

## Original Research Article

# **Experiential Factors as a Determinant for Climate Change Mitigation Behavior: A case of Tourist Hotel Managers in Naivasha Sub-County, Kenya**

## **Abstract**

Climate change is typically abstract, large scale, slow and often unrelated to the welfare of people's usual activities. There are however moments when the consequences of climate change are readily apparent, such as through experiencing extreme weather events. This study examined the association between personal experiences with extreme weather events together with emotions and taking actions that mitigate the consequences of climate change, a largely under researched topic. This relationship was tested among 182 randomly selected tourist hotel managers in Naivasha Sub-County in Kenya using paper and pencil survey techniques. An instrument made up of questions on the managers' extent of their personal involvement with extreme climate risks and events was utilized. Another set of questions that rated the managers' level of emotions towards climate change was also included. The study identified two categories of climate change mitigation behaviors (CCMB) using principle component analysis that are adopted by managers namely efficiency and curtailment practices. A beta regression model that accounts for the non-normality of the data was used to examine the relationship between experiential factors and CCMB. Findings indicate a moderate engagement in CCMB among the surveyed managers. Experiencing disasters was negatively and significantly associated with both curtailment and efficiency CCMB. Emotions were positively associated with efficiency CCMB but had a negative association with curtailment CCMB. The findings suggest that public education would benefit from strategies that focus on connecting experiencing weather related disasters and emotions with the reality of climate change.

**Keywords:** climate change mitigation behaviors, experiential factors, emotions, beta regression

## **1. Introduction**

Climate change has major and intensive effects in the tourism industry (Hall et al., 2013). Identifying factors that are associated with climate change mitigation behavior (CCMB) in this industry is attracting considerable research interest (Raihan, 2023). Among these, the notion that individuals' experiential factors have the potential to engage with climate change has been suggested in the literature (Hall et al., 2013). Available evidence on the association

between experiential factors and CCMB especially in the tourist hotels is however controversial and deficient (Souza-Neto *et al.*, 2023). A number of studies have reported evidence of notable effects of environmental experiential factors on climate attitudes and behaviors (Hoffmann *et al.*, 2022; Rosa & Collado, 2019; Van Linden, 2015), while other studies have found no effects (Otto *et al.*, 2019). The mixed results in the literature are difficult to reconcile due to a wide variety of methodological approaches, various operational definitions of CCMB, difference in adopted study designs and diverse human populations that are studied. This inadequacy limits the design of evidence based interventions to enhance peoples broad and extra CCMB. Need therefore exists to examine the magnitude of CCMB and associated experiential factors with more refined research methods.

Despite the controversies in literature, existing studies generally advance a proposition that individuals who are less likely to adopt pro-environmental behaviors are assumed to have different experiential backgrounds. This assumption was tested within the context of Naivasha sub-county, which hosts Lake Naivasha, an officially recognized Ramsar site and is a region currently experiencing significant climate change impacts in the form of increasing severe droughts, strong winds, heat waves, erratic rainfall patters, rising water levels of the lake and floods. This paper is organized as follows. The next sections reviews related literature followed by a methods section. The subsequent section offers the study results, followed by discussion of the study results, conclusions and recommendations. The limitation of the study is also offered as well as acknowledgements in this order.

## **2. Review of Literature**

Tourism contributes significantly to the Kenyan economy. According to World Travel & Tourism Council (WTTC, 2020), Kenya's travel and tourism sector contributed 8.2% to the country's Gross domestic product and 1.6 million jobs, representing 8.5% of the total jobs in 2019. Besides, the country is however facing climate change induced challenges, such as variation in weather patterns, unpredictable water levels in lakes and rivers, frequent and prolonged droughts and flash floods which are causing changes in the ecosystems and natural resources needed to sustain the tourism industry (Okumu, 2017). Currently, six heritage sites that serve as some of the major tourist attractions in Kenya and the world at large are at risk of being permanently changed or degraded due to the impact of climate change unless human interventions are put into place (Mbow *et al.*, 2017).

Kenya's policy response to climate change is contained in the National Climate Response strategy of 2010 and two consecutive five year National climate change Action Plans. The planned actions in the forests, wildlife, and tourism sectors includes adaptation through sustainably managed forests, increased forest cover, improved management of rangelands and grasslands, reduced coastal erosion through mangroves conservation and restoration, and maintenance of ecosystems for wildlife and linking of protected areas and mitigation through reductions in Green House Gases (GHG)(Mutimba *et al.*, 2019). Information on what managers of tourism accommodation facilities do to mitigate against the negative effects of climate change in Kenya is however scant. This study serves as a basis of understanding how experiencing disasters and concomitant emotional attachment are associated with CCMB among tourists' hotel managers.

This study adopted a socio-psychological approach to climate change (Vallacher & Nowak, 2007). Social psychologists believe that human behaviour is determined by both a person's characteristics and the social situation which is frequently a stronger influence on behaviour than are a person's characteristics (Stangor *et al.*, 2017). Studies are already applying social psychological theory and methods to the issue of climate change. This is due to the observation that the theories, models and research methods of social psychology can provide a powerful arsenal to complement the approaches of other disciplines (Fielding *et al.*, 2014). The value of this perspective is indispensable since climate change is thought to be driven by human behaviour (Tam *et al.*, 2021). Nielsen *et al.*, (2021) further observes that psychology can make a significant contribution to limiting the magnitude of climate change. This arises from appreciating the fact that the primary focus of (applied) psychology is understanding, explaining and changing behaviour in response to a some given problem (Yuriev *et al.*, 2020). Generally, there is limited disagreement that socio-psychology is uniquely positioned to contribute to a better understanding of the human dimensions of climate change (Linden, 2015; Stern, 2011).

