



A systematic review of the communication of dangers associated with climate change

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Abstract

The idea of disaster communication is frequent in conversations about climate change. For this reason, it is crucial to communicate the dangers of climate change to communities. This study is necessary to increase human capability, mainly through effective disaster communication, in order to assist society in developing the most effective long-term defense against the threats of climate change. The goal is to assist in creating strategies that will help society better deal with the effects of climate change. This study systematically reviewed past studies on climate change. The review revealed that climate change can enhance the prevalence of diseases, dwindling water resources, and loss of biodiversity. The study recommends that prior to a disaster event, mitigation activities could assist in lessening vulnerability to disaster impacts like property loss and fatalities. Minimizing losses during a disaster occurrence depends on comprehending and responding appropriately to warning messages. This study came to the conclusion that while sharing responsibility with citizens is the most effective strategy, disaster communication is crucial in efforts to reduce and manage the effects of climate change. As a result, addressing the changes and disseminating information about climate change requires an integrated approach. Communication then has to be a two-way process where society contributes to the formulation of strategies that affect their daily lives.

Keywords: Climate change, Communication, Disaster, Societies, Two-way process.

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1. Introduction

The way that the issue of climate change is communicated with communities is crucial. Climate change, defined by Arabadzhyan et al. [1] as a sudden shift in the average weather conditions experienced in a particular region over a period of time, has been identified as the cause of heightened frequency and intensity of widespread disasters like tropical cyclones. The World Economic Forum recently declared that climate change is one of the most important global risks that key decision makers will face in the years to come. According to Mutambisi et al. [2], climate change poses extremely dangerous global

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threats that require an immediate international response. Collier et al. [3] claim that health and life insurance may also be impacted by climate change. A recent study by Valverde Jr and Convertino [4] found that since 1990, at least 20 weather-related disasters have occurred each year that are severe enough for top reinsurers to classify them as major disasters.

It is almost impossible to discuss the environment without mentioning climate change, and conversely, it is almost difficult to discuss climate change without mentioning natural disasters. Policymakers have been sluggish to harmonize the legal processes addressing climate change and natural disasters, despite mounting evidence to the contrary [5, 6]. The problem of climate change and its effects has drawn more attention from governments, scientists, environmentalists, and specialists in disaster management throughout the past 20 years. Water supplies, agriculture and food security, human health, terrestrial ecosystems, and biodiversity are all severely strained by the global socioeconomic disruption caused by climate change [7]. According to Orimoloye et al. [8] and Xaba et al. [9], climate change is one of the largest threats to human development because it brings with it a number of disasters that have an adverse effect on the environment, which is essential to many human livelihoods, human health, and global food security.

The 17 Sustainable Development Goals (SDGs) are therefore focused on addressing climate change and its effects [10-12]. By enhancing human capability, particularly through participatory communication, societies can create the most effective long-term defense against the threats posed by climate change. This will help to improve health, end severe poverty, and slow down population growth. The goal is to assist in the development of strategies that will help societies better deal with the effects of climate change. Both directly and indirectly, effective communication can significantly lessen the detrimental effects of disaster climate events [13].

2. Role of Communication in Reducing Climate Events

There can never be a one-dimensional approach to solving climate change-related issues. Instead, addressing the changes and disseminating knowledge about climate change requires an integrated approach. In order for society to influence the development of strategies that impact their everyday lives, communication must be a two-way process [14, 15]. This two-way communication ensures that diverse perspectives are considered, allowing for more effective and inclusive strategies. Engaging communities in dialogue fosters collaboration and empowers individuals to contribute to climate solutions that resonate with their experiences. According to Bowden et al. [16], a communication approach that disregards society and focuses only on scientific facts and technocratic fixes without seeking public input is likely to face opposition and animosity. According to Booth et al. [17], disaster communication can help guide decisions for local ownership development and adaptation to climate change.

The four components of disaster management—preparation, response, recovery, and mitigation—are seen to be anchored by communication [18, 19]. The development of communication technology in the modern era has expanded the potential and effectiveness of disaster management, particularly in the areas of impact reduction and prevention. According to Collier et al. [3] and Brink and Wamsler [20], climate change communication can be a sustainable and successful strategy for mainstreaming climate change into development policies, mitigation and adaptation policies, and positive attitudes toward climate change mitigation. Adaptation processes have been proven to benefit greatly from the inclusion of participatory communication and communication for structural and sustainable social change at many levels of society [21, 22]. Thus, it is acknowledged that communication media and communication for development techniques are essential means of empowering people to participate in social and structural change, including that related to climate change risk adaptation and mitigation.

