritrop.cirad.fr/561127/1/document_561127.pdf.

[21] G. L. Kreps, "Health communication inquiry and health outcomes," Comun. e Soc., pp. 11–22, 2012, doi: 10.17231/comsoc.23(2012).1351.

[22] C. L. Dyer and J. R. McGoodwin, "'Tell Them We're Hurting,'" The Angry Earth. Routledge, pp. 183–195, 2019, doi: 10.4324/9781315298917-23.

[23] J. Subedi, "Disaster Informatics," Advanced ICTs for Disaster Management and Threat Detection. IGI Global, pp. 80–94, 2011, doi: 10.4018/978-1-61520-987-3.ch006.

[24] S. Islam, C. Chu, L. Liew, and J. C. R. Smart, "Distributing flood shelters for disaster risk reduction," Disaster Prevention and Management: An International Journal, vol. 29, no. 3. Emerald, pp. 322–339, 2019, doi: 10.1108/dpm-02-2019-0060.

[25] J. Klaaren, "Xenophobia-Induced Disaster Displacement in Gauteng, South Africa: A Climate Change Litigation Perspective." Center for Open Science, 2021, doi: 10.31219/osf.io/e5zju.

[26] L. Easthope and M. Mort, "Technologies of Recovery: Plans, Practices and Entangled Politics in Disaster," The Sociological Review, vol. 62, no. 1. SAGE Publications,

pp. 135–158, 2014, doi: 10.1111/1467-954x.12127.

[27] P. McGowran and A. Donovan, "Assemblage theory and disaster risk management," Prog. Hum. Geogr., 2021, doi: 10.1177/03091325211003328.

[28] Y. S. AlHinai, "Disaster management digitally transformed: Exploring the impact and key determinants from the UK national disaster management experience," International Journal of Disaster Risk Reduction, vol. 51. Elsevier BV, p. 101851, 2020, doi: 10.1016/j.ijdrr.2020.101851.

[29] S. T. Taba, M. Mojtahedi, and S. Newton, "Disaster risk management approaches in construction and built environment," International Journal of Disaster Resilience in the Built Environment, vol. 11, no. 1. Emerald, pp. 85–99, 2019, doi: 10.1108/ijdrbe-06-2019-0032.