TOWARDS PROMOTING CLIMATE CHANGE COMMUNICATION FOR IMPROVED ADAPTATION IN AFRICA: A GHANAIAN PERSPECTIVE

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ABSTRACT

Climate change has become a crucial global threat because of its impacts on the environment and human existence. Consequently, there have been various international platforms to discuss actions that combat climate change in line with the Sustainable Development Goal 13. Effective communication of climate issues remains one of the trusted ways of combating this menace, yet the incorporation of climate information to promote adaptation has been problematic especially in Africa due to ineffective strategies. This paper explored strategies for promoting climate change communication in Ghana. The diffusion of innovation theory and the theory of panned behavior informed this study within a quantitative paradigm that surveyed 327 Ghanaians. Using percentages, means, standard deviations, independent samples t-test and one-way ANOVA as analytical framework, the study discovered that respondents were generally dissatisfied with how climate change issues were communicated in Ghana. Respondents perceived climate change communication as a vital issue, which needs to be a critical part of Ghana's development agenda. The study found that incorporating more community mobilization and behavioral change techniques into climate change communication, empowering citizens, and adequately resourcing institutions mandated

to deal with climate change are key to achieving climate change adaptation in the country. The study thus concluded that Ghana requires more climate change communication research and a clear national climate change communication policy which is anchored on participatory communication, indigenous communication techniques and modern technologies.

1. *INTRODUCTION*

Issues of climate change have become imperative globally because of the growing and dire manifestation of the phenomenon with time. The global concern for climate change and its implications has seen it strongly represented in the Sustainable Development Goal (SDGs), precisely SDG 13, which enjoins nations to take urgent actions to combat climate change and its impacts. Calls for incorporating information and concerns on climate into policies and plans in developing nations continue to intensify even at the global stage (Pringle & Conway, 2012; Wilby et al., 2009). Although the use of climate risk information and risk assessment techniques and tools for development planning based on climate mainstreaming has received significant attention worldwide (McGahey & Lumosi, 2018; Wilby et al., 2009), the incorporation of climate information into adaptation strategies and plans has not received adequate attention among stakeholders (Wilby et al., 2009).

As a concept, climate change communication is explained as a science which seeks to engage people through exchange of information and deliberations to improve the behavior changes needed to reduce and adjust to cumulative climate variability (Harvey et al., 2012). Climate change communication relates to a well-planned process of informing, educating, persuading, warning, mobilizing and solving climate change-related problems. Individuals, communities and nations tend to appreciate, act on and care about climate change through effective communication. They develop climate change awareness, understanding, concern and action plans when climate change is effectively communicated to them (Yale School of the Environment, 2023). According to United Nations (2023), climate change communication refers to the process of educating and mobilizing audiences to take actions to confront calamities occasioned by climate change. In essence, climate change communication focuses on conscious measures including informing, educating, persuading, warning and mobilizing people and communities to care for and implement relevant actions aimed at dealing with climate change related crises.

Despite its significant value, climate change communication is faced with diverse challenges including superficial public understanding, poor transition from public awareness to public action, and inadequate measures to deal with the pervasive sense of hopelessness in climate change adaptation (Moser, 2016). Additionally, there are concerns that too much focus has been placed on physical science methodologies in the production of climate change information (McGahey & Lumosi, 2018; Tschakert, 2007). More critically, the proliferation of sectoral impact assessments in adaptation research to date globally tends to be influenced by the dominance and appeal of physical science methods for planners. The emphasis on social science research approaches and

methodologies appears very inadequate (Tschakert, 2007) since the current approaches and methodologies lead to a top-down production of climate change information which is very technical. Characteristic of the current approaches is the apparent relegation of other key actors including local communities to the background (Paavola & Adger, 2006; Tshakert, 2007). Consequently, this study argues for a greater shift towards people-centered climate change information and decision-making strategies (Paavola & Adger, 2006; Tshakert, 2007). It posits that ensuring that climate change messages and information reach the grassroots people and the local communities will enhance climate change adaptation (McGahey & Lumosi, 2018; Tshakert, 2007).

