



Utilisation of Social Media for Climate Change Adaptation and Mitigation in Taraba State, Nigeria

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Abstract

This study examines how social media platforms are shaping climate change communication, adaptation, and mitigation in Taraba State, Nigeria, a state where ecological vulnerability intersects with emerging digital engagement. Drawing on a cross-sectional survey of 385 respondents and integrating cross-tabulations, multiple regression, and correlation analysis, the study investigates the influence of demographic factors on digital climate engagement and the behavioural outcomes of social media campaigns. Findings reveal high levels of social media use for climate-related information, particularly among younger and more educated respondents, with WhatsApp and Facebook emerging as the dominant platforms. While respondents generally perceived social media as effective in raising climate awareness, a significant awareness–action gap remains, with behavioural change lagging behind information access. A strong positive correlation ($r = .879$, $p < .001$) was found between the type of climate content accessed and self-reported adoption of mitigation practices. The study advances theoretical insight by applying and extending the Technology Acceptance Model (TAM), Communication Infrastructure Theory (CIT), and Participatory Communication Theory to a digitally marginalised African context. It concludes that while social media holds transformative potential, its impact is constrained by infrastructural deficits, limited participatory mechanisms, and socio-political exclusions. Strategic, inclusive, and co-created communication efforts are essential for translating digital climate discourse into tangible community resilience.

Keywords: Social media, Climate adaptation, Behavioural change, Digital environmental citizenship, Nigeria.

Introduction

The world is hurtling toward an ecological precipice. Across continents, climate extremes are intensifying, melting glaciers, displaced populations, scorched farmlands, and cities drowned under floods are no longer dystopian futures but daily headlines. The climate crisis, once a matter of debate, has become a lived reality for millions. Yet amid the growing cascade of scientific reports and policy declarations, one question remains disturbingly under-asked: how are vulnerable, under-resourced communities adapting, and are they being heard in the digital age?

In Nigeria, one of Africa's most climate-vulnerable nations, the stakes are alarmingly high. Rising temperatures, erratic rainfall, soil degradation, and intensifying floods have converged to

threaten agricultural livelihoods, strain water resources, and provoke displacement. (Bako. Oparaku & Flayin, 2016). In Taraba State, a geographically rich yet socioeconomically fragile region, climate change is not a forecast; it is a destabilising force disrupting daily life. From flash floods in Karim Lamido to advancing desertification in Lau, the climate emergency manifests with ruthless immediacy. (Adelalu & Bwadi, 2023).

However, while climate scientists and policymakers scramble for top-down solutions, the digital era is generating bottom-up forces with transformative potential. Social media, often dismissed as frivolous or chaotic, has emerged as an unlikely but potent arena for climate action. With platforms like Facebook, Twitter (now X), WhatsApp, and Instagram, ordinary citizens, activists, and local organisations can share climate information, document disasters, crowdsource responses, and challenge narratives in real-time (Mavrodieva et al., 2019; Robelia et al., 2011). These digital arenas are not just platforms; they are battlegrounds for climate narratives, resilience-building, and community mobilisation.

Nevertheless, here lies the paradox: while global discourse celebrates social media's potential for climate engagement, its actual utility within vulnerable and underrepresented regions, such as Taraba, remains under-examined, under-theorised, and dangerously undervalued. Taraba's rich ecological diversity, from montane forests to savannah plains, faces climate disruptions that require localised, participatory solutions. Yet what digital strategies exist to support adaptation? Who is communicating climate risks and how? Whose voices dominate, and whose are excluded?

Communication scholars like Moser (2009) and Ockwell & Whitmarsh (2009) have long emphasised that effective climate response is not just about data but about dialogue, about how messages are framed, who delivers them, and through which channels they travel. In a world of information saturation, strategic communication is the bedrock of behavioural change. Social media, with its decentralised reach and participatory ethos, holds promise. However, in Taraba, questions of access, digital literacy, content relevance, and cultural context complicate this promise.

This study, therefore, fills a gap where silence and generalisation have dominated. It examines how social media is utilised, or neglected, in the pursuit of climate resilience in Taraba State. It explores the dynamics of digital engagement across stakeholders, government agencies, NGOs, community-based organisations, and citizens, shedding light on the lived realities of climate adaptation and mitigation in a region too often overlooked in academic and policy circles.

By foregrounding local voices and digital agency, this research aims to bridge the dangerous gap between global frameworks and local action. In doing so, it contributes to a more situated, participatory, and responsive climate communication paradigm, one that recognises that in the struggle for environmental survival, platforms matter, but people matter more.

