RESEARCH ARTICLE

Does Climate Awareness Lead to Climate Action? A Study on Adults in Malawi

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Abstract

The study examined the general understanding of climate change among Malawian adults (n=601) and its impact on their climate-related actions. Leveraging the knowledge-attitude-behavior theory, it assessed their awareness, readiness to act, and actual practices against climate change. The results showed that 40 percent of participants have a high awareness of climate change, with varied levels of awareness observed across the spectrum. Educational attainment (p=.000) emerged as the sole significant predictor of climate change awareness. Although 68 percent of respondents showed a willingness to act, the study found that some actions are more prevalent than others. The research identified a statistically significant relationship between climate change awareness and action (R=0.187, p<.001). These findings contribute to the ongoing discussion on the role of climate change awareness and its influence on action, offering valuable perspectives for policymakers in developing climate change awareness programs and education.

Keywords: climate change, awareness, climate action, climate change education, adults

I. Introduction

Climate change is increasingly acknowledged as a key sustainability issue affecting global communities in various ways (Belay et al., 2022; Kuthe et al., 2019; Resurreccion, 2023). Its impacts including rising sea levels, extreme weathers, and changes in precipitation and temperature have brought out devastating consequences to the ecosystem where human lives depend upon (Di Giusto et al., 2018).

The urgency in developing and implementing strategies for effectively mitigating and adapting to climate change cannot be overstated. Considering that climate change is mainly caused by human activities (Hundera et al., 2019; IPCC, 2014, 2023), effective responses to climate change should also be human-driven approaches.

Awareness of climate change and its origins is widely regarded as the foundation of such responses (Ağırbaş & Sarıçam, 2023; Predieri et al., 2023). The critical role of climate change awareness (CCA) in achieving climate action objectives has been widely acknowledged. For instance, Hwang et al. (2021) highlight that raising awareness for climate change mitigation and adaptation is fundamental to Sustainable Development Goal (SDG) 13 on climate action. SDG Target 13.3 emphasizes on the need to *"improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning*" (United Nations, 2015, p. 23).

Moreover, commitments outlined in the SDGs framework and the Paris Agreement necessitate widespread CCA (Johnston, 2018). Similarly, the Intergovernmental Panel on Climate Change (IPCC) has consistently argued for the positive impact of CCA on informed decision-making and behavioral changes (IPCC, 2007). The Intergovernmental Panel further asserts, in high confidence, that enhancing public awareness through education initiatives effectively influence individuals' behaviors (IPCC, 2023).

While some researchers argue for the critical role of CCA in shifting individuals' pro-environmental behaviors, others do not agree with such argument. For example, various scholars have argued that awareness or knowledge of climate change does not necessarily lead to action (Azevedo & Marques, 2017; Miléř & Sládek, 2011; Niepold et al., 2007; Simpson et al., 2021). In fact, some studies like that by Venghaus et al. (2022) empirically confirmed that there is no significant association between CCA and behavioral changes among Germans.

One speculation on such contradictory findings from current literature would be that the 'awareness-action' relationship may be context-dependent. In other words, CCA may lead to behavioral transformation in some regions or contexts but not in others. This necessitates a context-specific exploration of the relationship between CCA and climate action. For instance, it is crucial to whether the finding by Venghaus and others that there is no relationship between CCA and climate action among Germans applies to other regions like Malawi.

The contextual evaluation perspective is especially important in the case of developing regions like Africa, where the relationship between climate awareness and actions are less known despite its acute vulnerability to the impacts of climate change (Ajuang et al., 2016; Selormey et al., 2019; Simpson et al., 2021). Malawi is one of such developing nations in Africa that has experienced severe climate change impacts including devastating cyclones and droughts that have undermined agricultural production and the economy (Chisale et al., 2023; Fujisawa et al., 2020). In addition, few studies on CCA have been done in Malawi and to the knowledge of this study, none has assessed the correlation between awareness and practical behavioral transformation to address climate change. Given these challenges, our study set out to establish an empirical understanding on CCA and their impact on climate actions in Malawi, in view of contributing to the evidence-based design of the climate change education (CCE) and any related decisions.

a. Climate Change Awareness in Malawi

A literature search regarding CCA in Malawi on Scopus and ScienceDirect revealed two issues. First, there is a dearth in literature on CCA and climate action in Malawi. An article titles-abstracts-keywords search in Scopus using the Boolean operator "climate change awareness" OR "climate action" AND "Malawi" with no limits produced as few as seven articles. In ScienceDirect, title-abstract-keyword search using key terms namely climate change awareness, climate action, and Malawi yielded only three articles.