Effective disaster communication raises awareness and inspires households and the general public to plan for and lessen calamities [23]. According to Bowden et al. [16], the limits of traditional media in empowering the community may be unpacked through a democratic participatory strategy that takes into account the interests, capabilities, and cultural identity of local communities at all levels. As a result, communication media and communication for development strategies are acknowledged as essential channels for participation and empowerment in social and structural change, including that pertaining to disaster adaptation and mitigation due to climate change.

3. Media Use for Climate Change Communication

People have been able to communicate and exchange information online ever since social media emerged [24, 25]. During emergencies and disasters, social media is becoming a more crucial communication tool [26]. As a result, social networks enable both immediate news sharing and resharing as well as direct reporting. The audience is given the chance to actively participate in the generation of information rather than merely being passive consumers, thanks to this informal communication method, often known as "backchannel" communication, which also generates comments and discussion.

People may now communicate and exchange information online thanks to the growth of social media, especially Facebook and Twitter [27]. Through the exchange of web links, social networking enables information sharing to be quick and easy. In actuality, social networking provides information to people worldwide through common communication platforms, enabling users to submit and receive disaster-related information quickly [28]. This rapid dissemination of information can be crucial during emergencies, as it allows individuals to stay informed and coordinate responses effectively. Furthermore, the ability to share real-time updates fosters a sense of community and support among those affected by disasters. Saroj and Pal [26] aver that the public's need to use and keep an eye on social media platforms during disasters is still growing, particularly in light of officials' capacity to promote cooperative contacts across many disaster' governance facets.

For the relevant parties to plan their actions and make the right judgments, they need to know the facts of the current situation [29]. Such information must be accurate and timely to lessen the effects of disasters, particularly in terms of saving

lives. Following an incident, practitioners can improve emergency response communication networks by promptly utilizing social media. For example, real-time data directly gathered from social media over time gives first responders the chance to evaluate whether local cultures are important when it comes to enabling social media connections with important stakeholders like organizations and local governments. Additionally, practitioners can determine the most important stakeholders by using social network analysis using social media datasets [30]. There is no question that utilizing social media to its full capacity in disaster management will lessen the risk. Timely communication is necessary to achieve this.

4. Where and Who to Communicate Climate Change?

Climate change communication has never been simple [31, 32]. Now that climate change is becoming more of a lived reality rather than a theoretical issue, it is appropriate to consider if it will be simpler to discuss how we will respond to these developing effects. Positive attitudes toward climate change mitigation, in particular, can be achieved through climate change communication, which can be a durable and successful strategy for mainstreaming climate change into development programs [33]. As a result, communication media and communication for development strategies are acknowledged as essential channels for participation and empowerment in social and structural change [11, 34]. These strategies not only raise awareness but also foster a sense of communication platforms, stakeholders can effectively engage with diverse audiences, ensuring that the narrative around climate change is both inclusive and impactful.

Crosweller [35] and Thomas et al. [36] propose that disaster management leaders are a crucial component in responding to these ensuing repercussions. These executives take charge of the current systems that foresee the future to safeguard, maintain, or enhance well-being and reduce susceptibility to natural disasters. They play a vital role in coordinating resources, implementing effective strategies, and fostering community resilience. By leveraging their expertise, these leaders can significantly mitigate the impact of disasters and ensure a more sustainable recovery process. To influence investments for risk reduction, adaptation, response, resilience, and mitigation, these methods include program management, policy settings, and political advice. These leaders' choices and counsel can therefore have a big impact on how exposed communities and their surroundings are to the consequences of climate change. By promoting collaboration among various stakeholders, they can enhance the effectiveness of these strategies and create a unified front against potential threats. Ultimately, their vision and determination play a crucial role in shaping a future where communities are better equipped to face the challenges posed by a changing climate.

5. Perception of Danger and Response to Climate Change

One of humanity's biggest problems is now generally acknowledged to be climate change [37]. When it comes to assessing the degree of actual risk, perceptions of danger are crucial [38]. As people's inclination to accept, alter, or reject adaptive measures is influenced by their views, this has important ramifications for climate change adaptation. It is now well accepted that perceptions of danger are influenced by a variety of elements, including cultural, emotional, political, and social aspects [39, 40]. Understanding these influences can help policymakers design more effective communication strategies that resonate with communities. By addressing the specific concerns and values of individuals, interventions can be tailored to foster greater acceptance and implementation of necessary adaptive measures.