Africa is already experiencing the adverse impacts of climate change in various ways. In the views of Tadesse (2010), failure to reach equitable agreements on climate change negotiations will have severe consequences especially for Africa. Like any other developing world, climate change is a serious problem in Africa which requires drastic, fair and shared responsibility and actions. It is believed that climate change will wipe out efforts to tackle poverty in the continent unless urgent policies and actions are taken in terms of adaptation, mitigation and compensation (Chirisa, Matamanda & Mutamba, 2017; Tadesse, 2010). A critical part of the strategies to address the impact of climate change is for stakeholders to devise strategies aimed at promoting climate change communication. Yet, climate change communication has become a major challenge in Africa in general and Ghana in particular as communicators often face not only the complex convergence of scientific, practitioner and traditional knowledge systems (Kihupi et al., 2003; Naess, 2013) but also sensitivities related to power and agency dynamics especially among the rural dwellers. Additionally, not much research has focused on strategies to communicate and bring awareness of the threats of climate change and the adaptation and mitigation strategies required to stakeholders, including citizens (Fosu, Quashigah & Kuranchie, 2019). This study is, therefore, motivated by the need to deal with the adverse impacts of climate change using appropriate communication strategies. Consequently, this study focused on ascertaining strategies required to promote climate change communication in Ghana. The findings should respond to the increasing calls for scholarly works on climate change communication in Ghana, especially from the perspective of the social sciences (Tshakert, 2007) and help to improve inhabitants' access to information and knowledge for adaptable behaviors that mitigate the inimical impacts of the phenomenon.

1.1 Climate change communication in Africa and Ghana: The gaps in knowledge

Despite the increasing importance of climate change communication, there are critical knowledge gaps in climate change communication especially in Africa (McGahey & Lumosi, 2018). There are concerns about public awareness of climate change adaptation and mitigation mechanisms in the continent (Ifeanyi-Obi et al., 2017). Additionally, there is inadequate information and low public awareness of climate change issues. Shortage of useful and necessary information on climate change hinders effective adaptation in the continent (BBC World Service Trust, 2010).

These gaps are supported by numerous systematic reviews of the climate communication literature (McGahey & Lumosi, 2018; Moser, 2010; 2014; 2016; Nerlich et al., 2010) with interesting findings. According to McGahey and Lumosi (2018), studies and reviews on climate communication stress various critical issues and principles including the importance of identifying clear goals from the outset to help guide choices regarding relevant approaches to communication. The need to understand the audience and conveying climate information through credible messengers, and the importance of engaging people emotionally or ensuring appropriate framing

of the message have also been observed (Moser, 2010; Nerlich et al., 2010). Nerlich et al. (2010) saw no direct correlation between communication and behavior change. Rather, a mix of measures, alongside communication is required to embed approaches which are more directly related to practical behaviors in social life (Nerlich et al., 2010). In the views of Moser (2014), climate change communication constitutes a major challenge since it entails progressive and continual change with long lag times and uncertainties. Nevertheless, this challenge could be addressed using rigorous public engagement on climate change adaptation through interactions such as workshops and other social events to increase knowledge, foster deeper dialogue and transcend political, social or cultural differences (McGahey & Lumosi, 2018; Moser, 2014). Corner, Shaw and Clarke (2018), and Corner, Markowitz and Pidgeon (2014) upheld that the challenge in climate change communication is for communicators to communicate in a way which is easy for people to understand. When people easily understand messages and information on climate change, they tend to comply by changing their behaviors (Corner et al., 2014; Kasuli, 2022).

Consequently, there have been increasing calls for a newer approach to climate change communication in Africa (McGahey & Lumosi, 2018; Paavola & Adger, 2006). It has been suggested that the inclusion of social sciences into climate change information production will help bring out vital principles for promoting communication and critical perspectives for research. For example, scholars (Moser, 2010; Nerlich et al., 2010) have acknowledged the late arrival of social science enquiry to climate change communication. The authors argued that progress on many early climate communication efforts by physical scientists and environmentalists could have been improved if learning experiences from the broader behavior and communication sciences had been known and recognized (Moser, 2010; Nerlich et al., 2010). There are also concerns on the too much focus on Western scientific research on climate change issues (File, Dompapielle & Derbile, 2021) and the mismatch between climate knowledge creation and use, and the knowledge demands and understanding of different stakeholders (Dilling & Lemos, 2011).

In essence, it is suggested that climate change communication strategies in the African context need to focus on the inclusion of local communities because they have a role to play in the success of climate change adaptation strategies. However, for this to happen requires more participatory and inclusive communication techniques (Kuruppu & Liverman, 2011; Pringle & Conway, 2012). Communication techniques and strategies which involve face-to-face approaches are very participatory which often helps to persuade and influence social and behavior change more than mass-media communication (McGahey & Lumosi, 2018; Moser, 2010; Moser & Dilling, 2007). Though these participatory and dialogic forms of communication address the shortcomings of one-way monologic and technocratic form of information dissemination, there may be an apparent trade-off to be made between the urgency and scale of the response needed. There is a need for more empirical studies on the role of dialogue and inclusive communication and societal response on climate change communication (McGahey & Lumosi, 2018; Moser, 2010).

