# The Use of *Twitter* by Official Institutions in Disaster Risk Communication and Resilience

## A Case Study from Turkey

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**Abstract:** This study aims to explore the use of Twitter by Disaster and Emergency Management Authority (AFAD) in 2021, which is determined as the year of disaster education. Within the scope of this study, the tweets of the AFAD Presidency in the media section between January 1, 2021, and December 31, 2021, were examined. The tweets were categorized considering hazard types (geological, hydrological and climatological, biological, technological accidents and Chemical Biological Radiological Nuclear (CBRN), forest fires, migration, and other) and phases of the

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disaster management cycle (pre-disaster (mitigation, and preparedness), response, and post-disaster recovery). Five hundred and eighty tweets related to disasters were identified including the number of 88 disaster irrelevant tweets. Most of the tweets were related to hydrological and meteorological hazards. Regarding the biological disaster-induced COVID-19, only two tweets specific to the response process were identified. This study provides an overview of the characteristics and the potential role of social media in risk communication. These institutions can provide the risk information and work closely with the media to reach and share with the community.

*Keywords*: Disaster; risk communication; Twitter; community-based resilience; Turkey.

## 1. Introduction

### 1.1. *Risk Communication and Social Media*

Risk communication is a social process that involves informing and influencing people about hazards, changing their behaviors (risk information and education) and participating in decision making and planning (risk management). Although it varies by country, the dynamic source of risk communication is generally the media that informs and warns the majority of people on disasters.[1–3] Despite this important role, media usually covers disasters that have an impact on communities as they occur. Therefore, studies show that most of the news items focused on response and recovery with only a small proportion emphasizing mitigation and preparation.[4–8]

Social media refers to internet-based applications that enable people to communicate and share information. Examples of social media include blogs, discussion, and chat rooms, Wikis, YouTube, Channels, LinkedIn, Facebook, and Twitter. With the rapidly growing number of social media users worldwide, recently social media have increasingly become a major information source and a way of communication about disaster preparedness and warning.[3,9–11]

Social media plays a greater role in risk communication as an interactive communication tool for sharing information and exchanging messages between individuals, audiences, organizations, and public sectors about disaster issues.[12,13] The latest social media technologies allow sharing of information more rapidly and extensively, even during a disaster.

People who experienced a disaster use social media tools to inform their relatives that they are safe, help them think, and feel more supported.[14,15] One of the primary concerns is safety information. During a disaster, people want to know immediately whether their family and friends are safe. Therefore, social media applications such as "Twitter" have been more common in reaching and communicating with people during disasters.

Social media platforms have the feature to contribute to every stage of the disaster. Especially with the more effective use of Twitter during the risk and crisis management period, coordination between the public and the institutions can be ensured, and intervention and aid processes can be continued quickly and safely. Announcements to be made to the public through warning and alarm systems can be shared within the accounts opened on Twitter and this account can be followed. The use of social media in recent disasters around the world has been well documented.[11]

The evolution of new communication technology, such as social media technologies, offers more opportunities for two-way mediated communication. As opposed to the previous iterations of internet websites and applications, many social platforms and services provide more dynamic content, graphics, games, audio, and video, providing a richer user experience. These new technologies can affect how individuals learn, interact, and organize.[9] Social media can be used in disaster risk reduction and crisis response in different ways. This usage includes (i) a listening function, (ii) monitoring a situation, (iii) integration of social media into emergency planning and crisis management, (iv) crowd-sourcing and collaborative development, (v) creating social cohesion and promoting therapeutic initiatives, (vi) the furtherance of causes, and (vii) research.[13]

On an organizational level, social media use for emergencies and disasters can be divided into two main groups. First, by way of incoming messages, wall posts, and polls, social media can be used rather passively to disseminate information and obtain user response. The systematic use of social media as an emergency management tool is a second strategy. The systematic use of social media involves (i) using it for emergency communications and warnings, (ii) using social media to collect victim assistance requests, (iii) checking up on user activity and postings to establish situational awareness, and (iv) using uploaded photos to estimate damage.[16]

Social media have already demonstrated their use during disasters but also have the potential in helping build community disaster resilience.