It can be presumed that the views and reactions of individuals at risk from climate change would align with those of numerous intervening organizations if they had access to and comprehension of scientific and technical explanations of the threat. According to Mutambisi et al. [2] and Valverde Jr and Convertino [4], a person's vulnerability may be decreased, maintained, or even increased by a climate response (coping and/or adaptation plan), which necessitates the operationalization of that strategy as well as the ability to react to perceived threats. This highlights the importance of not only having a plan in place but also ensuring that individuals and organizations can effectively implement and adapt these strategies in response to climate-related challenges. A well-informed and adaptive approach can significantly influence the overall resilience of vulnerable populations. By enhancing human potential, particularly through communication, societies can create the most effective long-term defense against the threats posed by climate change [15, 32].

As demonstrated by the protective effects of effective communication before, during, and after a disaster, investing in public communication can have a positive externality in reducing vulnerability and enhancing adaptive capacity [35, 41]. Mitigation measures taken before a catastrophic occurrence could lessen vulnerability to its effects, including injuries, property loss, and loss of life [17]. One efficient mitigation strategy is to avoid constructing in high-hazard locations. Minimizing losses during a disaster occurrence depends on comprehending and responding appropriately to warning information [19]. Recovery and the effects of the disaster are the primary concerns of the post-disaster era. The effects of disasters include both social and physical effects [22]. Physical effects include harm to infrastructure, agriculture, and the environment, as well as casualties (mortality, injury, and illness) [40]. Social implications include political, economic, demographic, and psychological elements [42].

Effective climate change adaptation is extremely unlikely to be accomplished unless local priorities and beliefs receive much more attention [6]. Perceptions of climate change among at-risk individuals are likely to result in actions that only produce temporary benefits. As favorable side effects remain the same or even increase, climate vulnerabilities may decline while people locally manage everyday non-climate threats. Many initiatives that aim to protect at-risk individuals maintain vulnerability by failing to take into account their perceptions of climate change and local cultures [34].

Social and cultural factors, including beliefs, practices, identity, norms, religion, social organization, and values, are closely intertwined with perceptions of threat and responses to climate change [43]. Understanding why people view and react to climate change concerns in specific ways depends heavily on cultural influences. Effective and high-quality

emergency management requires culturally sensitive and flexible communication. On the other hand, communication that lacks cultural awareness could lead to unfavorable outcomes in emergency management [44]. Cultural misunderstandings can cause disputes, make it difficult for different stakeholders to coordinate, and slow down the disaster response process. The risen question is, how best to manage disasters associated with climate change?

6. Management of Disaster Associated with Climate Change

Disaster management includes operational activities in disaster prevention, response, recovery, mitigation, and early warning [45], administrative choices [46], and strategic planning [47]. The ideal way to address the challenging and intricate characteristics of the disaster management system would be to engage in responsibility sharing and collaborative bargaining with a variety of stakeholders [35]. Frameworks for inclusive governance that involve widespread citizen participation in the disaster management policy-making process are necessary for such negotiations.

It has been determined that fostering resilience requires shared responsibility. Every societal group has responsibilities when it comes to disaster management, according to the concept of shared responsibility [48, 49]. Governments and their agencies must specify exactly what is expected of them when prescribing them, as well as the repercussions, in order for this to be feasible. Natural disasters push the boundaries of national governments and emergency services, and shared responsibility serves as a means for all parties to contribute to disaster resilience De Vet et al. [50]. Monteil et al. [51] claim that shared responsibility is a metaphor for rethinking responsibilities and roles in disaster management. Atkinson and Curnin [48] add that States are ultimately in charge of lowering the risk of disasters; governments and pertinent stakeholders share this duty.

According to Crosweller and Tschakert [49], disaster reduction is a shared responsibility that is frequently not distributed evenly. Although communities and individuals have their roles to play, they lack control over many of the levers that are necessary to lower the chances of some disasters. To limit negative effects on communities, governments and industry in particular must work together to mitigate disaster risks that are under their control. Conflict over accountability also occurs when working with the private sector [2]. Consequently, the private sector is necessary to improve disaster preparedness for efficient response, in addition to having the ability to aid or hinder the future effects of disasters.

