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Derleme Makalesi

A COMPREHENSIVE REVIEW OF DISASTER MANAGEMENT MODELS AND APPROACHES BASED ON AMERICAN STUDIES

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Abstract[1] *1*

This study aimed to comprehensively evaluate the research that has significantly impacted the advancement of disaster management models and approaches since the early 20th century. This review article focuses on scholarly papers indexed in Web of Science and Scopus, which present disaster management models. The selection criteria for these articles were based on their circular models or visual representations of disaster and crisis management from a diverse range of perspectives since 1920. Various disciplines, including public administration, sociology, geography, psychology, and civil defence, have shaped disaster management. Before the 1970s, pioneers in the field, including Prince (1920), Carr (1932), Powell (1954), Chapman (1962), and Stoddard (1968), analysed the impact of disasters on society, and their studies were a significant contribution to the development of disaster management. The circular disaster management model was first introduced by Baird et al. in 1975, focusing on relief-based initiatives. In 1987, Mitroff and fellow researchers delved deeper into the subject, exploring reactive and proactive approaches while integrating the notion of vulnerability. Later models incorporated entitlements such as development, economic progress, risk, hazard, and strategic planning. As time passed, these models grew more extensive and all-encompassing. Nevertheless, disaster management still requires further advancement to tackle crucial challenges like climate change, sustainable development goals, resilience, and the Sendai risk reduction framework. It is recommended that these issues be addressed under the leadership of public administration.

Keywords: *Disaster, Disaster Management, Disaster Management Models, Disaster Research.*

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AMERİKAN ÇALIŞMALARINA DAYALI AFET YÖNETİM MODELLERİ VE YAKLAŞIMLARININ KAPSAMLI BİR İNCELEMESİ

Öz

Bu çalışmanın amacı 20. yüzyılın başlarından itibaren ortaya konulan afet yönetim modellerinin ve yaklaşımlarının kapsamlı bir şekilde değerlendirmesini yapmaktır. Makalede, Web of Science ve Scopus'ta indekslenen ve döngüsel veya entegre afet yönetim modeli öneren bilimsel çalışmalar ele alınmıştır. Yapılan taramalarda "afet yönetim modeli" anahtar kelimesi ile 1920 yılından itibaren çeşitli modeller ve yaklaşımlar öneren çalışmalar seçilmiş ve bu çalışmalar kapsamlı olarak değerlendirilmiştir. Kamu yönetimi, sosyoloji, coğrafya, psikoloji ve sivil savunma gibi çeşitli disiplinler, afet yönetim modellerinin gelişiminde önemli rol oynamıştır. 1970'lerden önce Prince (1920), Carr (1932), Powell (1954), Chapman (1962) ve Stoddard (1968) gibi alanın öncüleri afetlerin toplum üzerindeki etkisini analiz etmiş ve afet yönetiminin gelişimine önemli katkılar sunmuşlardır. Döngüsel veya entegre afet yönetimi modelinin ilk olarak Baird ve arkadaşları tarafından 1975 yılında önerildiği görülmektedir. Sonrasında Mitroff ve arkadaşları 1987'de bu konuyu genişleterek reaktif ve proaktif yaklaşımları inceleyip kırılganlık kavramını sürece dâhil etmişlerdir. Takip eden çalışmalarda afet yönetim modelleri kalkınma, ekonomik ilerleme, risk, tehlike ve stratejik planlama gibi başlıkları içererek daha yoğun ve kapsayıcı hale gelmiştir. Ancak afet yönetim modelleri içerisinde, iklim değişikliği, sürdürülebilir kalkınma hedefleri, dirençlilik ve Sendai risk azaltma çerçevesi gibi kritik konuların daha fazla yer alması ihtiyacı her geçen gün artmaktadır. Özellikle Kamu Yönetimi öncülüğünde bu konuların ele alınması önerilmektedir.

***Anahtar Kelimeler**: Afet, Afet Yönetimi, Afet Yönetim Modelleri, Afet Araştırmaları.*

INTRODUCTION

Recently, societies and countries have been impacted by numerous events that have had a negative effect. While environmental factors may be responsible for some of these occurrences, human behaviours also play a significant role. Of all these events, disasters are the most devastating and can occur at the national or international level. When disasters strike, people are often left with limited resources to cope. This underscores the need for preparation before such events occur. Being ready for disasters requires a systematic and well-planned approach that involves a series of actions. The key to ensuring this continuity lies in implementing sustainable disaster management strategies.

Effective disaster management involves the collaboration of various disciplines to solve complex and uncertain problems. Coordination between different institutions and organizations is crucial in dealing with these challenges. According to the United Nations, disaster management involves the precise organization, planning, and implementation of disaster preparedness, response, and recovery measures (United Nations, 2016, p. 14). Interdisciplinary study involves identifying high-risk areas, controlling natural, technological, social, human, and political

conditions, and developing rational plans, policies, and methods. From planning to management and control, public administration plays a crucial role. Its functions include training decision-makers and practitioners, guiding every detail, raising awareness, and establishing it as a culture (Karaman, 2017, p. 3).

Throughout the 20th century, disaster management has evolved through the influence of various scientific disciplines. Some focus on the impact of disasters on individuals and society, while others concentrate on losses and administrative procedures. Different viewpoints and expertise make it possible to approach disaster management from various angles, resulting in a multidisciplinary approach. However, in the 1970s, the need for response that encompass standard approaches to all hazards became apparent. The emergence of integrated disaster management was driven by catastrophic events that caused significant losses, particularly in the United States. This approach considers all hazards and prioritizes management and coordination against them (FEMA, 2017, pp. 3–4).

Upon examining the development of disaster management, it becomes clear that variances exist in events and approaches. These variances encompass the input of various scientific disciplines and studies into disaster management. The extensive study of disaster management by different scientific fields further reinforces a culture of multidisciplinary collaboration. This article endeavours to provide a comprehensive evaluation of the academic and scientific contributions to disaster management since the early 20th century. In conducting this assessment, it will explore researchers who have tackled various disaster management phases and models.

EARLY YEARS OF DISASTER MANAGEMENT

Disaster management has been the subject of academic and scientific study since the 20th century. In particular, research in the 1920s and 1970s aimed to define the events, analyses their effects on individuals and communities, and gain a deeper understanding of the problem. In 1920, Prince conducted a doctoral study on the impact of the explosion in the port of Halifax, Canada, on December 6, 1917. This explosion resulted in the loss of numerous lives and injuries to over 9,000 people (Janis, 1951; Scanlon, 1988, p. 213). Prince's thesis was the first academic study on this disaster to be systematically prepared and brought to the literature (Scanlon, 1988, p. 214). The study provides a ground-breaking analysis of the principles of disaster aid, identifying three distinct stages: emergency, transition-transfer, and rehabilitation. During the emergency phase, affected communities experience chaos and disruption. The transition and transfer stage involves deploying organized and skilled rescue and aid teams. In the rehabilitation phase, temporary aid efforts are extended to address social and economic losses and long-term strategies are developed to support a return to normalcy. The author presents a detailed breakdown of these three stages, including 11 sub-stages (Prince, 1920, pp. 85–86). By

observing events on the ground and sequencing interventions accordingly, this study shed light on the complex processes involved in disaster management. Notably, the study highlighted the role of the American Red Cross in disaster response and offered a valuable framework for future disaster relief efforts.