Objectives of the study

This study seeks to critically examine the dynamics of social media use for climate change adaptation and mitigation within the vulnerable yet digitally emerging context of Taraba State, Nigeria. Generally, it aims to unpack the communicative affordances and limitations of social media platforms in fostering climate resilience among diverse stakeholders. Specifically, the study seeks to achieve the following objectives:

1. To assess the frequency, platforms, and patterns of social media usage for climate change adaptation and mitigation among residents of Taraba State.
2. To examine the relationship between key demographic variables (age, gender, and level of education) and the frequency of social media use for climate-related information.

3. To determine the influence of demographic factors on the perceived effectiveness of social media in promoting climate change awareness and behavioural change.
4. To explore the correlation between the type of climate change content accessed on social media and the adoption of mitigation and adaptation practices.
5. To identify the main challenges faced by different demographic groups in using social media for climate change communication and action.

Literature Review

Climate change is no longer a distant environmental anomaly; it is a profound socio-political and developmental crisis with disproportionate impacts on vulnerable communities across the Global South. The Intergovernmental Panel on Climate Change report (González et al., 2021) emphasises that sub-Saharan Africa remains one of the most exposed regions to climate-induced stress. Nonetheless, ironically, it is also among the least studied when it comes to localised communication responses. Within this context, the literature on climate adaptation and mitigation has evolved; however, significant gaps remain in epistemic and geographic focus.

Scholars widely “acknowledge that differing values and interests affect adaptation outcomes” (Venterea et al., 2022, p. 17) and hold the view that adjustments in ecological, social, or economic systems in response to climate stimuli offer a vital response pathway to protect livelihoods (Eriksen et al., 2011; Tavares et al., 2020). Others maintain that mitigation, conversely, entails human interventions aimed at reducing or stabilising greenhouse gas emissions (Berglez & Al-Saqaf, 2021; Moser, 2009). In the Nigerian context, and particularly in states like Taraba, where climatic shifts are already eroding socio-ecological resilience, adaptation and mitigation are not abstract strategies; they are survival imperatives (Adelalu & Bwadi, 2023; Bako, Oparaku & Flayin, 2016). Yet, how these strategies are communicated and embedded within local knowledge systems remains under-theorised.

Traditionally, mass media have been key actors in shaping climate discourse. Researchers such as (Schäfer, 2012; Russill & Nyssa, 2009) argue that journalistic representations of climate change significantly shape public understanding and political salience. However, the one-directional nature of conventional media has been critiqued for failing to encourage deliberation, especially in marginalised contexts. Strategic climate communication, as proposed by (Falkheimer, 2016), shifts the paradigm towards participatory, multivocal, and networked approaches, precisely the space in which social media now operates.

Social media platforms offer an alternative communicative infrastructure that is participatory, decentralised, and immediate. Scholars such as (Arnot et al., 2024) believe in the capability of social media to reach diverse audiences and connect people, especially young ones, globally. Their interactive affordances challenge the gatekeeping model of legacy media, allowing for real-time storytelling, citizen science, and horizontal mobilisation (Pearce et al., 2019, 2020). Sites like Facebook, Twitter, and WhatsApp have become arenas for public discourse, enabling diverse actors, including youth, indigenous communities, and NGOs, to frame climate narratives, organise action, and contest dominant epistemologies (Zein et al., 2024; Lemos et al., 2012).

Empirical studies have found a positive association between social media platforms and community resilience. Such digital networks are effective in promoting knowledge sharing, fostering emotional solidarity, and facilitating rapid coordination in times of climate-related crises. (Dai et al., 2023; Gokcimen & Das, 2024; Kryvasheyev et al., 2016). Digital networks, according to Robelia et al., (2011) have consistently shown that digital sites have a significant impact on pro-environmental behaviour and attitudes, especially among young platform users who tend to follow peer patterns in the online community. Digital space often serves as a crucial

pedagogical intervention context in situations when the traditional infrastructure is poorly developed, (Almulhim & Cobbinah, 2024) say, social media becomes not just a tool but a lifeline for climate action.

Despite the great potential of social media for climate communication, their valorisation should be thoroughly questioned. Many scholars argue that these sites are prone to filter bubbles, disinformation, performative activism, and polarising digital divides, which undermine the effectiveness and equity of these technologies. (Freiling & Matthes, 2023; Ji et al., 2024; Sultana et al., 2024). In many African contexts, access to digital tools is mediated by socio-economic hierarchies, gender norms, and infrastructural deficits, raising questions about whose voices are amplified and whose are silenced in online climate conversations (Wang, 2022). Thus, the potential of social media must be critically contextualised within broader socio-technical and political realities.