Therefore, the five key characteristics of social media: Collectivity, connectedness, completeness, clarity, and collaboration lend themselves to be used increasingly to support disaster management functions in information dissemination, disaster planning and training of preparedness, response and recovery phases, participatory developing strategies and policies, and collecting and disseminating risk information.[6] Effective risk communication is one of the keys to individual participation in disaster management. As people who interact regularly and share a concern or ideas for something they may learn and practice how to do it better.[17] Social media can easily improve community resilience-building before, during, and after a disaster.

### 1.2. *Disasters and Turkey*

Disasters have continued to have a profound impact on society in the twenty-first century. Turkey has been impacted by several natural hazards, including earthquakes, landslides, and floods.[18] Between 2000 and 2018, the two most common disaster types were flooding (22 occurrences and 34% of all disasters recorded) and earthquakes (21 occurrences and 33% of all disasters recorded). Even though the number of occurrences for floods and earthquakes is nearly equal, the latter is far deadlier, with 950 fatalities (68% of all fatalities recorded) between 2000 and 2018, compared to 246 fatalities (18%) from floods.[19] The most destructive earthquakes were the Erzincan Earthquake in 1939 killing 32,962 people and the Marmara earthquake in 1999 killing 18,373 people. The recent earthquakes in the country were the Van earthquake in 2011 killing 644 people and the İzmir earthquake in 2020 killing 117 people.[20]

Meteorological hazards constitute the recent majority of disasters. In the last 20 years (2001–2020), there were 999 natural hazard events in Europe, of which 951 were weather-related, meaning they belonged to the natural hazards' subgroups meteorological, and/or climatological.[21] In Turkey, a total of 984 disasters with meteorological hazards has been reported in 2020.[22] A total of 297 severe cases of precipitation/flood disaster in 2020 have been reported. Storm-related disaster is in second place with 262 events. Storms and floods were observed in most parts of the country in 2020. A series of large forest fires occurred in many places such as Manavgat, Marmaris, Koycegiz, and Bodrum, in the south and southwest regions of Turkey in 2021. As of August 14, 2021, the total burned area was determined as 177,456 hectares.[23]

Disaster and Emergency Management Authority (AFAD), which is under the Ministry of Interior, is the leading disaster institution in Turkey. AFAD is responsible for preventing disasters and minimizing disaster-related damages, planning and coordinating post-disaster response, and promoting cooperation among various government agencies.[24]

The year 2021 was declared as "National Disaster Education Year" by AFAD, with the aim of raising awareness of disasters in the society, creating a behavioral change in disaster risk reduction, and taking precautions. In this period, a number of disaster awareness training were held either in person or online. 10,172,478 citizens have received the training, and disaster awareness instructor training was provided to 9,355 personnel. Furthermore, the number of views of educational videos about disasters on social media has exceeded 5 million.[25]

## 1.3.  *Role of Media in Risk Communication*

Based on a study determining the Turkish newspapers between 2010 and 2012 for news about natural hazards, it was found that almost all of the news items and articles were straight reporting, and that only a few were providing information regarding disaster preparedness.[26] According to another study conducted by Tekeli-Yeşil *et al.*,[7,8] leading sources of information regarding pre-disaster information are clearly lacking, and media coverage tended to focus on the immediate impact of disasters and that disaster news was largely about what was happening at the time of the event. Furthermore, TV, newspapers, and the internet were among the top three sources of information about earthquake risk and how to cope with it in Turkey.[12]

In recent years, the internet has profoundly influenced the media sector in Turkey as it is in the world.[7] The media is the leading source of disaster information among the Turkish people. In studies by Inal-Onal *et al.*[27,28] determining differences in the preferences of information sources among young people in Turkey, it was found that online activities from education, public to business sector media with TV, Internet, and social media were the top sources of information for Covid-19 measures and disaster-related issues.

According to the statistics of 2020, Turkey is among the countries where people spend the most time on social media with an average of 2 h and 50 min per day. Twitter, a popular social network, has become one of

the most essential tools that are being followed by and is helpful in reaching out to the masses. Twitter has 340 million users worldwide. Twitter was launched in 2006. Turkey is the 6th country with the most users in the world with 11 million 800 thousand users.[29]

Hence, in this context, this study aims to explore the use of Twitter by AFAD in 2021, which is determined as the year of disaster education.

## 2. Methods

There are four options on the AFAD's home page that could be accessed: tweets, replies, media, and likes (Figure 1).