In 1932, Carr conducted a study on the impact and mechanisms of disasters on society. The study highlighted that disaster phases are defined and handled systematically (Singleton, 2016, pp. 13–15). Carr emphasized that the size of disasters varies based on occurrence rate, affected area size, complexity, and severity and categorized disasters into four types. Additionally, Carr identified three primary stages of a disaster: the preliminary or prodromal stage, characterized by the onset of conditions that eventually lead to the disaster. The aftermath of a disaster can lead to dislocation or disorganization, resulting in loss of life, injuries, and property damage. How society responds to a disaster depends on its culture, values, leadership, severity, and complexity (Carr, 1932, pp. 213–214). Moving forward, the recovery or reorganization stage is critical. The study emphasized that events themselves are not disasters but rather the consequences of those events. For example, a storm is not a disaster if ships can sail the seas. This study also underscores the importance of preparedness as the first step in disaster management (Neal, 1997, p. 240). This academic work is vital for categorizing disasters and is the first to showcase the different phases of disaster occurrence systematically. Furthermore, it presents a comprehensive strategy for managing disasters before, during, and after the event. However, the study could have been more explicit in its language to enhance its effectiveness.

During the 1950s, there was a significant emergence of necessary resources related to disaster management. This period saw an increased focus on time and process-oriented approaches, which aimed to clarify how disasters occur and the steps required to respond to them. In 1954, Powell conducted a study in which he classified disaster phases into eight categories. These included pre-disaster conditions, warning, threat, impact, inventory, rescue, remedy, and recovery (Powell, 1954). Powell's work was instrumental in defining and systematizing disaster phases and has served as a critical resource for identical research. The disaster phases outlined in his research were expected to continue to serve as examples for the development of new disaster management systems in the years to come. To conduct effective disaster research, it is imperative to adopt a multidisciplinary approach. Considering various aspects such as theory, data source, method, and application is of utmost importance. These factors play a critical role in ensuring successful disaster research outcomes (Williams, 1954). Since the 1950s, sociologists have been the primary researchers in the field of disasters. During this period, researchers delved into comprehending the characteristics of disasters and their detrimental effects on communities. Notable sociologists who conducted research on disasters in the 1950s and 1960s included Charles Fritz, Eli Marks, Robert Endelman, Otto Larsen, Roy Clifford, Hiram Friedsam, Fred Crawford, Fred

Bates, Harry Moore, Arthur Prell, Albert Foley, Irving Deutscher, Meda White, and Ellwyn Stoddard, among other distinguished scholars (Quarantelli, 1994).

During the 1960s, there was a push for standardization in disaster management, with various definitions and approaches being developed. In a 1962 study, Chapman looked at previously defined disaster stages, offering new perspectives. He classified disaster phases into six distinct categories: warning, threat, impact, inventory, rescue, and remedy (Chapman, 1962). His research highlights the importance of pre-disaster training to manage deaths, injuries, and losses by preparing individuals for protection and rescue functions (Coetzee & Van Niekerk, 2012). Furthermore, the study detailed the various situations during the disaster response and recovery phases. Stoddard's 1968 study is a crucial contribution to disaster management. The ideas outlined in the study offer valuable perspectives on the ongoing disaster management processes. The study identifies three critical stages of disaster: pre-emergency, emergency, and post-emergency, each comprising various sub-phases or activities (Stoddard, 1968).

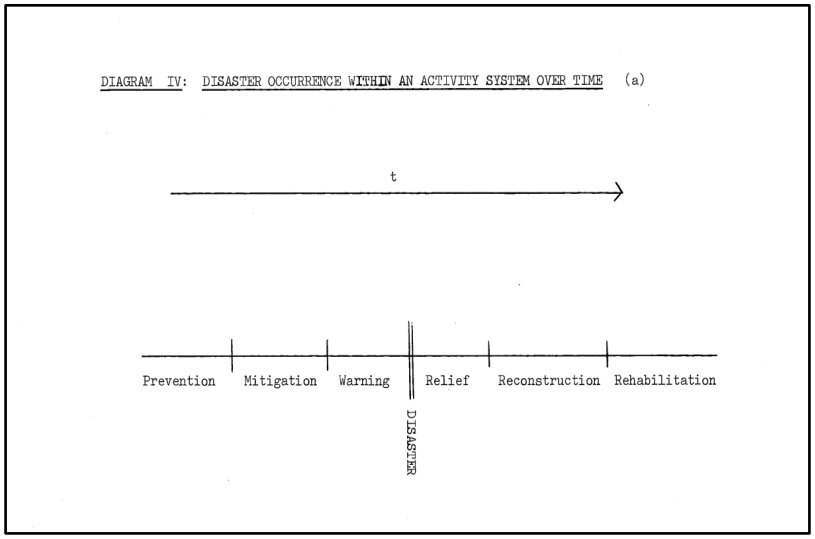
THE EMERGENCE OF MODELS

Disaster management research has laid a solid philosophical groundwork for contemporary studies since the 1970s. Rather than emphasizing definitions and concepts, these approaches - such as the nonlinear approach - meticulously scrutinize the process and stages, offering a comprehensive perspective. These approaches are a crucial framework for building a sophisticated disaster management system. In his 1970 reflection, Barton portrayed disasters as unexpected and uncontrollable and outlined five phases: pre-disaster, detection and communication, emergency (unorganized) response, organized social intervention, and post-disaster equilibrium (Barton, 1970). Barton's analysis regarded diverse variables, such as people, social crowds, authorized organizations, and provincial and nationwide systems. The study assumed that social and organizational disorders can occur during disasters. The initial disaster response usually happens without organization and coordination, followed by professional editors. The study highlighted the importance of preparedness among local people and groups, forming local teams to respond to disasters.

The year 1975 marked a significant turning point in disaster management. It was during this time that pioneering studies were conducted on integrated disaster management, which laid the foundation for a process-oriented approach. Mileti, Drabek, and Hass explored human and sociable behaviour during catastrophes and emergencies and recognised six distinct disaster phases: preparedness, alarm, pre-impact, earlier efforts, post-impact, and short-term activities, as well as relief, rehabilitation, and reconstruction (Mileti et al., 1975). These phases have become the basis for all disaster research and are considered a common practice for all catastrophes and crises. This study also outlines practices accepted since the 1920s.

