

Awareness of Climate Change Through Social Media Platform: A Case of Khyber Pakhtunkhwa

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<https://doi.org/10.62345/jads.2025.14.3.65>

Abstract

The issue of climate change is rapidly becoming a serious and complex problem in Pakistan. The country has been experiencing the deterioration of its condition for many years. Although those in charge of government policies and attorneys have made efforts to mitigate these threats, in several aspects, they have not been very effective. This is primarily because individuals lack sufficient knowledge about climate literacy (Jan et al., 2020). This paper examines the current state of climate change awareness in KPK, as well as the role of social media and social activists in promoting environmental awareness and media literacy. The results, which were the outcome of a qualitative, descriptive, and analytical approach to the study, demonstrated that a general lack of awareness of climate-related problems among the population is a significant drawback to the effectiveness of these undertakings. The social media campaign on environmental awareness needs to be initiated by the people themselves, rather than by policymakers or elites. Climate literacy should be promoted using readily available methods, such as social media. The report emphasises the need for nationwide plans to increase knowledge about climate change and media literacy, aiming to equip local communities with the necessary tools to address the pressing climate problem.

Keywords: Social Media, Climate Change, Education, Awareness.

Introduction

The modern perception of climate change is primarily concerned with the effects of anthropogenic activities on natural ecosystems. Climate change is now widely regarded as one of the most severe issues humanity has ever faced (IPCC, 2023). People have long discussed the issue of climate variability, but it was not until the 1980s that concern about it began to emerge (Carter et al., 2023). Ever since, concerns among environmentally conscious people and scientists have grown increasingly about the impact of human activity on the climate system. These impacts have become significant challenges to the planet's geophysical, social, and economic stability. To emphasise the urgency of action, former United Nations Secretary-General Antonio Guterres stated that climate change is outpacing us and urged immediate action (Guterres, 2018). He also emphasised the fact that damage may be irreversible unless something is done immediately. According to the United

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Nations Framework Convention on Climate Change (UNFCCC, 1992), climate change is defined as a change of climate that is directly or indirectly caused by human activity that brings about the alteration of the overall composition of the global atmosphere, in addition to natural climatic variability over a period of similar time. Climate change is a current phenomenon that refers to enduring shifts in the patterns and temperatures of weather.

Climate change has a significant impact on human settlements, agriculture, water resources, and energy provision. Developing countries contribute less to global greenhouse gas (GHG) emissions than industrialised countries, although they are more vulnerable because their economies rely heavily on climate change-sensitive sectors, including agriculture and water resources (Javed, 2016). A good example of this trend is Pakistan, which ranks sixth in the world as the most vulnerable nation to disruptions caused by climatic conditions. Notwithstanding the progress these institutions have achieved, the campaign to raise public awareness and climate literacy remains incredibly difficult to implement policies. Teaching people more about climate change is essential because it encourages everyone to participate in addressing environmental concerns and act responsibly.

The two key methods through which people worldwide are addressing climate change are mitigation and adaptation. Mitigation entails measures aimed at reducing greenhouse gas emissions to prevent further accumulation of gases in the atmosphere and to ensure that climate-related issues do not escalate. However, there is no time to lose, as much of the artificial greenhouse gases have already been released and are already trapped in the atmosphere; this means there is a need to adapt. Adaptation involves changes in biological, social, and economic systems to enhance resilience to climatic variability and extremes (Anderson, 2010). Both methods, mitigation and adaptation, require a large pool of climate knowledge among the general population, scholars, and key policymakers. The insufficiency of integrated awareness and participation in addressing climate change across various sectors is also an inhibiting factor in Pakistan's ability to develop a viable response.

This is particularly detrimental to food security and water supply due to climate change. Extreme weather occurrences, such as floods and cyclones, have become more frequent and intense due to changes in monsoon patterns, the melting of glaciers, and rising sea levels. This has been more affecting the developing countries (Scheffran, 2011). The reactions of society towards environmental risks are affected by cultural perceptions. The Cultural Theory of Risk, as proposed by Douglas and Wildavsky (1982), posits that a community's cultural norms and beliefs shape its perception of environmental risks. Such cultural systems influence people's perceptions of the dangers and methods for minimising or adjusting to them as acceptable, as well as the manner in which societies make decisions on the first move to take. Organisational cultures can be either beneficial or counterproductive to the development of effective and sustainable climate policy. This is an indication of the significance of addressing climate change in culturally and socially acceptable ways.