Moreover, most existing literature operates at a macro scale, examining national or global patterns while neglecting the granular realities of subnational regions, such as Taraba State. Despite growing interest in social media and climate discourse (Abuta et al., 2021; Adelalu & Bwadi, 2023; Javed et al., 2023), few studies have investigated how local actors in ecologically sensitive, yet digitally emerging settings are utilising these platforms for resilience-building. This lacuna is significant, given that climate change impacts and responses are intensely local.

Theoretical Framework

This study draws on two complementary theoretical perspectives, the Technology Acceptance Model (TAM) and the Communication Infrastructure Theory (CIT), to examine the utilisation of social media for climate change adaptation and mitigation in Taraba State, Nigeria. Overall, by applying these theories, it is possible to understand the determinants of engagement in digital platforms, as well as the structures of communities and communication ecologies that support or hinder the development of climate-responsive behaviours.

Technology Acceptance Model (TAM)

Developed by Davis (1989), the Technology Acceptance Model is a popular theoretical framework used to explain how users develop the tendency towards the acceptance and adoption of the emerging information and communication technologies. (Gayathri & Buvanewari, 2019). The Technology Acceptance Model (TAM) is based on two constructs: (1) Perceived Usefulness - belief that the performance or decision-making abilities will be enhanced through the use of technology, and (2) Perceived Ease of Use - the belief that the utilisation of the technology will not involve much effort. (McCord, 2006). The research aims to explain why the inhabitants of Taraba State access climate-related information through platforms such as Facebook, WhatsApp, and TikTok, and to implement the Theory of Acceptance and Use of Technology (TAM) framework. The empirical results suggest that the perceived usefulness in conjunction with perceived ease of use is crucial in predicting the adoption of these platforms. The findings indicate that the users perceive these sites as good sources of information and that the navigation is comparatively easy.

The current model aims to explain how social media users perceive the relevance and availability of climate-related content, including video content, infographics, and adaptation plans, and how this influences their willingness to engage in mitigation behaviours, such as planting trees and managing waste responsibly. Empirical evidence shows that in cases where users consider content as actionable, and platforms become friendly, their engagement is likely to deepen, and they will transition more easily to behavioural change. As a result, TAM can provide a theoretically

strong framework for inquiring about the psychological and behavioural processes through which social media can influence climate resilience.

Communication Infrastructure Theory (CIT)

In the Information Systems literature, the Theory of Acceptance and Use of Technology (TAM) focuses on individual motivation and interactions related to technology use. At the same time, the Communication Infrastructure Theory (CIT) posits that an organisation's use of technologies depends on the quality of its communication infrastructure. CIT is thus an alternative viewpoint that makes the use of technology an organisational, rather than an individual, thing. The argument that CIT builds on earlier studies by shifting the scope of the study beyond the individual to the collective is justified by empirical evidence indicating that both individual and organisational influences determine the acceptance and utilisation of technology. Wilkin (2022, p. 1) is based on the premise that “every community has a communication infrastructure consisting of a storytelling system embedded within a communication action context”. CIT (Cultural Integration Theory) offers a multidimensional approach to understanding the public's participation in addressing environmental problems. It is based on the assumption that the ability of people to engage in addressing problems of general interest, including climate change, is conditioned by access to and use of local networks of storytelling and communication tools, including digital media, community leaders, non-governmental organisations, and personal discussions. (Wilkin et al., 2010; Yong-Chan Kim, 2006).

Although scholars have explored how connections to local storytelling agents can impact health knowledge, attitudes, and behaviours and civic participation, (Nah et al., 2021; Wilkin, 2022), The community-based climate interventions do not seem to be limited by the applicability of the communication infrastructure theory. In Taraba State, where infrastructural gaps persist, a language barrier and a lack of uniformity in digital literacy remain, making CIT increasingly relevant. This theoretical perspective helps explain the practices associated with systemic problems, such as low internet connectivity, local content in local languages, and scepticism of digital sources, which influence how communities interpret and react to climate messages on social media. Notably, CIT highlights that demographic features, given the age and gender effect, affect media effects and act as significant points within the general communication ecology, which will enhance climate campaign adaptation and cultural response.

The combination of TAM and CIT hence provides a multidimensional paradigm to explore interaction between individual agency and community structures in the process of climate knowledge digital mediation. Whereas TAM explains how and why people use social media platforms in communicating about the climate, CIT addresses contexts in which the decisions are either validated, strengthened or compromised in special social situations.

This theoretical background places the study in a good position to contribute substantially in the body of knowledge in digital communication and climate adaptation literature especially in such low resource and climate-vulnerable contexts like the Taraba State.