In the same year, other studies explored subjects pertaining to disaster information, impacts, and regional events, along with potential measures to alleviate disasters. Nonetheless, the research conducted by Baird et al. stood out as the inaugural investigation to explore disaster planning and disaster management as a cohesive strategy within the disaster management literature (Baird et al., 1975, p. 41). This study suggested a systematic approach to pre-disaster planning, emphasizing the importance of inter-institutional information flow and joint preparation with development plans. Overall, these findings demonstrate the development of disaster management as a discipline and its inclusion in management and administrative science.

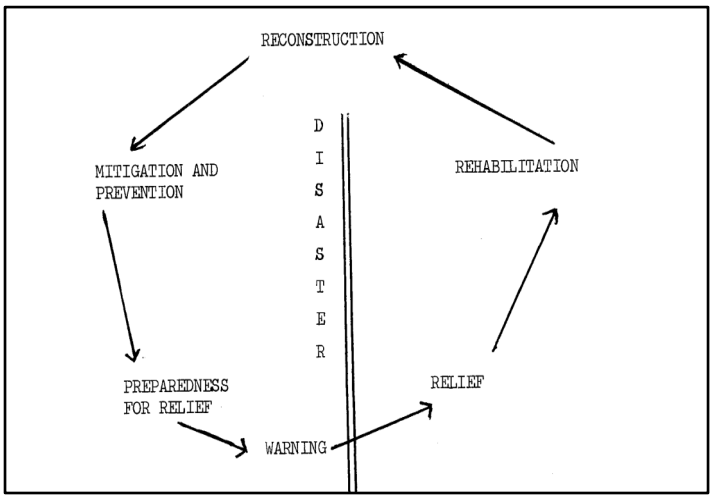
Figure 1: Disaster Occurrence within an Activity System over Time (a)



Source: (Baird et al., 1975, p. 41)

Figure 1 provides a comprehensive analysis of the evolution and trajectory of disasters. By examining the distinct phases of disaster formation, we gain valuable insights. The study has identified six critical stages of disaster occurrence, including prevention, mitigation, warning, relief, reconstruction, and rehabilitation.

Figure 2: Disaster Occurrence within an Activity System over Time (b)



Source: (Baird et al., 1975, p. 42)

According to Figure 2, disasters were described in linear and circular temporal patterns. The circular model outlined the phases of a disaster, including mitigation and prevention, preparedness for relief, warning, relief, rehabilitation, and reconstruction. Understanding the temporal occurrence stages of disasters is crucial for effective disaster management. This is the first study laid the philosophical groundwork for the integrated disaster management model, widely adopted and used worldwide in the 21st century.

The 1970s saw a surge in studies focused on disaster management. In 1976, Turner researched the institutional and inter-institutional processes underlying disaster occurrence. His study outlined six phases that illustrate the development of disasters, including the incubation period, onset, rescue and salvage, and complete cultural readjustment (Turner, 1976). The research emphasized that institutions require crucial intelligence information when managing disasters, emphasizing the importance of transparent, timely, reliable, valid, sufficient, and diverse information. Turner also highlighted the significance of understanding societal beliefs and cultural behaviours surrounding disasters. This study made a significant contribution to the field of disaster management, particularly in the realm of disaster information management.

HOLISTIC (INTEGRATED) APPROACHES

National Association of Governors (NAG) reported exploring various perspectives on organizing and coordinating disaster and emergency responses in the United States. This report contained historical significance for disaster management. NAG presented their findings to the President, outlining the issues and coordination

challenges in catastrophes and crises. As a result of this report, the Federal Emergency Management Agency (FEMA) was founded. FEMA aimed to streamline catastrophe and crisis operations with the endorsement of the US President. Upon its establishment, FEMA introduced a comprehensive approach to disaster management, which involved tackling mitigation, preparedness, response, and recovery efforts. This encompassing approach necessitated swift decision-making, operational readiness, analytical and evaluative skills, and policy formulation before, during, and after emergencies (National Governors' Association, 1979). During the 1980s, disaster management studies were primarily based on the four-phase model. One notable example was a study by Dynes et al. in 1981, which offered a perspective on disaster plans. The study identified timing and disaster stages (Dynes et al., 1981). Also, it broadly discussed preparation, response, and recovery strategies but did not consider the mitigation phase as separate phase but instead an activity carried out within recovery.

Comfort's initial study delved into integrated organizational interventions in emergency management and underscored the significance of effective information management. This study emphasized the need for access to precise information at all stages of disaster management, from mitigation to recovery, across all levels of governance. This marked a seminal moment in exploring disaster and emergency management from a public administration standpoint, paving the way for subsequent research in this field. It also identified using untimely or incorrect information as a significant challenge in effective emergency response processes (Comfort, 1985). A study conducted by Petak in 1985 delved into disaster management within the realm of public administration. The study explored the difficulties that arise when emergency management falls under the purview of public administration. It examined various phases of disaster management, including mitigation, preparedness, response, and recovery. Petak defined recovery within the context of the study. Throughout the study, he discussed essential notions including protection, risk reduction, resource management, response plans, and coordination, all from a public administration perspective (Petak, 1985).

In 1985, McLoughlin studied disaster management from a public administration perspective. The study developed an approach to integrated emergency management that focuses on a standard set of functions required for most emergencies. This approach emphasized that the integrated emergency management system should be standardized based on these functions. While this approach's disaster stages are similar to those of other studies, this study highlights the importance of implementing standardized procedures for crisis institutions (McLoughlin, 1985). According to this study, disaster and emergency response stages can be standardized based on observations. After the establishment of FEMA, standardization studies in disaster and emergency management became necessary due to the critical responsibilities of public administrators in the process. Furthermore, the study highlighted the importance of approaching disaster and

emergency processes in public administration with a holistic perspective. As a result of these studies, the topics covered in disaster management have been shaped into standardized processes.