Problem Statement

KPK is highly susceptible to the impacts of climate change, including heatwaves, water scarcity, desertification, coastal erosion, and urban flooding. Nevertheless, the residents of the region remain unaware of climate change and how to appropriately address it. The leading causes of this knowledge gap are the absence of systematic climate education in schools, the inability of local governments to participate effectively, the limited use of local media to deliver climate-related information, and the limited role of civil society in promoting climate awareness. Due to this fact,

the majority of approaches to addressing climate change in KPK are reactive rather than preventive. Adaptation solutions and implementation of policies within a community are not effective when citizens are not well-informed and empowered. It is essential to address these deficiencies in the system to achieve climate resilience and sustainable development in the region. The objective of this research is to explore the root causes of climate illiteracy in KPK and to provide viable solutions to increase awareness and engagement among the population.

Objective of the Study

To evaluate the current levels of climate change awareness and literacy levels among the general population in KPK. To identify systemic and structural issues that cause people in the province to learn about and discuss climate change. To provide viable means of making people climate literate and engaged at the grassroots level in their respective communities.

Research Question

1. How much do the respective groups of people in KPK know and understand about climate change?
2. What are the key institutional, educational, and media-related issues that complicate the discussion of climate change by people in the region?
3. What is the level of participation of schools, local government officials, media outlets and civil society groups in measures to raise awareness on climate change?
4. To what extent do locally relevant examples and grassroots outreach (like Lady Health Workers and schoolteachers) assist people in rural and urban regions to know more about climate change?
5. What efforts can be made to establish climate education in the official curriculum and informal community-based activities throughout the KPK?

Climate Change in KPK

Climate change, closely linked to the emission of greenhouse gases (GHGs) by humans, has become a significant global problem with grave consequences for social and economic stability, particularly in the Global South. According to the Intergovernmental Panel on Climate Change (IPCC), the average global temperature is expected to increase by 3.5°C to 4°C by the end of the 21st century, assuming current emission patterns are maintained (IPCC, 2014). The emissions of the world are caused mainly by the developed countries, but developing ones, such as Pakistan, are affected more because they rely on the areas that are susceptible to climatic changes, such as agriculture, water, and energy (Ludwig, Ozhan, & Tadesse, 2007; Kiran & Qurat-ul-Ain, 2017). KPK is a relatively susceptible province to the adverse consequences of climate shifts in southern Pakistan. Alterations in the monsoon cycles, a temperature rise, and increased occurrences of extreme weather conditions, such as droughts and floods, have placed considerable pressure on the already fragile social and economic structures of the province. The KPKi economy is primarily agricultural in nature, with agriculture constituting a significant portion of the GDP and providing employment for the majority of rural inhabitants (Javed, 2016). However, unpredictable rainfall and prolonged droughts, particularly in such areas as Tank, D-I-Khan, and Lakki Marwat, have led to chronic water scarcity and food insecurity, which are not suitable for the health and well-being of people, particularly vulnerable populations such as children (Shah, 2021). The country faces significant risks of climate change due to Pakistan, which emits less than 1% of the total GHG emissions in the world.

The Global Climate Risk Index has consistently ranked Pakistan among the top ten nations most affected by climate-related disasters (Germanwatch, 2018; The Express Tribune, 2020). The floods experienced in the province of KPK since 2007 have been numerous, but the worst of them occurred in 2010, when many people and properties were lost. In the meantime, the drought in South Africa has been observed since 2008, and children have been dying due to a lack of food and due to an inability to receive medical help (Ali & Hussain, 2020). Furthermore, heatwaves occur annually, and they are notorious in such cities as Karachi, where hundreds of individuals have died of heat-related conditions (Salam, 2018).

Awareness Regarding Climate Change in KPK

The awareness of climate change is typically associated with understanding the causes, effects, and how to mitigate the impact of global climatic events. Climate literacy is a more structured and scientific concept that often refers to the inclusion of climate science in school curricula. It emphasises that individuals should not only learn about the functions of climate systems, including their physical and natural implications, but also understand how climate change affects them and their responses to it. According to the National Oceanic and Atmospheric Administration (NOAA, 2008), climate literacy encompasses not only understanding the relationship between climate, people, and society, but also the ability to locate and disseminate climate-related data accurately and effectively. Miler and Sladek (2011) state that adequate climate literacy involves both cognitive and linguistic skills, referring to the person's ability to assess valid scientific information and communicate it effectively.