Second, the identified studies that delved into CCA in Malawi had notable gaps that future studies could pursue. A research study conducted by Chisale et al. (2023) provides a comprehensive examination of awareness, knowledge, and perceptions regarding climate change and variability among forest-dependent communities in Mchinji and Mangochi districts in Malawi. To assess respondents' awareness, the study asked them to identify any observed changes in the forest and agro-ecosystem that they believed to be an impact of climate change. Findings of the study revealed a significant variance in CCA and participants' willingness to transform their behaviors across the two districts. However, it fell short of assessing actions taken in practice and to what extent they are influenced by CCA.

Another recent study by Twinomugisha & Mushy (2021) assessed awareness of climate change among Malawian farmers in Salima district by asking the leading question "have you heard about climate change?". The study revealed that 71 percent of the respondents had heard about climate change, 17 percent were not sure, and 12 percent had not heard about climate change. Further questions were asked on observed effects of climate change and sources of the information, but these were not considered part of CCA. Still, this study did not assess actions taken to address climate change, let alone to what extent they are affected by CCA.

A study by Selormey et al. (2019) which was part of the Afrobarometer case studies explored CCA across 54 African countries including Malawi. Just like in the study by Twinomugisha and Mushy, awareness of climate change was determined based on whether respondents had heard about climate change. Based on this definition, 78 percent of Malawians were declared climate change aware. The study asked respondents about the meaning of climate change but did not consider responses to that question as part of CCA. Furthermore, it did not draw any relationship between being aware and what respondents do to address climate change.

Four years later, Kayuni & Chunga (2023) conducted a similar study to that by Selormey and others by asking whether respondents had heard about climate change as a measure of their awareness. The findings revealed that 74 percent of Malawians were climate change aware, a slight decrease from the earlier study by Selormey and others. Out of these, urban residents, men, and the more educated were found to be more aware than rural residents, women, and those with less years of education. However, just like all the above studies, this study did not assess how awareness is linked to climate action.

b. *Gaps in CCA Assessment in Malawi*

The studies on CCA in Malawi discussed in the preceding section exhibited similar gaps that are of interest to our study. The first gap is the lack of assessing the relations between CCA and climate action. The study by Chisale and others assessed willingness to act which is more of an attitude towards climate change than the actual actions taken in practice. Our study acknowledges that awareness potentially influences attitudes (willingness) which may in turn affect behavior as illustrated by the knowledge-attitudes-behavior model (Ajzen, 1991). Our study

addresses the need to establish a relationship between CCA and behaviors based on what individuals do in practice beyond willingness or attitude. By understanding how CCA is translated into climate action, we hope to provide a foundation to make informed decision on the design of climate change education (CCE) programs.

The second gap is on how CCA is conceptualized in the studies. Chisale and others describe it as 'knowing the impacts of climate change'. On the other hand, studies by Twinomugisha and Mushy, Selormey and others, and Kayuni and Chunga conceptualized it as 'having heard about climate change'. This is also the case in the study by Madaki et al. (2023). These conceptional variations demonstrate that CCA should be assessed by more than one assessment item used in the reviewed and other similar studies.

While agreeing that hearing about climate change is important for awareness, we consider it as part of being aware. One may hear about climate change but not know what it is or how it came into existence or its broad impact. For the purposes of our study, we conceptualize CCA as acknowledging that climate change is occurring, that it is a big or serious problem, that it is negatively affecting people, and that it is mostly caused by human activity.

Based on the above-mentioned gaps, our study aimed to 1) evaluate the levels of CCA among Malawian adults; 2) identify factors influencing CCA among the Malawian adults, and 3) explore the relationship between climate change awareness and climate action.

II. Data and Methodology

a. Study Area

Malawi is a located in South-East Africa and is a developing nation with notable sociodemographic gaps. As of the last census conducted in 2018, only 16 percent of the country's population live in urban areas which implies that the majority are rural residents (National Statistical Office, 2019).

