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Urban resilience and disaster management studies in the context of the United Nations Sustainable Development Goals: A bibliometric analysis from 2015 to 2025 in the WoS database

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ABSTRACT— This study examines scientific research in urban resilience and disaster management between 2015 and 2025 in the context of the United Nations Sustainable Development Goals (SDGs) through bibliometric analysis. The research aims to identify scientific trends and research gaps in these areas, focusing on SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action). 2,658 articles from the Web of Science (WoS) database were analyzed using VOSviewer (1.6.20) software. The study emphasized the importance of addressing disaster management and urban resilience from an interdisciplinary perspective. The results show that holistic strategies, including sustainable infrastructures, innovative early warning systems, and community engagement, need to be developed to enhance the implementation of the SDGs. The analysis of Türkiye reveals the country's vulnerability to natural disasters, with events such as the Kahramanmaraş earthquakes bringing the need to increase urban resilience back to the agenda. The study suggests that Türkiye's academic contributions in this field can be integrated into the international literature and shed light on the development of disaster management and sustainable development policies. In this context, policies that encourage the use of early warning systems, interdisciplinary cooperation, and innovative technologies are expected to significantly reduce disaster risks and build sustainable, resilient cities.

KEYWORDS: Urban resilience, Disaster management, Sustainable development goals, Bibliometric analysis, Climate action.

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1. INTRODUCTION

Disaster management processes of cities should not only minimize the impacts of disasters, but also include identifying potential risks in advance and making comprehensive preparations against these risks [1]. Urban resilience is of great importance, especially in terms of developing strategies to protect against and mitigate the negative impacts of climate change [2], [3]. However, the lack of awareness in society due to unplanned urbanization and consumption habits makes it difficult to achieve these goals [4], [5]. In this context, factors such as the establishment of sustainable infrastructure, adoption of resilient construction processes, mapping of disaster risks and raising social awareness should be integrated into the planning processes of cities [6], [7]. Disaster types such as floods, heat waves and storms, which are increasing especially with the impact of climate change, pose serious threats to the environmental, social and economic systems of cities [8], [9]. Therefore, disaster management policies of cities should be handled with a holistic approach that includes the development of early warning systems, implementation of post-disaster recovery strategies and cooperation with local stakeholders [10], [11]. It has become a fundamental requirement for cities struggling with climate

change and disaster risks to consider resilience and disaster management as complementary elements to create safer, sustainable and livable cities [12].

This approach addresses urban resilience and disaster management as a priority in the context of the United Nations' 2015 SDGs, specifically SDG 11 and SDG 13 (Figure 1) [13], [14]. These goals aim not only to make cities resilient to disasters but also to create inclusive, safe and sustainable living spaces [3], [15]. [16] discuss the applicability of sustainable infrastructure solutions for critical infrastructures within the framework of the United Nations SDGs. [17] evaluated engineering and management strategies to increase the resilience of infrastructures in areas such as urban planning, energy management, water resources management, wastewater treatment systems and disaster management, directly contributing to SDG 11, "Sustainable Cities and Communities". Similarly, another study analyzed how sustainable infrastructure solutions can be applied in different geographical and socio-economic contexts in the light of case studies and theoretical approaches [18].

Within the scope of SDG 13 "Climate Action", they aimed to make infrastructures resilient and sustainable against disasters by examining the technical, economic and environmental dimensions of existing infrastructure projects in line with environmental sustainability and climate change adaptation targets [19]. In the results of another study, in line with SDG 6 "Clean Water and Sanitation" and SDG 9 "Industry, Innovation and Infrastructure" targets, it provides practical recommendations for developing innovative strategies in infrastructure management and formulating policies to improve the welfare of societies [20]. It also emphasizes the potential of disaster-resilient infrastructure solutions to promote economic and social equality, in line with SDG 1 "End Poverty" and SDG 10 "Reduce Inequalities" [21].



Figure 1. UN SDGs (United Nations Sustainable Development Goals) [22]

Literature studies emphasize that urban resilience and disaster management are directly related to SDG 1, SDG 3, SDG 9, SDG 11, SDG 13 and SDG 17 [23], [24]. In particular, efforts in areas such as poverty alleviation, strengthening health infrastructures, building resilient infrastructures and international cooperation contribute to making cities more resilient to disasters [25], [26]. Developing disaster-resilient infrastructures, disseminating innovative early warning systems and promoting sustainable architectural solutions can both reduce disaster risks and improve quality of life [3], [27].

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Urban resilience refers to the capacity of cities to increase their resilience against natural and human-induced crises, while disaster management covers the processes of disaster prevention, risk reduction, response and recovery [3], [24]. Türkiye has a fragile structure in these issues due to its location on active fault lines and having different climate zones [28]. Reducing the physical, social and economic impacts of disasters, developing sustainable infrastructures and using innovative technologies are the main needs in this field [29], [30]. The Kahramanmaraş earthquakes have made these requirements even more visible and revealed that current practices need to be improved [31], [32]. The natural disasters experienced in Türkiye reveal that these global efforts should be strongly addressed at the national and local level [28], [33]. In particular, the Kahramanmaraş earthquakes in 2023 showed that the disaster management and urban resilience practices of our country need to be improved [34], [35]. In this direction, analyzing scientific studies in the field of urban resilience and disaster management will shed light on both the evaluation of existing approaches and the development of more effective policies.

This study aims to examine the scientific studies conducted in the field of urban resilience and disaster management in the period 2015-2025 through bibliometric analysis. Bibliometric analysis offers the opportunity to identify trends in the literature, research gaps and future areas of study by systematically evaluating the number, distribution, citation relationships and thematic trends of publications in a research field [36- 40]. The study also discusses the lessons that can be learned from Türkiye's disaster management experiences and the reflections of these experiences on the international literature within the scope of the analyzed literature.

The unique value of the research is that it addresses urban resilience and disaster management issues from a multidimensional perspective in the context of the United Nations SDGs. The analysis of post-disaster recovery processes in Türkiye and around the world will provide valuable contributions to both national policies and international literature. The results of the study will provide guidance on how to develop more effective disaster management strategies within the SDG framework.

In conclusion, this study aims to provide innovative and inclusive solutions in line with the SDGs by addressing the multidimensional relationships between urban resilience and disaster management. By integrating Türkiye's experiences in this field into the international literature, it is expected to guide scientific research and policy development processes.