Within the scope of this study, tweets in the media section were examined. Since the Tweets page could be accessed retrospectively until July 15, 2021, the media section, which was accessible for the whole of 2021, was preferred. The media section contains videos and pictures. In addition, retweets were not examined within the scope of the study, and irrelevant messages such as condolence or congratulations messages were excluded. Within the scope of this study, the tweets of the AFAD Presidency in the media section between January 1, 2021, and December 31, 2021, were examined.

The tweets were categorized according to hazard types (geological, hydrological and climatological, biological, technological accidents and CBRN, forest fires, migration, and others). Although detailed information about the content is important, we were not able to analyze the content of tweets in detail. However, we categorized them in a broader concept



Figure 1.    The official Twitter account of AFAD.

according to phases of the disaster management cycle (pre-disaster (mitigation, and preparedness), response, and post-disaster recovery).

## 3. Results and Discussion

In 2021, 580 tweets were identified on AFAD's Twitter account, of which 88 were disaster-irrelevant. Hence, 498 tweets were considered within the scope of the study. When we analyzed tweets according to the disaster management process;

(i) *Pre-Disaster* (*Risk Reduction and Preparedness*): Based on the scope of the study, tweets belonging to the pre-disaster process related to different hazard types were determined. Most of the tweets were related to hydrological and meteorological hazards. It is seen that the majority of tweet messages are related to the other group of hazards and take place in the form of activities.

(ii) *During Disaster* (*Response*): There are also tweets about the response process. Regarding the biological disaster-induced COVID-19, only two tweets specific to the response process were identified.

(iii) *Post-Disaster* (*Recovery*): There is information about the houses, especially about the victims who lost their homes after the disaster.

No tweets related to technological accidents and CBRN were detected. Despite forest fires have been experienced so intensely, this limitation in the number of tweets is striking. There are also a limited number of tweets related to the disaster management cycle regarding forest fires and forced migration. The majority of tweet messages are in the other group (Table 1).

This study reveals that tweets made by AFAD differ according to disaster types and disaster management cycles.

Although AFAD is responsible for the main coordination of CBRN hazards, the authorized institution in the field of infectious diseases is the General Directorate of Public Health of Turkey. AFAD hasn't played an active role in the coordination during the epidemic and Turkey's Disaster Response Plan (TAMP) has not been implemented at that period.[24] For this reason, it is thought that AFAD's tweet messages did not sufficiently cover this topic.

Table 1.    Message Contents Based on Hazard-Type Versus to Phases of Disaster Management Cycle.

| Hazard | Pre-Disaster Risk Reduction and Preparedness | During-Disaster Response | Post-Disaster Recovery |
|---|---|---|---|
| Geological | • Video education earthquake (*n*:56)<br>• Earthquake preparedness (*n*:1)<br>• Disaster resistant structure (*n*:1)<br>• Exercise video AFAD Jandarma EGM (*n*:1)<br>• Rockfall risk reduction study with video (*n*:2)<br>• Compulsory earthquake insurance video narration (*n*:3)<br>• ABMODEX Exercise: (*n*:5) video (*n*:3) and interviews (*n*:2)<br>• AFAD mobile application introduction with video (*n*:4), without video (*n*:1)<br>• Earthquake observation station with earthquake solution video (*n*:1) | • Earthquake search and rescue efforts and financial support (*n*:10)<br>• Earthquake notification (*n*:3) | Housing supply to disaster victims with video (*n*:3) and without video (*n*:3) |
| Hydrological and Meteorological | • Video training and meteorological warning-storm (*n*:20)<br>• Video education and meteorological warning-flood (*n*:136), without video (*n*:4)<br>• Video education and meteorological warning-frost-icing (*n*:20)<br>• Video education and meteorological warning-avalanche (*n*:3)<br>• Video landslide training (*n*:4)<br>• Precautions against suffocation and help video (*n*:7) | • Flood search and rescue efforts (*n*:23), with video (*n*:9)<br>• Helping the person stranded in the snow (*n*:3) | • Housing supply to disaster victims (*n*:2)<br>• Tent city container house after flood (*n*:2) |