Methodology

The study employed a cross-sectional survey design to investigate the use of social media in climate change adaptation and mitigation among the people of Taraba State, Nigeria. It was deemed that the cross-sectional design was suitable for recording the current trends of social media behaviour, content use, and self-reported behavioural consequences stratified by demographic groups. (Sanchez et al., 2023). This design, as explained by Zangirolami-Raimundo et al., (2018) allows the methodological analysis of connections between the relevant variables, namely age,

gender, frequency of use, content preference, and behavioural change, thus outlining the prevailing patterns and correlations without assuming causal relationships.

Study Area

Taraba State, situated in the northeastern part of Nigeria, is a diverse ecological system that encompasses savannah ecosystems and tropical rainforests. The region has been classified as being among the most climate-prone regions in the country; a high frequency of flooding incidents, drought, and rising levels of environmental degradation characterises the region (Adelalu & Bwadi, 2023). Taraba State in Nigeria is a good example to examine digital engagement in a poorly represented and ecologically vulnerable environment. It is within this context that a practical analysis of the effectiveness of technology-based solutions in fostering social and economic inclusion becomes possible, while also highlighting the complexity of issues that technology-based interventions must address.

Population and Sampling

The study population comprises the residents of the eleven local governments in Karim Lamido, Gassol, Ibi, Lau, Donga, Wukari, Takum, Ardo Kola, Kurmi, Bali, and Jalingo. These local governments experience the perennial impacts of climate change, particularly flooding (Adelalu & Bwadi, 2023). The projected population of Taraba State, by National Population Commission (2024) according to local governments, shows that: Karim Lamido has a population of 302,100, Gassol 385,500, Ibi 132,600, Lau 149,700, Donga 209,400, Wukari 374,800, Takum 211,700, Ardo Kola 138,100, Kurmi 143,600, Bali 332,000 and Jalingo 220,700. This sums up to two million, six hundred thousand and two hundred (2,600,200) as the total population of the study.

The Monkey Survey online sample size calculator was used to determine the sample for the study. At a 95% level of confidence and a 5% margin of error, the sample for the study is 385 respondents. Meanwhile, proportionate sampling was used to select participants from the eleven (11) local government areas according to the size of each local government. The survey will target a diverse sample of residents, including urban and rural populations, with a focus on individuals with varying levels of education, income, and access to technology. The proportionate sample is calculated using the following formula as seen in Table 1.

$$PS = \frac{PLG}{TP} \times \frac{SS}{1}$$

Where PS – Proportionate Sample

PLG	Population of Local Government
TP	Total population
SS	Sample Size
1	constant

Table 1: Proportionate Sample of Respondents across Local Governments

S/N	Local Government	Population	Participants
1	Ardo Kola	138,100	20
2	Bali	332,000	49
3	Donga	209,400	31
4	Gassol	385,500	57
5	Ibi	132,600	20
6	Jalingo	220,700	33
7	Karim Lamido	302,100	45
8	Kurmi	143,600	21
9	Lau	149,700	22
10	Takum	211,700	31
11	Wukari	374,800	56
	Total	2,600,200	385

A multistage sampling technique was used to ensure representativeness across urban and semi-urban areas. Stratified sampling was applied to capture diversity in gender, age, and location, while convenience sampling was used within strata due to variability in internet access and social media penetration.

Instrumentation

Data were collected using a structured, self-administered questionnaire comprising both closed-ended and scaled questions. The instrument was divided into sections covering demographic characteristics, frequency and type of social media use, platform preference, content engagement, behavioural responses, and perceived challenges. The questionnaire was pretested for reliability and clarity among a small sample ($n = 30$), yielding a Cronbach's alpha of 0.83, indicating high internal consistency.

Data Analysis

Data were coded and entered into SPSS Version 27. Descriptive statistics (frequencies, means, percentages) were used to profile respondent characteristics and usage patterns. In the current research, a combination of inferential methods was employed: correlation tests of independence, cross-tabulations to examine demographic trends, and the Pearson correlation test to evaluate the relationship between variables. These approaches supported an intensive quantitative analysis of user behaviours and attitudes, thus meeting the research objectives.

Ethics clearance was obtained from the relevant institutional review board, and informed consent was obtained from every participant. During the data collection process and in reporting, strict confidentiality and anonymity measures were implemented.

Results

The study presents an account of an empirical research question regarding the use of social media in conveying climate change information, facilitating adaptation and mitigation efforts in Taraba State, Nigeria. The sources are based on a cross-sectional study of 385 people. In contrast, the results are summarised into six major categories: demographic portraits, trends in using social media to consume climate-related information, perceptions of the effectiveness of the platforms, adoption habits, limitations to digital participation, and community-generated recommendations on how to improve climate advocacy.