The rural areas are characterized by poor access to essential services including education and information which may include that on climate change. When it comes to education, 69.6 percent of men and 62.9 percent of women are considered literate (National Statistical Office, 2021) . The country has over the recent years suffered from major climate change consequences including droughts and cyclones and other associated impacts (Chisale et al., 2023; Fujisawa, 2020).

Three of the country's twenty-eight districts were earmarked to be part of the study namely Lilongwe, Blantyre, and Zomba. These districts were specifically chosen due to their unique composition, encompassing both city and district regions, thereby offering a diverse sample that includes both urban and rural populations. Additionally, these areas exhibit a wide range of educational backgrounds, ranging from highly educated individuals to those with minimal or no formal education at all. This diversity in demographics is crucial as it enables a comprehensive analysis of various potential predictors of climate change awareness.

b. Study Population and Sample

The focus of the study was Malawian adults, legally defined as individuals aged 18 and above (Government of Malawi, 2015). The selection of adults as the target population was informed by several compelling reasons. Firstly, Liam (2020) highlights that adults are likely to contribute more to greenhouse gas (GHG) emissions due to the escalation of human activities with age. However, some of the adult population did not receive climate change education during their formal schooling years, as climate change was not a prominent public issue until the 1980's (Ağırbaş & Sarıçam, 2023). This lack of formal climate education in earlier years is supported by UNESCO's (2021) report, which states that Climate Change Education (CCE) was only recently introduced into formal schooling.

To determine the sample size for the study, the study used the Cochran formula n=(Z^2 P(1−P))/e^2 where n=sample size; Z=confidence interval; P=expected prevalence/proportion; and e=margin of error. The confidence level was pegged at 95 percent. The use of this formula was necessitated by the fact that the exact number of Malawian adults is infinite since the most recent population census in the country was conducted in 2018.

For the selection of respondents, the study utilized convenience sampling, also referred to as grab, accidental, or opportunity sampling (Obilor, 2023). This sampling technique was chosen to counter the time limitation for fieldwork.

c. Data Collection

A survey instrument was adapted from existing tools including the Clarkson University climate literacy tool (DeWaters et al., 2014; DeWaters & Powers, 2021; Powers et al., 2021). Others were tools used by Dalelo (2011) and by the European Union (2021).

Our survey tool's items had an acceptable content validity index ($I - CVI > 0.78$) and a remarkably high overall content validity index ($S - CVI = 0.96$) (Elangovan & Sundaravel, 2021). Results from the pilot study revealed high reliability for items on climate change knowledge ($\alpha = 0.830$) and those on climate action ($\alpha = 0.811$) based on the acceptable benchmark of 0.7 (Ritchie & Sharpe, 2022).

The tool was later translated into Chichewa, a dominant language in Malawi, to ensure increased participation by participants who cannot understand English. A team comprising a professional translator and four secondary school language teachers conducted the team-translation exercise.

After undergoing scrutiny and attaining ethical approval from the United Nation University's Research Ethics Committee, data collection was conducted in October and November 2023.

To ensure a robust and comprehensive data gathering process, the study employed two approaches: web-based questionnaires using Google Forms and face-to-face interviews for those who do not have access to the Internet or do not have sufficient literacy skills. A total of 110 participants responded to a google form unassisted, a further 193 respondents were interviewed using the same

google form, while 298 were interviewed using hard copy questionnaires. Both google form and paper-based interviews were facilitated by research assistants who underwent extensive training to ensure data collection integrity and consistency.

d. Data Analysis

For initial data management, the collected information was systematically compiled into an Excel spreadsheet and transferred to the Statistical Package for the Social Sciences (SPSS) version 27.0.1 for detailed analysis. Descriptive statistics were used for sociodemographic data, levels of CCA, and climate action. One-way ANOVA was used to determine the effect of location of residence, and gender while the t-test for independent samples statistic was used for age, level of education, and frequency of climate change training. Differences were considered significant only when $p < 0.05$ (Predieri et al., 2023). To determine the relationship between CCA and climate action, a regression analysis was employed.