The value of a social-psychological perspective is unmistakably the most important human-dimension of the climate change system (Gifford & Nilsson, 2014) and is yet the least understood and the most overlooked (Linden, 2015). Spence *et al.*, (2014) contend that notwithstanding the importance of human, cultural and social dimensions of climate change, most interventions are generally outlined in terms of either new technologies, industry incentives or other economic and market-based instruments. It has also been noted that insights from both

social and environmental psychology continue to be under considered significantly in the climate change mitigation debate (Nielsen et al., 2021).

Although important in their own right, technological advances and economic strategies including incentives and price mechanisms tend to primarily focus on creating extrinsic motivation and in the process; they inadvertently crowd out people's intrinsic motivation to care for the environment (van der Linden, 2015). Further, it has been said that external incentives are not stable, long-term drivers of pro-environmental behaviour (Bouman et al., 2020). This is despite the fact that the search for the determinants of stable pro-environmental conduct is a focal area of research in both social and environmental psychology (Gifford & Nilsson, 2014).

The experience-behavior link of natural disasters and CCMB has been examined in previous research but has been limited to measuring retrospectively self-reported experience using cross sectional designs or cohorts using before and after disaster procedures (Rudman et al., 2013). In the first of its kind, Bergquist et al (2019) used a crossover design, recruiting the same participants before and after experiencing a natural disaster. The study however used a single aspect of disasters. The study suggested that when people think about climate change after experiencing extreme weather, climate change will be perceived with stronger negative emotional activation than before. The current study adds to existing studies by examining the joint association of experiential factors using a validated environmental disasters and emotional attachment scale with multiple items and CCMB among tourist hotel managers using the novel beta regression approach in a developing world. In doing so, the study also controlled for socio-demographic characteristics.

### **3. Methods**

#### **Research Design**

The study was a cross-sectional survey where data were collected from tourist hotel managers at a single point in time. Surveys are cheap, fast to implement and offer significant insights to guide policy interventions. The study was primarily concerned with describing, recording and interpreting experiential factors and establishing their role on CCMB among managers of the tourist hotel facilities in Naivasha sub-county in Kenya.

## Target Population and Sampling

The target population constituted of 85 medium and luxury priced tourist hotel facilities in Naivasha sub-county in Kenya. These hotels pay a license fee of between Kshs. 25,000-100,000 annually and serve both local and international tourists. Three groups of hotels were identified based on the amount of licence fee paid as the stratification criteria; category A (Ksh 75,000-100,000), category B (Ksh 50,000-70,000) and category C (Ksh 25,000-35,000). A list of the eligible tourist hotel facilities was obtained from the revenue collection section of Naivasha Sub-County. The list had a total number of 85 facilities that pay annual licensing fees of between Kshs 25000 and 100000 of which 13 were in category A, 20 in category B and 52 in C depending on the amount paid.

A two stage cluster sampling technique was employed. Managers of tourist hotels were chosen by first selecting a sample of tourist hotel and then selecting some of the managers in each of the selected hotel. Next an initial study was conducted to identify the basic characteristics of the tourist hotels and the number of personnel in management positions. It emerged from this exercise that on an average the target hotels had four staffmembers in management positions with a range of 2 to 8. The target population was thus 340 hotel managers.

Following Krejcie and Morgan (1970) sample size determination formula, 70 tourist hotels were randomly selected in the first stage. Using the same formula, a minimum sample size of 180 tourist hotel managers were required. In the second subsequent stage, a sample of 182 managers was randomly selected using a modified Kish Grid method as suggested by Clark and Steel (2007). This method uses flexible intermediate designs between the two extremes and which optimize survey costs and are statistically efficient.

**Table 1: Sample Size**

License category (Kshs)	Total number (PSUs)	Target Population (SSUs)	Required Sample size (PSUs)	Required Sample size (SSUs)
75,000-100,000	13	52	11	28
50,000-70,000	20	80	16	43
25,000-35,000	52	208	43	111
<b>Total</b>	85	340	70	182

### 3.3 Study Instrument

The main data collection tool that was used in this study was a structured self-administered questionnaire. The study used an instrument made up of questions on the managers' extent of their personal involvement with extreme climate risks and events was utilized. Another set of questions that rated the managers' level of emotions towards climate change was also included. Questions on the managers' experiential characteristics had items adapted from Bergquist et al., (2019). This study opted for the frequency that is the **number of environmental disasters experienced personally by the surveyed managers in the previous 5 years**. A set of questions that rated the managers' level of emotions towards climate change as concern to the tourism and the hotel industry was also included. On a scale of 1-5, the managers expressed their feelings towards climate change as concern to the tourist hotel industry ranging from 1= Not at all to 5 = To a very great extent. The items measuring emotions consisted of **7 descriptors ranging from distressed, anxious, hopelessness, guilt, optimism, calm to happiness**.

The questionnaire also had another section that established the general socio-demographics of the managers. The managers' demographic data particularly on age, sex and education were collected. The last section of the questionnaire contained questions on CCMB as the dependent variable. This section sought the frequency of application of various practices recommended by United Nations World Tourism Organization-Environment Programme (UNWTO-UNEP) for hotel establishments to mitigate climate change (World Tourism Organisation & United Nations Environment Programme, 2008). The focal outcome of interest, was a set of 24 items on managers self-reported behavioural engagement in climate change mitigation which were measured on a five likert scale ranging from 1 = Never to 5 = Always.

