

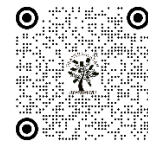
Original Article

CLIMATE CHANGE REPRESENTATION AND AUDIENCE ENGAGEMENT ON AFGHAN FACEBOOK PAGES: A QUANTITATIVE CONTENT ANALYSIS

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ABSTRACT

Climate change cases significant environmental, economic, and social challenges in Afghanistan, yet little research has considered how climate-related issues are represented and engaged with on social media platforms. This study investigates climate change representation and audience engagement on Afghan Facebook pages through quantitative content analysis. A total of 60 climate-change-related Facebook posts published between January and September 2025 were collected from four major Afghan media organizations: TOLO News, Ariana News, Pajhwok News, and Shamshad News. The study was guided by Knowledge Gap Theory and Framing Theory and analyzed post characteristics, including topic, language, post type, media format, message tone, and audience engagement indicators.

Descriptive statistics, Chi-square tests, Mann-Whitney U tests, and Kruskal-Wallis tests were employed to analyze the data. The findings reveal that drought (56.7%) and flood-related issues (23.3%) dominated climate change communication on Afghan Facebook pages. Climate-related content was primarily communicated through image-based posts and negatively framed messages. Audience engagement varied considerably across posts, with video content generating the highest engagement levels. Significant relationships were found between post type and audience engagement ($p = .005$), language and audience engagement ($p = .029$), and message tone and audience engagement ($p = .015$). Dari-language posts and informative messages received significantly higher engagement than Pashto-language and negatively framed posts. However, no significant relationship was found between media organization and climate-change topic representation ($p = .439$).

The study concludes that content format, language, and message tone play important roles in shaping audience engagement with climate-related information on Afghan Facebook pages. The findings contribute to the limited literature on climate communication in Afghanistan and provide practical implications for media organizations seeking to enhance public engagement with environmental issues through social media.

Keywords: Climate Change, Facebook, Audience Engagement, Climate Communication, Social Media, Afghanistan, Content Analysis.

INTRODUCTION

Climate change is one of the most critical global challenges, with its impacts disproportionately affecting fragile and conflict-affected countries such as Afghanistan. The country faces severe climate-related threats, including droughts, floods, air pollution, water scarcity, and declining agricultural productivity, which threaten livelihoods, food security, and public health. Despite these growing environmental risks, climate change communication and public awareness remain relatively underdeveloped in Afghanistan due to limited institutional capacity, weak environmental education, and restricted access to reliable information

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sources. In this context, all types of media and particularly social media platforms have emerged as an important source of climate-related information and public discussion [Schäfer \(2015\)](#), [Hakimi et al. \(2024\)](#).

Social media platforms have a significant role in shaping climate change communication since they enable the rapid dissemination of information, increasing public visibility of environmental issues, and facilitating audience interaction through likes, comments, and shares. Research indicates that social media has become a central space for climate discourse, allowing environmental organizations, activists, scientists, and citizens to exchange information, mobilize collective action, and participate in environmental discussions across geographic boundaries [León et al. \(2021\)](#), [Saini and Rana \(2025\)](#). Social media platforms such as Facebook facilitate information sharing, engagement, discussion, and community-building around climate-related issues. Facebook allows media organizations to communicate climate-related issues to large audiences while also creating spaces for public engagement and discussion. Previous studies suggest that digital media can contribute to raising environmental awareness and encouraging public participation in climate-related conversations [Alawade and Obun-Andy \(2024\)](#).

Previous research has shown that social media platforms not only ease information dissemination but also influence public perceptions, climate attitudes, and environmental engagement through interactive communication features [Anderson \(2017\)](#), [Veltri and Atanasova \(2017\)](#), [Pearson et al. \(2016\)](#).

Also, climate change communication on social media is formed by the ways environmental issues are represented, framed, and emotionally communicated. Different forms of content, message tones, media formats, and audience reactions may influence how climate-related information is interpreted and engaged with online [Mocatta et al. \(2023\)](#). Social media platforms are also vulnerable to misinformation, selective framing, polarization, and echo chambers that may affect public understanding of climate change issues. While social media networks create opportunities for communication, participation, and mobilization, they can simultaneously facilitate the spread of climate disinformation and reinforce ideological polarization through algorithmic filtering and homophily [Kumar and Haneef \(2025\)](#). These challenges are particularly relevant in contexts characterized by uneven digital literacy and limited access to scientific information.

Afghanistan represents a particularly important context for examining Knowledge Gap Theory because access to information, digital literacy, educational opportunities, and media infrastructure remain highly uneven across the country. Significant differences exist between urban and rural populations in terms of internet access, educational resources, media exposure, and scientific literacy. In such environments, social media can function both as a tool for narrowing information gaps by expanding access to climate-related content and as a mechanism for reinforcing inequalities through misinformation, selective exposure, and unequal engagement with reliable information sources. These conditions make Afghanistan an important case for understanding how climate-related communication circulates within fragile and information-vulnerable societies.