III. Findings

Our study aimed at assessing climate change awareness and its predictors among Malawian adults and whether their understanding of climate change translates into practical climate actions. The findings of the study are presented in this section.

a. Profiles of Participants

The findings in Table 1 below show that more respondents were rural residents (n=355, 59 percent) than their urban counterparts (n=266, 41 percent). This reflects the representation reported by the National Statistics Office (NSO) that as of last household census done in 2018, more Malawians resided in rural (84 percent) National Statistical Office (2019).

The number of male participants (n=314, 52 percent) was slightly larger than that of females (n=287, 48 percent), presenting a gender balance. Respondents 30 years and younger (n=293) constituted almost half (49 percent) of the total sample while the age group of 60 and above (n=11) participated the least, representing only about two percent. This corresponds to the census data that 72 percent of Malawi's population are under 30 years of age while only five percent of the population are 60 years or older.

Regarding the education level, those who did not attend any formal school (n=26) and completed primary education only (n=165) make up the largest portion representing 32 percent. This corresponds the national attainment which indicates shrinking transition rates from lower to higher education levels. For instance, the Government of Malawi reported a primary school completion rate of 56 percent and a translation rate to secondary school of 42.5 in 2022.

Those who completed secondary schools (n=188, 31 percent) and bachelor's degree or equivalent (n=190, 31 percent) are equally represented. The number however drastically go down for those who attended up to the level of master's degree or its equivalent (n=27, four percent) and only five studied up to the Doctoral degree or its equivalent level (about 1 percent). Lastly, only 26 participants

(four percent) did not attend any formal education.

Tab. 1. Respondents' Socio-demographic Information

Description		Rural	Urban	Total
Gender	Female	160	127	287
	Male	175	139	314
	Total	335	266	601
Age	Under 20 years old	29	27	56
	21-30 years old	127	110	237
	31-40 years old	86	82	168
	41-50 years old	63	34	97
	51-60 years old	24	8	32
	61 years and above	6	5	11
	Total	335	266	601
Level of education	No education	24	2	26
	Primary school	140	25	165
	Secondary school	106	82	188
	Bachelor's degree or its equivalent	157	133	190
	Master's degree of its equivalent	6	21	27
	Doctoral Degree of its equivalent	2	3	5
	Other	0	0	0
	Total	335	266	601
Climate change training	Yes, one time	24	22	46
	Yes, two to four times	14	14	28
	Yes, more than four times	7	7	14
	No	286	222	508
	I don't know	4	1	5
	Total	335	266	601

Source: Author

Finally, an overwhelming majority of participants (n-=508, 85 percent) reported that they did not attend any climate change training in the past year. The number of those who did not attend any climate change training was almost split in half between rural (n=286, 56 percent) and urban residents (n=222, 44 percent). This finding indicates a lack of climate education across both countryside and city populations.

b. Climate Change Awareness

The predominant CCA among the respondents was revealed. As shown in Figure 1, a substantial number of respondents either strongly agreed or agreed to each of the five items used to assess CCA. Out of the 601 respondents interviewed, 560 of them (93 percent) either strongly agreed or agreed with the accurate definition of climate change that '*climate change is the extreme change in weather patterns*' (DeWaters & Powers, 2021; Powers et al., 2021). In addition, 591 respondents (98 percent) observed that '*climate change is happening*'. Furthermore, 564 respondents (94 percent) reported that '*it is a big problem*'. Lastly, 580 of the total respondents (97 percent) indicated that '*climate change negatively affects people*'.

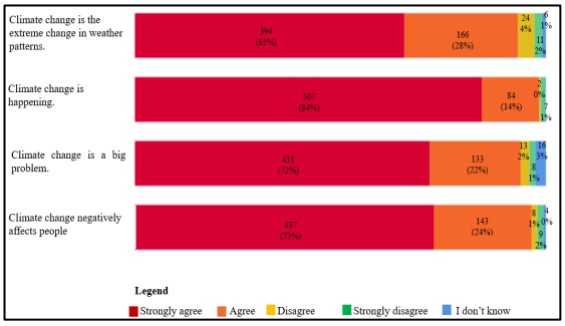

Fig. 1. Respondents' Self-Reported Awareness of Climate Change.
Source: Author

Further results depicted in Figure 2 below indicate varying degrees of respondents' familiarity with the causes of climate change that the current scientific community acknowledges, i.e., climate change is mainly caused by human activities. A considerable number of respondents claimed to be very familiar with these causes (n=227) or extremely familiar (n=188), followed by those being a moderately familiar (n=170).