### **Reliability and Validity Tests**

The items on **emotions and experiential** characteristics and climate change mitigation behaviours used in this study were adapted from **Bergquist et al., (2019)**. The items selected for emotions and experience with extreme weather conditions, were measured subjectively using multiple variables. This initial exercise ensured that the items in the survey instrument were not only complete but more importantly reliable. Experts in tourism and research methodology from **universities in Kenya and research institutes** were then used to assess the validity of the selected items. **These experts were identified by searching the internet through their publications and later contacting them by cell-phone.** The experts were requested to identify if the set of questions extracted from literature actually measured the intended constructs. They were advised to make any change to the wording of the questions and to add other items if necessary. Their comments were subsequently incorporated in a revised questionnaire.

Conducting a pre-test was meant to test the study questionnaire for potential misunderstandings or problems and consequently make appropriate corrections on identified

weaknesses and inadequacies. The questionnaire items were subjected to a pre-test using a sample of 15 tourist hotel facilities in the neighbouring Nakuru City. The chosen facilities had similar characteristics as those in the actual study. An additional section was added to ask respondents in the pilot study about the time it took to complete the questionnaire; comprehension of instructions; ambiguity of terminology and any recommendations for questionnaire improvements.

### **Data Collection**

A paper and pencil interviewing (PAPI) technique was employed in the current study. The method was found to be appropriate with tourist hotel managers, a target audience that was challenging to reach. The targeted hotel managers were physically contacted in their respective hotel facilities. The PAPI technique is useful in situations where a complicated problem is being investigated, such as climate change in this study. It is however found to be costly in terms of time and money as sometimes more than one session was required to complete the survey. Concerns of the presence of the researcher in biasing the response by the respondents have been raised. This was circumvented by minimizing intervening with the respondents answering of the survey through first clarifying the study purpose and avoiding leading questions. Prior to the survey, the sampled respondents were informed about the purpose and nature of the research and that the confidentiality and anonymity of the information they provided.

### **Data Management and Analysis**

Data from the questionnaires was cleaned, counter-checked for accuracy entered into a computer while missing and spurious data were imputed automatically in Stata software using formula for chained equations of multiple variables. Exploratory data analyses were conducted to

verify that the data does not violate the assumptions of a normal distribution. Numerical data were summarised using mean ( $\pm$  SD), median and the 25<sup>th</sup> and 75<sup>th</sup> percentiles. On the other hand, categorical data was presented using frequencies and percentages. The data was further presented using graphs and tables. The individual climate change mitigation behaviour and emotional factor scores that are in nature of the likert scale were not interpreted in their raw form but were converted to Percentage of Maximum Possible (POMP) scores. This involved taking the raw score and subtracting the minimum score and then dividing the result by the possible scoring range. This scoring method effectively standardized the scores to allow comparison across alternative scoring methods and instruments (Fischer and Milfont, 2010).

Factor analysis using Principal component Analysis (PCA) were applied in order to identify if there are any dimensions of CCMB. Items with either poor loading scores or cross-loadings were removed. The widely recognized Kaiser criterion of retaining only factors with Eigen values greater than one was used. The specific items in each of the identified dimensions of CCMB were aggregated for every respondent. These identified dimensions of the outcome were subsequently used in all other analyses in the study. The Cronbach's alphas ( $\alpha$ ) of these scales were computed.

A correlation analysis was initially conducted in order to examine the relationship between the different dimensions of CCMB and experiential factors. This exercise also helped to identify if multicollinearity was an issue of concern with the studied variable.

A variable dispersion beta regression model that is commonly used by practitioners to model outcome variable that assume values in the standard unit interval (0,1) was then employed to establish the significant socio-cultural correlates of CCMB in this study. This model is based on the assumption that the dependent variable is beta-distributed and that its

mean is related to a set of regressors through a linear predictor with unknown coefficients and a link function (Cribari-Neto & Zeileis, 2010). The choice of this model was informed by the fact that it naturally incorporates commonly observed features such as heteroskedasticity or skewness which is usually notable in data taking values in the standard unit interval, for instance rates and proportions as was the case with both dimensions of CCMB in the current study. To help the interpretation of observed coefficients in this model, the marginal effects of the role of the experiential factors as correlates of CCMB were also calculated with the help of both Stata version 11 software (StataCorp, 2009) and the betareg package in the R computing environment Version 4.2.2 (R Core Team, 2021).

#### **4. Results**

A total of 182 managers responded to this survey. The sample was not evenly-balanced in terms of gender, age and education attainment (Table 1). There was greater participation of males (70%), middle-aged (between 30 and 49 years at 93%) and moderately educated individuals (that is diploma holders at 43%). Further, a majority of the respondents (37%) reported that they had 5-9 years' work experience. In addition, most of the respondents described their job title as head of department (41%). It is also important to point out that 68% of the respondents indicated that they were not members of any environmental group.

**Table 2: Demographic Profile of Respondents**

	Proportion	SE	(95% CI)	
<b>Gender</b>				
Female	0.30	0.03	0.23	0.37
Male	0.70	0.03	0.63	0.77
<b>Age</b>				
Below 29 years	0.03	0.01	0.00	0.05
30-39 years	0.52	0.04	0.44	0.59
40-49 years	0.41	0.04	0.34	0.48
Above 50 years	0.05	0.02	0.02	0.08
<b>Educational Attainment</b>				
Secondary	0.03	0.01	0.00	0.05
Certificate	0.16	0.03	0.11	0.22
Diploma	0.43	0.04	0.36	0.50
Degree	0.37	0.04	0.30	0.44
Post Graduate	0.01	0.01	0.00	0.03
<b>Work Experience</b>				
Below 4 years	0.08	0.02	0.04	0.12
5-9 years	0.37	0.04	0.30	0.44
10-14 years	0.24	0.03	0.17	0.30
Above 15 years	0.31	0.03	0.25	0.39
<b>Job Title</b>				
General Manager	0.25	0.03	0.18	0.31
Head of Department	0.41	0.04	0.33	0.48
Head of Section	0.34	0.04	0.28	0.42
<b>Member of Environmental Group</b>				
No	0.68	0.03	0.61	0.75
Yes	0.32	0.03	0.25	0.39