Table 1. (*Continued*)

| Hazard | Pre-Disaster Risk Reduction and Preparedness | During-Disaster Response | Post-Disaster Recovery |
|---|---|---|---|
| Biological | | Helping those in need during the COVID-19 process (*n*:1) with video (*n*:1)During the COVID-19 process, people from abroad were hosted (*n*:1) with video (*n*:1) | |
| Technological accidents CBRN | | | |
| Forest fires | • Citizen aid information in forest fires (*n*:1)<br>• Meeting on forest fires Manavgat (*n*:1) | • Response and rescue work in the fire that spreads to the houses from the forest fire with video (*n*: 2)<br>• Forest fire response work (*n*:9) with video (*n*:7)<br>• Distribution of citizen aid to forest fires (*n*:2) | Housing construction for those who lost their homes (*n*:1) |
| Migration | Pardus migration map started to be used (*n*:1) | The construction of briquette houses for Syrian immigrants continues with video (*n*:1) | |

Table 1.   (*Continued*)

| Hazard | Pre-Disaster Risk Reduction and Preparedness | During-Disaster Response | Post-Disaster Recovery |
|---|---|---|---|
| Organizational | • Collaboration help video (*n*:1)<br>• Collaboration studies (*n*:13)<br>• Disaster education center opening (*n*:1) with video (*n*:1)<br>• Disaster awareness area opening (*n*:1)<br>• Meeting on risk reduction (*n*:9) Meeting (*n*:13)<br>• Meeting with other countries (*n*:5)<br>• AFAD encourages volunteering (*n*:12)<br>• AFAD with a volunteer incentive video (*n*:13)<br>• Police search and rescue team inauguration (*n*:1)<br>• Disaster-themed slogan contest (*n*:1)<br>• Disaster awareness training video (*n*:12) without video (*n*:3) video narration for the disabled (*n*:1)<br>• Disaster training kit (*n*:2) with video (*n*:1)<br>• Disaster awareness studies (competition) (*n*:2)<br>• AFAD promotional video (*n*:1)<br>• Missing person search activity (*n*:3) with video (*n*:1)<br>• Information was given about the humanitarian aid activities carried out by AFAD (*n*:2)<br>• Ramadan parcel with video (*n*:1)<br>• Search and rescue work in the well (*n*:1)<br>• First aid training video in disasters (*n*:3) | • Assistance to the Overseas Flood Victims with the personnel (*n*:2); with video (*n*:2)<br>• Foreign food aid (*n*:1)<br>• Help with collaboration (*n*:2)<br>• Overseas personnel assistance (*n*:2)<br>• Overseas help video (*n*:2)<br>• Foreign aid (*n*:3)<br>• Awards (*n*:3) with video (*n*:1)<br>• AFAD simulation truck (*n*:2)<br>• Activity introduction (*n*:1)<br>• Ambassador hospitality (*n*:1)<br>• For the Benefit of Humanity (*n*:1)<br>• Coordinator of the Technology Competition (*n*:1)<br>• Teknofest (*n*:5) with video (*n*:1)<br>• April 23 enthusiasm for children in the terror zone (*n*: 1)<br>• The joy of Eid al-Fitr (*n*:1)<br>• Gökpınar lake cleaning video (*n*:1)<br>• Third national landslide Symposium (*n*:2) | |

Table 1. (*Continued*)

| Hazard | Pre-Disaster Risk Reduction and Preparedness | During-Disaster Response | Post-Disaster Recovery |
| --- | --- | --- | --- |
| | • ASASE2021 event (*n*:1)<br>• Project presentation about the Kusadasi gulf earthquake (*n*:1)<br>• Communication training video with 112 (*n*:2)<br>• Give way in traffic, holiday traffic poster (*n*:1)<br>• Search and rescue for person lost on glacier climbing (*n*:1)<br>• Donations deposited to the support account for floods and earthquakes are in tabular form (*n*:70)<br>• Mobile kitchen truck accreditation work with video (*n*:1)<br>• Disaster and resilience congress (*n*:3)<br>• Red Crescent aid activities with promotional video (*n*:2)<br>• AFAD personnel recruitment (*n*:1)<br>• Personnel training (*n*:3)<br>• AFAD's works with video (*n*:5) without video (*n*:6)<br>• TARAP activation (*n*:3) with video (*n*:1) | • Sampling planting work with video (*n*:1)<br>• Fire preparedness video training (*n*:3)<br>• Environmental pollution awareness (*n*:1) | |

As of January 24, 2022, it was reported that the total number of patients infected with coronavirus in Turkey was 10,339,097 and the total number of patients who died was 84,445. However, AFAD was found to be quite insufficient in the number of informative tweets about COVID-19.