Climate change remains a threat to the survival of Ghana in many ways including the environment, health and the agriculture. Ghana's economy is largely climate sensitive as various sectors such as agriculture, mining, oil and forestry are all impacted by climate change (Arhin, 2022; Government of Ghana [GoG], 2021). Local communities in Ghana are experiencing extreme changes in climatic conditions which is affecting the people in many ways. Cultural lifestyles and economic livelihoods in most coastal areas are being disrupted due to frequent and more intense storm surges, erosion, and inundation. Ghana needs focused and pragmatic approaches to dealing with climate

change impacts for both current and future generations (GoG, 2021). Over the years, Ghana has developed various regulations for managing human interactions with the environment and for preserving human life and wellbeing, infrastructure, livelihoods, and society, in general. A significant part of the country's legal frameworks for managing climate change is the 1992 Constitution. In particular, Article 257 of the 1992 Constitution of Ghana outlines vital policy decisions which have remarkable implications for the protection of the environment.

In addition to the demands of the 1992 Constitution, Ghana passed the Environmental Protection Agency (EPA) Act, 1994 (Act 490) aimed at protecting the environment coupled with the adoption of the Environmental Assessment Regulations (EAR) in 1999. The EAR (amended in 2002) requires that before the beginning of any activity which relates to the environment, that activity needs to be registered by the Environmental Protection Agency (EPA) and an environment permit issued in respect of the undertaking. Again, Ghana is a signatory to the three Rio Conventions: (a) United Nations Convention on Biological Diversity (UNCBD), (b) United Nations Convention to Combat Desertification (UNCCD), and (c) United Nations Framework Convention on Climate Change (UNFCCC). The country has taken steps to meet obligations under these conventions. The Ministry of Environment Science, Technology, and Innovation is mandated to coordinate the implementation of the Rio Conventions (GoG, 2021; UNESCO, 2022).

Despite the diverse efforts Ghana has made in climate change, there are concerns regarding the country's overall commitment towards the promotion of climate change adaptation and mitigation. For example, there are concerns on the adequacy and appropriateness of the measures Ghana has for enhancing agenda setting, resource mobilization, and research on climate change (GoG, 2021). Concerns also manifest on how information and messages on climate change are shared and diffused, and the institutional capacity for climate change adaptation coupled with low public awareness and inadequate knowledge of climate change in the country (BBC World Service Trust, 2010; GoG, 2021; UNESCO, 2022). Indeed, the concerns about climate change in Ghana amidst the efforts made present a challenge to stakeholders including researchers. Implicit in these concerns are the calls for stakeholders such as researchers to help look for strategies to promote climate change communication in the country. Strategies for effectively communicating climate change issues in Ghana are critically needed for increased awareness and knowledge on climate change issues to facilitate adaptation (Fosu et al., 2019; McGahey & Lumosi, 2018; Moser, 2010; Moser & Dilling, 2007). This study, thus, strove to explore strategies required to promote climate change communication for improved adaptation in Ghana.

2. THEORETICAL FRAMEWORK

This study is framed by two relevant theories: The diffusion of innovation theory and the theory of planned behavior. The calls for multiple approaches to climate change adaptation find relevance in the diffusion of innovation theory. The theory looks at change as mainly being about the evolution of products and behaviors. It states that people change their ideas and behaviors in favor of new ideas and behaviors based on the relative advantage of the expected change over the old ideas and behaviors, and this further depends on the economic advantage, convenience and prestige associated with the new ideas and behaviors (Robinson, cited in Kasuli, 2022). This implies that he greater the perceived relative advantage of any message and information on climate change adaptation, the easier the adoption of the message and information. This affirms the importance of communication in climate change adaptation (Muchunku, Mberia & Ndati, 2014).

The Theory of Planned Behavior postulates that people's behaviors are commonly determined by their intentions which are determined by attitudes, subjective norms and perceived behavioral control (Asare, 2015; Ryan & Worthington, 2021). According to Ajzen (2005), perceived behavioral control relates to how individuals desire to perform specific behaviors. It also entails the degree to which individuals believe they have control over performing those behaviors. Behavioral intention is the driving factor which influences behaviors. The stronger their intentions to engage in certain behaviors, the more likely people will perform those behaviors. On the other hand, attitude refers to the extent to which people have a favorable or unfavorable appraisal of a specific behavior (Asare, 2015). The more people have a favorable assessment of a given behavior, the more they are likely to engage in the behavior. Again, subjective norms are the social pressures often exerted on individuals to undertake or not undertake particular behaviors (Asare, 2015).