At the same time, Facebook has become one of the most influential digital communication platforms in Afghanistan, particularly for news consumption and public discussion. Afghan media organizations increasingly use Facebook to communicate environmental issues, natural disasters, and climate-related events to audiences. Despite the growing importance of social media for climate communication in Afghanistan, limited empirical research has systematically examined how climate change is represented on Facebook and how different content characteristics influence audience engagement. This study addresses this gap by analyzing climate-related Facebook posts published by major Afghan media organizations. Existing research has primarily focused on climate awareness, traditional media coverage, or general social media use, while limited attention has been given to the systematic analysis of climate change representation and audience engagement on Afghan social media platforms.

Drawing on Knowledge Gap Theory [Donohue et al. \(1975\)](#) and Framing Theory [Entman \(1993\)](#), this study examines climate change representation and audience engagement on Afghan Facebook pages through quantitative content analysis.

Problem Statement

Climate change has become one of the most urgent and needing environmental and social challenges facing Afghanistan. The country is highly vulnerable to climate-related disasters such as droughts, floods, water scarcity, air pollution, and declining agricultural productivity, all of which threaten livelihoods, food security, public health, and economic stability. Despite the growing severity of these environmental challenges, climate change communication and public engagement in Afghanistan remain limited due to weak institutional structures, uneven access to education, low levels of digital literacy, and restricted access to reliable environmental information sources [Hakimi et al. \(2024\)](#).

In recent years, social media platforms particularly Facebook has become increasingly important sources of news, public discussion, and information dissemination in Afghanistan. Afghan media organizations actively use Facebook to communicate social, political, and environmental issues to large audiences. Social media platforms provide opportunities for rapid information sharing, audience interaction, and public engagement through likes, comments, and shares [Alawade and Obun-Andy \(2024\)](#). At the same time, however, digital platforms are also vulnerable to misinformation, selective framing, emotional polarization, and unequal information accessibility, especially in fragile societies characterized by uneven digital literacy and unequal media access [Mocatta et al. \(2023\)](#).

Afghanistan represents a particularly important context for examining climate communication because of its sharp inequalities in education, internet accessibility, geographic development, and media infrastructure between urban and rural populations. These inequalities create conditions in which social media may either help reduce information gaps by increasing access to climate-related

content or reinforce existing knowledge gaps through unequal access to reliable information and exposure to misleading or emotionally framed content. Knowledge Gap Theory suggests that information distributed through mass media is often acquired more quickly by socially advantaged groups, potentially widening disparities in public understanding [Donohue et al. \(1975\)](#). In the Afghan context, where access to reliable environmental information remains uneven, understanding how climate issues are represented and engaged with on social media becomes especially important.

Although previous studies have examined climate change awareness, media communication, and social media use, several important gaps remain. Existing research has largely focused on traditional media, public awareness surveys, or general climate communication patterns [Schäfer \(2015\)](#), [Hakimi et al. \(2024\)](#). Other studies have examined climate communication on social media platforms without systematically analyzing how climate issues are represented through different post types, media formats, thematic categories, message tones, and audience engagement patterns in Afghanistan [Darwishean et al. \(2024\)](#).

Furthermore, limited research has quantitatively examined how audiences interact with climate-related Facebook content in the Afghan media environment. There is insufficient empirical evidence regarding which types of climate-related posts generate greater audience engagement, how Afghan media organizations frame climate issues, and how audience sentiments are reflected in online interactions. Most importantly, few studies have applied quantitative content analysis to examine the relationship between climate change representation and audience engagement on Afghan social media platforms.

Therefore, this study seeks to address these gaps by conducting a quantitative content analysis of climate-change-related Facebook posts published by major Afghan media organizations. The study examines how climate change issues are represented through different themes, tones, languages, and media formats, and how audiences engage with such content through likes, comments, shares, and top-comment sentiments. By doing so, the research contributes to broader discussions on climate communication, media representation, audience engagement, and digital information inequality in fragile and information-vulnerable contexts such as Afghanistan.

RESEARCH OBJECTIVES

MAIN OBJECTIVE

To examine climate change representation and audience engagement on Afghan Facebook pages through quantitative content analysis.

SPECIFIC OBJECTIVES

- To identify the dominant climate change topics and representation patterns on Afghan Facebook pages.
- To measure audience engagement with climate-change-related Facebook posts through likes, comments, shares, and engagement scores.
- To examine the relationship between post characteristics and audience engagement on Afghan Facebook pages.

RESEARCH QUESTIONS

GENERAL QUESTION

How are climate change issues represented and engaged with on Afghan Facebook pages?

Specific Research Questions

- 1) What climate change topics and representation patterns are most frequently observed on Afghan Facebook pages?
- 2) What types of climate-change-related Facebook posts generate the highest audience engagement?
- 3) Is there a significant relationship between post characteristics and audience engagement on Afghan Facebook pages?

RESEARCH HYPOTHESES

H1: Audience engagement differs significantly across post types.

Variables

- Independent Variable: PostType
- Dependent Variable: Engagement_Sum

SPSS Test

- Kruskal–Wallis Test

H2: Message characteristics (language and message tone) are significantly associated with audience engagement on Afghan Facebook pages.