2. Theoretical Method

The study is based on the analysis of articles published between 2015 and 2025 by using relevant keywords and appropriate filters from the Web of Science (WoS) database. In this framework, the data of a total of 2,658 articles were obtained from the WoS database and bibliometric analyses were performed using VOSviewer (1.6.20) software version. In addition, the top 20 most cited articles were identified and detailed analyses were conducted on these articles.

3. Findings

3.1 Search criteria

In particular, the research aims to assess the applicability of the SDGs from the perspective of urban resilience and disaster management. Addressing the issue on these two main axes brings to the fore the need to develop effective strategies to address today's environmental and social problems.

The time period between 2015 and 2025 is important for assessing the period from 2015, when the United

Nations SDGs were adopted, to the present day, as well as critical intermediate targets in the future. The reason for choosing these years is the effort to provide an accurate framework for monitoring the development of sustainability policies and practices. By limiting the research to only article-type publications, it is aimed to ensure the scientific accuracy and depth of the subject. The aim here is to ensure that peer-reviewed academic studies are taken into account rather than broader or popular sources.

Research categories cover a wide range of disciplines, from environmental sciences to management and urban planning, remote sensing and sustainable science technologies. This has made it possible to approach the issue not only from an environmental but also from a social, economic and technological perspective. For example, remote sensing and environmental studies allow for data analytics and technical analysis of issues such as disaster management and urban resilience. In addition, themes such as sustainable science and risk assessment allow for the study of key approaches to mitigating climate change impacts and enhancing resilience.

The broad coverage of citation indexes reveals that this work is considered in an interdisciplinary framework, ranging from the natural sciences to the social sciences and humanities. This allows us to understand not only the technical aspects of issues such as sustainability and resilience, but also their social and cultural dimensions. This increases the potential of the research to contribute to the development of effective policies and strategies on a global scale.

Overall, the search criteria below provide a powerful structure for understanding how the UN SDGs are addressed from different scientific perspectives. In particular, examining current and critical issues such as climate change, urban resilience and disaster management in an interdisciplinary framework supports the accumulation of scientific knowledge that can contribute to building a more sustainable and resilient future. The flow chart of the study is as given in Figure 2.

WoS Research criteria:
"Analyze Results: United Nations Sustainable Development Goals (Topic) and Urban Resilience (OR - Search within topic) and Disaster Management (OR - Search within topic) and 2025 or 2015 or 2016 or 2017 or 2018 or 2019 or 2019 or 2020 or 2021 or 2022 or 2023 or 2024 (Publication Years) and Article (Document Types) and Environmental Sciences or Urban Studies or Management or Remote Sensing or Regional Urban Planning or Environmental Studies or Green Sustainable Science Technology (Web of Science Categories) and 6.153 Climate Change or 6.3 Management or 6.115 Sustainability Science or 4.169 Remote Sensing or 3.40 Forestry or 6.317 Risk Assessment (Citation Topics Meso) and Science Citation Index Expanded (SCI-EXPANDED) or Social Sciences Citation Index (SSCI) or Arts & Humanities Citation Index (A&HCI) (Web of Science Index)"

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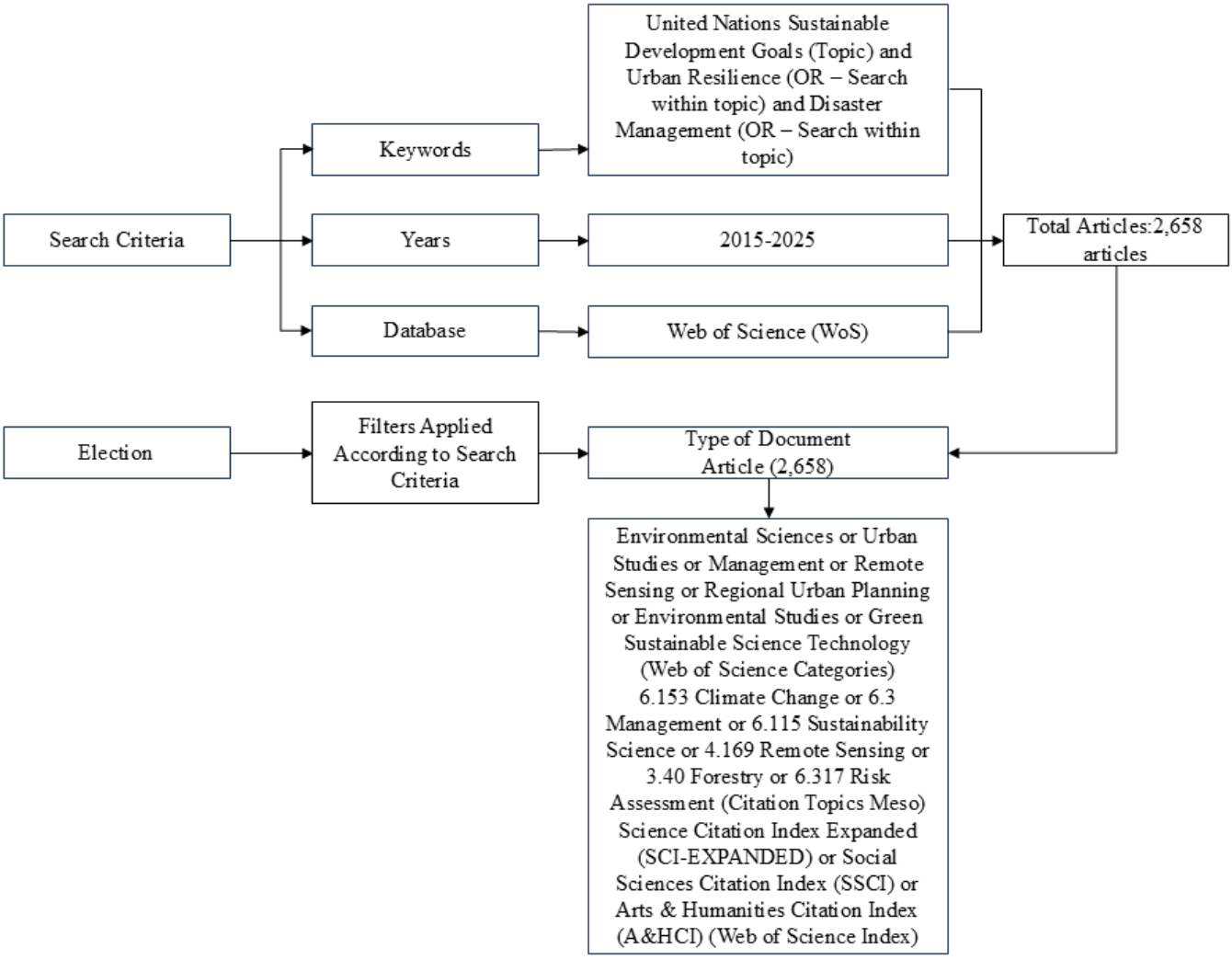


Figure 2. Flowchart (Workflow)

Figure 3 shows the distribution of academic studies published in various citation indexes within the scope of the analyzed literature. The most highly represented index is Science Citation Index Expanded (SCI-EXPANDED) with 1,951 studies. This is followed by the Social Sciences Citation Index (SSCI), which covers studies in the field of social sciences, with 1,845 studies.