According to Ryan and Worshington (2021), individuals' perception of behavioral control based on a given behavior is a function of both their assessment of the likelihood that a specific control factor will occur and the potential of the control factor to hinder or promote the behavior. The authors added that attitudes, subjective norms and perceived behavioral control may not always contribute equally to predicting intentions. That, sometimes individuals' intentions may be influenced mainly by attitudes, with subjective norms having very little or no influence over the behavior. However, at other times a person's intention may be influenced mostly by his or her subjective norm and attitudes, with intention playing very minimal or no influence at all in the behavior exhibited (Archie et al., 2022; Ryan & Worshington, 2021). Behavior change is critical to climate change adaptation. Climate change adaptation can only occur when people have the intention to change their behaviors. Attitudes of the public and their subjective norms can all shape the kind of behaviors needed to foster climate change adaptation. The messages and information the public receive about climate change can influence their intentions to change and their attitudes towards adaptation. In short, the theory states that the adaptative capacity of the public in terms of climate change is determined by the kind of climate change messages and information provided to them and how they influence their intentions, subjective norms and attitudes towards change.

3. METHODS AND MATERIALS

In executing this study, a descriptive survey design was used. The researchers focused on Ghanaians aged 18 years or above. A total of 327 Ghanaians participated in the study based on convenience sampling method. Convenience sampling method enabled the researchers to obtain data from Ghanaians who were accessible, available and willing to participate in the research (Given, 2008; Obilor, 2023). The researchers used questionnaires to gather data from the selected respondents. The items in the questionnaire were organized under two sections. Section A focused on the demographic features of the respondents, whilst Section B considered issues in line with the research aim. Demographic features focused on the gender, age and educational backgrounds of respondents. Questions on strategies to promote climate change communication focused on various issues including having a more participatory climate change adaptation approach, using climate change brand ambassadors, the need for policymakers need to embed climate change issues in all levels of formal education, and the need for relevant agencies and stakeholders to communicate necessary messages about climate change to the public. There were questions on other issues such as using folklores and indigenous languages and music to communicate climate change issues, having more community mobilization techniques, and communicating messages and information about climate change in a way that the public can understand.

The administration of the questionnaire occurred in two ways. In the first instance, the questionnaire was distributed randomly to Ghanaians on various social media platforms such as WhatsApp, telegram and e-mail via Google Form for those who were interested in the study and were ready to provide data to complete it. The researchers distributed the Google Form to students from various tertiary institutions in the country who were on these social media platforms for them to complete the questionnaire. Again, the researchers distributed the Google Form to other Ghanaians who were not from tertiary institutions, but they (researchers) had link with them via various social media platforms. Respondents were encouraged to forward the Google Form to other Ghanaians on social media platforms who were interested in the research to complete the questionnaire. The strategy used enabled only Ghanaians who were interested in the research and were willing to participate in it to complete the form. The Google Form was administered over a period of two weeks and at the end of the period 231 Ghanaians had filled the form. In the second strategy, printed questionnaires were distributed to Ghanaians who did not fill out the Google Form but had expressed interest in the study to complete the questionnaires. Through convenience sampling method, a total of 96 Ghanaians were selected to complete the printed copies of the questionnaire. All the 96 Ghanaians who expressed interest in the topic willingly completed the questionnaires given to them. At the end of the data collection period which spanned over a month, a total of 327 Ghanaians had taken part in the study.

In analyzing the collected data, both descriptive and inferential techniques were used. Frequencies and percentages were used to analyze the demographic data whilst means and standard deviations were relied on to analyze the strategies for promoting climate change communication. Again, an independent samples t-test was used to determine whether differences existed in the views of male and female respondents on the strategies to promote climate change communication in Ghana. Likewise, a one-way ANOVA test was done to examine differences in the views of respondents on the strategies based on their ages. During the analysis, the researchers first calculated the Cronbach's alpha to determine the reliability of the instrument. A coefficient of 0.813 was obtained which implies that the questionnaire was highly reliable. Given the importance of ethical issues in research, the researchers ensured that informed consent of participants was obtained before the data was collected. At the introductory part of the Google Form application, researchers stated that only Ghanaians who agree to take part in the study should complete the form. That, persons who would not consent to participate in the study should not fill the form. Again, respondents were informed that their participation was purely voluntary, and that they could cease their participation at any stage of the data collection. Finally, respondents were assured of confidentiality of the information they would provide for the study. Similar ethical issues were observed for respondents who filled the printed questionnaires which were distributed to them by the researchers.

4. RESULTS AND DISCUSSION

This section presents and discusses the findings of the research based on the demographic features of respondents and the study aim. Demographic features considered in this study were gender, age and education level (Table 1). The table shows that females (54.7%) dominated in terms of Ghanaians who participated in the study as compared to males (45.3%).