Variables

- Independent Variables:
- Language
- MessageTone
- Dependent Variable:
- Engagement_Sum

SPSS Tests

- Mann–Whitney U Test (Language)
- Kruskal–Wallis Test (MessageTone)

H3: There is a statistically significant relationship between media organization and climate-change topic representation.

Variables

- Independent Variable:
- Media
- Dependent Variable:
- Topic

SPSS Test

- Chi-Square Test

LITERATURE REVIEW

Schäfer (2015) reviews extensive research on the role of media in shaping public understanding of climate change, identifying media as one of the primary sources of climate-related knowledge. The study emphasizes the need for greater research attention toward television, online platforms, and non-Western contexts, arguing that much of the existing scholarship remains concentrated on print media and Western societies. Schäfer also identifies important gaps related to audience engagement, media production processes, and behavioral outcomes, highlighting the need for more interdisciplinary and effect-oriented climate communication research.

Recent scholarship has highlighted the growing importance of social media platforms in climate change communication. León et al. (2021) argue that social media provides unique opportunities for organizations to foster public discussion, increase climate knowledge, and encourage environmental action. Unlike traditional media, social media enables two-way interaction, allowing users to participate actively in climate-related discussions rather than functioning solely as information recipients. The authors further suggest that successful climate communication on social media depends on strategies that encourage interaction, participation, and audience engagement.

Similarly, Kumar and Haneef (2025) emphasize that social media networks provide communicative, participatory, advocacy, and mobilizing functions that support climate communication. Their work demonstrates that social media platforms can facilitate public awareness, environmental activism, and climate-related engagement through features such as sharing, commenting, and hashtag participation. However, they also caution that the same platforms may facilitate climate misinformation and polarization.

Mocatta et al. (2023) examine the impact of local journalism on climate change communication in rural and regional Australia, areas significantly affected by global warming. Their research investigates how local reporters covered the School Strikes for Climate movement as a means of understanding media advocacy in smaller communities. While rural journalists often engage in advocacy for the public good, the authors found that dominant journalistic norms and highly polarized opinions regarding climate issues limited direct advocacy efforts. As a result, many journalists employed subtle forms of “quiet advocacy” to navigate these challenges while still promoting public engagement with climate change at the community level.

Alawade and Obun-Andy (2024) emphasize the important role of media in shaping public perceptions of climate change, particularly through social and digital media platforms. Using secondary data and desk research, their study found that newer media platforms—such as social media, blogs, and online news outlets—significantly influence public discussions and attitudes regarding climate change in Nigeria. The authors conclude that these digital platforms not only promote environmental awareness but also encourage proactive responses to climate-related challenges. Their findings suggest that social media can serve as an important tool for increasing public education and engagement on climate change issues.

León et al. (2022) investigated how visual representations of climate change on social media influence audience interaction. Analyzing climate-related images shared on social media, the authors found that images portraying real people, local relevance, narratives, and visible impacts generated higher levels of user interaction. Their findings suggest that visual communication strategies play an important role in fostering public engagement with climate-related content.

[Hakimi et al. \(2024\)](#) highlight the pivotal role of public awareness in shaping active responses to climate change in Afghanistan. The study finds that heightened awareness encourages sustainable practices, collective environmental responsibility, and greater public participation in addressing environmental challenges. By examining Afghanistan as a case study, the research demonstrates how local awareness initiatives may contribute to broader climate adaptation efforts. However, although the study confirms the importance of awareness in promoting climate action, it leaves an important gap regarding how such awareness is formed through media communication and whether it translates into long-term public engagement and behavioral change.

[Darwishean et al. \(2024\)](#) explore climate change communication on the X platform in Afghanistan, highlighting the country's environmental vulnerability and limited climate awareness strategies. Using content analysis, the study identifies recurring themes related to climate impacts, funding limitations, and gender-related vulnerabilities. The findings demonstrate the growing importance of social media platforms in shaping environmental discussions and promoting climate-related awareness and engagement in Afghanistan. However, the study focuses primarily on thematic communication patterns and gives limited attention to audience engagement metrics and comparative differences between content types and media formats.

Although previous studies have demonstrated the importance of media and social media in climate communication, several important gaps remain. Existing research has focused primarily on public awareness, climate communication strategies, thematic analyses, or environmental activism [Schäfer \(2015\)](#), [León et al. \(2021\)](#), [Kumar and Haneef \(2025\)](#). Limited research has quantitatively examined how different content characteristics—including post type, language, media format, and message tone—shape audience engagement with climate-related Facebook content in Afghanistan. Furthermore, little empirical evidence exists regarding the representation of climate change issues on Afghan social media platforms and the ways audiences respond to such representations.

THEORETICAL FRAMEWORK

This study is guided by two complementary theoretical perspectives: Knowledge Gap Theory and Framing Theory.

KNOWLEDGE GAP THEORY

Knowledge Gap Theory, developed by Tichenor, Donohue, and Olien in the 1970s. The theory suggests that as mass media information spreads, individuals with higher socioeconomic and educational status tend to acquire it faster than those with lower status, leading to a widening knowledge gap [Donohue et al. \(1975\)](#). However, when issues directly affect local communities or spark conflict, these gaps may narrow because wider attention and interpersonal communication increase public engagement.

