Turkish Journal of Health Science and Life

AN OVERVIEW OF DISASTER RESILIENCE

Gülhan ŞEN[a]

[a] Burdur Mehmet Akif Ersoy University, Faculty of Health Sciences, Emergency Aid and Disaster Management, Burdur, Turkey

ARTICLE INFO

REVIEW ARTICLE

Article history:
Received: 22 September 2021
Accepted: 30 November 2021
Available : 27 December 2021

Key Words:
Disaster, Disaster Management, Resilience, Disaster Resilience, Disaster-resilient society

*Correspondence: Gülhan ŞEN
Burdur Mehmet Akif Ersoy University, Faculty Of Health Sciences, Department of Emergency Aid and Disaster Management, Burdur, Turkey.
e-mail: gulhansen@mehmetakif.edu.tr

Turkish Journal of Health Science and Life
2021, Vol.4, No.3, 106-115

ABSTRACT

Increasingly, in this century that we have evolved into a risk society, disasters negatively affect them in many ways and weaken their resilience. For this reason, in recent years, the global focus has been on developing disaster resilience. Because increasing the resilience of the society means reducing the effects of the disaster. Therefore, creating disaster-resilient communities is the most effective way to protect a community's future.

So, this study aims to discuss the concept of disaster resilience, the place and importance of disaster resilience in disaster management, and the steps taken in the international context in a broader framework. Consequently, building disaster-resilient societies is has a substantial place in realizing successful and integrated disaster management and ensuring sustainable development.

INTRODUCTION

Since the past, human beings have had to cope with disasters and have been affected physically, socially and, economically. Today, we are exposed to many natural and man-made disasters. According to EM-DAT data, which is an international database, a total of 785 natural disasters occurred, approximately 194 million people were affected and, 26,835 people died by these disasters in the years 2019-2020. In terms of economic loss, there was a loss of approximately 302 billion US dollars. In addition, the most ongoing COVID-19 epidemic and climate change disasters dominated in 2019-2020. Compared to the previous two decades (2000-2019), the number of disasters in 2020 was above the average in terms of life and economic losses. The deadliest disasters experienced were heatwaves, floods, droughts, forest fires, storms and, the COVID-19 outbreak. Here, it has seen how global climate change has increased the number and impact of disasters (1,2). In addition, our evolution into an information society and then a super-smart society with the developing technology and globalization has brought the concepts of risk, security, and fear. This situation has made today's societies a society of risk and fear. Therefore, not only natural disasters but also new security threats such as cyber-attacks, international migration, and terrorist attacks affect people, and disaster resilience of societies is decreasing.

According to the 2019 World Risk Report, the disaster risks of 180 countries were evaluated. In this assessment, the degree of exposure of countries to

disasters, coping capacities and adaptive capacities were determined (3). Accordingly, the three countries with the highest disaster risk worldwide are the islands of Vanuatu (index value: 56.71), Antigua and Barbuda (index value: 30.80), and Tonga (index value: 29.39). The African continent has the highest social vulnerability, and the European continent has the lowest disaster risk. On the other hand, Turkey ranks 113th out of 180 countries, with an index value of 5.6, in the order of disaster risk from high to low. The country with the lowest disaster risk worldwide is Qatar (index value: 0.31) (3).

In addition, the disaster risk of the future is climate change and the risks arising from the impact of climate change The Intergovernmental Panel on Climate Change (IPCC) stated that since the pre-industrial era, the air temperature has increased by almost twice the global average temperature, and by 2050, it will increase by another 2.5-3°C. This climate change and global warming adversely affect food security and the ecosystem. This situation causes disasters such as desertification, heat waves, drought, forest fires, floods, hurricanes to be experienced more frequently and intensely (4,5). Therefore the focus has been on developing resilience against disasters globally in recent years due to the factors, such as increasing natural disasters, climate change, migration, population growth, terrorist attacks. Especially since the adoption of the Hyogo Framework, the primary purpose of pre-disaster work has shifted not just to reducing vulnerability but to increasing community resilience (6). Because increasing the resilience of the society means reducing the effects of the disaster. (7). In addition, not only the intensity of disasters and security threats, but also the level of development of the society is very important. Accordingly, underdeveloped societies are more vulnerable than developed societies (3). Indeed, building strong, healthy, resilient communities that can withstand and recover from disasters is the most effective way to protect a community's future. So, this study aims to discuss the concept of disaster resilience, the place and importance of disaster resilience in disaster management, and the steps taken in the international context in a broader framework.

Disaster Resilience Concept

In recent years, the concept of resilience has become important for modern societies as states must learn to adapt and manage risks in ways that minimize their impact. The origin of the word resistance comes from the Latin word “resilio”. It is generally used to mean "jump back" or "jump back" (8, 9, 10, 11).