Other international agencies, such as UNESCO (2014), affirm that awareness and education empower people to equip communities with the necessary tools to address climate-related issues proactively. Greater understanding of climate change leads to behavioural change, particularly among younger generations, and makes communities more resilient. Climate action also requires the education and involvement of the people, as they provide them with the knowledge and skills necessary to execute mitigation and adaptation techniques (Anderson, 2010). In Pakistan, particularly KPK, organised climate education and a limited amount of knowledge among the people are also still significant barriers to climate resilience. One of the challenges is that a broad, significant portion of the population does not perceive climate change as a pressing or real problem. This is largely primarily due to a lack of information dissemination, and people are not engaging at the grassroots level (Rauf, 2017). This ignorance extends beyond the masses to educated individuals and even those in charge of environmental governance. According to the Planning Commission of Pakistan (2010), climate literacy should not be the prerogative of professionals and politicians alone. The subject should be minimally known by people at all levels to enable them to make informed decisions and alter their behaviour.

Article 6 of the United Nations Framework Convention on Climate Change (UNFCCC, 1992) stipulates that governments that are signatories are expected to promote climate education, raise awareness, and build capacity within their respective national systems. Nevertheless, there is still much to be done in Pakistan to ensure that these responsibilities are fulfilled. Although the National Climate Change Policy (2012) was formulated, a significant gap remains between what the policy states and what people know about it, particularly in provinces such as KPK, which are more prone to climate stressors.

KPK must be informed immediately of what is happening in their locality. The region is already experiencing climate change, which is affecting the social and economic stability in the area, particularly in drought-plagued districts such as Tank, D-I-Khan, and Lakki Marwat, as well as the

flood-prone Indus Delta. Awareness about climate change should be created through community-based programmes, media interventions, school curricula, and programs that will enable individuals to acquire new skills. According to Shahid and Piracha (2016), increasing awareness of environmental problems among local communities may contribute to ensuring that people are more conscious of them and strengthening communities, particularly in rural and peri-urban areas that face a greater risk of environmental challenges.

The gap between research, policy, and practice remains to be bridged. According to Javed (2016), it is crucial to transform academic research into policy that can be implemented to enhance the effectiveness of climate governance. In that regard, KPK needs a concerted effort to entrench climate awareness within its institutional framework, utilising media and schools, colleges, and building a long-term public infrastructure.

Factors of Awareness Lacking Regarding Climate Change

The number of institutional and socio-political factors that have caused people in Pakistan, particularly in vulnerable regions such as KPK, to remain relatively oblivious or ignorant of climate change is numerous. The lack of political will and institutional commitment over time is one of the most significant problems. Although the problem of climate change is becoming increasingly important and is widely discussed worldwide, Pakistan has yet to compile a unified national strategy to educate its people about it and raise their awareness of this phenomenon (Khan, 2016). Even political leaders fail to pay sufficient attention to climate education, resulting in a tremendous knowledge gap at both the national and provincial levels.

The second factor contributing to this occurrence is that climate change is not a popular subject taught in schools. The curriculum in Pakistan has remained essentially unchanged, despite the urgent need to address the climate crisis, a pressing issue in the country. Education is a primary mechanism for informing the population. In the majority of cases, climate science is not included in the primary academic curriculum, particularly in rural schools of KPK, where environmental degradation is likely to occur (SCO, 2020).

Third, schools in the country pay little attention to preparing kids for jobs and the workforce, which often results in a lack of environmental and civic education. They are generally advised to pursue subjects that can earn them money immediately, meaning that multidisciplinary subjects, such as environmental sciences and sustainability, are not as popular (Rauf, 2017). This close attention renders it more difficult to raise a climate-conscious population.

Fourth, the situation is exacerbated by the fact that there are no organised community engagement activities. Pakistan lacks regular community-level interventions, similar to those in community-level initiatives in Bangladesh, where climate change awareness campaigns are integrated into local governance and rural development initiatives. Rural grassroots interventions, such as regional language media, farmers' cooperatives, or women's groups, are scarce or underfunded in KPK (Shahid & Piracha, 2016).