Among the other indexes, Conference Proceedings Citation Index - Science (CPCI-S) has a limited place with 9 studies and Conference Proceedings Citation Index - Social Science & Humanities (CPCI-SSH) with 5 studies. Arts & Humanities Citation Index (A&HCI), which is in the field of arts and humanities, is represented by only 2 studies.

This distribution reveals that scientific publications are largely focused on the natural and social sciences, with less attention paid to the arts and humanities. Conference proceedings also make a relatively limited contribution.

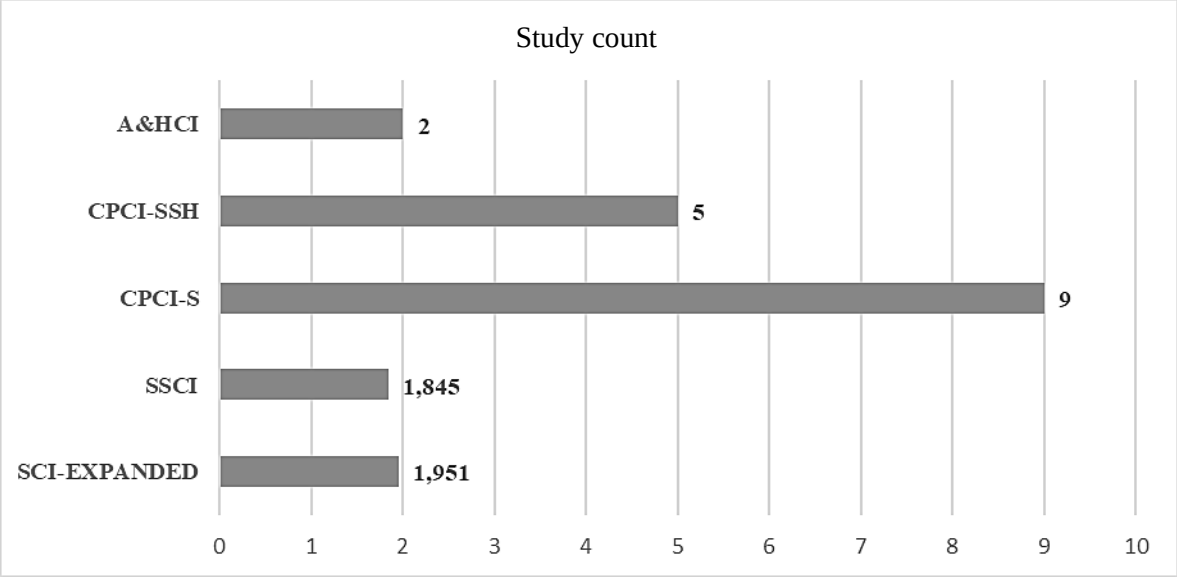


Figure 3. Index type of the studies within the scope of the reviewed literature

Table 1 includes the top 20 most cited SDG studies and related topics. Within the scope of the reviewed literature, it is determined that the articles in Table 1 address a wide range of important themes such as sustainability, urban resilience, green technology, climate change adaptation and environmental management. When the keywords and focal points are analyzed, it is seen that topics such as the applicability of the SDGs, resilience capacities of cities, nature-based solutions, sustainability reporting of companies and environmental quality are intensively researched.

The most cited article is Le Blanc's "Towards Integration at Last? The Sustainable Development Goals as a Network of Targets". This study examines the interconnections and integration potential of the SDGs and tops the list with 818 citations. The second ranked study, Meerow and Newell's 2019 [42deepened the meaning of urban resilience in the context of social-ecological systems and green infrastructure by addressing questions such as "for whom, when, where and why?". The study received 490 citations and explored critical elements of urban sustainability in detail.

In third place, Gupta and Vegelin's [43] paper discusses how the SDGs should be considered in the context of inclusive development and questions the relationship between growth and development in the Anthropocene era. This article received 414 citations. Frantzeskaki's [44] paper shares seven important lessons on planning for nature-based solutions in cities and provides a framework for practice in this area. Cited 397 times, this paper presents innovative approaches to climate change adaptation and urban resilience.

Another important study that stands out in the research is the article titled "Citizen science and the United Nations Sustainable Development Goals" published by [45]. This study addressed the role of citizen science in the achievement of SDGs and attracted attention with 351 citations. In addition, [46] study focused on issues such as land degradation prevention and land use planning within the framework of sustainable land management and ranked high on the list with 348 citations.

The study by [47], which examines sustainability trends, and the article by [49], which deals with integrated policy implementation, have also contributed to the SDG implementation and integration processes. These studies have become an important source of information in their fields with 331 and 322 citations respectively. [51] article on the relationship between urban ecosystem services and sustainability and governance received

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315 citations.

As a result, what these studies have in common is that they comprehensively address the applicability of the SDGs and their impacts in various fields. Themes such as climate change, green technology, nature-based solutions, and environmental stewardship are the main focus areas highlighted in these papers. These findings provide an important basis for understanding the impact of the SDGs on scientific research and practice.