In general, resilience is understood as the ability of a system to withstand, recover, or even become stronger from exposure to critical events or shocks. Accordingly, resilience is the capacity of the affected community to self-organize, move away from negative situations, and recovery stronger than before (12). Disaster resilience is the ability of a society, community, or system to cope with disasters, overcome with the least damage, and balance with the social, physical and psychological capacity (13). In other words, disaster resilience is the capacity, ability, or competence to cope with stress, crisis, or a disaster and return to pre-existing living conditions (14).

The first use of the concept of resilience in the field of the disaster was made by Timmerman (1981) by addressing climate change in the article titled “Vulnerability, Resilience and The Collapse Of Society”(15). In the narrowest sense, disaster resilience is "leap forward" and "continue" after a disaster (10). In a broad sense, disaster resilience is the ability of society or system to overcome disasters and emergencies and successfully regain equilibrium with its sociological, psychological and physical capacity (16). According to another definition, disaster resilience is the capacity of communities to mitigate, prepare, respond, recover and adapt to new conditions while learning from past disasters (15). Thus, disaster resilience includes the capacity to reduce or prevent losses, control the effects of disasters, and recover with minimal social disruptions. Disaster resilience can appear as a result or process. For example, resilience as the ability to cope with

dangers or to recover is a result. Resilience as a process is the state of continuous learning and taking responsibility to develop and maintain the capacity to cope with hazards (17). However, disaster resilience has four dimensions: technical, organizational, social, and economic. The technical dimension of disaster resilience is the ability of physical systems to perform at desired levels when exposed to disasters. The organizational dimension of disaster resilience is the ability of institutions and organizations to respond to disasters and perform critical functions. The social dimension of disaster resilience consists of measures taken to reduce the exposure of communities and governments to the effects of disasters. The economic dimension of disaster resilience, on the other hand, refers to the capacity to reduce direct and indirect economic losses caused by disasters (18).

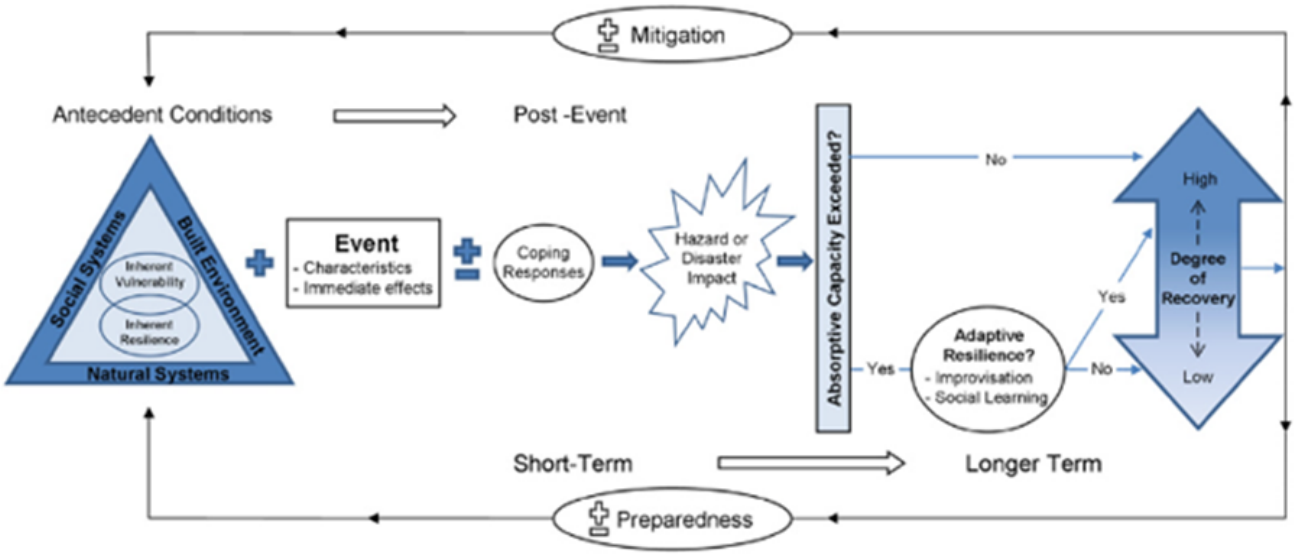
When we look at the definitions of disaster resilience in general, we see that the words used in common are capacity, ability, and recovery. In terms of capacity, adaptive, absorptive, and coping capacity are expressed. These capacities are considered essential components of disaster resilience (17,19).

Components of Disaster Resilience

As noted above, adaptive capacity, absorptive capacity, and coping capacity are essential components of disaster resilience. In particular, adaptive capacity has an important place in building disaster resilience. It is defined that adaptive capacity is the ability to adapt to change, moderate effects, and cope (17). In other words, it is the ability of systems, institutions, or people to adapt to potential damage, take advantage of opportunities, and respond to consequences (4). It is also significant to plan, prepare, facilitate and implement compliance options (8). Therefore, adaptation and adaptation are the basis of adaptive capacity. In this way, adaptive capacity makes it possible to reach the solution through learning, adaptation and transformation (19).