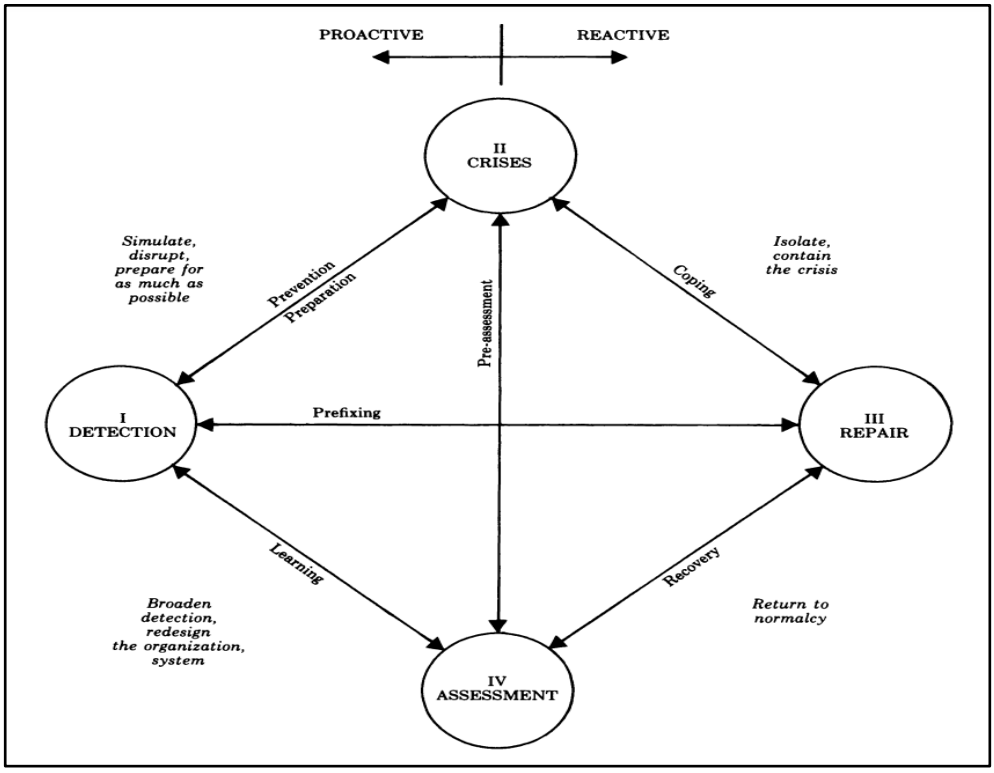
Back in 1986, a comprehensive study was conducted to assess the efficacy of disaster response measures from the standpoint of human and social systems. The study scrutinized various aspects of disaster management, ranging from preparedness, planning, and early warning to response, pre-impact deployment, post-impact emergency response, recovery, restoration (spanning up to 6 months), reconstruction (post-six months), mitigation, and hazard perception (Drabek, 1986). This comprehensive study offered valuable insights into disaster management from a sociological perspective. Additionally, the study highlighted the importance of including planning within the preparation phase of disaster response.

Disaster Research Centre, founded in 1963 at Ohio State University and later relocated to the University of Delaware in 1985, has played a significant role in advancing scientific and academic research on disasters. Sociologists primarily staff the centre with a focus on the social dimensions of disasters. The centre has five general goals, including synthesizing existing research on organizational behaviour under stress, examining pre-crisis organizational structures and procedures, establishing a field research team, creating an agenda for corporate behaviour under pressure, and publishing scientific papers based on determined goals (Quarantelli, 1986). In coordination with a concurrent project, the centre conducted field experiments and laboratory simulation studies to achieve its aims. The research centre in question has made significant strides towards improving disaster management thanks to the efforts of its scientific researchers and field investigators. The accomplished sociologists who founded and took part in the centre have established a solid basis for disaster research thanks to their authorship of numerous reports and scholarly publications at the conceptual and theoretical levels.

Disaster management studies have incorporated concepts such as uncertainty and emergency plans since the 1980s. In 1987, According to McConkey's research, planning for uncertain situations is essential and should be prioritized in emergency plans for disaster management. This study was one of the first to highlight the importance of accounting for indecisiveness, risks, perils and potential possibilities in emergency planning. Contingency planning is crucial for administrative gaps, damage to production areas, lack of necessary resources, kidnapping of senior managers, disorder of computer infrastructures, confiscation of personal belongings, natural disasters, and terrorist attacks (McConkey, 1987). The importance of emergency plans in disaster management has become increasingly apparent with this study. It also suggested that these plans follow specific standard procedures, such as determining probabilities, creating assumptions to support probability estimations, preparing action plans, establishing a follow-up and observation method, creating a resource base, and drafting financial reports.

During the 1990s, disaster management studies began to integrate crisis management issues. As crisis management is a crucial component of the overall disaster management system, the insights gained from these studies have been significant. Mitroff et al. conducted a study in 1987 that examined effective crisis management. In Figure 3, they identified four phases of managing crisis: detection, crisis, repair, and assessment, which are viewed as interrelated rather than sequential. The study also found that institutions' reactive behaviour during times of crisis can be attributed to their denial or acceptance of their vulnerability. However, when institutions acknowledge their vulnerability, they prioritize preparation and prevention activities, exhibiting proactive behaviour.

Figure 3: Model of Crisis Management



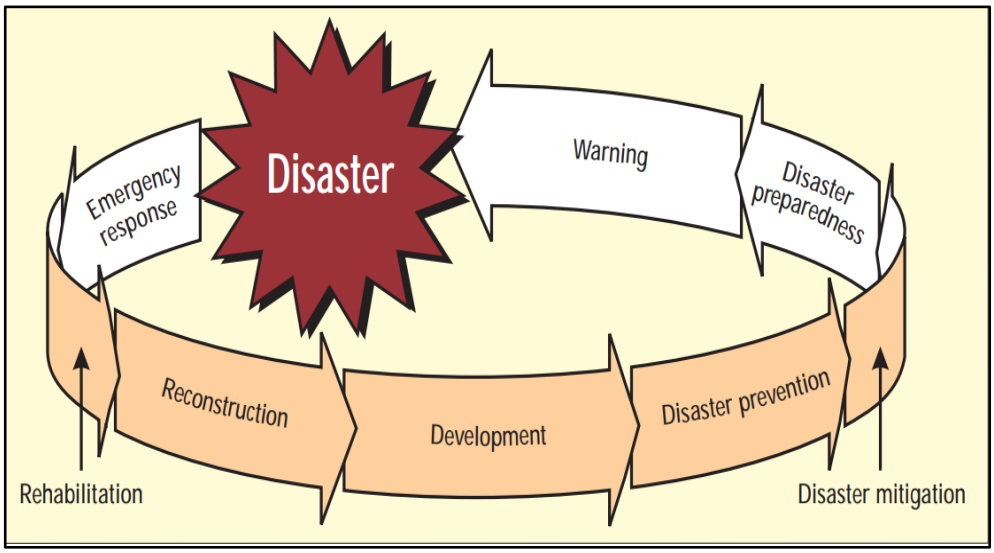
Source: (Mitroff et al., 1987, p. 284)

Following the publication of this study, disaster management researchers began incorporating reactive and proactive concepts into their systems. Furthermore, the study highlights that institutions acknowledging their vulnerability prioritize prevention and preparation measures and act proactively, while those denying their vulnerability tend to react after the fact.

Prior to 1987, research primarily focused on the social and societal impacts of disasters. Social researchers aimed to understand how individuals and communities are affected by events and what measures can be taken to prepare for it. Among disaster researchers, sociologists conducted the most extensive research and produced numerous written materials. Their studies cantered around various factors such as identifying what scares or disturbs people during a disaster, exploring techniques to reduce or control fear, determining which individuals are prone to panic and who can be trusted to lead in an emergency, and examining aggressive behaviours and anger that may arise among disaster victims (Quarantelli, 1987).