Table 1. Top 20 most highly cited studies

Author Name, Year of Publication	Article Title	Document Type	Keywords	Citation Numbers
[41]	Towards Integration at Last? The Sustainable Development Goals as a Network of Targets	Article	sustainable development goals; sdgs; policy integration; sustainable development; development; science-policy interface	818
[42]	Urban resilience for whom, what, when, where, and why?	Article	urban resilience; urban sustainability; social-ecological systems; vulnerability; adaptation; green infrastructure	490
[43]	Sustainable development goals and inclusive development	Article	sustainable development goals; inclusive development; anthropocene; growth	414
[44]	Seven lessons for planning nature-based solutions in cities	Article	nature-based solutions; cities; climate adaptation; urban resilience; experiments; co-creation	397
[45]	Citizen science and the United Nations Sustainable Development Goals	Article	-	351
[46]	Land in balance: The scientific conceptual framework for Land Degradation Neutrality	Article	neutrality; land degradation; response hierarchy; integrated land use planning; sustainable land management; sustainable development goals	348
[47]	Assessing research trends related to Sustainable Development Goals: local and global issues	Article	sustainability; agenda 2030; sdgs; implementation	331
[48]	Beyond Cockpit-ism: Four Insights to Enhance the Transformative Potential of the Sustainable Development Goals	Article; Proceedings Paper	-	325
[49]	Integration: the key to implementing the Sustainable Development Goals	Article	sustainable development goals; means of implementation; integration; trade-offs and synergies; governance; human well-being	322

Author Name, Year of Publication	Article Title	Document Type	Keywords	Citation Numbers
[50]	New challenges for corporate sustainability reporting: United Nations' 2030 Agenda for sustainable development and the sustainable development goals	Article	corporate social responsibility; 2030 agendaglobal reporting initiative (GRI) guidelinessustainability reporting and accountingsustainable development goals (SDGs)	321
[51]	Resilience of and through urban ecosystem services	Article	resilience; urban ecosystem services; urban planning; governance; sustainability	315
[52]	The urban sustainable development goal: Indicators, complexity and the politics of measuring cities	Article	-	313
[53]	Green technological innovation, green finance, and financial development and their role in green total factor productivity: Empirical insights from China	Article	green productivity; green finance; financial development; green innovation	312
[54]	Resilience trade-offs: addressing multiple scales and temporal aspects of urban resilience	Article	climate change adaptation; resilience trade-offs; scales; sustainability transition; urban resilience	287
[55]	Tandem-L: A Highly Innovative Bistatic SAR Mission for Global Observation of Dynamic Processes on the Earth's Surface	Article	-	276
[56]	Mapping the Sustainable Development Goals Relationships	Article	sustainable development; sustainable development goals; relationships; synergies; trade-offs; correlation	275
[57]	Interdisciplinarity: Practical approach to advancing education for sustainability and for the Sustainable Development Goals	Article	interdisciplinarity; education; sustainable development; sustainability; mba; prme	274
[58]	Quantification of food waste per product group along the food supply chain in the European Union: a mass flow analysis	Article	food waste; mass balance; food groups; by-products; systematic accounting; food value chain	268
[59]	The imperativeness of environmental quality in the United States transportation sector amidst biomass-fossil energy consumption and growth	Article	biomass energy consumption; CO_2 emissions; fossil fuel energy consumption; real gdp; transportation; united states	268

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Author Name, Year of Publication	Article Title	Document Type	Keywords	Citation Numbers
[60]	How environmental taxes and carbon emissions are related in the G7 economies?	Article	CO_2 emissions; economic complexity; environmental taxes; energy usage; renewable energy; natural resources rent	250

Another finding from the WoS database is the distribution of the number of academic publications related to the UN SDGs (Table 2). SDG 13 on climate change is one of the areas that has received the most academic attention with 2,084 publications. It is followed by SDG 11 with 1,601 publications and SDG 15 with 1,561 publications. SDG 14 has created an important academic focus on aquatic ecosystems with 1,419 publications. SDG 2, which addresses food security and sustainable agriculture, stands out with 1,261 publications. Studies on innovation and infrastructure are prominent in SDG 9 with 987 publications, while SDG 7 on clean energy is represented by 493 publications.

SDG 6 on water management and access receives relatively moderate academic attention with 353 publications. SDG 8, which targets decent work and economic growth, is on the list with 258 publications. SDG 4 and SDG 5, which address education and gender equality, have been the subject of less research with 13 and 42 publications respectively. SDG 16, which focuses on peace, justice and strong institutions, is one of the least represented goals in academia with only 3 publications.

These findings show that environmental issues such as climate change, sustainability of cities and biodiversity are the focus of academic studies. In contrast, social goals such as gender equality, quality education and peace seem to receive less academic attention. This suggests that some goals need further research and offer opportunities for future work.

Table 2. Distribution of the number of academic publications related to the UN SDGs

SDG No	SDG Name	Number of Studies
01	No Poverty	86
02	Zero Hunger	1261
03	Good Health and Well Being	157
04	Quality Education	13
05	Gender Equality	42
06	Clean Water and Sanitation	353
07	Affordable and Clean Energy	493
08	Decent Work and Economic Growth	258
09	Industry Innovation and Infrastructure	987
10	Reduced Inequality	10
11	Sustainable Cities and Communities	1601
12	Responsible Consumption and Production	400
13	Climate Action	2084
14	Life Below Water	1419
15	Life On Land	1561
16	Peace, Justice and Strong Institutions	3
17	Partnerships For The Goals	17

*40 records (1,505%) do not contain data in the analyzed area.

As a result of the analysis using Vosviewer (1.6.20) and the criteria determined in the studies, the most co-occurring words are shown in the graph below (Figure 4).