Two other important components of disaster resilience are absorptive capacity and coping capacity. Absorptive capacity is society's ability to reduce event effects using predetermined coping responses, that is, the ability to absorb (17). Coping capacity is the ability of a system to anticipate, act, achieve goals, and manage resources. Coping capacity requires societies or systems to use their absorptive capacity in the event of a disaster. In general terms, coping capacity relates to factors that affect a society's ability to prepare for disasters, use their absorptive capacity, and recover (19). In general terms, coping capacity relates to society's ability to prepare for disasters, using their absorptive capacity, and recover.

Figure 1: Shematic representation of the disaster resilience of place (DROP) model



In Figure 1(17), DROP Model, the location and stages of adaptive capacity, absorptive capacity, and coping capacity, which are components of disaster resilience, are clearly shown. Accordingly, the process of disaster response and recovery process depends on the absorptive capacity of the system. If a community implements an adequate coping response, the impact of the hazard will be weakened and the community's absorptive capacity will not be exceeded. Thus, the recovery process of society will be fast and high.

According to the model, the absorptive capacity of a community can be exceeded in two ways. First, it will exceed local capacity when the hazard is too great. Second, if the danger is not too great but the current coping capacities are insufficient against the hazard, society's absorptive capacity will be exceeded and disaster will approach. In both cases, the community's ability to use its adaptive capacity with improvisation and social learning will be decisive in the degree of recovery. Accordingly, the more adaptive capacity is, the faster and higher the recovery degree will be (17).

As can be seen, capacity building is crucial for disaster resilience. Although the concept of capacity building emerged in the late 1980s, it began to settle on the development agenda in the 1990s. Progress in capacity building can enable communities and states to implement the best resilience strategies. In this way, communities and states can achieve their goals of building resilience independently of foreign aid (20). Therefore, to improve capacity for disaster resilience, it is necessary to improve the prevention and protection of hazards, develop early warning systems, increase disaster awareness, establish emergency and disaster planning, and determine better building strategies (21).

Within the framework of disaster management, the concepts of risk reduction and vulnerability/ vulnerability, which are directly related to disaster resilience, should also be addressed. Because when danger, risk and vulnerability come together, disasters with devastating environmental, economic, social and physical effects occur. Consequently, reducing vulnerability and increasing resilience in risk reduction policies are very important for successful disaster management (13). In addition, while disasters can affect the whole of society at large, they do not affect all people equally. Individuals defined as vulnerable groups in disasters, that the elderly, individuals with special needs, the poor, women and children, ethnic or linguistic minorities, immigrants, asylum seekers, refugees, illegal immigrants, are more affected by disasters (15, 22). Thereby, the most basic concepts necessary to understand the disaster resilience are vulnerability and risk reduction.

The Relationship Between Vulnerability and Disaster Resilience

The concept of vulnerability is mentioned in the disaster management and resilience literature frequently. It is defined as the extent of damage and loss caused by hazards. It is sensitivity to hazards. The United Nations defines vulnerability as a situation in which a society, a system, or an asset is susceptible to the effects of hazards resulting from physical, social, economic, and environmental factors (23). According to another definition, vulnerability is the degree of susceptibility of a population or system to hazards and stresses. It is also the extent to which it cannot cope with these dangers (21). According to an ecological approach, vulnerability is a systematic situation that negatively affects, destabilizes, and erodes ecological resilience. It is also a product of exposure, sensitivity, and adaptive capacity reflecting current conditions (24). In other words, it is a state of susceptibility to harm caused by being exposed to stresses and not having the capacity to adapt (25). In short, it is the sensitivity of a society or system to hazards and disasters.

In order to measure vulnerability, it is necessary to determine how much people are exposed to disaster (degree of exposure), probability of harm (degree of vulnerability) (26), and the degree of coping with hazards. Therefore, exposure, susceptibility and adaptive capacity are the main components. Accordingly, exposure is the degree to which a system experiences the hazards relative to the

magnitude, frequency, duration, and coverage hazards. Responsiveness is the degree to which a system is affected by disturbances and changes. Adaptive capacity is the ability of a system to adapt to and cope with hazards or changes (25). In this context, vulnerability is also directly related to adaptive capacity. So, the concepts of resilience and vulnerability are interrelated.

Both resilience and vulnerability are part of a system and a dynamic process (9, 27). In addition, they are based on the same factors such as demographic, social, cultural, economic, and political aspects. However, they appear as opposite concepts in the disaster management literature. Accordingly, resilience is defined positively, such as the capacity of the system to organize itself and adapt to the emerging conditions, while the vulnerability is expressed in negative terms such as susceptibility to harm and sensitiveness to disasters (25). So they are two sides of the coin, and if fragility is negative, resilience is positive. That's why, the absence of one means the presence of the other (10). In this case, as fragility increases, resistance decreases, so the capacity to cope with disasters also decreases (13). As it can be seen, vulnerability and disaster resilience are complementary and influencing but opposite concepts.