Applied to climate change in Afghanistan, this theory highlights how social media may raise awareness unevenly across society. While urban, educated groups with greater digital access may benefit quickly, rural and marginalized populations may lag behind. Yet, because climate change poses visible threats such as droughts and floods, the issue has the potential to stimulate broad concern that can reduce disparities in awareness.

[Coker \(2019\)](#) extends the concept of knowledge gaps to research contexts, emphasizing that identifying such gaps is the basis for creating new knowledge. In the communication field, this means social media can help close awareness gaps by providing platforms for widespread participation. Still, disparities in digital literacy and accessibility may prevent equal knowledge distribution.

Although this study does not directly measure knowledge acquisition or socioeconomic differences, Knowledge Gap Theory provides a contextual framework for understanding how inequalities in access to information and digital resources may influence engagement with climate-related content in Afghanistan.

FRAMING THEORY

Framing Theory provides a more direct explanation for how climate change issues are represented in media content. According to Entman cited by [Güran and Özarslan \(2022\)](#), "Framing Theory explains how media influence audience interpretation by selecting and emphasizing particular aspects of reality." Frequently using keywords, metaphors, images, symbols, or emotional cues to direct perception, frames function through inclusion, exclusion, and emphasis.

Media organizations do not simply report events; they actively construct representations through the selection of topics, language, tone, visuals, and presentation formats. Different frames may emphasize threats, solutions, responsibility, vulnerability, or adaptation, thereby shaping audience perceptions and responses.

Previous climate communication research demonstrates that framing significantly influences how audiences interpret environmental issues. Climate change may be framed through narratives of risk, crisis, responsibility, adaptation, or solutions, each of which can affect audience perceptions and engagement differently. Social media platforms further amplify framing effects by enabling rapid circulation, personalization, and interaction with framed climate messages [León et al. \(2021\)](#), [Kumar and Haneef \(2025\)](#).

In the context of climate change communication, framing influences which environmental issues receive attention and how those issues are presented to the public. For example, climate change may be framed as an environmental crisis, a development challenge, a humanitarian issue, or a policy problem. Similarly, message tone and media format may influence audience engagement and interaction.

This study applies Framing Theory to examine how climate change issues are represented through different topics, post types, media formats, languages, and message tones on Afghan Facebook pages. The theory helps explain variations in climate-related communication and audience engagement across different forms of social media content.

INTEGRATION OF THE THEORIES

Together, Knowledge Gap Theory and Framing Theory provide a comprehensive framework for understanding climate communication on Afghan Facebook pages. Knowledge Gap Theory explains the broader context of unequal information access and communication opportunities, while Framing Theory explains how climate change issues are represented and communicated through media content.

By combining these perspectives, the study examines both the representation of climate change issues and the patterns of audience engagement associated with different forms of climate-related communication on Afghan social media platforms.

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study employed a quantitative content analysis design to examine climate change representation and audience engagement on Afghan Facebook pages.

Quantitative content analysis is a systematic research method used to objectively analyze communication content through numerical coding and statistical analysis. In this study, Facebook posts related to climate change were systematically coded and analyzed to identify patterns of representation, communication characteristics, and audience engagement.

The study focused on examining how climate change issues were represented by Afghan media organizations on Facebook and how audiences interacted with these posts through likes, comments, and shares.

DATA SOURCES AND SAMPLING

The data for this study were collected from the official Facebook pages of major Afghan media organizations, including:

- TOLO News
- Ariana News
- Pajhwok News
- Shamshad News

Facebook was selected because it is one of the most widely used social media platforms for news consumption and public communication in Afghanistan.

The dataset included climate-change-related Facebook posts published between January 1, 2025, and September 29, 2025. The final dataset consisted of 60 Facebook posts collected from the selected Afghan media pages.

A purposive sampling technique was used to select posts directly related to climate change and environmental issues. Climate-related posts were identified using relevant keywords and hashtags, including:

- #ClimateChange
- #Drought
- #Floods
- #Rainfall
- #ClimateAction
- #Environment
- #Pollution

Only posts directly addressing climate change, environmental challenges, natural disasters, climate awareness, or environmental protection were included in the analysis.

UNIT OF ANALYSIS

The unit of analysis in this study was individual Facebook posts published by Afghan media organizations.

Each Facebook post was treated as a separate analytical unit and coded according to predefined variables in the codebook.

DATA COLLECTION PROCEDURES

Data were manually collected and organized in Microsoft Excel using a structured coding sheet.

Each Facebook post was coded according to the following variables:

- Post date
- Media organization
- Post type
- Language
- Media type
- Topic category
- Message tone
- Accuracy flag
- Likes count
- Comments count
- Shares count
- Total engagement score
- Top-comment sentiment

Audience engagement was measured through:

- Likes
- Comments
- Shares
- Total engagement score

The coding process enabled systematic classification of climate-change-related Facebook content and audience interaction patterns.

CODING CATEGORIES

The coding framework was designed to examine both climate change representation and audience engagement.

Representation Variables

- Topic category
- Message tone
- Language
- Media type
- Post type

Engagement Variables

- Likes count
- Comments count
- Shares count
- Engagement sum

Audience Response Variable

- Top-comment sentiment

The coding categories allowed the researcher to quantitatively analyze how climate change issues were communicated and how audiences reacted to different forms of content.