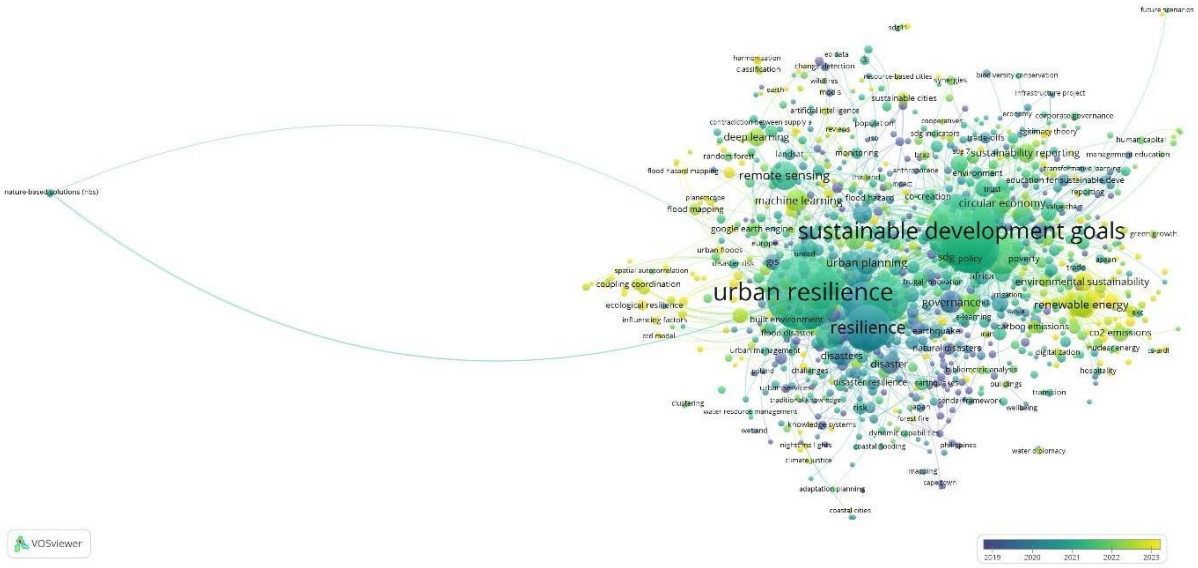


Figure 4. The most common keywords in the studies within the scope of the literature examined

Figure 4 illustrates the relationships between key concepts such as SDGs, urban resilience and nature-based solutions and the density of these topics in the scientific literature. Sustainable Development Goals (SDGs) and Urban Resilience stand out as the most central and dense concepts, highlighting the importance of these areas in the literature and their strong interconnections with each other. The concept of Nature-based Solutions is a bit more independent from the other key concepts, while nature-based solutions seem to occupy a unique place in the literature. The color gradient in the image reflects research trends by year. From 2019 to 2023, it can be seen that topics such as renewable energy, climate action and governance have received increasing attention. In conclusion, this network analysis provides a clear picture of how sustainable development, urban resilience and nature-based solutions are considered together in the literature and the evolving research trends in these areas.

Figure 5 shows the co-authorship networks between countries. The largest nodes represent countries at the forefront of academic production and collaboration. China (People's R China) and the USA have the largest nodes and are leaders in international collaboration. The United Kingdom (England), India, Germany and Australia are also important hubs. Co-authorship ties are concentrated between countries in Asia, Europe and the Americas. For example, there are strong ties between China and India, while the US has an extensive network of international partnerships.

Smaller countries have integrated into global cooperation networks by linking with large central countries. These findings reveal the importance of cross-country collaboration in scientific production and the central role of some countries in these collaborations.

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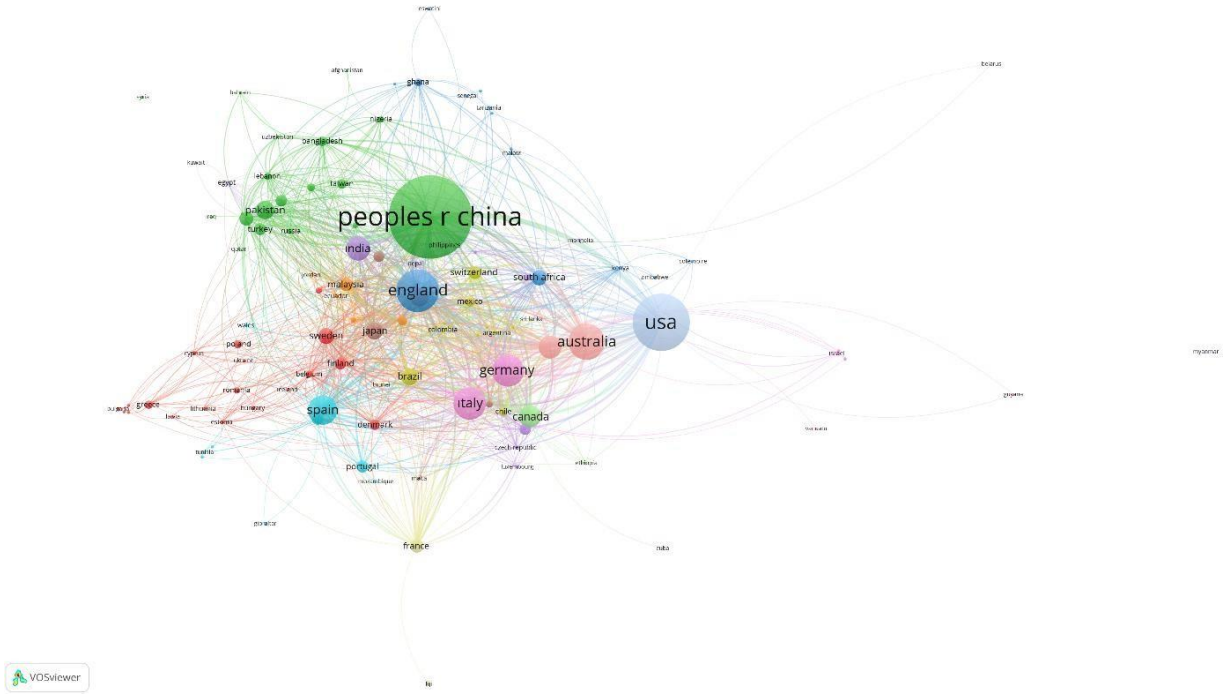


Figure 5. Co-authorship networks between countries

In Figure 5, Türkiye is included in the scientific co-authorship network and appears as a regional nexus. Türkiye appears to have developed collaborations especially with Asian countries such as Pakistan, India and Bangladesh, but also with European countries such as the UK, Germany and Italy. Türkiye's position in the network shows that it is active in terms of international cooperation, but has developed relationships that are more concentrated with specific countries rather than a central role in the scientific co-authorship network. In addition to its regional connections, Türkiye has the potential to engage in broader collaborations to strengthen its position in the global scientific network.

Figure 6 shows the network of co-authorship among authors in scientific studies. Bekun, Festus Victor, Gyamfi, Bright Akwasi, Gyamfi, Bright Akwasi, and Alola, Andrew Adewale stand out as central figures in the network, and these researchers have a wide network of collaborators. Authorship links reveal strong collaborations between researchers from different regions. For example, Leal Filho, Walter and Sharifi, Ayyoob, and others have notable connections within their sub-networks. This structure shows that international collaboration is widespread among researchers working in areas such as sustainability, climate change and urban resilience, and that certain names play a central role in these networks.