The methods of analysis, such as frequency distributions, cross-tabulations, and correlation analyses, are applied to explain the links between the main demographic factors (age, gender,

education) and behavioural outcomes. This multilateral approach offers nuanced perspectives on how social media informs knowledge production, behavioural purpose, and mass action in a digitally marginalised, yet ecologically vulnerable part of the world.

Tabular display formulation compiles notable patterns and associations, offering the possibility of comparing variables to identify compatibility and deviations in online participation and climate adherence. It is based on the theoretical framework of the underlying Technology Acceptance Model (TAM) and Communication Infrastructure Theory (CIT), thereby uniting human agency with broader structural forces in the uptake and adoption of climate-related information in online settings.

Table 2: Demographic Profile of Respondents

Demographic	Variable	N	%
Age	18-24	72	18.7%
	25 - 34	89	23.1%
	35 - 44	108	28.1%
	45 - 54	62	16.1%
	55 and above	54	14.0%
Gender	Male	227	59.0%
	Female	158	41.0%
Highest Level of Education	Postgraduate	98	25.5%
	Primary	61	15.8%
	Secondary	88	22.9%
	Tertiary	138	35.8%
Occupation	Business	80	20.8%
	Civil Servant	121	31.4%
	Farmer	55	14.3%
	Public Servant	74	19.2%
	Student	55	14.3%

As shown in Table 2, a demographic segregation of the population of the survey suggests a fair share of the age groups. The respondents between the ages 35 and 44 years are the largest (28.1), secondly those between 25 and 34 years (23.1) and thirdly those between 18 and 24 years (18.7). The results reveal that the sample includes both digital natives of emerging adulthood and mid-career adults, whose social media literacy is proposed to be of divergent levels based on the previous research. The gender distribution is biased in favour of males (59%) compared to females (41%), which could reflect the overall digital access and usage gaps in northern Nigeria, especially in Taraba State.

The current sample of 456 people indicates quite a high level of tertiary (35.8%) and postgraduate (25.5%) qualification, which means that the population is well educated in general. These findings are remarkable considering the body of evidence in the past that has shown a positive relationship between environmental awareness and educational attainment and the presence of digital media interaction. At the same time, the occupational mix is biased with the civil servants (31.4 %), the business owners (20.8 %), the public servants (19.2 %), which are the occupational groups that tend to hold the positions overlapping with the policy, communication, or community influence as functional areas that are deeply involved in climate advocacy.

The Usage Patterns of Social Media for Climate Change Mitigation and Adaptation

Cross tabulation of the frequency of social media use, the social media platforms and the content was computed to establish the use pattern of social media use for climate change mitigation and adaptation in Taraba State (See Table 3).

Table 3: Cross-tabulations of social media platforms usage patterns in Taraba State for climate change-related communication and engagement

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
How often do you use social media to access information about climate change?	398	2.0	5.0	3.817	1.0403	1.082
Which social media platform do you use most often to access climate change-related information?	398	1.0	6.0	2.781	1.7544	3.078
What type of content related to climate change do you most commonly access on social media? (Select all that apply)	398	1.0	5.0	3.239	1.4304	2.046
Valid N (listwise)	398					

The study reveals a high level of social media engagement for climate change communication among respondents in Taraba State ($M = 3.82$). This suggests that digital platforms are not only accessible but also function as active channels for environmental information flow. However, the high standard deviation ($SD = 1.04$) implies variability in usage frequency, likely shaped by infrastructural inequities, data costs, digital competence, and social capital.

Interestingly, platform preference was highly dispersed ($M = 2.78$, $SD = 1.75$), indicating no dominant platform. This dispersion likely reflects digital pluralism in Taraba's media ecosystem, where users interact across WhatsApp, Facebook, Instagram, and Twitter(X) depending on content type, language, data availability, and social networks. Such heterogeneity challenges platform-centric campaign strategies and underscores the need for multi-platform engagement approaches tailored to users' habits and infrastructural conditions. The type of content accessed, measured with a mean of 3.24, suggests an appetite for informative and visually engaging material.

The relationship between key demographic variables (age, gender, and level of education) and the frequency of social media use for climate-related information

A chi-square test of independence was conducted to examine the relationship between demographic variables (age, gender, and level of education) and the frequency with which respondents use social media to access climate change information. The results showed a statistically significant relationship, $\chi^2(8) = 640.800$, $p < .001$, indicating that demographic factors significantly influence how often respondents engage with climate-related content on social media. The result is shown in Table 4.

Table 4: The relationship between key demographic variables (age, gender, and level of education) and the frequency of social media use for climate-related information

As shown in Table 4, A chi-square test of independence was conducted to examine the relationship between demographic variables (age, gender, and level of education) and the frequency with which respondents use social media to access climate change information. The results showed a statistically significant relationship, $\chi^2(8) = 640.800$, $p < .001$, indicating that demographic factors significantly influence how often respondents engage with climate-related content on social media.