Initially, the factorability of 24 climate change mitigation items was examined using well recognized criteria for the factorability of a correlation were used. Firstly, it was observed that 16 of the 24 items correlated at least 0.3 with at least one other item, suggesting reasonable factorability. Secondly, the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.73, above the commonly recommended value of 0.6, and Bartlett's test of sphericity was significant ( $\chi^2(153) = 840.26, p < .05$ ). The diagonals of the anti-image correlation matrix were also all over 0.5. Finally, the communalities were all above 0.3, further confirming that each item shared some common variance with other items. Given these overall indicators, factor analysis was deemed to be suitable. Principal components analysis was used because the primary purpose was to identify and compute composite scores for the factors underlying the short version of the CCMB. A two factor solution, which explained 49% of the variance, was preferred because of: (a) its previous theoretical support; (b) the 'levelling off' of Eigen values on the scree-plot after two factors; and (c) the insufficient number of primary loadings and difficulty of interpreting subsequent factors. There was little difference between the two factor varimax and oblimin solutions, thus both solutions were examined in subsequent analyses before deciding to use an oblimin rotation for the final solution. The Cronbach's alphas were acceptable: 0.68 for efficiency and 0.63 for curtailment CCMB.

Composite scores were created for each of the two factors. Higher scores indicate a greater use of the given mitigation practice. Although an oblimin rotation was used, a strong positive correlation existed between the two dimensions of CCMB ( $r = 0.64, p < 0.05$ ). Overall, these analyses indicated that two factors were underlying responses to the CCMB items and that each of the two factors was moderately internally consistent.

Descriptive statistics for both dimensions of CCMB are presented in Table 3. The managers had a median score of 0.66 (25<sup>th</sup>-75<sup>th</sup> percentile = 0.23-0.86) in curtailment CCMB and 0.46 (25<sup>th</sup>-75<sup>th</sup> percentile = 0.36-0.79) in efficiency CCMB.

**Table 3: Descriptive Statistics of the Two Dimensions of CCMB**

Type of CCMB	Mean	Median (25 <sup>th</sup> -75 <sup>th</sup> Percentile)	Skewness	Kurtosis
Efficiency	0.49 (0.16)	0.46 (0.36-0.79)	0.43	2.17
Curtailment	0.59 (0.20)	0.66 (0.23-0.86)	-0.29	1.59

The skewness and kurtosis were not within a tolerable range for assuming a normal distribution and visual examination of the histograms suggested that the distributions were not approximately normal. Mitigation curtailment behaviour was negatively skewed. Efficiency behaviour had a positive skew. Further examination of the observation that the scores on curtailment behaviour are skewed offer additional support (One-sample Kolmogorov-Smirnov (K-S) test  $D = 0.16$ ,  $p < 0.05$ ). This test offers further formal support that the curtailment data is not normally distributed. Additional formal analyses show that scores on efficiency CCMB are skewed (One-sample Kolmogorov-Smirnov (K-S) test  $D = 0.15$ ,  $p < 0.05$ ). The test offers further formal support that the efficiency behavior data is not normally distributed. **The data were therefore well suited for beta regression analyses (Cribari-Neto & Zeileis, 2010).**

A visual presentation of the curtailment and efficiency CCMB data **is offered in Figure 1**. Curtailment CCMB appears to be a multimodal distribution. Additional inspection of the histogram shows that Efficiency CCMB was positively skewed. These results suggest that further statistical analyses that require data to be normally distributed are not applicable.

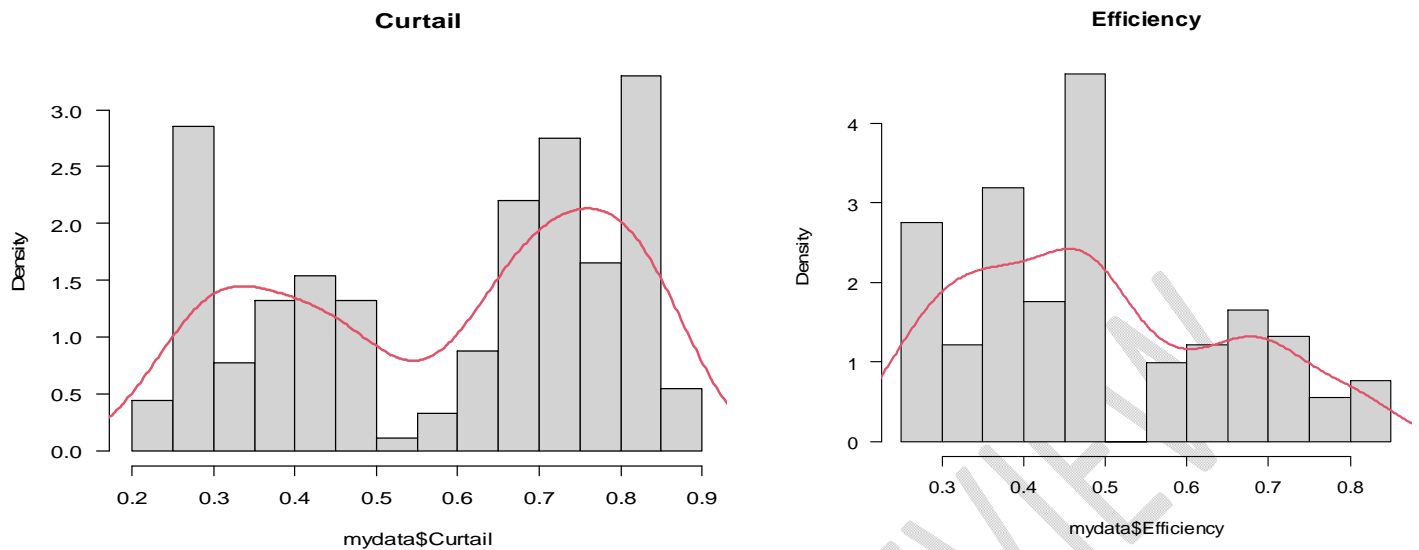


Figure 1: Distribution of CCMB Scores (Left Curtailment Behaviour, Right Efficiency Behaviours)