As a result, the concept of vulnerability is a powerful element for coping with disasters. So as to increase resilience, the states should evaluate the levels of vulnerability, and priority should give to develop the adaptive capacities of particularly vulnerable individuals. Thus, societies will have the assets, resources, and capacities to respond to current threats and unknown challenges. It will also be a critical step for the continuity of sustainable development.

The Relationship between Risk Reduction and Disaster Resilience

It is not possible to consider risk reduction and resilience separately. Systematic actions taken to reduce risk—predicting risks, analyzing them up-to-date, minimizing or eliminating their effects—are also the basis for building resilience. For this reason, efforts to build disaster resilience are in the risk reduction stage of disaster management.

The risk reduction phase includes advanced measures taken to reduce, prevent or eliminate risks to protect people and property from hazards and their effects (28). For this, up-to-date risk analyzes (29) and risk-reducing investments should be made by managing this process correctly. These are important for the successful management of disaster resilience (30). In particular, it is necessary to develop community-based risk reduction strategies to create a disaster-resilient society (27). Community-based risk reduction is a process in which the community actively participates in the prevention, reduction, monitoring, and assessment of disaster risks in order to reduce their vulnerability and increase their capacity. Accordingly, people are at the center of decision-making and the active participation of the most vulnerable groups in this process is important (9). In short, the basis of disaster risk management is to reduce vulnerability, strengthen capacities and improve disaster resilience with a proactive approach and active participation.

Another important issue within the framework of disaster risk reduction and disaster resilience is the concept of risk society. With industrialization and globalization, we have evolved into an information society. However, today's societies have become a risk society due to the increased risk factors, uncertainties, and insecurity with the information society (31). Risk society theory emerged with Ulrich Beck. According to Beck, the risk society is a result of modernization, and its solution is reflexive modernization (32). He also defined the characteristics of risks in the risk society. Accordingly, risks aren't predicted in the risk society. This situation makes it difficult to take precautions against risks and brings the concept of insurability with it. In addition, the risk affects everyone, not only locally or individually, but globally. At the same time, risks in the risk society are unpredictable, so they are learned by trying and experiencing (33). Therefore, today's risk

society come up to againts a wide variety of risks caused by globalization and technological development. For this reason, it is very important to develop policies to reduce risk and increase resilience in the risk society.