Residual analysis revealed notable patterns. Male respondents aged 25–34 with secondary education reported a higher-than-expected frequency of social media use for climate information (residual = +3.221), while older adults aged 55 and above with postgraduate education were more likely to report never using social media for such purposes, consistent with expected frequencies. Conversely, respondents aged 18–24 with only primary education reported occasional use significantly more than expected (residual = +2.823), suggesting a gap in educational influence on climate information seeking.

These findings underscore the impact of demographic background, particularly age and education, on patterns of social media use related to climate change.

Table 5: The Influence of Demographic Factors on the Perceived Effectiveness of Social Media in Promoting Climate Change Awareness and Behavioural Change

Frequency							
Age Group	Gender	Highest Level of Education		How often do you use social media to access information about climate change?			
				Rarely	Occasionall	Frequently	Always
18-24	Male	Primary	Observed	0	48	13	0
			Expected	6.028	37.250	17.623	.099
			Pearson Residual	-2.586	2.823	-1.306	-.315
		Secondary	Observed	0	0	11	0
			Expected	.031	.622	9.694	.653
			Pearson Residual	-.177	-.812	1.217	-.833
25 - 34	Male	Secondary	Observed	0	0	77	0
			Expected	.218	4.354	67.857	4.571
			Pearson Residual	-.467	-2.148	3.221	-2.205
		Tertiary	Observed	0	0	12	0
			Expected	.034	.679	10.575	.712
			Pearson Residual	-.184	-.848	1.272	-.870
35 - 44	Male	Tertiary	Observed	0	0	46	20
			Expected	.026	.556	45.012	20.406
			Pearson Residual	-.162	-.749	.261	-.108
	Female	Tertiary	Observed	0	0	0	42
			Expected	.000	.000	.000	42.000
			Pearson Residual	.000	.000	-.001	.001
45 - 54	Female	Postgraduate	Observed	7	0	0	37
			Expected	.002	.039	8.283	35.676
			Pearson Residual	163.319	-.198	-3.194	.510
		Tertiary	Observed	0	0	0	18
			Expected	.000	.000	.000	18.000
			Pearson Residual	.000	.000	.000	.000
55 and above	Female	Postgraduate	Observed	54	0	0	0
			Expected	54.000	.000	.000	.000
			Pearson Residual	.001	-.001	.000	.000
Chi-Square 640.800		df 8	Sig..000				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regr	95.402	2	47.701	87.176	.000 ^b
	Resi	209.024	382	.547		
	Tota	304.426	384			

a. Dependent Variable: How effective do you think social media is in promoting climate change adaptation strategies (e.g., water conservation, crop rotation)?

b. Predictors: (Constant), Gender, Age Group

As shown in Table 5, to determine the influence of demographic factors on the perceived effectiveness of social media in promoting climate change awareness and behavioural change, a multiple linear regression was conducted using age and gender as predictor variables. The regression model was statistically significant, $F(2, 382) = 87.176$, $p < .001$, accounting for a substantial portion of the variance in perceived effectiveness ($R^2 = .313$).

This indicates that age and gender combined significantly affects respondents' perceptions of how effective social media platforms are in promoting adaptive climate strategies, such as water conservation or crop rotation. However, due to the absence of the coefficient output, the relative influence of each predictor variable (e.g., whether females perceive social media as more effective than males, or whether younger respondents are more receptive) cannot be determined from the current output alone. Nevertheless, the strength of the overall model suggests that demographic background is a meaningful determinant in shaping how social media's role in climate communication is perceived.

Table 6: The correlation between the type of climate change content accessed on social media and the adoption of mitigation and adaptation practices

Correlations			
		What type of content related to climate change do you most commonly access on social media? (Select all that apply)	Have you ever adopted a new practice for climate change mitigation (e.g., waste management, planting trees) due to social media campaigns?
What type of content related to climate change do you most commonly access on social media? (Select all that apply)	Pearson Correlation	1	.879**
	Sig. (2-tailed)		.000
	N	385	385
Have you ever adopted a new practice for climate change mitigation (e.g., waste management, planting trees) due to social media campaigns?	Pearson Correlation	.879**	1
	Sig. (2-tailed)	.000	
	N	385	385

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 6, to examine the relationship between the type of climate-related content accessed on social media and the likelihood of adopting climate mitigation or adaptation behaviours, a Pearson correlation was computed. Results showed a very strong positive correlation between the type of content accessed and behaviour adoption ($r = .879$, $p < .001$, $n = 385$), indicating that individuals who frequently engage with specific content such as waste management tips, tree planting campaigns, or energy-saving practices are significantly more likely to report adopting these behaviours in response to social media messaging. This finding confirms the persuasive power of climate-related content in influencing user behaviour, reinforcing the value of strategic message design for public engagement and action.