Table 1: Demographic features of respondents

Gender	Frequency	Percent
Male	148	45.3
Female	179	54.7
Age		

Table 1 Continued:		
Below 25yrs	126	38.5
25-34yrs	134	41.0
35-44yrs	57	17.4
Above 44yrs	10	3.1
Educational level		
Basic education	4	1.2
Secondary education	12	3.7
Tertiary education	311	95.1

Source: Field survey, 2023

Also, many (58.4%) of the respondents were between the ages of 25 and 44 years, with 38.5% below 25 years. Again, most (95.1%) of the respondents had educational qualification up to the tertiary level. The finding on educational level of respondents is not surprising because given the sampling strategy adopted, more Ghanaians who fall within tertiary education category were likely to be involved in the study.

The study examined the strategies to promote effective climate change communication in Ghana. To address the research aim, the researchers first ascertained from the respondents if they were satisfied with how climate change was communicated in the country (Table 2).

Table 2: Respondents' views on how climate change was communicated in Ghana

View	Frequency	Percentage
Satisfied with how climate change is communicated in Ghana.	69	21.1
Dissatisfied with how climate change is communicated in Ghana.	228	69.7
Undecided.	30	9.2
Total	327	100.0

Source: Field survey, 2023

About 70 percent of the respondents said they were dissatisfied with how climate change was communicated, but 21.1% of them were satisfied with how climate change was communicated. It can be inferred from the result that there is increasing dissatisfaction among Ghanaians who took part in the study with respect to how climate change was communicated in the country.

Following the finding on poor satisfaction with climate change communication in Ghana, the researchers explored strategies critical for promoting climate change communication in the country (Table 3). Various strategies were identified as vital for promoting climate change communication in Ghana. For example, respondents stated that policymakers needed to ensure that climate change issues become critical on the national agenda (M=3.79). They also called for a more participatory climate change adaptation approach in the country (M=3.79) coupled with the country having climate change brand ambassadors as part of the climate change communication at both local and national levels (M=3.29). This should help raise awareness about climate change at all levels among Ghanaians. Respondents further agreed that to ensure effective communication of climate change, Ghana should rely on folklores and indigenous languages and music to communicate climate change issues (M=3.88). Clearly, respondents believe that creating stories, folklores and music around climate change based on local language will enhance indigenous knowledge about climate change which will lead to increased adaptation. Another strategy identified concerns the need for policymakers to embed climate change issues in all levels of formal education (M=3.64).

This strategy is critical because though some efforts are currently being made to integrate climate education into the pre-tertiary education curriculum, same cannot be said of tertiary education.

Table 3: Strategies to promote effective climate change communication in Ghana

Strategy	Minimum	Maximum	Mean	Std. Dev.
Policymakers need to ensure that climate change issues become critical on National Agenda.	1.00	4.00	3.798	0.478
There is the need for a more participatory climate change adaptation approach in the country.	1.00	4.00	3.798	0.465
Ghana needs to have climate change brand ambassadors as part of the climate change communication strategies.	1.00	4.00	3.290	0.878
Policymakers need to embed climate change issues in all levels of formal education.	1.00	4.00	3.648	0.661
There is the need for relevant agencies and stakeholders to communicate necessary messages about climate change to the public.	1.00	4.00	3.816	0.479
Local voluntary groups and change agents should actively get involved in communicating climate change issues in the country.	1.00	4.00	3.370	0.861
We need to rely on folklores and indigenous languages and music to communicate climate change issues.	1.00	4.00	3.882	0.878
Climate change communication strategies used in the country should include more community mobilization techniques.	1.00	4.00	3.819	0.430
We need to communicate messages and information about climate change in a way that the public can understand.	1.00	4.00	3.825	0.453
State agencies and stakeholders need to use different ways and approaches of communicating climate change issues in the country.	1.00	4.00	3.825	0.418
Citizens must be empowered to contribute to the fight against climate change issues.	1.00	4.00	3.830	0.430
There should be the involvement of climate change communication experts in formulating climate change communication strategies at all levels of the nation.	1.00	4.00	3.382	0.870
Information and messages about climate change should be well-targeted to the audience.	1.00	4.00	3.830	0.408
We need to communicate clear and useful facts and information about the causes and effects of climate change to the public.	1.00	4.00	3.831	0.420
Relevant state agencies and institutions need to be appropriately resourced by government to contribute to climate change communication.	1.00	4.00	3.229	0.923
There should be more research on how to promote effective climate change communication in the country.	1.00	4.00	3.831	0.428
Climate change communication strategies should include more behavioral and social change techniques.	1.00	4.00	3.837	0.377
There should be a clear national climate change communication policy framework.	1.00	4.00	3.840	0.374