OPERATIONALIZATION OF VARIABLES

The variables used in this study were operationalized through a structured coding framework designed to quantitatively analyze climate change representation and audience engagement on Afghan Facebook pages.

Independent Variables

1) Post Type

Post type refers to the format of Facebook content published by media organizations.

Categories

- News article
- Video
- Infographic
- Meme

Measurement Level: Nominal

2) Language

Language refers to the primary language used in the Facebook post.

Categories

- Dari/Persian
- Pashto

Measurement Level: Nominal

3) Media Organization

Media organization refers to the Afghan media outlet that published the Facebook post.

Categories

- TOLO News
- Ariana News
- Pajhwok News
- Shamshad News

Measurement Level: Nominal

4) Media Type

Media type refers to the technical format of the Facebook post.

Categories

- Text
- Image
- Video
- Mixed media

Measurement Level: Nominal

5) Topic

Topic refers to the primary climate-change-related issue discussed in the Facebook post.

Categories

- Drought
- Floods
- Air pollution
- Environmental awareness
- Water scarcity

- Climate policy
- Climate-related disasters

Measurement Level: Nominal

6) Message Tone

Message tone refers to the dominant communication style or emotional framing of the Facebook post.

Categories

- Informative
- Alarming
- Persuasive
- Neutral

Measurement Level: Nominal

Dependent Variables

7) Likes Count

Likes count refers to the number of likes received by a Facebook post.

Measurement Level: Scale

8) Comments Count

Comments count refers to the total number of comments received by a Facebook post.

Measurement Level: Scale

9) Shares Count

Shares count refers to the total number of times a Facebook post was shared.

Measurement Level: Scale

10) Engagement Sum

Engagement sum refers to the total audience interaction with a Facebook post, calculated by combining likes, comments, and shares.

Formula

$\text{Engagement_Sum} = \text{Likes_Count} + \text{Comments_Count} + \text{Shares_Count}$

This variable was used as the primary indicator of audience interaction and engagement.

Measurement Level: Scale

Audience Response Variable

11) Top-Comment Sentiment

Top-comment sentiment refers to the dominant emotional or attitudinal orientation expressed in the most engaged audience comment under a Facebook post.

Categories

- Positive
- Negative
- Neutral
- Skeptical

Measurement Level: Nominal

Data Analysis

The quantitative data were analyzed using Microsoft Excel and SPSS.

Descriptive Statistics

Descriptive statistics were used to summarize:

- frequencies,
- percentages,
- means,
- and engagement patterns.

These analyses helped identify:

- dominant climate-change topics,
- common post formats,
- audience interaction trends,
- and representation patterns.

Inferential Statistics

Several inferential statistical tests were conducted to examine relationships between variables.

The analyses included:

- Crosstabulation analysis
- Chi-square tests
- Mann–Whitney U tests
- Kruskal–Wallis tests
- Spearman correlation analysis

These tests were used to determine whether audience engagement differed significantly according to:

- post type,
- language,
- topic,
- message tone,
- and media organization.

Nonparametric statistical tests were selected because engagement variables such as likes, comments, and shares were not normally distributed and showed substantial variation across Facebook posts.

VALIDITY AND RELIABILITY

Several procedures were followed to ensure the validity and reliability of the study.

First, all Facebook posts were coded using a structured coding framework with predefined coding categories and definitions to ensure consistency during data collection.

Second, engagement figures and coded variables were cross-checked during data entry to reduce coding errors.

Third, only climate-change-related Facebook posts were included in the dataset to ensure content relevance and analytical accuracy.

The systematic coding process enhanced the reliability and consistency of the quantitative content analysis. Because the study employed single-coder content analysis, formal intercoder reliability testing was not conducted. To improve coding consistency, all posts were coded using a structured codebook and reviewed multiple times. Future studies should employ intercoder reliability measures such as Cohen's Kappa or Krippendorff's Alpha.

ETHICAL CONSIDERATIONS

This study used only publicly available Facebook content from official media pages.

No private or restricted information were accessed during the research process. User identities appearing in comments were anonymized to protect privacy and confidentiality.

All collected data were used strictly for academic and research purposes.

RESULTS AND FINDINGS

This chapter presents the findings of the quantitative content analysis conducted on climate-change-related Facebook posts published by four major Afghan media organizations: TOLO News, Ariana News, Pajhwok News, and Shamshad News. The analysis is organized according to the study's research questions and hypotheses. First, descriptive findings are presented to identify dominant climate change topics and representation patterns. Second, audience engagement statistics are reported. Finally, inferential statistical analyses are presented to examine relationships between content characteristics and audience engagement.

CLIMATE CHANGE REPRESENTATION ON AFGHAN FACEBOOK PAGES

To address the first research question, frequency analysis was conducted on climate-related Facebook posts.