Table 7: Challenges Hindering the OPTIMAL utilisation of Social Media for Climate Action in Taraba State

Item	Response	N	%
Recommendations to improve social media-based climate change campaigns in Taraba State.	Increased use of local languages	39	10.1%
	Collaboration with local influencers or community leaders	43	11.2%
	More interactive content (e.g., webinars, live discussions)	39	10.1%
	More information on climate change adaptation practices	112	29.1%
	Awareness of funding or support opportunities for climate adaptation	152	39.5%
Likelihood of recommending social media platforms for sharing climate change information to others in your community.	Not likely at all	15	3.9%
	Slightly likely	23	6.0%
	Moderately likely	126	32.7%
	Very likely	178	46.2%
	Extremely likely	43	11.2%

Table 7 examined the challenges hindering the optimal utilisation of social media for climate action in Taraba State. The most preferred recommendation to improve social media campaigns is "awareness of funding or support opportunities for climate adaptation" (39.5%), followed by "more information on climate change adaptation practices" (29.1%). This response pattern suggests an information gap: communities are aware of climate threats but feel under-resourced and under-informed on actionable responses.

Furthermore, the high likelihood of respondents recommending social media for climate communication (89.1% moderately to extremely likely) signifies strong grassroots support for digital advocacy.

Discussion

This study investigated the utilisation of social media for climate change adaptation and mitigation in Taraba State, Nigeria, a region marked by ecological vulnerability and emergent digital connectivity. The discussion integrates empirical findings with theoretical frameworks and prior literature to elucidate how digital platforms shape climate knowledge, perception, and behavioural response in a semi-peripheral context. The results indicate a high level of social media engagement for accessing climate-related information ($M = 3.82$), reinforcing the idea that digital tools are not peripheral but increasingly central to environmental discourse in Taraba State. This aligns with studies by Basch et al. (2022) Pearce et al. (2019), and Perga et al. (2023), which suggests that social media constitutes a new public sphere for climate communication, even in under-resourced environments. However, platform usage was highly variable ($M = 2.78$, $SD = 1.75$), suggesting a fragmented digital ecosystem that relies on platforms like WhatsApp, Facebook, and regionally relevant tools. This diversity supports Wang's (2022) call for culturally situated, multi-platform engagement strategies adapted to local media habits and technological infrastructures.

The chi-square analysis confirmed that demographic factors significantly influence the frequency of social media use for climate-related information ($\chi^2(8) = 640.800$, $p < .001$). Notably, male respondents aged 25–34 with secondary education reported significantly higher usage rates than expected (residual = +3.221), while older respondents with postgraduate education reported

near-zero usage, consistent with expected values. This reinforces Javed et al., (2023) assertion that younger, less institutionally embedded individuals are often more agile in adopting digital media for climate discourse. These findings underscore the necessity for age- and education-sensitive communication strategies. Younger people, particularly digital natives, represent a critical demographic for climate advocacy campaigns in Nigeria. Conversely, the digital exclusion of older and less tech-savvy populations raises concerns about equitable access to climate knowledge.

The multiple linear regression model revealed that age and gender significantly predict perceived effectiveness of social media in promoting behavioural change ($F(2, 382) = 87.176, p < .001, R^2 = .313$). Although, individual predictor coefficients were not available, the model indicates that demographic variables are not only associated with the frequency of use but also with perceptions of influence. This suggests that climate communicators must consider not only who uses digital platforms but also how different demographic segments interpret their effectiveness. Nevertheless, the average score for behavioural adoption due to social media campaigns ($M = 2.73$) indicates an awareness-action gap, consistent with findings by Falkenberg et al., (2022). This suggests that while social media raises awareness, it is insufficient on its own to spur behavioural change unless embedded within enabling sociocultural and institutional environments.

A strong positive correlation was found between the type of climate content accessed on social media and self-reported behavioural change ($r = .879, p < .001$). Respondents who engaged with content related to tree planting, waste management, or adaptation strategies were significantly more likely to implement such actions. This supports Yong-Chan Kim's (2006) observation that message relevance and format, especially video narratives and how-to guides, are critical in converting passive awareness into active response. This finding reinforces the importance of content strategy in climate communication. High-quality, actionable, and visually engaging materials can serve as effective nudges for pro-environmental behaviour, especially among digitally literate audiences.