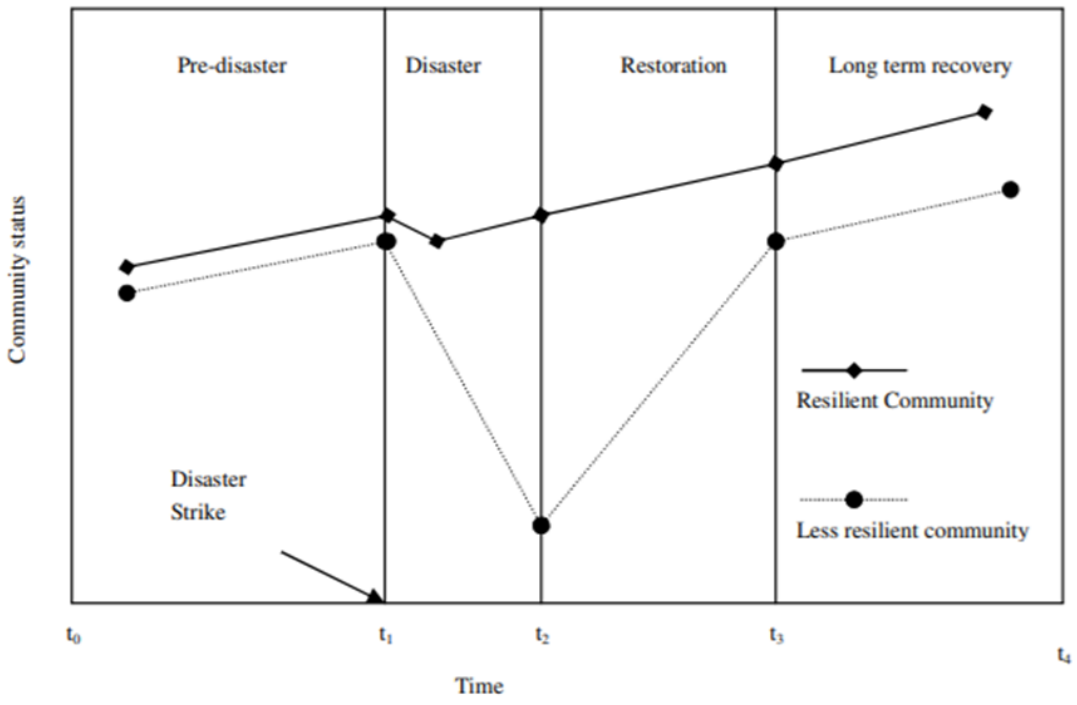
Disaster Resilient Society

Disaster preparedness is not just about an effective and rapid response capacity. It also requires being prepared for a rapid recovery process after disasters. It would not be wrong to say that there is an increasing awareness in this sense globally. The underlying reason is that building disaster-resilient communities prevents future losses (24). Resilient communities are better able to withstand crises and have the ability to recover from their effects. In addition, resilient communities have the potential to come to a stronger position from their pre-crisis position (34). Therefore, in recent years, creating a disaster-resilient society has become an important tool in disaster reduction, risk assessment, policy-making, and decision-making processes in environmental, social, economic, or technological fields (16).

Community resilience is a continuous participation process that ensures preparedness before disasters and healthy recovery afterward (34). Social disaster resilience is the ability of a community to live with, cope with and manage disasters with an integrated, comprehensive, participatory, and positive approach. In general, social disaster resilience includes working well under stress, successful adaptation to new challenges, self-confidence, and social capacity (35, 36). According to another definition, social disaster resilience is the capacity of communities to prepare, absorb, heal, learn, adapt and transform for natural hazard events, That's why, natural hazards do not always turn into natural disasters, especially in highly resilient communities (19). Because, a resilient community can respond positively to changes or stress (disaster, crises, etc.). In addition, they can maintain their basic functions as a community despite these stresses (9, 27). In short, disaster-resilient societies have low levels of vulnerability to the effects of disasters, high coping capacities, and quick return to normal life.

From a disaster risk reduction perspective, disaster-resilient societies are the ideal state of a community. Disaster-resilient societies can maximize the capacities of their social, economic, environmental, and physical systems, ensure the continuity of

Figure 2: The difference between disaster-resilient and non-disaster-resilient societies



sustainable development, and take further steps towards becoming an "ideal society" by raising the level of welfare. Thus, these societies are welfare societies that can absorb the effects of disasters through resilience and adaptation and also can develop specific behaviors, strategies, and measures for risk reduction (9, 27, 37).

As seen in Figure 2 (6), disaster-resilient societies and non-disaster-resilient societies differ in their capacity to cope with disasters and recover. Accordingly, disaster-resilient societies can respond to disasters more quickly and move on to a faster recovery process.

Disaster Resilience in the International Framework

In recent years, the concept of disaster resilience has been at the top of the agenda of disaster risk reduction policies. First, a parallel effort was made with the International Decade for Natural Disaster Reduction (IDNDR) in 1990 to build frameworks for disaster risk reduction. In this period, the years 1990-2000 were accepted as a decade in which activities were planned for disaster risk reduction. In 1994, the World Conference on Natural Disaster Reduction held in Yokohama, Japan, was the first UN World Conference to address the importance of disaster risk reduction and the social aspects of vulnerability. The Report of this conference includes the Yokohama Strategy for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation, the Principles, the Strategy and the Plan of Action. The Yokohama Strategy stated that those most affected by disasters are poor communities and socially disadvantaged groups. It states that disaster prevention, risk reduction, and preparedness are more economical than disaster response, and it is necessary to reduce disaster risks as a part of poverty reduction and sustainable development. In addition, it was mentioned that it is necessary to encourage the active participation of the society, to reduce the vulnerability level of the society, and to use early warning systems effectively in disaster reduction policy (38).

Another development in the international arena for disaster resilience is the Millennium Declaration and the accompanying Millennium Development Goals. The Millennium Development Goals consist of eight goals that the member states of the United Nations aim to achieve by 2015. These are end poverty and hunger, achive universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS, malaria and other diseases, ensure environmental sustainability, develop a global partnership for development (17, 39, 40, 41). Thus, awareness of the connection between poverty and disasters has begun to increase. In addition, the reduction of disaster risk and the creation of disaster-resilient societies have begun to take their place in the increasingly popular goals of sustainable development.

Another international action is the Hyogo World Conference on Disaster Reduction held in Kobe, Japan, 2005, and the Hyogo Framework Action Plan (2005-2015). Accordingly, the Hyogo framework emphasized that disaster risk reduction efforts should be systematically integrated into sustainable development and poverty reduction policies, plans, and programs and supported by bilateral, local, and international cooperation. Thus, sustainable development, poverty reduction, good governance, and disaster risk reduction are mutually supportive goals. (42). At the same time, creating a culture of safety and resilience at all levels using knowledge, innovation, and education is one of Hyogo's five priorities (43). However, while the Hyogo Framework for Action has succeeded in reducing disaster mortality globally, it has not succeeded enough in dealing with the underlying factors that increase the exposure of people and assets to hazards. This situation became the target of the Sendai Framework created after the Hyogo Framework (44). Therefore, the concept of resilience in the global context started to become widespread with the Hyogo Framework for Action and is further emphasized by the Sendai Disaster Risk Reduction Framework (2015-2030).