When the messages are examined in the AFAD social media review, it is seen that AFAD uses a more active communication strategy in risk communication and uses social media mostly for providing information. AFAD sends warning messages, especially in advance of meteorological hazards. There were also posts about the emergencies and ongoing efforts regarding the Izmir earthquake. In AFAD's communication strategy, the message contents on earthquake and meteorological events provide brief information on risk reduction, response, and recovery efforts.

Some tweets gave information about training activities and seminars; in other words, social media is generally used effectively for disseminating information on prevention, emergency notification and improvement work.

AFAD actively uses the Twitter account in creating a risk perception and inducing individual capacity for prevention and resilience. In addition, it has been observed that traditional one-way communication, which includes top-down information flow, is used extensively as a form of communication. One-way communication tools are far from public participation in decision-making and risk communication processes. Ding and Zang[30] stated that there is insufficient access to resources in risk messages presented by authorities, which will cause the public to turn to less reliable sources to learn more about risk situations.

## 4. Conclusion and Recommendations

This study provides an overview of the characteristics and the potential role of social media usage in risk communication in disaster-prone Turkey. The most challenging issue of disaster risk management, which is risk communication aiming to motivate people for preparedness and enhance community resilience, would be easier with media. Social media is the fastest-growing part of the media. Social media has also evolved into an important communication tool in risk reduction and emergency management (sharing emergency information and coordinating community response) and community development (increasing social capital and improving social networks). Social media, like Twitter, is considered as an

information and education tool for official institutions dealing with disasters. Governmental institutions such as AFAD are using social media to manage risk communication, to engage with communities to participate in mitigation efforts to reduce disaster risk (structural and non-structural methods) and transform people to improve resilience through community development.

Social media can build the formation of social capital that is particularly related to one of the main goals for community development and disaster resilience. That can be enhanced through the relationships among people, during/after a disaster, and build up sustainable social networks as social resources to initiate resilience and recovery.[31] Social networks can form social capital to interact with others without the limitations of geography and lack of time and also encourage and sustain resilient communities.[3,32]

With improving technology, exposed information and themes via high-tech visual presentations help to get people's attention. The risk communication should be enriched with information based on hazard/ vulnerability data and local knowledge to cover the needs of communities during a further disaster, such as social characteristics (elderly/young people, without leaving no one behind) and circumstances based on physical vulnerabilities (location of risk areas, being in an old risky building, or poorer living conditions in a crowded public building).

Building the essential information on the premise of collective memory could also be useful for people that have experienced an earthquake, but for those who have not experienced any disaster, it does not mean much. The young participants showed less interest in disaster preparedness and related information. Special consideration should be given to this group; they have a different understanding and awareness of disasters and information to attract their attention. Therefore, Twitter, as a preferred social media tool for the younger use of social media in disaster and crisis situations, is a fast and effective platform.

Since reliable information is needed for efficient disaster management, social media can have negative impacts on response and recovery operations. Even though the content of the information usually provided within the media is restricted, it can reach vast numbers of people and compel them to search for further information from various sources. The characteristics of social media platforms allow anyone to post messages that

may spread false information and rumours.[33] The biggest threat during disasters is unreliable information which not only wastes limited human resources but also causes unnecessary anxiety, confusion, and distrust within the community, thus can even lead to chaos and calamities will arise.

In relation to the use of social media, local governments and non-governmental organizations should use it more actively and keep the information up-to-date while using it. Covering all types of hazards in their messages may also contribute improving the safety culture in the community. The communities should be also made aware that unnecessary use of the social media should be prevented in order to sort out the hashtags opened during a disaster, and the help messages sent to the relevant officials.

The media usually disseminate information without the assistance of governmental disaster institutions. The content they provide can be far away from providing helpful information about preparedness for a disaster. In order to achieve the partnership with media for better risk communication, also reaching their own community, and providing strategic ideas, institutions should understand the media.[7,8]

Post-disaster phases can open a window of opportunity for risk communication data. Further research on analyzing social media data would help to identify community needs, spatial and temporal scales of the disaster, how to respond to future disasters, maximize the immediate positive response of communities, to understand community dynamics, and predict what makes a community resilient. Finally, we recommend further studies that analyze the content of tweets in detail and investigate retweets. Such studies would give an understanding of the dynamics of the use of social media.

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