Interestingly, when asked if climate change is a natural environmental phenomenon, the patterns of their familiarities appeared to be identical as the previous question. In other words, there were almost as many respondents who reported that climate change is caused 'mostly by changes in the natural environment' as those who chose 'mostly caused by human activities'

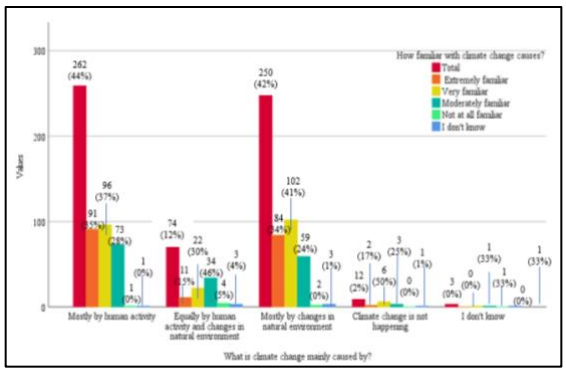

Fig. 2. Familiarity with Climate Change Causes*Main Cause of Climate Change.
Source: Author

While it has been scientifically established that human activities are the main cause of climate change (IPCC, 2023), studies have found that global populations continue to deny or not be aware of this. For instance, Jürkenbeck et al., 2021) observed that 17 percent of citizens of the United States of America (USA), 10 to 15 percent of Germans, and four percent of Norwegians deny the existence of climate change. Another study by The Policy Institute (2022) found similar misconceptions as 24 percent of Norwegians, 17 percent of citizens of the United Kingdom, 16 percent of the Polish and 10 percent of Italians reported that climate change is not caused by human activities (Jürkenbeck et al., 2021).

c. Levels of Climate Change Awareness

Our study had five items aimed at comprehensively assessing CCA. The items are indicated in Figure 1 above.

All the questions were five-point Likert scale response items. The first four items except the one on the main cause of climate change had response options *'strongly agree'* (coded as 5 in our scoring), '*agree*' (4), '*disagree*' (3), '*strongly disagree*' (2) and '*I don't know'* (1). The question *'What is the main cause of climate change?'* had '*mostly by human activities*' (coded as 5 in our scoring), '*equally by human activities and changes in the natural environment*' (4), '*mostly by changes in the natural environment*' (3), '*climate change is not happening'* (2), and '*I don't know*' (1).

A climate change awareness levels model of four groups namely *very high, high, average,* and *low* was determined prior to commencing computations. Thereafter, a new variable coded CCA composite scores which are means for each respondent's scores. These were statistically divided into quartiles leading to the division of the scores ≤4.39 representing low CCA; 4.40-4.59 for average; 4.60-4.99 for high; and 5.0≥ for very high awareness. The findings from the processes above are illustrated in Figure 3 below.

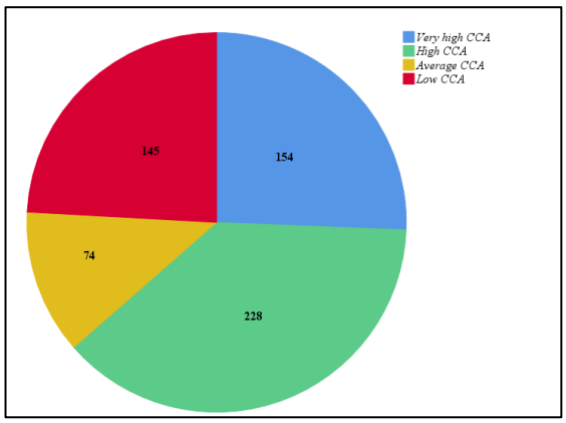

Fig. 3. Levels of climate change awareness
Source: Author

According to the findings, most respondents have high awareness of climate change (n=228) representing about 38 percent. Almost an equal share had either very high (n=154) or low (n=145) awareness representing 26 percent and 24 percent respectively. Although representing the group

with the least number of respondents (n=74), the average CCA group still claimed a significant 12 percent of the total number of respondents.

d. Predictors of Climate Change Awareness

An analysis of the mean values ($\bar{x}$) presented in Table 2 indicates heightened CCA among certain demographic segments. Urban residents ($\bar{x}$=22.77), males ($\bar{x}$=22.61), and respondents in the 21-30 years age bracket ($\bar{x}$=22.92) had higher mean scores. Moreover, respondents holding master's degrees recorded a mean score of 23.41 which is higher than the rest of the education levels. Participants who were not sure if they attended climate change training or not or the 'I don't know' group had comparatively the highest mean ($\bar{x}$=23.20) in their sub-category.