The 2015-2030 Sendai Framework for Disaster Risk

Reduction was approved by governments at the World Conference on Disaster Reduction in 2015. Sendai was published to fill several gaps in Hyogo in addressing disaster risk factors, setting action targets and priorities, enhancing disaster resilience at all levels, and providing adequate means of implementation. Sendai has four priority goals. These include understanding disaster risks, strengthening disaster risk governance to manage disaster risk, investing in disaster risk reduction for resilience, and improving disaster preparedness for effective response, building back better in recovery, reconstruction, and rehabilitation (45). In addition, Sendai aims to strengthen resilience by implementing integrated and inclusive measures to prevent exposure to hazards and vulnerability to disasters and prepared for response and recovery (43,45,46).

Another international step is The 2030 Agenda for Sustainable Development. The Sustainable Development Goals (SDGs) are the continuation of the Millennium Development Goals. In this context, the SDG consists of 17 objectives, including ending poverty and hunger, ensuring healthy living, reducing climate change and supporting adaptation efforts, reducing disaster risk, creating resilient societies by 2030 (47). In addition, the Sustainable Development Goals are directly or indirectly related to disaster risk reduction and resilience. These objectives solidly demonstrate the role of disaster risk reduction as a fundamental development strategy (46,47).

The most important step taken recently for adaptation to climate change and international cooperation has been the Paris Agreement. The Paris Agreement, acknowledged at the 21st Conference of the Parties (COP) in 2015, is a global framework on climate change. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. It also aims to adapt to the adverse effects of climate change, increase adaptive capacity, strengthen resilience and reduce vulnerability to climate change in a way that does not threaten food production (48).

Finally, the last international step to increase resilience against disasters is HABITAT III - The New Urban Agenda. Habitat III is the first UN conference after the 2030 Agenda for Sustainable Development Goals and the Paris Agreement. Habitat III states that the urban population will double in 2050, and this situation will affect sustainable urban development, causing some difficulties such as economic and social exclusion, inequalities, environmental degradation, poverty, migration, increasing security threats. In this respect, Habitat III is an opportunity to overcome these challenges and contribute to sustainable development. Accordingly, the New Urban Agenda envisions cities that encourage civic participation, peaceful, safe, participatory, smart, inclusive, egalitarian, having social inclusion, resilience to disaster, and compatible with climate change, with the vision of "Right to the City" (49).

CONCLUSION

Disasters are a challenging situation that results in the death and injury of many people, were limited or insufficient, the balance of resource-demand deteriorates, and it is necessary to intervene as soon as possible by combating time. Therefore, disasters are events that exceed the ability of a society to use its resources, cause physical, economic, social, and environmental losses, and cause critical deterioration in the functioning of the community. On the other hand, disaster resilience is the ability of societies to cope with the effects of disasters, better back as soon as possible, adapt to dangers, and learn from the experiences. For this reason, resilient communities are those that are minimally affected by the effects of disasters and can recover quickly. Thereby, building disaster resilience in disaster management is a powerful way to reduce damage and losses from disasters. Indeed, building strong, healthy, and resilient communities that can withstand and recover from disasters is the most effective way to protect a community's future.

In today's world, the concept of disaster resilience has gained importance due to factors such as increasing disasters, climate change, migration,

population growth, and terrorist attacks. The global focus on disaster management is now moving from vulnerability to resilience. In addition, disaster resilience is increasingly forming the basis of public policies and programs for disaster management. Accordingly, building disaster-resilient societies has a substantial place in integrated disaster management and sustainable development. For all these reasons, should be created and increased society's resilience to disasters. First of all, a general awareness should be created about the importance of community resilience. Community development based on knowledge and participation should also be encouraged. The states should adopt a holistic disaster management approach and develop and implement disaster plans. In addition to these, they should develop economic resources and reduce risk, resource inequalities, and vulnerability areas. Local people should be actively involved in every stage of disaster management. In addition, it should develop social capital, increase social supports and use social capital in disaster management. Finally, since we are a risk society, societies should plan the unexpected to be prepared for unpredictable risks.