Lastly, marginalisation of civil society and non-governmental organisations (NGOs) championing environmental interests is also another major issue. They are mocked or pushed out in Pakistan as westernised or liberal and thus, not trusted by the populace and having little influence. It is a stigma that damages their credibility and prevents them from having serious discussions about climate change (Javed, 2016). The climate change issue is not a household subject in the traditional and online media, which could be quite influential in modifying people's mindset. Instead, they would pay more attention to political news or sensations.

Eliminating the structural impediments will necessitate a plethora of things to occur. These involve transforming the way schools are taught, lobbying politicians to show concern, promoting community participation, and ensuring that the role played by civil society in environmental activism is not undervalued. KPK frequently experiences various climate-related issues, including droughts, floods, and heatwaves.

Methodology

This study employed a qualitative method and utilised content analysis to evaluate and critique the existing literature on climate change systematically. This paper uses descriptive analysis to critically examine various academic and policy discourses, elucidating the complexities of climate change and environmental events. The main areas of interest include the structural and anthropogenic causes of climate change, the general scientific and disruptive models of global warming and the advancement of climate literacy and awareness paradigm within the population. Mainly devoted to the communicative ecology of climate change, with its critical importance of social media and social activists, i.e., civil society organisations, local government bodies, and schools. The paper will investigate the role these actors play in supporting information-seeking, as well as shaping the population's perception and the overall reactions of social media users and the general public towards the issue of climate change. The. The paper will also help in understanding the socio-communicative nature of environmental governance.

This paper provides a critical examination of the state of climate literacy and awareness in Pakistan, with a special focus on identifying the root issues that hinder successful climate adaptation and mitigation efforts. It also has implications for the self-sustaining manner of enhancing people's involvement and attention to climate change through optimising and exoptimising sources and institutional frameworks. The analysis reviews numerous secondary sources, including peer-reviewed journal articles, academic books, policy briefs, working papers, reports by international organisations, and official documents published by the Government of Pakistan, to gain a broader perspective. The paper consists of six main sections, each with its own subsections. The introduction describes the problem and provides a background on the scope of the study. Part two provides the investigation with a theoretical background. The third describes the approach in greater detail. The fourth discusses how climate change would impact Pakistan.

Findings

According to the Constitution of Pakistan, the provincial governments are responsible for legislative, administrative, and control activities related to education and literacy (Janjua, 2013). Similarly, provincial governments have the mandate to formulate and implement strategies to address climate change. The federal government primarily manages international obligations to address (UNDP, 2019). This decentralised system offers a strategic opportunity to integrate climate education into the formal academic systems of KPK. Pakistan has five major levels of education, including Pre-primary, Primary (Grades 1-5), Middle (Grades 6-8), Secondary (Grades 9-10), Higher Secondary (Grades 11-12) and University-level education, which may rise to the PhD level (Janjua, 2013). These stages will provide a valuable opportunity to incorporate climate-related content into the school curriculum, enabling children to learn about the environment at an early age.

To ensure that climate literacy becomes established in everything in a planned manner, the content may be categorised and inserted in the following manner:

Table 1: Climate literacy content

Level	Grades	Climate Change Content
Pre-Primary	Nursery-Prep	Basic introduction to the environment through play-based learning: earth, sky, air, sun, energy, and nature-focused activities.
Primary	Grade 1-5	Foundational knowledge on Earth's energy balance, sun's role, atmosphere, and basic natural cycles. Integration into general science and storytelling activities.
Middle	Grade 6-8	Systematic introduction to greenhouse gases, energy balance, climate systems, and the human impact on the environment. Use of essays and debates in language subjects (English, Urdu).
Secondary	Grade 9-10	Detailed scientific and socio-political content such as climate change mechanisms, global warming debates, and mitigation strategies.
Higher Secondary	Grade 11-MS	In-depth exploration of adaptation and mitigation policies, climate change impacts on water, food, energy, health, and education—particularly with emphasis on Pakistan-specific challenges and responses.

The above structural model, inspired by the San Francisco Climate Education Project (2018), may be modified to suit the particular environmental and socioeconomic context of KPK. For example, areas such as Tank, D-I-Khan, and Lakki Marwat experience frequent droughts or are vulnerable to sea flooding. This project involves teachers, school leaders, and the broader community. Students can be educated about climate change and incorporate it into their daily lives through training workshops, curriculum changes, and extracurricular activities such as essay contests, environmental clubs, and scientific fairs (Rauf, 2017; UNESCO, 2020). KPK can build resilience at the grassroots level by implementing changes such as these at every level of schooling, which will help people become more conscious of the environment and care about it.