It would be impossible to debate the term "disaster" without bringing up its four components: preparedness, response, recovery, and mitigation [52]. Communication is the thread that connects the four after it is realized that they are interrelated. Because of this interconnection, effective communication networking is necessary before successful outcomes from disaster management initiatives can be assured. According to Vashishta and Chadda [6], every precaution taken by disaster management professionals prior to a disaster occurs is primarily intended to lessen the impact of the disaster on those who are most at risk and to minimize the socioeconomic repercussions on the impacted population.

Additionally, preparedness is critical to pre-disaster programs because it improves managerial and technical efforts to respond to emergencies and disasters by strengthening staff capability [44, 50]. Planning, emergency personnel training, warning systems, emergency communication systems, evacuation plans, and training are all part of the preparation process. Disaster response and recovery, according to He and Faure [41], are the comprehensive, urgent measures implemented by the government, agencies, and specialists in disaster management to provide for the fundamental needs of disaster victims until more long-term, sustainable solutions are developed. The objectives are to ensure the survival of a sizable population, promptly restore vital services, replace and repair damaged infrastructure, and restart economic activity in order to prevent or lessen recurrence. It is vital to stress once more that effective, transparent, and timely information sharing is essential to the four stages of the disaster management process. This is true not just for disaster managers but also, and perhaps more crucially, for those who are most at risk.

7. Conclusion

In an effort to reduce and control the effects of climate change disasters, disaster management is essential, but the best way to do this is through shared responsibility with citizens. Addressing the changes and disseminating knowledge about climate change requires an integrated approach. In order for society to influence the development of tactics that impact their everyday lives, communication must be a two-way process. As a result, disaster communication can be seen as essential to risk monitoring, disaster assessment, disaster control, and reviewing planning frameworks in the fight against climate change. It goes without saying that disaster communication is a more affordable option than regulatory frameworks for reducing health and environmental hazards and is integral to effective decision-making in climate change action.

To fully utilize the adaptive ability that already exists, scientifically based climate change information needs to be presented in a way that speaks to local perspectives and gives local groups the confidence to use their skills. It takes time and effort on the part of individuals and organizations to build the confidence and skills necessary to effectively communicate climate change for adaptation and resilience building. This process often involves collaboration among scientists, community leaders, and stakeholders to ensure that the information is relevant and actionable. By fostering these connections, communities can develop tailored strategies that not only address their unique challenges but also empower them to take proactive steps in mitigating the impacts of climate change. Therefore, facilitators need to be able to choose climate change information that are most pertinent to the circumstances of a particular community.

Devastating outcomes can result from inadequate disaster communication [28]. One option might be to hold locals more accountable for their evacuation choices. This is consistent with the demand for warning systems that are people-centered. These methods are predicated on the idea that including people in choices and actions empowers them and makes disaster reduction procedures more successful. In addition to involving the public as partners, practitioners and local authorities should share decision-making authority with the public while considering their needs and viewpoints.

Long-term procedures and a clear understanding of the advantages for participants are required to encourage people to actively participate in disaster management. Social media, smartphone applications, and new information and communication technologies may empower people and provide them access to knowledge concerning disaster assessment. Establishing suitable responsibility frameworks and determining the most effective means of disseminating information regarding uncertainty are both essential for improving communication procedures. These strategies not only enhance engagement but also build community resilience by ensuring that individuals feel informed and prepared. By fostering a culture of collaboration and open dialogue, disaster management efforts can become more inclusive and effective, ultimately leading to safer and more resilient communities. Better methods should be adopted to educate people about the costs of their choices and the precautions they need to take, enabling them to make wise and responsible decisions for their own safety in an emergency.

The study concludes that preventive measures could help reduce susceptibility to the effects of a disaster, such as loss of life and property. Minimizing losses during a disaster occurrence depends on comprehending and responding appropriately to warning messages. Recovery and the effects of the disaster are the primary concerns of the post-disaster era. One efficient mitigation strategy is to avoid constructing in high-hazard locations. Increasing adaptive capacity and decreasing susceptibility are two benefits of investing in public awareness through communication. According to this study, planning, carrying out, and overseeing responses to climate disasters should involve those who are most at risk. This will aid in the development of an awareness of local risk perceptions, which frequently give significant weight to non-climate disasters that must be incorporated into climate disaster responses.

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