Means were calculated based on: 3.50-4.00=Highly Agree, 2.50-3.49=Moderately Agree, 1.50-2.49=Lowly Agree,   1.00-1.49=Undecided
Source: Field survey, 2023

Additionally, strategies identified from data to promote effective climate change communication in Ghana include having local voluntary groups and change agents to be actively involved in communicating climate change issues (M=3.37) and involving climate change communication experts in formulating climate change communication strategies at all levels of the nation (M=3.38). The study again observed that ensuring that information and messages about climate change are well-targeted to the audience (M=3.83), communicating clear and useful facts and information about the causes and effects of climate change to the public (M=3.83) and communicating messages and information about climate change in a way that the public can understand (M=3.82) are vital measures for promoting climate change communication in the country. The respondents further said that relevant agencies and stakeholders need to communicate necessary messages about climate change to the Ghanaian public (M=3.81).

Moreover, respondents agreed that state agencies and stakeholders needed to use different ways and approaches of communicating climate change issues (M=3.82), citizens needed to be empowered to contribute to the fight (M=3.83), and more community mobilization techniques (M=3.81) should be included in climate change communication. Community mobilization measures including face-to-face engagement with the audience in small groups, co-producing solutions and the use of context-specific digital techniques such as local broadcasting are essential in enhancing climate change communication. Moreover, including more behavioral and social change techniques in climate change communication (M=3.83) is perceived as one strategy to enhance climate change communication in Ghana. Ghanaians believe that promoting climate change communication requires a change in behaviors of the citizens and the larger society. Appropriately resourcing relevant state agencies and institutions by government can promote climate change communication (M=3.22). Finally, conducting more research on climate change communication (M=3.83), and providing a clear national climate change communication policy framework (M=3.84) are vital strategies for promoting climate change communication in Ghana.

An inferential analysis was conducted to determine whether differences existed in the mean scores of strategies to promote climate change communication in Ghana for male and female respondents at a significance level of 0.05 (Table 4). A p-value of 0.076 which is higher than the alpha value of 0.05 implies that no statistically significant differences exist in the views of male and female Ghanaians on the strategies required to promote climate change communication in Ghana. In other words, the respondents expressed the same views on climate change communication strategies Ghana needs regardless of the differences in their sexual orientation.

Table 4: An independent samples t-test of differences in the overall views of male and female respondents on strategies to promote climate change communication in Ghana

Item	Sex	N	Mean	SD	T	Df	Sig. (2-tailed)
Views on climate change communication strategies	Male	148	43.4730	15.43380	2.279	325	.076
	Female	179	37.0559	12.09542			

Source: Field survey, 2023

Finally, the researchers tested the differences between ages of respondents and their overall views on the climate change communication strategies using one way ANOVA (Table 5). Researchers divided the subjects into four groups (Group 1: Below 25 years; Group 2: 25-34 years; Group 3: 35-44years; and Group 4: Above 44 years).

Table 5: An ANOVA test of differences between overall views on the climate change communication strategies of respondents and their ages

	Sum of Squares	Df	Mean Square	F	Sig. (2-tailed)	Effect size
Between Groups	310.425	3	103.475	2.654	.049	.024
Within Groups	12590.896	323	38.981			
Total	12901.321	326				

Source: Field survey, 2023

The p-value (p=0.013) which is less than the alpha value of 0.05 indicates that there are significant differences in the overall views of respondents on the strategies to promote climate change communication in Ghana based on their different age categories. This means that significant differences exist in the mean scores and the standard deviations for Group 1 (M=27.11, SD=7.05); Group 2 (M=26.37, SD=6.06); Group 3 (M=25.28, SD=4.79); and Group 4 (M=22.20, SD=4.63). Though Group 1 has a higher mean and standard deviation than Groups 2, 3 and 4, the effect (eta-squared=0.024) of the differences was small based on the guidelines proposed by Cohen (1988). Only 2.4% of the differences in the views of the respondents on climate change communication strategies is due to differences in their ages.