### The Role of Experiential Factors on CCMB

Two types of experiential factors namely experiencing environmental hazards and emotions have been proposed as probable correlates of climate change mitigation behaviours in literature. Measures of experiencing environmental hazards either use the frequency or intensity scores. This study opted for the frequency that is the number of environmental disaster experienced in the previous 5 years. In addition, an adapted, short, seven item instrument with 5-options ranging from 1 = low feelings to 5 = high feelings was used to measure emotions in this study. An acceptable Cronbach's alpha ( $\alpha = 0.60$ ) for this scale was obtained.

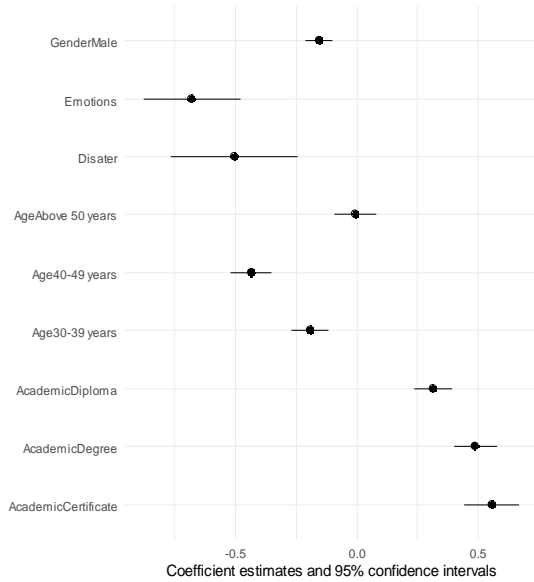
Both efficiency and curtailment CCMB were positively and significantly correlated with each other (Table 4). Further, both efficiency and curtailment CCMB had inconsistent correlations with the two dimensions of experiential factors.

**Table 4: The Descriptive and Correlation Statistics of the Survey Data**

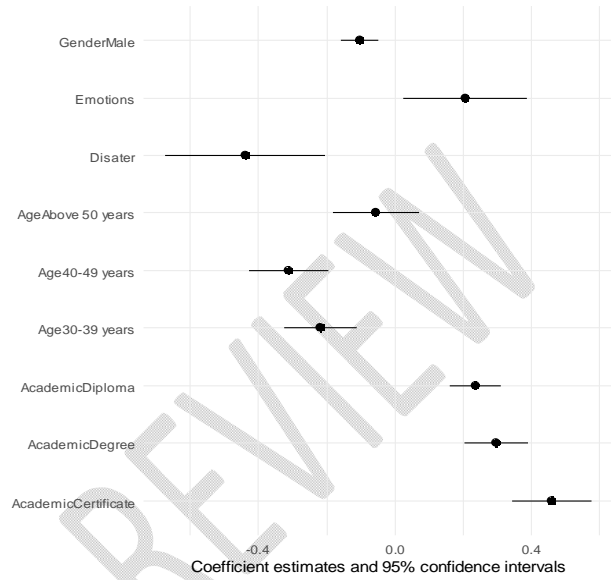
Variable	Mean (SD)	1	2	3	4
1 Curtailment CCMB	0.59 (0.2)	1			
2 Efficiency CCMB	0.49 (0.16)	0.57	1		
3 Frequency of Disasters	0.44 (0.17)	0.10	0.01	1	
4 Emotions	0.68 (0.17)	-0.26	0.19	0.33	1

The association between experiential factors and CCMB of the surveyed tourist hotel managers are presented in Figure 2. A beta regression model revealed that the two dimensions of experiential factors had varied statistical association with both dimensions of CCMB. Experiencing disasters was negatively and significantly associated with both curtailment ( $\beta = -0.51, \rho < 0.05$ ) and efficiency ( $\beta = -0.44, \rho < 0.05$ ) CCMB. Emotions were positively and significantly associated with efficiency CCMB ( $\beta = 0.21, \rho < 0.05$ ) but had negative statistical association with curtailment CCMB ( $\beta = -0.68, \rho > 0.05$ ).

### Curtailment CCMB



### Efficiency CCMB



**Figure 2: The Association between CCMB and Experiential Factors**

### 5. Discussion

A two dimensional typology of CCMB consisting of curtailment and efficiency practices was demonstrated in this study. The study findings further indicate a moderate engagement in CCMB among the surveyed tourist hotel managers. The reported results suggest that experiential factors explain extra and broad commitments to mitigate climate change although the relationship is complex and varied. Experiencing disasters was negatively and significantly associated with both curtailment and efficiency CCMB. Emotions were positively associated with efficiency CCMB but had a negative association with curtailment CCMB.

The finding that CCMB is two-dimensional is consistent with the categorization described by some literature (Flemming *et al.*, 2008; Matsumoto & Sugeta, 2022) but differs with other research that suggests that CCMB is made up of many more dimensions (for instance, Gillis (2016). Curtailment behaviors have been described as repetitive efforts that reduce consumption

(Matsumoto & Sugeta, 2022). Efficiency behaviors on the other hand, are defined as once in a time actions that involve the adoption of a technology that produces the desired or intended result timely (such as purchasing energy efficient electrical appliances). Differences in results emanate from the use of measurement of variables. The current study used multiple measures of variables while much of the existing literature tends to use single measures.