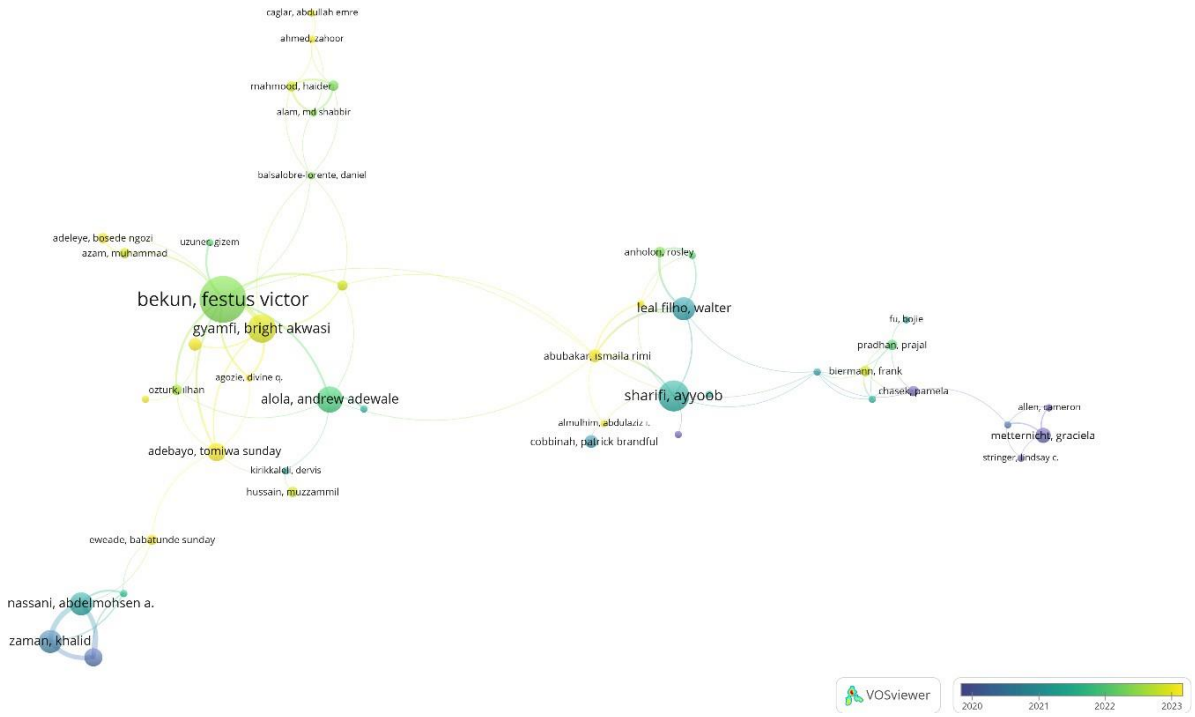


Figure 6. Co-authorship network between authors

Figure 7 shows the findings obtained using VOSviewer to visualize the scientific collaborations and citation networks between countries. Figure 6 allows to analyze the scientific impact of countries and their trends over time. In Figure 6, the scientific impact of countries is expressed by the size of the bubbles. Countries such as the USA, China and the UK are positioned in the center with larger bubbles, indicating their leading role in scientific production and more citations. This shows that these countries are also key players in international collaborations.

The colors in the image reflect the distribution of citations by year. Dark blue tones represent the year 2020, while light green tones represent the year 2023. This color scale allows us to analyze the change in the scientific impact of countries over time. For example, countries represented by light green tones have seen their scientific impact increase in recent years. On the other hand, countries represented by dark blue tones reveal that their scientific impact has been more concentrated in the past years.

The links in Figure 7 represent scientific collaborations between countries. It is particularly noteworthy that countries with large bubbles, such as the US and China, have dense networks of international cooperation. These countries are at the center of scientific work both at the local and international level. On the other hand, countries represented by smaller bubbles (e.g. Uganda and Zambia) have a lower influence in scientific collaborations. However, this does not mean that their scientific activities are completely neglected, but only that their share in global collaboration and citation networks is more limited.

Another noteworthy factor in the analysis is that Türkiye is referred to as "Turkey" and "Turkiye" in two different ways in academic studies. This situation indicates that there are naming inconsistencies in the data set and may have a negative impact on the accuracy of the analysis results. In order to correct such inconsistencies, it is important to name the studies as "Turkey" in order to obtain more accurate results in future studies.

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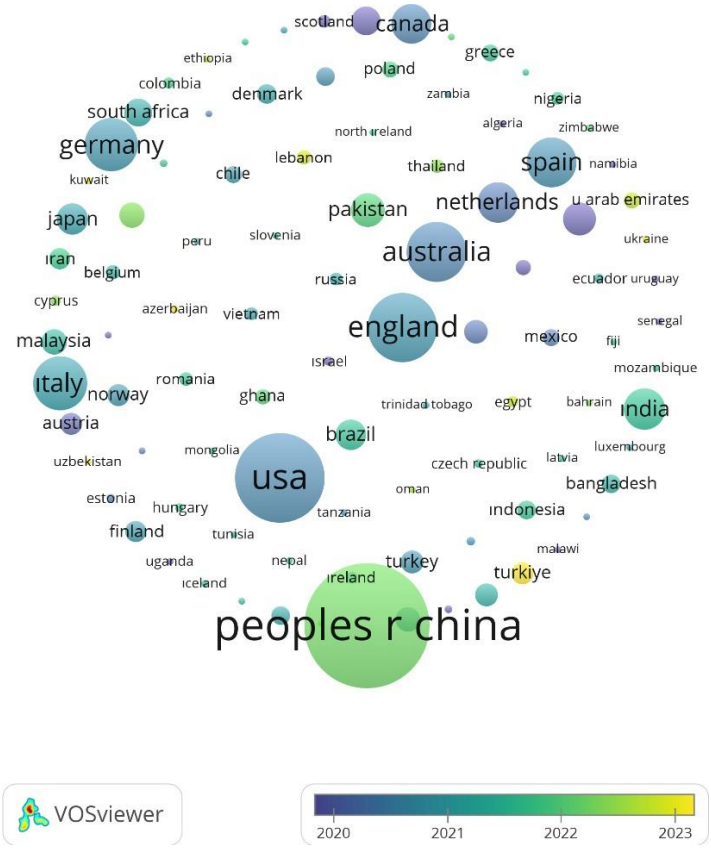


Figure 7. Scientific co-operation and citation networks between countries

As a result, Figure 7 serves as an important tool for understanding the geographical distribution of scientific collaborations and their trends over time. The leadership of countries such as the US and China in scientific production is clearly evident, and the increase in scientific contributions from developing countries shows that scientific activities are becoming increasingly inclusive. However, regions such as Africa and South America are often represented by smaller bubbles, pointing to the need to increase scientific collaborations in these regions.