4.1 Discussion of results

The results showed that more females participated in the study. Again, most of the respondents were between the ages of 25 and 44 years whilst most of them had education up to the tertiary level. The findings on demographic features are relevant because age, gender and education correlate with perceptions about climate change (Dunlap et al., 2002; Semenza et al., 2008; Stern, Dietz & Kalof, 1993). Where many people lack adequate formal education, it becomes imperative for climate change communicators to consider channels which are embedded in the native language and are relatable to the target audience (Naab et al., 2019). The finding that most respondents were dissatisfied with how climate change is communicated in Ghana implies that the existing climate change communication approach requires re-examination. In other words, newer strategies are needed for communicating climate change in the country. On strategies to promote climate change communication in the country, respondents agreed that policymakers need to ensure that climate change issues become critical on the national agenda coupled with the use of more participatory climate change communication approaches. Similarly, Ghana is called upon to have climate change brand ambassadors as part of the climate change communication at both local and national levels to help raise awareness about climate change. The results on using participatory approaches, involving climate change ambassadors and raising awareness at all levels confirm previous studies (CRED, 2009; Corner, 2011; Corner et al., 2018; Kasuli, 2022) which stated that effective climate change communication should move beyond simply giving information to involve strategies to promote active public engagement and awareness creation. Communicating climate change is about getting people to accept new ways of going about their lives. Whatever message or information is sent to the audience may come as a new thing or product to them. Accepting messages from climate change brand ambassadors and having climate change issues as part of the formal education curriculum are all new things whose results will depend on the relative advantages these changes offer. In line with the diffusion of innovation theory, new ideas are seen by social groups as better than the old ideas if the new ideas have an economic advantage, convenience, prestige, etc. (Robinson, cited in Kasuli, 2022).

From this study, respondents are calling upon Ghana to use folklores, indigenous languages and local music to communicate climate change issues and also ensure that climate change issues are embedded in all levels of formal education. Clearly, respondents believed that creating stories, folklores and music around climate change based on local language will enhance indigenous knowledge about climate change which will lead to increased adaptation. The potency of indigenous knowledge in facilitating climate change communication finds expression in literature (Cameron, Mauro & Settee, 2021). Cameron et al. (2021) explained that the use of indigenous knowledge helps people not just to connect to the environment but also understand, survive and adjust to it. Besides, the call for including climate change issues in all levels of formal education is critical because though some efforts are currently being made to integrated climate education into the pre-tertiary education, the same thing cannot be said about tertiary education. Apart from a few tertiary institutions that are making some efforts in climate change adaptation and mitigation by developing academic programs and courses and conducting some studies, no conscious attempts have been made in Ghana's higher education to enhance adaptive capacities of learners. This is not surprising because there is no clear focus on climate change in Ghana's Education Strategic Plan [2018-2030] (UNESCO, 2022). Overall, the findings on the use of indigenous communication strategies and formal education validate earlier studies (Jima, 2022; Koehler, 2016) which stated that indigenous knowledge systems and formal education must coexist to promote meaningful progress in society.

Having local voluntary groups and change agents to be actively involved in communicating climate change issues and involving climate change communication experts in formulating climate change communication strategies at all levels of the nation were seen as vital strategies for enhancing climate change communication. The finding on involving local people resonates well with McGahey and Lumosi's (2018) claim which showed that engaging local people is an important strategy to enhance climate change communication. The authors added that climate change communication messages and information should be more applicable to the everyday lives, contexts and experiences of citizens (Corner et al., 2018).

The study has discovered various ways in which climate change communication can be promoted in Ghana. These include ensuring that information and messages about climate change are well-packaged and targeted to the audiences and communicating clear and useful facts and information about the causes and effects of climate change to the public. Likewise, relevant agencies and stakeholders are to communicate necessary messages about climate change to the Ghanaian public. The findings on the packaging of climate change information and messages coincide with Gbetibouo et al. (2017) who remarked that climate change information should be packaged in a way that is easily accessible to the target audience and communities to achieve its intended purpose. Also, the findings on the nature of climate change information and messages find expression in the works of scholars (Corner et al., 2014; Corner et al., 2018) who argued that climate change should be communicated in a way for citizens to easily understand the intended message. According to Center for Research on Environmental Decisions [CRED] (2009), it is important for climate change communicators to understand who their target audiences are. Climate change communicators need to try and identify the misunderstandings of their target audience and what their audiences are likely to be thinking about when it comes to issues of climate change. This will enable climate communicators to clearly provide information and messages that will yield desired results (CRED, 2009).

Moreover, the respondents called on state agencies and stakeholders to use different approaches and ways to communicate climate change issues. They also believed citizens should be empowered to contribute to the fight, and that more community mobilization techniques should be included in climate change communication. Community mobilization measures such as face-to-face engagement with the audience, co-producing solutions and the use of context-specific digital techniques such as local broadcasting are essential in enhancing climate change communication. To ensure effective community mobilization for climate change communication, CRED (2009) advised climate change communicators to break large community groups into smaller groups and engage them through discussions on climate change and encourage very useful participation of all members. Once people feel that they were actively involved in the decision-making process, they tend to develop positive attitudes and favorable behavior change since they support the final decisions made. Community mobilization techniques are also informed by local conditions which are very useful for climate change adaptation strategies (The World Bank, 2021). Thus, involving people in decision-making and localizing climate change techniques can help to influence their intentions and subsequent behaviors. According to the theory of planned behavior, people's readiness to put up new behaviors to facilitate climate change adaptation depends on factors including their subjective norms about climate change and favorable assessments they make regarding the new climate-sensitive behaviors (Asare, 2015; Ryan & Worthington, 2021).