Since the United Nations declared the International Decade of Disaster Reduction (IDNDR) in 1990, efforts have been made to implement long-term plans and projects in disaster management. The decade's goal was to reduce losses caused by nature-triggered disasters such as quakes, forest fires, locust invasions, drought, and desertification through international collaboration, especially in developing countries. During this period, disaster research emphasized the importance of preparation over response. Lechat's study revealed that prevention and preparation should be prioritized in disaster management without diminishing the significance of response and recovery (Lechat, 1990). Preventative measures in disaster management involve various activities, including developing disaster scenarios, understanding risks, implementing government policies, setting up warning systems, training emergency teams and the public, and taking proactive measures such as environmental management and structural engineering. The preparatory phase includes operating detection and warning systems, issuing instructions to minimize the negative impact on individuals, and informing communities at risk before, during, and after a disaster (Lechat, 1990). This study revolutionized the field of disaster management by emphasizing prevention and preparation over response and recovery. Going forward, risk management will take precedence over crisis management in disaster management strategies. As disaster management has become more comprehensive and integrated, research has begun to visualize and shape the disaster process in various ways. Kelly proposed a model in 1998 for complex events that develop irregularly. Disaster management approaches developed so far are considered linear and nonlinear/complex. The development processes of disasters are built on phases, events, interventions, and elapsed time (Kelly, 1998, p. 26).

Figure 4: Circular Model of Disaster



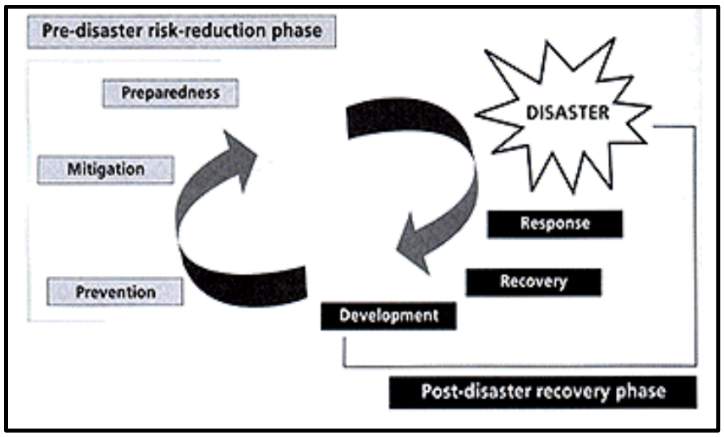
Source: (Kelly, 1998, p. 26)

According to Figure 4, disaster management was closely linked to development and economic progress. The various phases of disaster management were found to be cyclical, highlighting the importance of developing and implementing cohesive policies for recovery efforts following a catastrophic event. This study also offered a simplified model for managing disasters based on real-world experiences, reducing the complexity of these challenging situations.

In recent years, disaster management has evolved to include various principles and procedures. These principles encompass all aspects of disaster management and were outlined by DPLG in its study. According to these principles, the primary objective of disaster management should be to reduce vulnerability through development policies, not just to provide aid. Additionally, disaster management should prioritize the most at-risk and vulnerable populations, foster a culture of prevention and protection, integrate with development policies, and involve society in the processes. Finally, disaster aid must be fair, transparent, and inclusive, without discrimination based on differences (DPLG, 1998, p. 19). In order for disaster management to be effective, it must have a solid foundation that is supported by local structures and legal frameworks. Moreover, it should be flexible, practical, feasible, and sustainable to address the unique challenges of each disaster. Disaster management should also be tailored to meet specific needs and priorities and should be approached from an interdisciplinary and integrated perspective, as noted by DPLG in 1998. These principles have led to extensive interdisciplinary studies in development policies, vulnerability, risk reduction, and disaster protection culture. Further research has also highlighted the importance of management science

concepts, including transparency, inclusiveness, flexibility, locality, and sustainability, in disaster management (DPLG, 1998, p. 19).

Figure 5: Traditional Model - Sequences of Action



Source: (DPLG, 1998, p. 19)

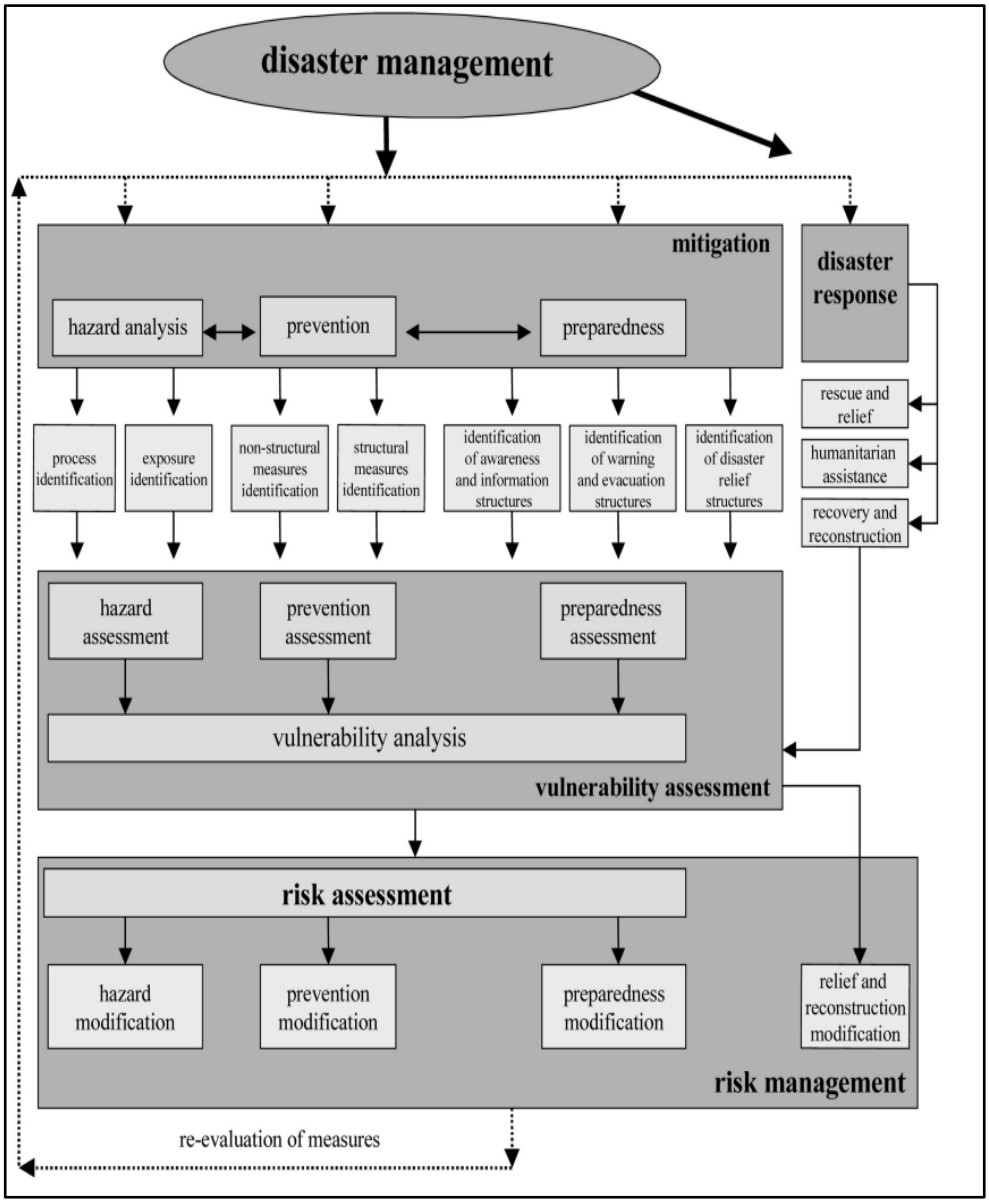
Based on the model depicted in the Figure 5, disaster management comprises a series of phases that are continuously ongoing. Moreover, the process of disaster management encompasses development as well. In subsequent research, such figures and visuals are frequently employed to elucidate the intricacies of disaster management.