The reported results show that experiencing disasters was negatively and significantly associated with both curtailment and efficiency CCMB. A closer examination of the **functional relationship** indicated a positive inverted U shaped association between experiencing calamities and efficiency mitigation behaviors in the mean model but a negative U shaped relationship in the precision model. Taken together these findings are indicative of a threshold for the role of experiencing environmental hazards and CCMB. The reported results imply that respondents who had first-hand experience with environmental related calamities were unlikely to report CCMB uniformly when compared to those without such experience. This finding is in contrast with the mainstream opinion in the literature that experiencing environmental catastrophes induces individuals to undertake significant climate change mitigation activities (**Harnett, 2017**; Van der Linden, 2015; 2014).

In addition, most of the existing literature examines the role of only a single environmental hazard such as experiencing floods or air pollution by the general public (Munoz-Carrier *et al.*, 2020; Ogunbode *et al.*, 2019; Whitmarsh, 2008). This literature nonetheless concludes that extreme weather experiences have the potential to increase engagement in climate change. A study conducted in England demonstrated a contrary result with flood victims having very little differences from other respondents in their understanding of and responses to climate change (Whitmarsh, 2008). The same study however reported that experiencing air pollution had

significant associations on both perceptions of and behavioural responses to climate change. Another study with the public in the UK showed that the relative explanatory power of personal experience with extreme weather was not particularly strong (Van linden *et al.*, 2015). This result may be explained by the fact that a perceptual connection needs to be made prominent in order for individuals to essentially attribute their adverse environmental experience to climate change (Whitmarsh, 2008). A longitudinal qualitative study in New Zealand reported that entrepreneurs in the Small and Medium Enterprises (SMEs) tourism sector who had been affected by extreme weather events had attitudes and behaviours towards climate change that differed significantly from those unaffected (Hall, 2006).

It has been noted that the role of experiential factors on CCMB is mainly through prompting the way individuals perceive the proximity and implications of climate change and individuals' differences in the subjective attribution of extreme weather events to climate change (Ogunbode *et al.*, 2019). Existing literature further provides at least three reasons why experience with unfavourable environmental experience should lead to the undertaking of desirable climate change mitigation behaviours (van der Linden, 2015). The first postulation suggests that affect which is viewed briefly as fast and associative information guides the perceptions of risk which it turn direct climate change mitigation practices. In the second explanation, affect is taken to flow from cognitive appraisals (in other words affect is thought of as a post-cognitive process). Finally, a dual-process model has been suggested which integrates aspects from both of the above two theoretical perspectives.

The first two explanations seem at the onset not to sufficiently explain the threshold of experiencing environmental disasters and CCMB that was demonstrated in the current study. The third approach however seems to suggest a close link between personal experiences with

environmental calamities, affect and risk perception. This observation resonates well with the experiential theory proposed by Kolb (1984) which takes a more holistic approach and emphasizes how experiences, in addition to cognition, environmental factors and emotions, influence the learning process. Currently, studies are yet to clearly unravel the relationship between the three aspects of personal experience, affect and cognition with environmental hazards. One study conducted in China, demonstrated an improvement in the individuals' perception of climate change had the potential to increase the desirability of mitigation behaviours particularly on water conservation. Individuals however only increase their engagement with climate change mitigation if they attribute their experiences of extreme weather effects to climate change (Chen *et al.*, 2023). Otherwise individuals may simply ignore the threat or deny the existence of climate change. Further, there is some limited literature that indicates that risk perception and affect reciprocally influence each other in an even feedback mechanism (van der Linden, 2015). In short, the difference in findings from the current study and past research can be explained by the failure of the latter to appreciate the cognition-emotion dilemma in the context of climate change mitigation actions.

It is also important to mention that compared to many other hazards, the threat of climate change is unique (Breakwell, 2010). In this regard, two reasons have been advanced in the literature. First, climate change has wide scope and breadth and different individuals comprehend it variously. Second, climate change is not directly situated in our daily settings. Appreciating both reasons may help explain the discrepancies in existing research findings.

Moreover a recognition of the cognition-emotional predicament is convincing since more effective public engagement with climate change requires risk communication strategies that are

able to effectively take into account the way in which cognitive and experiential processes shape and influence public perceptions of climate change (Marx et al., 2007). It may appear that the negative significant association observed in the current study can be explained as the failure of the surveyed managers of hotel facilities to successfully link personal experience and affect. Examining the conceptual relationship between personal experiences, affect and risk perception is crucial in improving understanding on how emotional and cognitive processes shape individual perceptions of climate change.

The results that emotions are associated with CCMB are not consistent with research conducted in the developed world (such as Van Der Linden, 2015) which indicates a strong and significant relationship. Other studies have however argued that emotion explain very little variance in pro-environmental actions (Sjoberg, 2006, 1998). The differences in findings occur primarily from variations in the definition and measurement of the concept of emotion. Studies tend to use either the term emotions, affect or attitude interchangeably (Van der Linden, 2015) and consequently causing much confusion and differences in findings in climate change studies. Therefore, if affect is operationalized as an attitudinal measure and since the term emotion is often mistakenly paralleled with affect, it is easy to falsely conclude that emotions are an important determinant of pro-environmental behaviour.