Media Obligation Regarding Awareness of Climate Change

The media, both traditional and digital, play a highly significant role in shaping the discourse of the population, educating it, and engaging it in its communities. The traditional media include television, radio, newspapers and magazines. The digital and social media platforms, enabled by universal internet access, continue to gain relevance in the way people communicate today (Ashraf & Islam, 2014). Such platforms also serve as educational and advocacy platforms as well as a source of pleasure, which can be described as an essential conduit between the government and the population (Hanan et al., 2016). In Pakistan, particularly in KPK, the media can change the way people think of climate change and what they think is valuable to them. Since climatic hazards such as high-frequency flooding in upper KPK and prolonged droughts in Tank, DI Khan, and Lakki Marwat are increasingly becoming serious, the media can assist in raising awareness of these issues and engaging people in finding solutions. Moreover, the media can become a tool for translating complex scientific data and policy frameworks into understandable stories, enabling people and communities to make informed decisions (Kakade et al., 2013).

The media does have a role in advising people; however, it must initiate a discussion and encourage governments to take action. Specific messages about the urgency of climate challenges, including the water shortage in Jacobabad, the increase in temperatures in Larkana, and the energy supply issues in cities such as Sukkur, can prompt people to request long-term solutions (Riaz, 2018). Integrity and consistency should be a priority in the media to effectively reach viewers and gain their trust. In Pakistan, there are approximately 2,000 print magazines and over 100 television stations, with many individuals also visiting social media sites (Khan, 2018). However, in the case of climate change, nothing is utilising this infrastructure fully. The government should be at the forefront in bringing regulations by asking media houses to allocate time and space towards climate-related programming. For example, the Pakistan Electronic Media Regulatory Authority (PEMRA) instructed TV stations to play public service advertisements regarding water conservation and the fundraising for the Mohmand Dam every hour during prime time (PEMRA, 2018). A similar directive framework can be applied in climate change awareness campaigns. It should promote the institutionalisation of climate knowledge through media and structured programming. Television and radio stations could host panel discussions with climate scientists, policy analysts, educators, and media analysts, primarily in prime time. This could be done in these forums, where they could be informed about the climatic issues KPK is experiencing, such as rising sea levels in coastal regions, and how they could adjust to them. Meanwhile, rural areas lacking adequate services should be accessed through regional language media, such as the KPK languages' radio and TV. Media companies are also expected to collaborate with schools and nonprofits to ensure that their content is factual and accurate, particularly in areas where it is pertinent. You can engage social media by hosting inter-sharing campaigns, sharing engaging content, and participating. With the media in KPK operating in unity, they can do a great deal in educating individuals about climate change and mobilising them to take action, as this will make the province more resilient to the dangers of climate change.

The media, including both traditional and digital, is essential in shaping people's conversations, informing them, and mobilising them in their communities. Examples of traditional media are television, radio, newspapers, and magazines. The importance of digital and social media platforms, enabled by ubiquitous internet connections, is increasing in the way individuals communicate today (Ashraf & Islam, 2014). These platforms serve not only as an element of fun, but they could be used to educate and advocate to communities, and thus, they become a key connection between the state and the people (Hanan et al., 2016). The media can influence the thought patterns and priorities of people in Pakistan, particularly in KPK, towards climate change. With climatic risks such as frequent floods in upper KPK and prolonged droughts in Tank, DI Khan, and Lakki Marwat becoming more pronounced, the media can contribute to increasing awareness of environmental issues and engage people in seeking remedies. Moreover, the media can also be used as a tool to transform complex scientific data and policy frameworks into understandable stories, enabling people and communities to make informed decisions (Kakade et al., 2013).

The media's role is to educate the people, but it must also initiate discussions and encourage governments to take action. A specific message about pressing climate concerns, including water shortages in Jacobabad, temperature increases in Larkana, and energy issues in cities such as Sukkur, can prompt people to demand long-term solutions (Riaz, 2018). Media outlets should prioritise and be consistent to establish the most effective viewers. Print, over 100 television stations, and a significant number of people access social media sites (Khan, 2018). However, this infrastructure is not utilised to its capacity when it comes to discussing the issue of climate change.