3.2 Urban resilience and disaster management in Türkiye

Türkiye is located in a geography vulnerable to natural disasters and faces a significant challenge in disaster management and urban resilience due to rapid urbanization processes. The 2023 Kahramanmaraş earthquakes have once again highlighted the extent of this vulnerability and the need to increase the resilience of urban areas. The United Nations SDGs provide an important roadmap for reducing disaster risks and building sustainable cities. In this context, examining academic studies on increasing urban resilience in Türkiye provides a basis for both evaluating current policies and shedding light on future practices. In this context, a bibliometric analysis was conducted with VOSviewer software, Türkiye's academic accumulation in this field was discussed and the results of the analysis of the studies contributing to the efforts to build more disaster-resilient cities were presented.

According to the data obtained from the WoS database, it was observed that Turkey was named in the studies with two different names. There were 52 studies as Turkiye and 49 studies as Turkey. Within the scope of the reviewed literature, Türkiye ranks 11th among the top 20 countries with 101 publications (Table 4).

Table 4. Country publication numbers

Queue	Country Name	Number	Row rows	Country Name	Number
1	China	690	**11**	***Türkiye***	***101***
2	USA	416	**12**	Pakistan	93
3	England	278	**13**	South Korea	91
4	Australia	224	**14**	Japan	85
5	Italy	192	**15**	Brazil	80
6	Germany	187	**16**	Sweden	73
7	Spain	170	**17**	South Africa	71
8	India	129	**18**	Saudi Arabia	62
9	Netherlands	123	**19**	Malaysia	61
10	Canada	119	**20**	France	59

An analysis of academic studies relevant to Türkiye shows that issues of global importance such as urban resilience, sustainable development, natural disaster management and energy transition are prominent. For example, Gangadhari and Karadayı-Usta [61] highlighted Türkiye's carbon reduction policies in achieving the SDGs while addressing the challenges faced in the transition to a net zero economy. Similarly, Elansari and Alzubi [62] emphasized the role of the UN SDGs in disaster management and examined Türkiye's contributions, particularly in the context of SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action).

Urban resilience and natural disaster preparedness efforts have become more important following the 2023 Kahramanmaraş earthquakes. In this context, Fan and Abbas [63] examined the effects of organizational and environmental factors on post-disaster recovery and discussed how Türkiye can benefit from international experiences in terms of urban resilience. Furthermore, Akkus and Çaliyurt [64] focused on how sustainable entrepreneurship can contribute to UN goals and highlighted Türkiye's innovative solutions in this field.

Türkiye's international academic collaborations are also noteworthy. Collaborations with countries such as Germany, the UK and the USA have led to significant progress on issues such as climate change, energy transition and disaster risk management. For example, Satiroğlu [65], in his study on integrated coastal zone management in coastal Türkiye, has shown how both local and international expertise can be brought together.

These studies reveal that Türkiye is both contributing to global goals and generating solutions to critical problems at the national level. Increasing interdisciplinary and international cooperation in areas such as sustainable development and disaster management will accelerate progress in this field and bring Türkiye to the center of these issues.

According to the VOSviewer analysis, the keyword cloud in Figure 7, which examines urban resilience and disaster management efforts in the Turkish context, reveals key themes that strongly relate to the SDGs. The phrase "Sustainable Development" is at the center of the visual, indicating that these efforts directly contribute to SDG targets 11 and 13, in particular "Sustainable Cities and Communities" and "Climate Action". Concepts such as renewable energy, environmental sustainability and carbon reduction emphasize that research in this field focuses on reducing environmental and climatic impacts.

While disaster management stands out as a priority area for Türkiye, which is highly prone to natural disasters, expressions such as economic growth and financial development indicate that these efforts are also linked to economic dimensions. Moreover, concepts such as ecological footprint and environmental quality reflect the

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sensitivity of sustainable development efforts on environmental impacts. The links between keywords reveal that international cooperation and trade policies play an important role in Türkiye's sustainability and disaster management efforts. Overall, this visualization shows that Türkiye's research in the fields of sustainable development and disaster management is in line with global goals and is having an increasing impact in these fields.

Figure 8 shows a keyword co-occurrence network from a bibliometric study focused on Türkiye, revealing significant clusters and themes related to sustainability. The central keywords, such as "renewable energy," "sustainable development," and "environmental sustainability," dominate the network, emphasizing their critical role in research associated with Türkiye. The interconnectedness of terms like "CO2 emissions," "economic growth," and "SDGs" suggests a strong focus on the relationship between environmental goals and economic development.

Moreover, the inclusion of "disaster management" and its linkage to "Türkiye" highlights the regional focus on addressing natural disasters within the broader sustainability framework. The timeline gradient indicates increasing attention to keywords such as "carbon reduction" and "clean energy" in recent years. Overall, the analysis underscores a dynamic integration of global sustainability themes with localized priorities in Türkiye.