Within the administrative discipline, many studies delved into disaster management, addressing key components such as the roles and responsibilities of disaster managers, planning procedures, and operational protocols. A few experts even stressed the crucial role that management plays in disaster situations, highlighting the need for training and experience in this area (Cuny, 1998a). Disaster management can be divided into two distinct categories: routine and non-routine processes. Routine tasks are carried out during non-crisis periods, while non-routine tasks are implemented during actual crisis scenarios. Advanced planning activities fall under the preparation phase and can be further classified into three groups: strategic planning, contingency planning, and planning. The role of a disaster manager involves overseeing the operations, human resources, and organization involved in managing a disaster. To do so effectively, careful attention must be given to a range of essential tasks, including planning, resource management, monitoring, evaluation, decision-making, information management, problem-solving, control, coordination, communication, and institutional development (Cuny, 1998b).

One notable study conducted by Weichselgartner in 2001 focused on the topics of mitigation, vulnerability, and disaster risk management. The study presented a comprehensive disaster management model for individual and social vulnerabilities. This model breaks down disaster management into two phases:

mitigation and response. The mitigation phase includes prevention, preparedness, and hazard analysis efforts, while the response phase encompasses rescue, humanitarian assistance, recovery, and reconstruction processes. Moreover, the model factors in risk assessment, vulnerability assessment, and hazard assessment form a holistic disaster management framework (Weichselgartner, 2001, p. 93).

Figure 6: Disaster Management Process

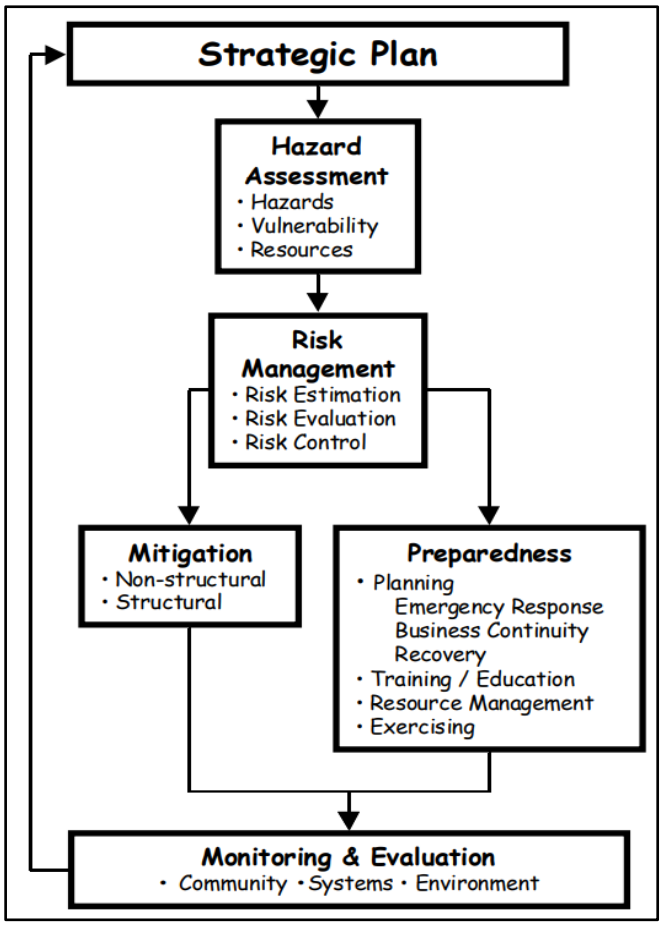


Source: (Weichselgartner, 2001, p. 93)

Figure 6 follows the four standardized steps of managing disasters and considers risk, danger, and vulnerability processes. Furthermore, it suggests that future studies on integrated disaster management will encompass more intricate processes.

Disaster management saw ongoing advancements in 2002, with a focus on strategic planning. Manitoba conducted a study that year which outlined a disaster management model specifically tailored for the health sector. It emphasized the importance of comprehending hazard, vulnerability, and disaster management. The integrated disaster management model highlighted hazard assessment, risk management, mitigation, and preparedness as crucial factors, necessitating a strategic approach (Manitoba, 2002, p. 94).

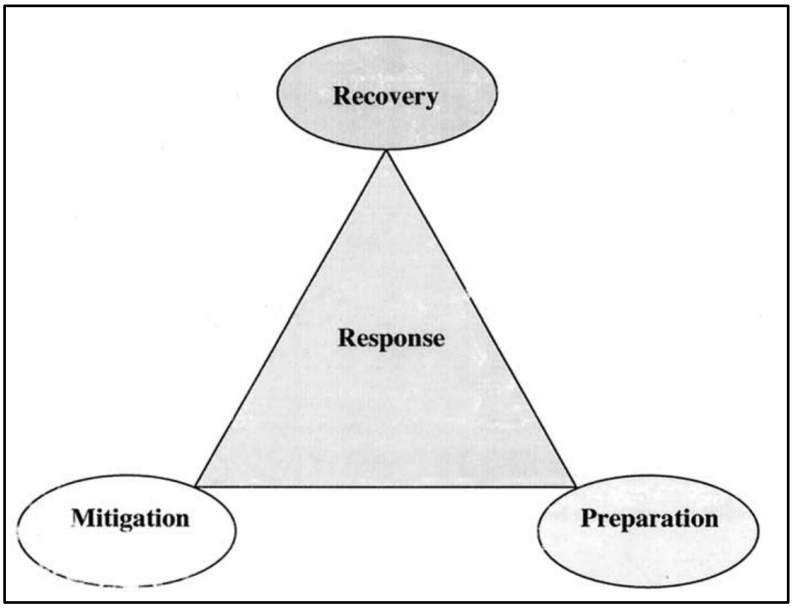
Figure 7: Integrated Disaster Management Model



Source: (Manitoba, 2002, p. 34)

The disaster management model outlined in this study begins with strategic planning, followed by hazard assessment, risk management, mitigation, and preparation, each with their relevant subheadings. After monitoring and evaluation, the model's emphasis on strategic planning has contributed to disaster management.