Table 1

Table 1 Distribution of Climate Change Topics					
		Topic			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Climate Change	2	3.3	3.3	3.3
	Climate Solutions	2	3.3	3.3	6.7
	Drought	34	56.7	56.7	63.3
	Flood	14	23.3	23.3	86.7
	Irrigation	1	1.7	1.7	88.3
	Irrigation/Water Management	2	3.3	3.3	91.7
	Rainfall	4	6.7	6.7	98.3
	Solution	1	1.7	1.7	100
	Total	60	100	100	

The results indicate that drought was the dominant climate-related topic, representing 56.7% of all analyzed posts. Flood-related content accounted for 23.3% of the sample, making it the second most frequently represented topic. Other climate-related issues, including rainfall, climate solutions, and water management, received considerably less attention. These findings suggest that Afghan media organizations primarily focus on climate issues that have immediate and visible impacts on livelihoods, agriculture, and food security.

POST TYPES AND REPRESENTATION PATTERNS

Image-based posts were the most frequently used format (50%), followed by reports (26.7%), videos (15.0%), and image-plus-report posts (8.3%). This indicates a strong preference among Afghan media organizations for visually oriented climate communication.

Regarding language, 70.0% of the posts were published in Dari and 30.0% in Pashto, suggesting that climate-related communication on Facebook is primarily directed toward Dari-speaking audiences.

Analysis of message tone revealed that negative framing dominated climate-related communication. Negative posts accounted for 76.7% of the sample, while positive and informative posts represented 18.3% and 5.0%, respectively. This finding indicates that climate change is primarily framed as a threat, risk, or environmental challenge rather than as an opportunity or solution-oriented issue.

Audience sentiment, measured through top-comment sentiment, showed a different pattern. Positive comments accounted for 56.7% of the sample, while neutral and negative comments represented 15.0% and 11.7%, respectively. This suggests that audiences generally responded positively to climate-related content despite the predominance of negatively framed posts.

ANSWER TO RESEARCH QUESTION 1

The findings indicate that climate change representation on Afghan Facebook pages is dominated by drought- and flood-related issues, image-based communication, and negative framing. At the same time, audience reactions were predominantly positive, suggesting substantial public interest and engagement with environmental issues.

AUDIENCE ENGAGEMENT PATTERNS

To address the second research question, descriptive statistics were calculated for likes, comments, shares, and total engagement.

Table 2

Table 2 Descriptive Statistics of Audience Engagement					
Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Likes_Count	60	10	3800	538.57	756.277
Comments_Count	60	0	1500	37.3	195.086
Shares_Count	59	0	1300	28.24	168.837
Engagement_Sum	60	10	4500	618.67	909.528
Valid N (listwise)	59				

The average post received 538.57 likes, 37.30 comments, and 28.24 shares. The mean total engagement score was 618.67 interactions per post. However, the large standard deviations indicate substantial variation in audience engagement across climate-related Facebook posts.

The most highly engaged post received 4,500 interactions, while the least engaged post received only 10 interactions. These findings suggest that certain climate-related posts were considerably more successful than others in attracting audience attention and interaction.

ANSWER TO RESEARCH QUESTION 2

Audience engagement varied substantially across climate-related Facebook posts, indicating that some content characteristics may significantly influence user interaction.

HYPOTHESIS TESTING

H1: Relationship Between Post Type and Audience Engagement

A Kruskal–Wallis test was conducted to determine whether audience engagement differed according to post type.

Table 3

Table 3 Kruskal–Wallis Test: Post Type and Audience Engagement			
Ranks			
	PostType_Num	N	Mean Rank
Engagement_Sum	Image	30	23.83
	Image+report	5	35.2
	Report	16	32.19
	Video	9	47.11
	Total	60	

$$H = 13.025, df = 3, p = .005$$

The results reveal a statistically significant difference in engagement across post types ($p = .005$). Video posts achieved the highest mean rank (47.11), followed by image-plus-report posts and reports, while image-only posts received the lowest engagement.

Decision: H1 is supported.

These findings suggest that audience engagement is significantly influenced by post format, with video content generating the highest levels of interaction.

H2: Relationship Between Message Characteristics and Audience Engagement

H2a: Language and Audience Engagement

A Mann–Whitney U test was conducted to compare engagement between Dari and Pashto posts.

Table 4

Table 4 Mann–Whitney U Test: Language and Audience Engagement				
Ranks				
	Language_Num	N	Mean Rank	Sum of Ranks
Engagement_Sum	Dari	42	33.71	1416
	Pashto	18	23	414
	Total	60		

U = 243.00, Z = -2.178, p = .029

The results indicate a statistically significant difference in engagement between the two language groups. Dari-language posts generated significantly higher audience engagement than Pashto-language posts.

H2b: Message Tone and Audience Engagement

A Kruskal–Wallis test was conducted to examine differences in engagement according to message tone.

Table 5

Table 5 Kruskal–Wallis Test: Message Tone and Audience Engagement			
Ranks			
	MessageTone_Num	N	Mean Rank
Engagement_Sum	Informative	3	51
	Negative	46	27.15
	Positive	11	38.91
	Total	60	

H = 8.374, df = 2, p = .015

The results indicate a statistically significant relationship between message tone and audience engagement. Informative posts generated the highest engagement levels, followed by positive posts, while negative posts received comparatively lower engagement.