In addition, more behavioral and social change techniques are required in climate change communication to enhance climate change adaptive behaviors in Ghana. Ghanaians believe that climate change communication strategies should target social and behavior change. Changes at both individual and societal levels are critical to effective climate change adaptation. However, for this to be possible will depend on the readiness of individuals and communities to change their behaviors. The value of behavior change in climate communication is echoed by the theory of planned behavior which states that people's actions are directed by their intentions and the subjective norms (Ryan & Worthington, 2021). Thus, for Ghanaians to alter their behaviors and adapt to new behaviors which positively impact the climate is subject to their readiness to perform the new behaviors. Whatever is communicated to Ghanaians in terms of behavior and social change will yield the expected results only if they have the intentions and are ready to change.

More so, the study realized that relevant state agencies and institutions need to be well resourced by government to effectively contribute to climate change communication coupled with calls for more research on climate change communication. This result mirrors that of Arhin (2022) who found that resourcing climate change policies and programs, especially financing, has been a major challenge in Ghana. Similarly, Oduro-Ofori, Isahaka and Opoku-Antwi (2021) established that providing adequate resources is key to the success of climate change communication. The authors contended further that half of climate change adaptation programs of local authorities are never implemented due to poor financing. According to Arhin (2022), Ghana needs to invest more into climate change adaptation and mitigation. The revelation on the need for more research is reinforced in earlier reports regarding climate change adaptation measures in Ghana (GoG, 2021).

Finally, the findings of this study indicated no significant differences existed between gender and the strategies to promote climate change communication. This contradicts earlier conclusions (Shi et al., 2015; Stern et al., 1993) which stated that gender differences affect perceptions about climate change. On the other hand, this study revealed that significant differences exist between ages of respondents and their views on the strategies to promote climate change communication in Ghana.

This result mirrors literature (Dunlap et al., 2002; Shi et al., 2015) which depicts that differences exist between people's age and their perceptions about climate change.

5. CONCLUSIONS AND PRACTICAL IMPLICATIONS

This research has shown that there are concerns about climate change communication in the country. Ghanaians who participated in this study are generally dissatisfied with the existing climate change communication strategies stakeholders use in the country. They believe that newer and more comprehensive strategies need to be evolved and adopted to promote climate change communication in the country. It is their contention that policymakers should consider climate change issues as critical on national agenda. Respondents are calling for stakeholders to adopt a more participatory climate change adaptation approach as well as instituting climate change brand ambassadors as part of the climate change communication at both local and national levels. Again, policymakers need to embed climate change issues in all levels of formal education, in addition to having local voluntary groups and change agents to be actively involved in communicating climate change issues. Also, messages and information about climate change should be communicated in a way that the public can understand coupled with the need for state agencies and stakeholders to use different ways and approaches of communicating climate change issues. Moreover, the study calls on duty bearers to empower citizens to contribute to the 'fight' and involve climate change communication experts in formulating climate change communication strategies at all levels of the nation. Further, stakeholders including the Ministry of Environment, Science and Technology, the Ministry of Local Government and Rural Development, the Ministry of Information, the Environment Protection Agency, and the media need to collaboratively develop a national climate change communication policy which is based on a clearly defined framework. The national climate change communication policy should be informed by the multi-sectoral nature of climate change, participatory and context-specific communication channels, folklores and other indigenous communications, and community mobilization techniques. The policy should, again, pay attention to how to appropriately resource relevant state agencies to effectively play their roles in climate change communication for improved adaptation. Besides, there is the need for sector-specific climate change communication policies which will be informed by the overall national policy. One limitation of this study relates to the lack of more in-depth views of respondents on the issues due to the concentration on only quantitative methods. Again, the use of convenience sampling method hinders the representativeness of the sample size. Based on the sampling method used, the findings of this research did not reflect the opinions of Ghanaians who could not be reached. Nonetheless, the conclusions of the study are very relevant to inform policy decisions in Ghana and beyond, especially given the growing need for effective climate change communication strategies for adaptative behaviors.

6. REFERENCES

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7. ACKNOWLEDGEMENT