However, it is important to acknowledge that mean scores are influenced by the number of respondents within each socio-demographic category. To ascertain the statistical significance of the observed differences, both one-way ANOVA and t-test for independent samples analyses were employed. These statistical tests revealed that the level of education was the only factor that significantly influences CCA among the participants, with a p-value of .000.

Tab. 2. Climate Change Awareness*Socio-Demographic Factors

			n	$\bar{x}$	SD	*p*
Awareness	Location	Rural	335	22.42	2.30	.074
		Urban	266	**22.77**	2.49	
	Gender	Female	287	22.55	2.33	.754
		Male	314	**22.61**	2.44	
	Age	Under 20 years old	56	22.34	2.52	.099
		21-30 years old	237	**22.92**	2.23	
		31-40 years old	168	22.48	2.54	
		51-60 years old	32	22.27	2.43	
		41-50 years old	97	22.06	2.47	
		61 years and above	11	22.18	1.33	
	Education	None	26	20.92	2.51	.000***
		Primary school	165	22.13	2.31	
		Secondary school	188	22.94	2.16	
		Bachelor's degree or equivalent	190	22.71	2.57	
		Master's degree or equivalent	27	**23.41**	2.19	
		Doctoral degree or equivalent	5	22.8	1.30	
	Climate change training	No	508	22.62	2.38	.664
		Yes, one time	46	22.18	2.36	
		Yes, 2-4 times	28	22.22	2.59	
		Yes, > 4 times	14	22.71	2.61	
		I don't know	5	**23.20**	1.79	

Source: Author

Although the findings did not establish any statistical significance apart from education levels, the mean differences concur with earlier findings on CCA in Malawi. A recent Afrobarometer report found that urbanites (87 percent) as compared to rural residents (72 percent) and men (79 percent) as compared to women (69 percent), those with post-secondary education (91 percent) as compared to those with primary (67 percent) or no schooling (54 percent) were more aware of climate change (Kayuni & Chunga, 2023). Furthermore, younger generations, for example those aged 26 to 35 years (78 percent), 36-45 years (77 percent) had higher awareness than those aged 56 and above (68 percent).

e. Climate Action

As indicated in Table 3, around 68 percent of all the respondents expressed their complete willingness to take climate action followed by 27 percent who were mostly

willing to do so. Only one percent of the respondents indicated that they are not at all willing to act.

Tab. 3. Respondents' Willingness to Take Climate Action

		Frequency	Percent	Valid %
Valid	Completely willing	411	68.4	68.4
	Mostly willing	161	26.8	26.8
	Not so willing	21	3.5	3.5
	Not at all willing	6	1.0	1.0
	I don't know	2	.3	.3
	Total	**601**	**100.0**	**100.0**

Source: Author

The study further questioned respondents' actual climate actions over the past year to determine if their professed willingness to act aligned with their practices. As seen in Figure 3, the findings revealed a disparity in these actions. For instance, a higher number of respondents reported that they 'always' walked or cycled when going for short distances (n=226), used organic farming fertilizers for crops or plants (n=187), and dumped garbage properly in designated places (n=294).

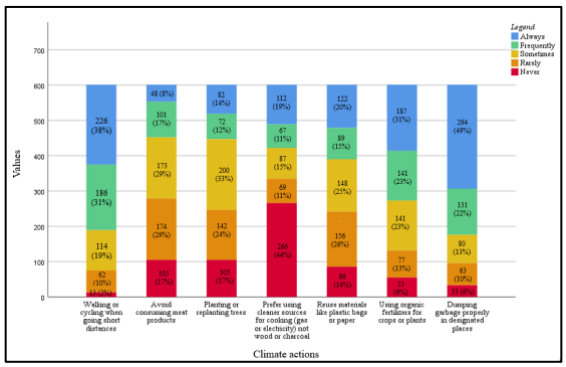

Fig. 1. How Often Respondents Have Been Taking Climate Action in the Past Twelve Months.
Source: Author

In contrast, many respondents reported 'never' to prefer using cleaner sources of energy for cooking ($n = 266$), avoiding meat consumption ($n = 105$), or engaging in afforestation or reforestation ($n = 105$). This finding highlights differences in climate action commitment.