Decision: H2 is supported.

These findings demonstrate that both language and message tone play significant roles in shaping audience engagement with climate-related Facebook content.

H3: Relationship Between Media Organization and Climate Change Topic Representation

A Chi-square test was conducted to examine whether climate change topic representation differed across media organizations.

Table 6

Table 6 Chi-Square Test: Media Organization and Topic Representation									
Media * Topic Crosstabulation									
		Topic							
			Climate Change	Climate Solutions	Drought	Flood	Irrigation	Irrigation/Water Management	Rainfall
Media	Ariana News	Count	1	0	5	3	0	1	0

	% withi n Medi a	10.00 %	0.00%	50.00 %	30.00 %	0.00%	10.00%	0.00%
PajhwokNews	Count	0	0	7	6	0	0	0
	% withi n Medi a	0.00%	0.00%	53.80 %	46.20 %	0.00%	0.00%	0.00%
ShamshadNe ws	Count	0	1	13	1	0	1	1
	% withi n Medi a	0.00%	5.90%	76.50 %	5.90%	0.00%	5.90%	5.90%
TOLONews	Count	1	1	9	4	1	0	3
	% withi n Medi a	5.00%	5.00%	45.00 %	20.00 %	5.00%	0.00%	15.00 %
Total	Count	2	2	34	14	1	2	4
	% withi n Medi a	3.30%	3.30%	56.70 %	23.30 %	1.70%	3.30%	6.70%
Test	Value							
χ^2	21.32							
	1							
df	21							
p	0.439							

The results indicate no statistically significant relationship between media organization and climate change topic representation ($p = .439$). Although some variation existed across media outlets, drought remained the dominant topic across all organizations.

The Chi-square results should be interpreted with caution because several cells contained low expected frequencies due to the relatively small sample size.

Decision: H3 is not supported.

This finding suggests that Afghan media organizations generally share similar priorities in climate change coverage.

SUMMARY OF FINDINGS

The findings demonstrate that climate change communication on Afghan Facebook pages is primarily focused on drought and flood-related issues. Climate-related content is predominantly communicated through image-based posts and negative framing. However, audiences generally respond positively to climate-related content.

Audience engagement is significantly influenced by post type, language, and message tone. Video content, Dari-language posts, and informative messages generate the highest levels of interaction. In contrast, no significant differences were found in climate change topic representation across media organizations. [Abhinav Sharma et al. \(2025\)](#)

Overall, the results suggest that both communication format and message characteristics play important roles in shaping audience engagement with climate-related content on Afghan Facebook pages.

DISCUSSION

This study looked at climate change representation and audience engagement on Afghan Facebook pages through quantitative content analysis. The findings show important patterns regarding how climate-related issues are communicated by Afghan media organizations and how audiences respond to such content. [Nair and D \(2026\)](#)

The first major finding reveals that drought was the most frequently represented climate-related topic, accounting for more than half of all analyzed posts. Floods were the second most common topic, while other climate-related issues received comparatively limited attention. This pattern reflects Afghanistan's environmental reality, where drought and water scarcity have become among the most pressing challenges affecting agriculture, livelihoods, and food security. The dominance of drought-related content suggests that Afghan media organizations prioritize climate issues that have immediate and visible consequences for local communities. This finding is consistent with [Darwishean et al. \(2024\)](#), who found that climate communication in Afghanistan often focuses on environmental impacts and vulnerabilities. [Satapathy and Panda \(2025\)](#)

The results also indicate that the most popular post format was image-based material, with the most audience engagement coming from video posts. Because audiovisual content draws attention more successfully, offers more information, and is frequently given priority by social media algorithms, video posts probably created increased interaction. This result is in line with earlier research showing that interactive and visually appealing material typically attracts more audience attention and participation on social media sites. Videos, emotionally charged information, and visual narratives are frequently simpler to comprehend and distribute, which boosts user engagement and interaction [León et al. \(2022\)](#).

The considerable association between post type and engagement shows that audiences are more inclined to interact with visually rich and dynamic information. This finding supports previous research indicating that multimedia formats enhance audience attention and participation on social media platforms [Alawade and Obun-Andy \(2024\)](#). For climate communication practitioners, this suggests that video-based content may be particularly effective for increasing public engagement with environmental issues.

Another crucial finding is the significant relationship between language and audience engagement. Dari-language posts received significantly higher engagement than Pashto-language posts. Higher engagement with Dari-language content may reflect the larger Facebook audience using Dari as a primary communication language as well as differences in media consumption patterns. Several explanations may account for this pattern, including differences in audience size, media consumption habits, and platform usage among linguistic communities. This finding supports the assumptions of Knowledge Gap Theory, which suggests that access to and engagement with information may vary across different population groups. Although this study does not directly measure knowledge acquisition, differences in engagement levels indicate unequal patterns of interaction with climate-related information.

The study also found a significant relationship between message tone and audience engagement. Informative posts generated the highest engagement, followed by positive posts, while negatively framed posts received comparatively lower engagement. This finding supports previous research suggesting that audiences respond positively to climate-related content that provides practical information, meaningful explanations, and opportunities for understanding environmental issues. Informative communication may reduce psychological distance and enhance public engagement with climate-related challenges [León et al. \(2021\)](#).