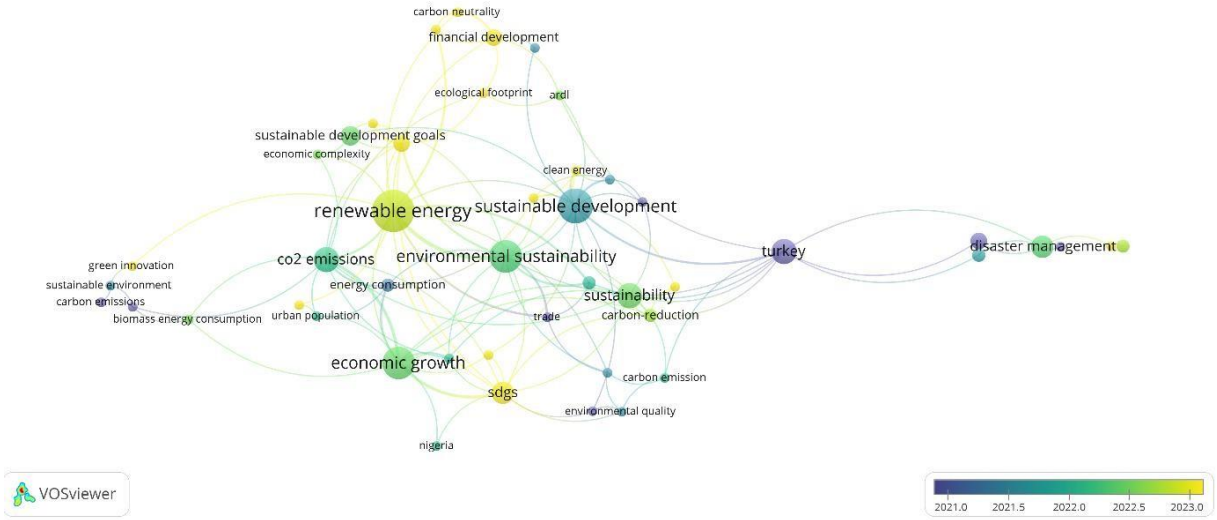


Figure 8. Cloud of keywords in urban resilience and disaster management studies covering Türkiye

In Figure 9, this analysis with VOSviewer visualizes Türkiye's international collaborations and co-author networks in urban resilience and disaster management studies. Türkiye, represented by the nodes "Turkey" and "Turkiye", occupies a central position in both regional and global collaborations. The "Turkiye" node shows particularly strong connections with countries in the Middle East, Central Asia and South Asia, while the "Turkey" node emphasizes relations with Europe, North America and some Asian countries. Turkiye's strong ties with countries such as Azerbaijan, Lebanon, Pakistan and Saudi Arabia reveal an important network of cooperation in regional development, disaster management and sustainability. In addition, collaborations with countries such as Russia, Italy, Denmark and Japan support knowledge and experience sharing at the global level. The shades of color show how these collaborations have evolved over time and reveal that Türkiye has taken an increasingly active role in international academic work in recent years. This analysis is valuable in demonstrating Türkiye's strategic importance in global networks in the context of the SDGs and its contributions to knowledge production

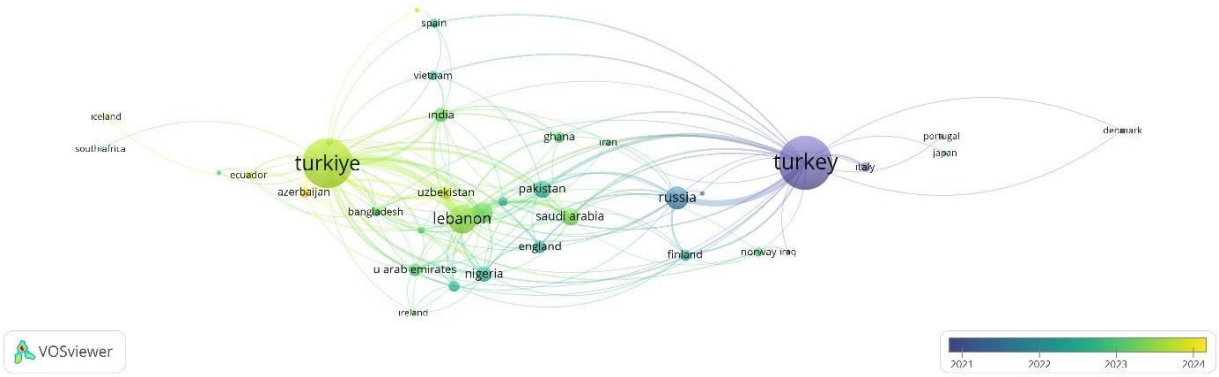


Figure 9. Türkiye's international collaborations and co-author networks

4. Conclusion and Suggestions

This study on urban resilience and disaster management has shown that addressing the issue in the context of the UN SDGs is a critical requirement for cities to become both more resilient and sustainable. The findings of the study point to the need to develop strategies to increase the applicability of SDG 11 and SDG 13 targets in particular. While the trends highlighted in the literature review emphasize the importance of interdisciplinary collaboration in disaster management and urban resilience, there are still significant research gaps in these areas that need to be addressed. In particular, the under-examination of social and economic dimensions makes it difficult to integrate existing approaches with the principles of social inclusion and equity.

Analyses of Türkiye show that the country is highly vulnerable to natural disasters, and events such as the Kahramanmaraş earthquakes have made the need to increase urban resilience more visible. However, it is noteworthy that despite Türkiye's potential to play a central role in international academic cooperation networks, its effectiveness in these networks is limited. Nevertheless, Türkiye's experiences in post-disaster recovery processes can provide valuable contributions to the international literature. The study also emphasizes that improving technological investments such as early warning systems and data analytics can increase the effectiveness of disaster management strategies. In this context, improving the existing technological infrastructure and implementing innovative methods will be an important step towards reducing disaster risks.

Based on the research findings, a series of recommendations can be offered to address the fundamental gaps in urban resilience and disaster management. First, new research frameworks should be developed to enhance interdisciplinary collaboration. Studies that bring together different fields such as engineering, environmental science, sociology and economics will make disaster management approaches more comprehensive and holistic. Secondly, a more in-depth examination of social and economic impacts may allow for more effective planning of post-disaster recovery processes. In this context, policies and practices focusing especially on the needs of disadvantaged groups should be prioritized. Moreover, establishing training programs and technical support mechanisms to increase the disaster management capacities of local governments will accelerate the achievement of SDGs.

On the other hand, expanding Türkiye's international academic cooperation networks can enable the sharing of scientific knowledge and the development of more effective policy recommendations. Developing joint projects, especially with European and Asian countries, will increase the capacity to generate innovative solutions to global climate change and disaster management problems. Strengthening social participation is also an important part of these processes. Disaster awareness-raising programs and involving citizens in

decision-making processes at the local level can play a key role in increasing urban resilience. Increasing the use of technology and encouraging investments in areas such as data analytics, remote sensing and early warning systems will provide significant gains in both risk reduction and response processes.

In conclusion, this study provides a valuable guide for the development of effective policies in the fields of disaster management and urban resilience at global and local levels. In particular, integrating Türkiye's existing experiences with the international literature to produce more inclusive and innovative solutions can make a significant contribution towards achieving the SDGs. In this respect, the proposed strategies will be a guide not only for academic studies but also for policymakers and practitioners.

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