Figure 8: The Four Phases of Emergency Management



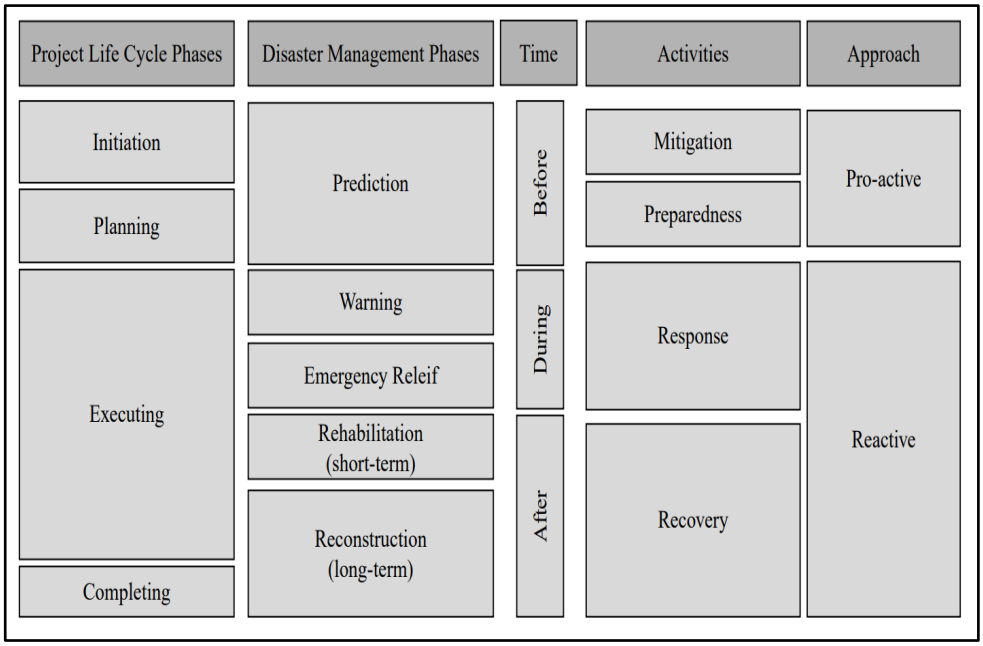
Source: (Cyganik, 2003, p. 83)

Cyganik analysed disaster preparedness plans at a Virginia hospital, emphasizing the need for preparation and decontamination units, particularly in the event of chemical attacks that could impact hospitals (Cyganik, 2003, p. 83). The study identified four essential steps of disaster planning: mitigation, preparedness, response, and recovery. One of the key findings of this study was that effective disaster management, especially in the context of hospitals, hinges on the response phase. The study also highlighted that the success of this phase is heavily dependent on the preceding preparation and mitigation phases. This model offered a unique perspective on the various disaster phases, which can be incredibly valuable to researchers. Furthermore, it provided vital information that large institutions, like hospitals, can use to prepare for major social events and disasters.

In 2006, a comprehensive disaster management model distinguished between proactive and reactive phases and highlighted their importance. The proactive approach involves planning and executing activities to minimize adverse effects before a disaster occurs. The reactive approach, on the other hand, focuses on response and recovery efforts after a disaster strikes. The integrated approach incorporates proactive and reactive strategies, with the proactive approach requiring

the identification of risks through mitigation, preparedness, and early warning. Risk assessment is critical for these activities based on the identified risks. The reactive approach involves assessing the level of impact and its effects, with warning, emergency relief, rehabilitation, and reconstruction phases depending on the response and recovery activities (Moe & Pathranarakul, 2006, p. 401).

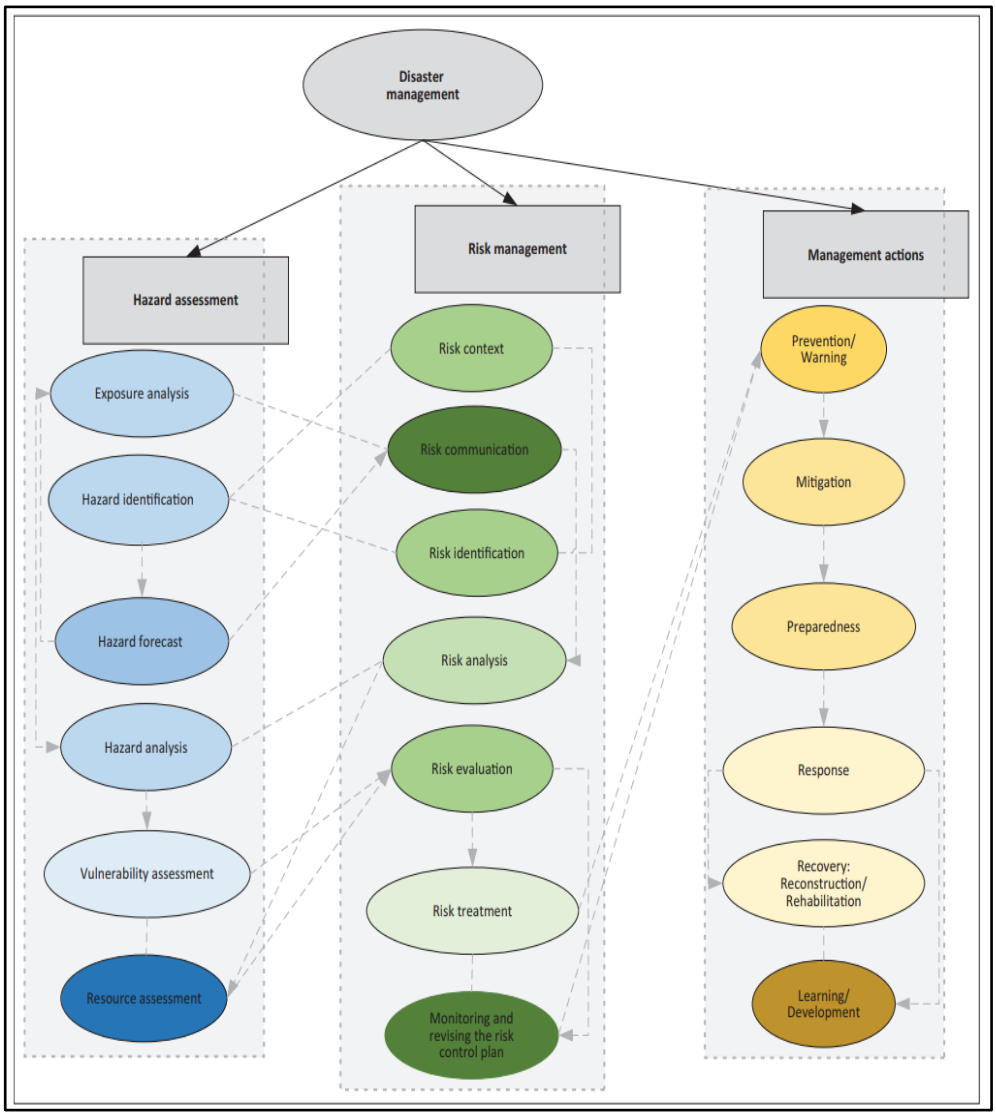
Figure 9: A Comparison of Project Life Cycle Oath Disaster Management