Contrary to expectations, there was no statistically significant relationship between media organization and topic representation. While there were significant differences across media outlets, all organizations focused primarily on drought and flood-related issues. This finding suggests that Afghan media organizations share similar priorities in their climate coverage, likely reflecting the common environmental challenges facing the country. However, the lack of statistical significance should be interpreted cautiously because the sample size was relatively small and many cells in the Chi-square analysis contained low expected frequencies.

The findings also support recent claims that social media platforms have become central spaces for climate awareness and environmental engagement. By enabling information sharing, interaction, and participation, social media can contribute to environmental communication and public engagement, particularly in countries where traditional environmental communication infrastructures remain limited [Saini and Rana \(2025\)](#).

Overall, the findings demonstrate that climate change communication on Afghan Facebook pages is characterized by a strong emphasis on environmental threats, particularly drought, while audience engagement is influenced by content characteristics such as post format, language, and message tone. These results contribute to the growing literature on climate communication in

developing and information-vulnerable contexts and highlight the importance of social media as a platform for environmental communication and public engagement in Afghanistan.

CONCLUSION

This study examined climate change representation and audience engagement on Afghan Facebook pages through quantitative content analysis of 60 climate-related Facebook posts published by TOLO News, Ariana News, Pajhwok News, and Shamshad News.

The findings indicate that drought and flood-related issues dominate climate change communication on Afghan Facebook pages, reflecting the country's vulnerability to environmental and climate-related challenges. Image-based content was the most common format used by media organizations, while video posts generated the highest levels of audience engagement.

The study further found that audience engagement differed significantly according to post type, language, and message tone. Dari-language posts and informative content attracted higher levels of interaction, suggesting that both linguistic and communicative factors influence audience engagement with climate-related information. In contrast, no significant relationship was found between media organization and topic representation, indicating that Afghan media outlets generally focus on similar climate-related issues.

These findings highlight the important role of social media in communicating climate-related information and fostering public engagement in Afghanistan. They also suggest that the effectiveness of climate communication may depend not only on the topics being discussed but also on how those topics are presented to audiences.

The study contributes to the limited body of research on climate communication in Afghanistan by providing empirical evidence on climate change representation and audience engagement on social media. Furthermore, it demonstrates the usefulness of quantitative content analysis for examining environmental communication in fragile and information-vulnerable contexts.

Despite its contributions, the study has a number of limitations, including a relatively small sample size, focus on a single social media platform, and concentration on a limited number of media organizations. Future studies might increase the sample, include additional social media platforms such as X, Instagram, and TikTok, and examine audience comments in greater depth through qualitative analysis.

Overall, the findings indicate that social media platforms and particularly Facebook has significant potential to support climate communication and public engagement in Afghanistan, provided that media organizations employ effective content formats and communication strategies that encourage audience interaction and understanding.

RECOMMENDATIONS

The following suggestions are put forth in light of the study's findings:

- Media organizations can increase the use of video-based climate content, as video posts generated the highest audience engagement.
- Organizations should expand coverage beyond drought and flooding to include other climate-related issues such as air pollution, renewable energy, climate adaptation, and environmental sustainability.
- Media organizations should produce more informative content that provides practical knowledge and solutions, as informative posts generated higher audience engagement.
- Policymakers should collaborate with media organizations to disseminate accurate climate information through social media platforms.
- Policymakers should support public awareness campaigns that use social media to communicate climate risks and adaptation strategies.
- Policymakers should encourage the development of digital climate communication initiatives targeting vulnerable populations.
- Environmental Organizations should utilize Facebook and other social media platforms as tools for environmental education and public engagement.
- Environmental Organizations should promote community participation in climate discussions through online campaigns and awareness programs.

LIMITATIONS OF THE STUDY

This study has several limitations that should be acknowledged.

First, the dataset consisted of only 60 climate-change-related Facebook posts, which may limit the generalizability of the findings.

Second, the study focused exclusively on Facebook and did not examine climate communication on other social media platforms such as X (Twitter), Instagram, TikTok, or YouTube.

Third, the analysis was limited to four Afghan media organizations and therefore may not fully represent climate communication practices across all Afghan media outlets.

Fourth, audience engagement was measured through quantitative indicators such as likes, comments, and shares. The study did not conduct an in-depth qualitative analysis of audience comments and discussions.

The absence of intercoder reliability testing represents another limitation that may affect coding consistency.

Finally, because some categories contained relatively small numbers of cases, certain statistical analyses—particularly the Chi-square test—should be interpreted with caution.

SUGGESTIONS FOR FUTURE RESEARCH

Future studies may build upon the findings of this research in several ways:

- Examine climate communication across multiple social media platforms, including X, Instagram, TikTok, and YouTube.
- Conduct longitudinal studies to investigate changes in climate communication patterns over time.
- Analyze audience comments using qualitative content analysis or discourse analysis to better understand public perceptions of climate change.
- Investigate the effectiveness of different climate communication strategies in promoting environmental awareness and behavioral change.
- Examine the relationship between climate communication, misinformation, and public trust in environmental information.

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