The findings on varying commitments to climate action agree with the study by Venghaus et al. (2022). The authors noted that people tend to take actions that are cost related. Most Germans cut their purchase of electricity preferring to replace it by the cheaper green electricity. In this case, reducing cost is the motivation as opposed to intended climate action.

f. Climate change awareness and climate action

A linear regression analysis was conducted to examine the influence of CCA on climate action. The findings show an $R\ value$ of 0.187 which signals a low positive correlation between the two variables. An analysis of the coefficients predicts that if CCA changes by one unit, climate change action changes by $0.230\ units$. The p-value is $< .001$ which illustrates a statistically significant difference and is evidence that climate change awareness positively impacts climate action.

Tab. 4. Results of Linear Regression Analysis

Model Summary[b]					Coefficients[a]					
						Unstandardized coefficients		Standardized		
Model	R	R^2	Adjusted R^2	Std. Error of the Estimate		Beta	Std. Error	Beta	t	Sig.
1	.187[a]	.035	.033	.579913	(Constant)	2.340	.225		10.40	<.001
					CCA	.230	.050	.187	4.65	<.001

a. Predictors: (Constant), Climate change awareness *b. Dependent Variable: Climate action*

Source: Author

Our finding that CCA among Malawian adults significantly affects climate action does not agree with certain studies including that by Venghaus et al. (2022). In their study, the

authors found no evidence that increased CCA manifests itself in significant behavioral changes among the German public.

IV. Discussion and Conclusion

In this study, we conducted investigation on climate change awareness among Malawian adults, its predictors, and influence on their adoption of low-carbon behaviors. The relationship was explored considering the longstanding debate that CCA does not guarantee climate action. Our focus was on whether CCA influences practical behaviors as opposed to willingness to act or protest-related behavior aimed at putting pressure on policymakers.

The findings revealed that most of the respondents have either 'very high' or 'high' CCA. However, the respondents were notably divided on whether climate change is mostly caused by human activity or changes in the natural environment.

The findings further established that while there are mean differences between groups in each socio-demographic factor like location of residence, gender, age, education level, and frequency of climate change training. Out of these, only education level significantly affects CCA. This finding is particularly important as it suggests the need for intensified CCE in lower education levels. It also signals the need for increased CCA programs for those with few years or no education to enhance their understanding of climate change.

Lastly, our study has statistically determined that there is a positive correlation between CCA and respondents' behavior. This finding has not only challenged prevailing debates that CCA does not automatically lead to action, but it has affirmed the study's earlier observation that CCA's influence on low-carbon behaviors might be contextual. While studies elsewhere found no relationships between CCA and climate action, that correlation exists among the Malawian adults who participated in our study. The study has, therefore, underscored the need to empirically substantiate both the claim that CCA influences or does not influence behaviors.

By advancing the perspective that the CCA-climate action relation ought to be assessed context by context, our study is of the view that effective decisions for climate change mitigation or adaptation or climate change education may be framed based on the available evidence. For instance, the finding in this study that there is a relationship between CCA and climate action among Malawian adults may hint to decision-makers in the country on the need to concentrate on awareness-raising among the unaware populations which, as found in our study, translates to behavioral transformation. In situations where the two are not related, decisions may be made to devise strategies for promoting climate action for both the aware and the unaware.

The study however has fallen short in certain areas that future studies on CCA and climate action may build on. On the methodological front, the use of convenience sampling means that the results may not be

inferred on all Malawian adults (Andrade, 2021). Future studies should employ sampling methods that ensure generalizability of the findings.

Second, the study observed that the respondents reported that they take certain climate actions and not others. For instance, most respondents reported that they do not avoid the consumption of meat products while mentioning that they walk or cycle when going nearby. The study cannot explain why this case arose as it relied solely on quantitative data. Do respondents walk or cycle because they cannot financially afford to ride a bus or a car? Or do they deliberately do so because they are environmentally conscious? Future studies must conduct an in-depth exploration of such questions through qualitative methods.

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