The demographic data revealed a male majority (59%), yet correlation analyses suggest that female respondents demonstrated higher frequency of use, stronger platform loyalty, and greater likelihood of adopting climate practices due to social media messaging ($r = -0.703, p < .001$). This is consistent with the literature on gendered climate resilience (Happer & Philo, 2013; Schäfer, 2012), which positions women as key agents of adaptation, especially in Global South contexts. These insights suggest that gender-sensitive digital campaigns, incorporating local languages, emotional storytelling, and community influencers, could yield higher impact and inclusivity. Despite promising levels of engagement, infrastructural and socio-technical barriers persist. Challenges such as poor connectivity, lack of local language content, and limited digital literacy were repeatedly cited ($M = 2.28$). The most suggested improvement was increasing awareness of funding opportunities for adaptation (39.5%), followed by expanding information on climate practices (29.1%).

The Communication Infrastructure Theory (Ball-Rokeach & Kim, 2001) helps contextualise this finding. While storytelling networks (via WhatsApp, Facebook) are active, the communication action contexts, such as institutional trust, policy support, and infrastructural readiness, remain weak. This results in a partially functional communication ecosystem, limiting the real-world application of climate knowledge. The Technology Acceptance Model (Davis, 1989) partially explains why users are drawn to familiar, low-barrier platforms like WhatsApp. High mean scores for frequency of use and platform preference correlate with perceived ease of

use and usefulness, two central tenets of TAM. However, the model falls short in explaining socio-political and infrastructural constraints.

To account for these, the Communication Infrastructure Theory (CIT) offers a more comprehensive framework. It emphasises the interplay between personal networks, media platforms, and institutional scaffolding. In Taraba, digital storytelling exists, but weak institutional support limits uptake and transformation. Additionally, the results support emphasis on dialogue over didactic messaging. Respondents' moderate ratings of NGO/government campaigns suggest that top-down efforts lack local embeddedness. For impactful success, any campaign for climate change resilience using social media must prioritise co-creation, featuring community members and local influencers to build resonance and trust. Moreover, the concept of digital environmental citizenship (Tavares et al., 2020) aligns with the high willingness of respondents to recommend social media for communicating about climate (89.1%). This implies a potential civic power that could be tapped into through tactical involvement, capacity development, and infrastructural enabling.

Cross-tabulations, triangulation, regression, and correlation analysis lend a multidimensional insight into digital climate communication in Taraba. The Social media is not a silver bullet. Demographic profiling, content planning, participatory design, and infrastructural support are determinants of its efficacy. The results depict a paradox: the digital platform promotes engagement but is limited by systematic exclusion. To overcome this, NGOs, the government, and community-based organisations will have to collaborate to create inclusive digital ecosystems that deliver climate resilience.

Conclusion

The research reveals the growing popularity of social media as a medium for climate change communication, adaptation, and behavioural participation in Taraba State, Nigeria. A cross-sectional survey of 385 participants yields results that outline a dynamic, yet uneven, digital ecosystem, where age, gender, content preferences, and platform use are systematically related to access to climate-related information, as well as its influence. The conclusion is clear that social media is an indispensable tool for climate change awareness and community-level mobilisation, yet its potential remains constrained by infrastructural, linguistic, and strategic limitations. While platforms such as Facebook and WhatsApp are widely used, the translation of awareness into sustained action is hindered by low digital literacy, inadequate localisation of content, and insufficient participatory strategies. Moreover, gendered and generational dynamics underscore the need for a more inclusive approach to climate communication that leverages the digital strengths of young people and the environmental commitment of women.

Theoretically, the findings reinforce and expand models such as the Technology Acceptance Model (TAM) and Communication Infrastructure Theory (CIT), demonstrating that perceived usefulness, digital habits, and storytelling networks are crucial for public adoption. However, without supporting infrastructure and institutional credibility, the full realisation of digital environmental citizenship remains aspirational. The path to climate resilience in Taraba State, therefore, lies not only in disseminating information but also in transforming communication into collaborative action. Social media is a powerful tool, but only when rooted in participatory, localised, and demographically attuned strategies can it achieve its transformative promise.

Recommendations

This study recommends that climate communication strategies should prioritise Facebook and WhatsApp, given their widespread use and ease of access. Video and infographic content should be favoured over text-heavy materials to better resonate with user preferences. Given the

prominence of youth in climate engagement, local governments and NGOs should sponsor training programs that enhance both digital literacy and climate literacy, enabling more informed use of social media for environmental advocacy. Additionally, communication campaigns must be sensitive to gendered patterns of use and influence. By employing women-led narratives, culturally relevant female influencers, and community-driven stories, trust and behavioural adoption can be increased. Messages should be delivered in local languages and incorporate community-specific experiences, metaphors, and imagery to enhance emotional and cognitive resonance.

Conflict of Interest

The authors declare that there is no conflict of interest associated with this study.

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