The term emotion is seen in literature as basically a strong feeling that derives from one's circumstances, mood, or relationships with others. Emotion is further described as a complex experience of consciousness, bodily sensation, and behaviour that reflects the personal significance of a thing, an event, or a state of affairs (Mauss & Robinson, 2009). While the results of the current study indicate a significant linkage between self-reported emotion status

and both climate change curtailment and efficiency activities it is important to point out that this relationship has an upper threshold and varies with the type of climate change mitigation actions. That is emotions have a positive and practical significance up to moderate levels beyond which diminishing effects set in with notable variance in the precision model in climate change curtailment behaviors. This result separates the current study from existing studies. The finding is sensible as individuals differ and have varying emotional thresholds especially with emotions. The reported result is significant and it adds to the discourse on the role of emotions on climate change mitigation behaviour especially in the hotel sector. The result indicates that a clear link needs to be made significant in order for people to actually causally attribute their emotions to climate change.

## **6. Conclusion**

This study examined the role of experiential factors on CCMB among managers of tourist hotel facilities within Naivasha Sub-county in Kenya. It provides empirical evidence for a two-dimensional structure of CCMB namely curtailment and efficiency activities and also highlights important differences in their experiential correlates. The surveyed managers had moderate to high levels on the two dimensions of experiential factors. Findings further indicated a statistically significant but varied relationship between the two dimensions of experiential factors and both curtailment and efficiency CCMB.

## **7. Recommendations**

Environmental policy designers should develop strategies for behavioural change towards climate change mitigation that are specific to the experiential characteristics of tourist hotel managers. The findings suggest that such behavioural changes would be intensified through strategies that strengthen the association between experiencing environmental disasters and individual emotions with climate change.

## 8. Study Limitations

One possible limitation when drawing conclusions about the observed results of this study is that it covered only a small geographical area and a specific group of respondents domiciled in the hotels. Future studies should incorporate other variables with alternate research methodology, extended to other tourism sectors and areas countrywide in order to minimize generalizability concerns related to the current findings.

### Disclaimer (Artificial intelligence)

The Authors declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT and so on) and text-to-image generators have been used during writing or editing of manuscripts

### References

- Bergquist, M., Nilsson, A., & Schultz, P. W. (2019). Experiencing a severe weather event increases concern about climate change. *Frontiers in Psychology, 10*, 220. <https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00220/full>
- Bouman, T., Steg, L., & Zawadzki, S. J. (2020). The value of what others value: When perceived biospheric group values influence individuals' pro-environmental engagement. *Journal of Environmental Psychology, 71*, 101470.
- Breakwell, G. M. (2010). Models of risk construction: Some applications to climate change. *WIREs: Climate Change, 1*(6), Article 6.
- Chen, D., Gan, P. I., Lee, H. M., Li, Z., Krishna, V. S., & Wang, Q. (2023). Sustaining Tourism Sector Through Domestic Tourism and Analytics. In Y. Y. Nguwi (Ed.), *Tourism Analytics Before and After COVID-19* (pp. 199–210). Springer Nature Singapore. [https://doi.org/10.1007/978-981-19-9369-5\\_12](https://doi.org/10.1007/978-981-19-9369-5_12)

- Clark, R. G., & Steel, D. G. (2007). Sampling Within Households in Household Surveys. *Journal of the Royal Statistical Society Series A: Statistics in Society*, 170(1), 63–82. <https://doi.org/10.1111/j.1467-985X.2006.00434.x>
- Cribari-Neto, F., & Zeileis, A. (2010). Beta Regression in R. *Journal of Statistical Software*, 34(2), Article 2. <https://doi.org/10.18637/jss.v034.i02>
- Fielding, K. S., Hornsey, M. J., & Swim, J. K. (2014). Developing a social psychology of climate change. *European Journal of Social Psychology*, 44(5), 413–420.
- Fischer, R., & Milfont, T. (2010). Standardization in Psychological Research. *International Journal of Psychological Research*, 3(1), 88–96.
- Flemming, S. A. C., Hilliard, A., & Jamieson, G. A. (2008). The Need for Human Factors in the Sustainability Domain. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 52(11), 748–752. <https://doi.org/10.1177/154193120805201111>
- Gifford, R., & Nilsson, A. (2014). Personal and social factors that influence pro-environmental concern and behaviour: A review. *International Journal of Psychology: Journal International De Psychologie*, 49(3), 141–157. <https://doi.org/10.1002/ijop.12034>
- Gillis, A. J. (2016). *Categorizing Pro-environmental Behaviors Using the Laypeople's Perspective*.
- Hall, C. M. (2006). New Zealand tourism entrepreneur attitudes and behaviours with respect to climate change adaptation and mitigation'. *Int. J. Innovation and Sustainable Development*, 1(3), Article 3.
- Hall, C. M., Gössling, S., & Scott, D. J. (2012). *Tourism and climate change impacts, adaptation & mitigation*. Routledge.

- Hall, C. M., Scott, D., & Gössling, S. (2013). The Primacy of Climate Change for Sustainable International Tourism. *Sustainable Development*, 21(2), 112–121.  
<https://doi.org/10.1002/sd.1562>
- Harnett, E. (2017). The state of climate change knowledge among UK and Australian institutional investors. *Sustainable Finance Programme, Smith School of Enterprise and the Environment. The State of Climate Change Knowledge–Working Paper–February*.  
<https://www.smithschool.ox.ac.uk/sites/default/files/2022-04/State-of-climate-change-knowledge-among-UK-and-Australian-institutional-investors-SFP-Working-Paper-February-2017.pdf>
- Hoffmann, R., Muttarak, R., Peisker, J., & Stanig, P. (2022). Climate change experiences raise environmental concerns and promote Green voting. *Nature Climate Change*, 12(2), 148–155. <https://www.nature.com/articles/s41558-021-01263-8>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.
- Linden, S. (2015). The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. *Journal of Environmental Psychology*, 41, 112–124.
- Marx, S. M., Weber, E. U., Orlove, B. S., Leiserowitz, A., Krantz, D. H., Roncoli, C., & Phillips, J. (2007). Communication and mental processes: Experiential and analytic processing of uncertain climate information. *Global Environmental Change*, 17(1), 47–58.  
<https://www.sciencedirect.com/science/article/pii/S0959378006000847>
- Matsumoto, S., & Sugeta, H. (2022). Efficiency Investment and Curtailment Action. *Environmental and Resource Economics*, 83(3), 759–789.  
<https://doi.org/10.1007/s10640-022-00709-7>

- Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition & Emotion*, 23(2), 209–237. <https://doi.org/10.1080/02699930802204677>
- Mbow, H.-O. P., Reisinger, A., Canadell, J., & O'Brien, P. (2017). Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems (SR2). *Ginevra, IPCC*.
- Munoz-Carrier, G., Thomsen, D., & Pickering, G. J. (2020). Psychological and experiential factors affecting climate change perception: Learnings from a transnational empirical study and implications for framing climate-related flood events. *Environmental Research Communications*, 2(4), 045003. <https://doi.org/10.1088/2515-7620/ab89f9>
- Mutimba, S., Simiyu, S. W., Lelekoiten, T. L., & Ospina, A. V. (2019). *sNAPshot*.
- Nielsen, K. S., Clayton, S., Stern, P. C., Dietz, T., Capstick, S., & Whitmarsh, L. (2021). How psychology can help limit climate change. *American Psychologist*, 76(1), 130.
- Ogunbode, C. A., Demski, C., Capstick, S. B., & Sposato, R. G. (2019). Attribution matters: Revisiting the link between extreme weather experience and climate change mitigation responses. *Global Environmental Change*, 54, 31–39. <https://doi.org/10.1016/j.gloenvcha.2018.11.005>
- Okumu, F. O. (2017). *Forest Conservation Strategies to Mitigate the Impact of Climate Change on Human Security in East Africa: A Case Study of Mount Kenya Forest* [PhD Thesis]. University of Nairobi.
- Otto, S., Evans, G. W., Moon, M. J., & Kaiser, F. G. (2019). The development of children's environmental attitude and behavior. *Global Environmental Change*, 58, 101947. <https://www.sciencedirect.com/science/article/pii/S0959378018309087>

- R Core Team. (2021). *R: A language and environment for statistical computing* (Version 4.2.2) [Computer software]. R Foundation for Statistical Computing. <https://www.R-project.org/>
- Raihan, A. (2023). A review of the global climate change impacts, adaptation strategies, and mitigation options in the socio-economic and environmental sectors. *Journal of Environmental Science and Economics*, 2(3), 36–58.  
<https://doi.org/10.56556/jescae.v2i3.587>
- Rosa, C. D., & Collado, S. (2019). Experiences in nature and environmental attitudes and behaviors: Setting the ground for future research. *Frontiers in Psychology*, 10, 763.  
<https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00763/full>
- Rudman, L. A., McLean, M. C., & Bunzl, M. (2013). When truth is personally inconvenient, attitudes change: The impact of extreme weather on implicit support for green politicians and explicit climate-change beliefs. *Psychological Science*, 24(11), 2290–2296.  
<https://journals.sagepub.com/doi/abs/10.1177/0956797613492775>
- Sjoberg, L. (1998). Worry and risk perception. *Risk Analysis*, 18, 85–93.
- Sjoberg, L. (2006). Will the real meaning of affect please stand up? *Journal of Risk Research*, 9, 101–108.
- Souza-Neto, V., Marques, O., Mayer, V. F., & Lohmann, G. (2023). Lowering the harm of tourist activities: A systematic literature review on nudges. *Journal of Sustainable Tourism*, 31(9), 2173–2194.  
<https://www.tandfonline.com/doi/abs/10.1080/09669582.2022.2036170>
- Spence, A., Leygue, C., Bedwell, B., & O'Malley, C. (2014). Engaging with energy reduction: Does a climate change frame have the potential for achieving broader sustainable

- behaviour? *Journal of Environmental Psychology*, 38, 17–28.  
<https://doi.org/10.1016/j.jenvp.2013.12.006>
- Stangor, C., Jhangiani, R., & Tarry, H. (2017). *Principles of social psychology*. BCcampus.
- StataCorp. (2009). *Stata Statistical Software* (Release 11) [Computer software]. StataCorp LP.
- Stern, P. C. (2011). Contributions of psychology to limiting climate change. *American Psychologist*, 66(4), 303–314. <https://doi.org/10.1037/a0023235>
- Tam, K.-P., Leung, A. K. -y, & Clayton, S. (2021). Research on climate change in social psychology publications: A systematic review. *Asian Journal of Social Psychology*, 24(2), 117–143.
- Vallacher, R. R., & Nowak, A. (2007). Dynamical social psychology: Finding order in the flow of human experience. *Social Psychology: Handbook of Basic Principles*, 2, 734–758.
- van der Linden, S. (2014). On the relationship between personal experience, affect and risk perception: The case of climate change. *European Journal of Social Psychology*, 44(5), 430–440.
- Whitmarsh, L. (2008). Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *Journal of Risk Research*, 11(3), 351–374. <https://doi.org/10.1080/13669870701552235>
- World Tourism Organisation, & United Nations Environment Programme. (2008). *Climate Change and Tourism: Responding to Global Challenges*.  
<https://wedocs.unep.org/xmlui/handle/20.500.11822/25945>
- World Travel & Tourism Council (2022). *Travel & Tourism Economic Impact Report*.  
<https://wttc.org/research/economic-impact>

Yuriev, A., Dahmen, M., Paillé, P., Boiral, O., & Guillaumie, L. (2020). Pro-environmental behaviors through the lens of the theory of planned behavior: A scoping review. *Resources, Conservation and Recycling*, 155, 104660.

UNDER PEER REVIEW