REFERENCES

1. EM-DAT,2020. Disaster Year in Review 2019. (Cited:13/05/2020). Available from: https://www.emdat.be/publications.
2. EM-DAT, 2021.Disaster Year in Review 2020 Global Trends and Perspectives. (Cited: 20/05/2021.). Available from: https://www.emdat.be/publications.
3. Day SJ, Forster T, Himmelsbach J, Korte L, Mucke P, Radtke K, Thielbörger P, Weller D. World risk report 2019—focus: Water supply. Berlin, Germany: Bündnis Entwicklung Hilft; 2019.
4. IPCC. AR5 Synthesis Report: Climate Change 2014. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland; 2014.
5. Karapınar B, Özertan G, Tanaka T, An N, Turp MT. (2020). İklim Değişikliği Etkisi Altında Tarımsal Ürün Arzının Sürdürülebilirliği. TÜSİAD, İstanbul; 2020.
6. Mayunga JS. Understanding and applying the concept of community disaster resilience: a capital-based approach. Summer Academy For Social Vulnerability And Resilience Building. 2007; 1(1): 1-16.
7. Colten CE, Kates RW, Laska SB. Community resilience: lessons from new orleans and hurricane katrina. CARRI Report, 3; 2008.
8. Klein, RJ, Nicholls, RJ, Thomalla, F. Resilience to natural hazards: how useful is this concept?. Environmental Hazards.2003; 5(1): 35-45.
9. Kafle, SK. Measuring disaster-resilient communities: a case study of coastal communities in Indonesia. Journal Of Business Continuity & Emergency Planning. 2012; 5(4): 315-325.
10. Manyena, B, O'Brien, G, O'Keefe, P, Rose, J.Disaster resilience: a bounce back or bounce forward ability?. Local Environment: The International Journal of Justice and Sustainability. 2011; 16 (5): 417-424.
11. Zobel, CW. Representing perceived tradeoffs in defining disaster resilience. Decision Support Systems. 2011; 50(2): 394-403.
12. Tulane University,2012. Haiti humanitarian assistance evaluation: from a resilience perspective. Tulane University's Disaster Resilience Leadership Academy. Available from: https://reliefweb.int/report/haiti/haiti-humanitarian-assistance-evaluation-resilience-perspective.
13. Varol, N, Kırıkkaya, EB. Afetler karşısında toplum dirençliliği. Resilience, 2017; 1(1), 1-9.
14. Lucini, B. Disaster resilience from a sociological perspective, exploring three Italian earthquakes as models for disaster resilience planning. Humanitarian Solutions in the 21st Century, Springer International Publishing, Cham; 2014.
15. Mayunga JS. Measuring the measure: a multi-dimensional scale model to measure community disaster resilience in the us gulf coast region. Texas A&M Universit;2009.
16. Ahsan, MM, Mahmood, SS, Varol, N. Assessment of climate disaster resilience ın dhaka city: a case study of Ward No. 28 Of Dhaka South City corporation. Journal of Disaster and Risk. 2018;1(2): 81-92.
17. Cutter, SL, Barnes, L, Berry, M, Burton, C, Evans, E, Tate, E, Webb, J. A place-based model for understanding community resilience to natural disasters. Global Environmental Change. 2008;18(4): 598-606.
18. Bruneau, M, Chang, SE, Eguchi, RT, Lee, GC, O'Rourke, TD, Reinhorn, AM., ... ,Von Winterfeldt, D. A framework to quantitatively assess and enhance the seismic resilience of communities. Earthquake Spectra. 2003;19(4): 733-752.
19. Parsons M, Glavac S, Hastings P, Marshall G, McGregor J, McNeill J, Morley P, Stayner R. Top-down assessment of disaster resilience: a conceptual framework using coping and adaptive capacities. International Journal of Disaster Risk Reduction, 2016;19: 1-11.
20. Amaratunga D, Faber M, Haigh R, Indirli M, Kaklauskas A, Lill I, Perdikou S, Rochas C, Sparf J, Perera S, Thayaparan M, Velazquez, J. ANDROID report: disaster resilience education and research roadmap for Europe 2030. Disaster Resilience Network, 2015. Available from: www.disaster-resilience.net.
21. Pasteur K. from vulnerability to resilience, a framework for analysis and action to build community resilience. Practical Action Publishing, UK; 2011.