Source: (Moe & Pathranarakul, 2006, p. 401)

The figure's model outlines cyclical stages, disaster management stages, timing, activities, and approaches. The cyclical stages include initiation, planning, executing, and completion, while disaster management stages encompass prediction, warning, emergency relief, rehabilitation, and reconstruction processes. Timing is classified as before, during, and after, with activities in mitigation, preparedness, response, and recovery. Proactive and reactive approaches were identified, and the model integrated disaster management studies into a structured set of functions rather than a circular process.

Figure 10: Disaster Management

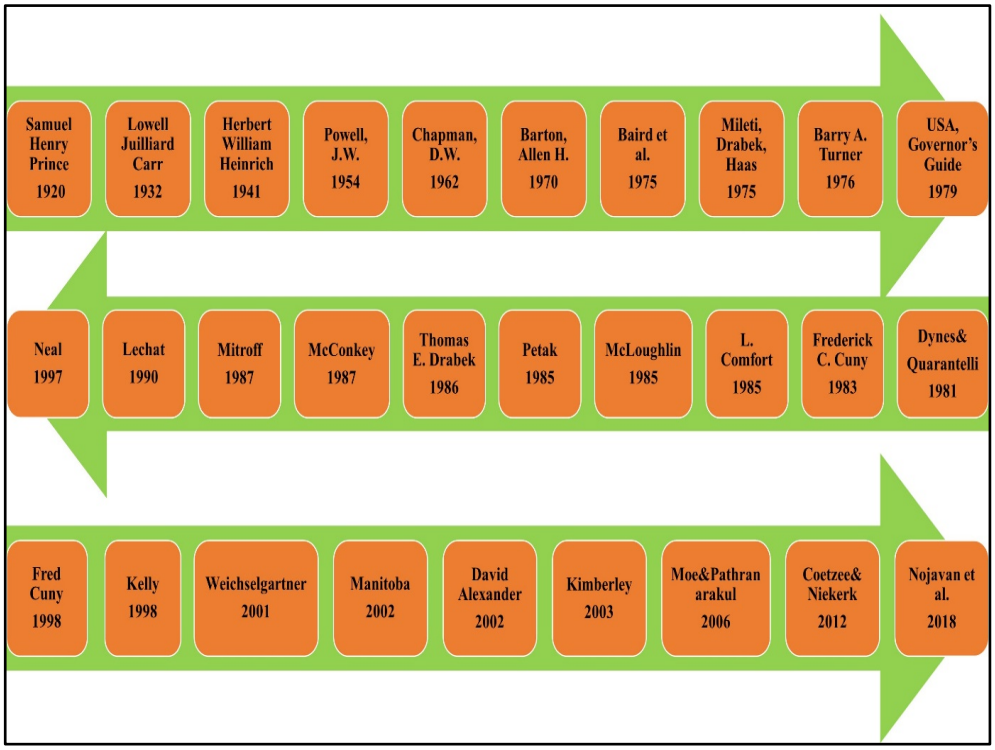


Source: (Nojavan et al., 2018, p. 7)

Figure 10 explored disaster management through three main categories: hazard assessment, risk management, and management actions. Each category is further broken down into subcategories, which are discussed in depth. Hazard estimation involves analysing exposure, identifying hazards, and assessing vulnerability and resources. Risk management includes communication, identification, analysis, assessment, elimination, and monitoring. Lastly, management actions encompass prevention and warning, mitigation, preparedness,

response, recovery, and learning. Furthermore, this model highlighted the interconnectedness of specific subcategories. It illustrated that disaster management comprises more intricate and multifaceted processes beyond the commonly recognized four phases.

Figure 11: The Researchers Contributed to the Development of Disaster Management



Source: Designed by the author.

It is undeniable that researchers have made ground-breaking contributions to the field of disaster management since 1920, as evidenced by the Figure 11. The contributions made by researchers vary depending on their respective fields.

CONCLUSION

This study aimed to comprehensively evaluate the research that has significantly impacted the advancement of disaster management models. Experts from various scientific fields have investigated disaster management from multiple angles, resulting in a multifaceted approach to contemporary disaster management. Many disciplines, including sociology, geography, psychology, civil defence, and public administration, have shaped the progression of disaster management. Before the 1970s, pioneers in the field analysed the impact of disasters on society, and their

studies contributed to the development of disaster management. One of the critical breaking points in the development of disaster management occurred in 1975 when cyclical disaster management models were proposed for the first time. The introduction of proactive and reactive approaches and concepts of vulnerability in disaster management followed this process. In particular, the idea of proactive process indicates that disaster management has begun to focus on risk reduction and risk management. The 1990s show that the concepts of economic progress and development began to be discussed within disaster management. The development idea indicates that disaster management has started to focus on developing sustainable policies. At this point, the development of disaster management has caused the phases of mitigation, preparedness, response, and recovery to be used almost as standard worldwide. In particular, mitigation studies argue that the risk management phase should be the focus of disaster management. Over the years, disaster management models have evolved to encompass a more comprehensive and inclusive approach. Presently, disaster management strategies are tailored to different criteria, including a country's specific hazards, institutional frameworks, cultural diversity, and level of economic development. Nonetheless, recent disasters highlight that in addition to mitigation and preparedness measures, mass migrations and the far-reaching impacts of climate change also factor into effective disaster management. Despite the progress that has been made, there is still room for improvement in addressing critical aspects such as climate change, risk governance, sustainable development goals, resilience, and the Sendai risk reduction framework. Therefore, it is highly recommended that these topics be given greater prominence in disaster management models.

Yazar katkı oranı ve çıkar çatışması beyanı: Çalışma tek yazarlı olup katkı oranı %100'dür ve herhangi bir çıkar çatışması bulunmamaktadır.

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