The government can lead in regulation, which includes obliging media houses to reserve some time and space for programs concerning climate change. Using the example, the Pakistan Electronic Media Regulatory Authority (PEMRA) instructed TV channels to broadcast public service messages regarding water conservation and raising funds for the Mohmand Dam every hour during prime time (PEMRA, 2018). The same framework of directives can be applied to the climate change awareness campaigns.

Local Government Obligations

Local governments worldwide play a significant role in combating climate change, particularly in creating awareness and engaging the public. The nearest connection between the state and its citizens in Pakistan is the local government. This makes them the ideal locations where climate information can be disseminated and solutions to this problem promoted at the local level. These are institutions that are not only representative examples of the grassroots spirit of democracy but also serve as providers of public services, particularly those that contribute to the environment remaining strong (World Bank, 2020). The internal organisation and development of local government in Pakistan, however, portrays a history of innovation, which in most cases are the initiatives of the military regimes. The first official system of local government was established in 1959 through the Basic Democracies Ordinance, introduced by General Ayub Khan. This hierarchical four-tier system was created to enhance administrative authority at the expense of seeming to have participatory governance (Cheema, Khwaja, and Qadir, 2006).

This was later reintroduced in 1979 in the form of three-tier local governance by the government of General Zia-ul-Haq. This was somewhat concerned with rendering military control legitimate rather than providing people with increased influence. The most comprehensive and sustained reform occurred in 2001, when General Pervez Musharraf's devolution plan allowed elected local politicians, known as Nazims, to manage local bureaucracies for the first time. The approach enhanced greater administrative decentralisation and facilitated easier access for individuals to engage in development planning, including environmental projects (Cheema et al., 2006).

Local governments in KPK may also play a significant role in creating awareness about climate change, particularly in districts that are more prone to droughts, floods, and heatwaves, such as Tank, DI Khan, Lakki Marwat, Badin, and Dadu. Union Councils, Municipal Councils, and district councils have the proximity and local context needed to implement awareness programs tailored to the local socio-economic conditions. Local governments in KPK can undertake practical actions to address the issue of climate change by incorporating climate change modules into local development plans, collaborating with non-governmental organisations to hold community workshops, and encouraging schools to implement environmental programs (Ali & Shah, 2018). However, the local governments in KPK have failed to perform their duties properly due to irregular elections, a lack of finances, and ineffective communication with the provincial and federal governments. The fact that local officials lack the proper training on climatic matters, as well as the institutions' insufficient capacity, remains a problem. The legislative changes, capacity-building initiatives, and climate fund distribution may all contribute to the local government making a more effective effort to educate people about the environment and prepare for future changes (UNDP Pakistan, 2021).

Conclusion

To make climate policies effective, individuals should be informed and capable of reading and writing about climate change. This is particularly critical in areas such as KPK, Pakistan, where

individuals are highly vulnerable. There are increasing climate change-related issues, such as intense heatwaves, acute water shortages, desertification in areas like Tank, DI Khan, and Lakki Marwat, flooding in Buner, and coastal erosion in places like Malakand, affecting KPK. It is understandable that, with these increasing threats, we require a swift, informed, and proactive response from the government and the masses as a whole. In this research, the authors aimed to assess the current state of climate change awareness and literacy in Pakistan, particularly in KPK. They found significant gaps that could be attributed to the inadequacy of the system and structure. It has been found that political prioritisation is lacking, climate education is not taught in schools, there is little media coverage in regional languages, and there are inadequate mechanisms for community involvement, making it more challenging for people in KPK to understand climate risks. Although the province often has to deal with calamities caused by climate change, the current approach is primarily reactive rather than preventive. The study identified several significant barriers: the provincial education system predominantly lacks integrated environmental or climate education, particularly in rural public schools; existing community outreach initiatives, such as those operated by Lady Health Workers (LHWs), have not been utilised for climate messaging; local government entities, ideally positioned to engage with vulnerable communities, remain underfunded and underutilised; civil society organisations, while active, are fragmented and often excluded from formal policymaking processes; and regional media outlets, especially KPK i-language newspapers and television channels, have yet to incorporate climate change themes into their programming systematically. These constraints cumulatively contribute to a populace that is under-informed and underprepared in the face of escalating climate hazards.

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