22. First J. The Development And Validation Of The Disaster Adaptation And Resilience Scale. (Doctoral Dissertation, The Faculty of the Graduate School At the University of Missouri, USA); 2019.
23. UNISDR, 2009. UNISDR Terminology On Disaster Risk Reduction. United Nations International Strategy for Disaster Reduction, Genova. Available from: http://www.unisdr.org/we/inform/terminology.
24. Gall M. From Social Vulnerability To Resilience: Measuring Progress Toward Disaster Risk Reduction. Interdisciplinary Security ConnecTions' Publication Series of UNU-EHS, No. 13; 2013.
25. Adger WN. Vulnerability. Global Environmental Change. 2006; 16(3): 268-281.
26. UNDP, 2014. Disaster resilience measurements stocktaking of ongoing efforts in developing systems for measuring resilience. Available from: https://www.preventionweb.net/publications/view/37916.
27. Twigg J. Characteristics of a disaster-resilient community: a guidance note. Department for International Development (DFID), London; 2007. Available from: http://lib.riskreductionafrica.org/bitstream/handle/123456789/623/characteristics%20of%20a.pdf?sequence=1.
28. Godschalk DR. Urban hazard mitigation: creating resilient cities. Natural Hazards Review, 2003; 4(3), 136-143.
29. Özer YE. Risk azaltma yaklaşımı çerçevesinde dirençli kentler. Bursa: Ekin; 2018.
30. Karaman ZT. Afet yönetimine giriş ve Türkiye'de örgütlenme. Bütünleşik Afet Yönetimi (Ed: Zerrin Toprak Karaman, Asuman Altay). Ss: 1-38. İlkem, İzmir; 2017.
31. Karaman ZT. Risk toplumunda afetlerde erken uyarı, mukavemetli toplum ve kamu yönetiminin ikna kapasitesi. BEÜ SBE Derg. 2019;8(1), 185-212.
32. Beck U. Critical theory of world risk society: a cosmopolitan vision. Constellations, 2009;16(1), 3-22.
33. Koçak H, Memiş K. Ulrich beck'in risk toplum teorisi bağlamında güvenlik ve özgürlük ikilemi. Afyon Kocatepe University Journal of Social Sciences. 2017;19(2): 251-265.
34. Arbon P, Gebbie K, Cusack L, Perera S, Verdonk S. Developing a model and tool to measure community disaster resilience. Torrens Resilience Institute, 28; 2012.
35. Arbon P, Gebbie K, Cusack L, Perera S, Verdonk S. Developing a model and tool to measure community disaster resilience. Torrens Resilience Institute, 28; 2012.
36. Arbon P, Steenkamp M, Cornell V, Cusack L, Gebbie K. Measuring disaster resilience in communities and households. International Journal of Disaster Resilience in the Built Environment. 2016; 7 (2): 201- 215.
37. Tierney K, BruneauM. Conceptualizing and measuring resilience: a key to disaster loss reduction. TR News, 250 (pp: 14-18); 2007.
38. Yokohama Strategy. Plan of action for a safer world-guidelines for natural disaster prevention, preparedness and mitigation. In World Conference on Natural Disaster Reduction. Yokohama, Japan; 1994, May.
39. WHO, 2020. Millennium development goals (MDGs) https://www.who.int/topics/millennium_development_goals/about/en/, Available from: 06/04/2020.
40. Yılmazer M, Onay M. Bölgesel kuruluşların liderliğinde binyıl kalkınma hedeflerinin başarısı: İZTO, İzka Projeleri. Ekonomi Bilimleri Dergisi. 2014;6(1): 1-16.
41. Özbakır SN. Birleşmiş milletler binyıl kalkınma hedefleri ve 2030 sürdürülebilir kalkınma hedefleri. İzmir Ticaret Odası, İzmir; 2016. Available from: http://izto.org.tr/demo_betanix/uploads/cms/yonetim.ieu.edu.tr/6360_1470056885.pdf.
42. UNISDR, 2005. Hyogo framework for action 2005–2015: building the resilience of nations and communities to disasters. World Conference on Disaster Reduction (A/CONF. 206/6). Geneva: The United Nations International Strategy for Disaster Reduction.
43. Pradhan C, Chauhan R. Disaster resilience for sustainable development in Nepal. Disaster Risk Reduction Methods, Approaches and Practice-An Interdisciplinary Approach for Disaster Resilience and Sustainability (pp. 21-33). Edt. Indrajit Pal, Jason von Meding, Sangam Shrestha, Iftekhar Ahmed, Thayaparan Gajendran. Springer, Singapore; 2020.
44. Keating A, Campbell K, Szoenyi M, McQuistan C, Nash D, Burer M. Development and testing of a community flood resilience measurement tool. Natural Hazards and Earth System Sciences Discussions. 2017;17(1): 77-101.
45. UNISDR, 2015. Sendai framework for disaster risk reduction 2015-2030. United Nations Office for Disaster Risk Reduction. Geneva, Switzerland, https://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf, Available from: 25.03.2020.
46. Pal I, Von Meding J, Klinmalai C. Regional perspectives on disaster resilience and sustainable development. Disaster Risk Reduction Methods, Approaches and Practice-An Interdisciplinary Approach for Disaster Resilience and Sustainability (pp. 3-20). Edt. Indrajit Pal, Jason von Meding, Sangam Shrestha, Iftekhar Ahmed, Thayaparan Gajendran. Springer, Singapore; 2020.
47. UN Office for Disaster Risk Reduction, 2015. Disaster risk reduction and resilience in the 2030 agenda for sustainable development. https://www.unisdr.org/files/46052_disasterriskreductioninthe2030agend.pdf, Available from: 25.03.2020.
48. UNFCCC,2015. Adoption of the Paris Agreement. Report No. FCCC/CP/2015/L.9/Rev.1, Available from: http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf.
49. Habitat III-Yeni Kentsel Gündem, 2020. https://habitat.csb.gov.tr/. Available from: 31.05.2020.