AFRICAN JOURNAL OF HOSPITALITY, TOURISM AND LEISURE
2026, Vol. 15, No. 3, pp. 906-916
https://doi.org/10.46222/ajhtl.19770720.794

AJHTL
OPEN ACCESS

Research article

The impacts of weather and climate variability on tourism in selected communities in Tanzania

Acha-Anyi Asongu [1] and Paul Nkemngu Acha-Anyi [2]

[1] Faculty of Management and Public Administration Sciences, Walter Sisulu University, South Africa

[2] Department of Tourism, Hospitality and Sports Management, Faculty of Management and Public Administration Sciences, Walter Sisulu University, South Africa

ABSTRACT

Weather and climate variability create uncertainty for tourism demand and disrupt tourism operations. The purpose of this study was to explore the relationship between weather and climate variability and residents' perceptions of tourism operations in the city of Dar es Salaam and neighbouring communities, including Kisarawe, Mkuranga, Vikindu, Kibaha, and Bagamoyo, in Tanzania. A quantitative research approach was employed using a structured questionnaire to collect data from 497 respondents in the identified communities. Analyses of variance were performed on the data to examine statistically significant differences among demographic variables such as gender, age groups, and community attachment. While a number of statistically significant results are observed in aspects of weather and climate variability, this study's findings reveal a broad consensus among respondents on the impacts of weather and climate variability on tourism within their communities. Based on these findings, significant policy and practical implications are drawn mainly to harness efforts towards climate action. The policy and practical implications derived from this study contribute to the call for urgency from policymakers and other stakeholders to address the climate crisis.

KEYWORDS

Weather variability; climate change; tourism; communities; ANOVA; Tanzania

Introduction

Climate change has been described as posing one of the great existential threats to the attainment of sustainable livelihoods among communities in East Africa, particularly in Tanzania (Acha-Anyi, P. N., 2026; Becken, 2023). More than half of the rural population in the region faces rising temperatures, drought, erratic rainfall, extreme heatwaves, and flooding, all of which negatively impact socio-economic life (IPCC, 2023). These disruptions have devastating impacts in vulnerable regions like Tanzania, where individual households experience climate change through declining crop yields, high food prices, reduced access to water, unemployment, health issues, and uncertainty about climate variability (Luhunga, 2025). Recent scholarship in Tanzania suggests that weather and climate variability have severe consequences for the economy, overall well-being, tourism, development planning, and livelihood systems, highlighting the need to understand how communities perceive and respond to climate-driven disruptions (Kitogo et al., 2026). Popular tourism destinations are exposed to climate-driven disruptions (Chapungu et al., 2024). Tourism destinations are connected to the environment, ecology, infrastructure, and the weather, which is increasingly threatened by climate variability. Therefore, weather and climate variability affect destination sustainability through extreme floods, shifting rainfall patterns, heatwaves, water scarcity, and disruption of infrastructure and recreational facilities (Chapungu et al., 2024). These pose severe operational risks and long-term structural issues, particularly in countries like Tanzania, where tourism is closely linked with household livelihoods and community resilience (Kitogo et al., 2026). In Tanzania, tourism serves as the leading source of foreign exchange and contributes approximately 17% to GDP through employment (about 15 million jobs), accommodation, food systems, coastal attractions, among others (George, 2025). Thus, tourism contributes substantially to the Tanzanian economy. However, tourism systems in Tanzania are severely

CORRESPONDING AUTHOR'S CONTACT: Paul N. Acha-Anyi achasinstitute@gmail.com

HOW TO CITE: Asongu, A-A. & Acha-Anyi, P.N. (2026). The impacts of weather and climate variability on tourism in selected communities in Tanzania. African Journal of Hospitality, Tourism and Leisure, 15(3), 906-916 https://doi.org/10.46222/ajhtl.19770720.794

ISSN: 2223-814X (Online) | © 2026 AJHTL

This work is published by African Journal of Hospitality, Tourism and Leisure and is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Open Rubric

affected by climate variability. Climate-driven challenges have implications for the tourist experience, destination sustainability, and communities whose livelihoods are linked to tourism activities (George, 2025; Kitogo et al., 2026; Luhunga, 2025). These environmental challenges can deeply influence perceptions of climate risk. Thus, there is a need to explore how communities perceive the impacts of weather and climate variability on tourism and social and economic realities. Hence, this study was guided by the following research questions:

- What is the relationship between weather, climate and tourism?
- How has climate change impacted natural and environmental resources in Tanzania?
- How do demographic factors influence community perceptions of the impacts of weather and climate variability on tourism?
- What policy and practical implications can be drawn from community perceptions of weather and climate variability on tourism?

Research suggests that community response to weather and climate variability is shaped by how climatic changes are perceived and experienced (Freihardt, 2024; Troncarelli et al., 2023). Therefore, exploring these local perceptions and experiences is essential, as it reflects the interplay of perception and experience, which are elements that significantly influence resilience strategies within the community. In essence, perceptions of climate variability influence how communities respond to climate resilience initiatives. Thus, climate adaptive behavior is impacted by community and household perceptions of vulnerability and resilience to climate-driven disruptions. However, limited research has focused on exploring community perceptions on the impacts of weather and Climate variability on Tourism in developing countries. Furthermore, there is a need to explore social differentiation in weather and climate variability perception because perceptions of climate change are different among demographic and social groups (Poortinga et al., 2023). Age, gender, and community attachment also influence perceptions of weather and climate variability (Poortinga et al., 2023; Scannell & Gifford, 2017). Despite the burgeoning discourse that climate variability is socially perceived, there remains a paucity of empirical research regarding how demographic factors such as gender, age, and community attachment influence climate change perceptions and tourism in the African context.
Against this background, this study aims to address this gap by exploring the impacts of weather and climate variability on tourism communities in Tanzania. The study investigates how gender, age, and community attachment influence perceptions on weather and climate variability in Tanzania. The research question guiding this study is: How do demographic and social factors influence community perceptions of the impacts of weather and climate variability on tourism in Tanzania?

Literature review

Climate variability and tourism systems

Climate stressors such as extreme drought, erratic rainfall, and extreme heatwaves are affecting the tourism industry (Acha-Anyi, 2026). Many tourist destinations rely on their climate as a natural resource that attracts tourists and drives economic growth. The African continent has many tourist destinations and attractions ranging from iconic wildlife safaris, natural wonders, and historic sites (Luhunga, 2025). In Tanzania, top destinations include the Serengeti, the iconic Mount Kilimanjaro, and beautiful beaches (Luhunga, 2025; George, 2025). Tourism contributes substantially to employment, hospitality services, food systems, and ecosystem-based livelihoods in Tanzania. However, in recent years, weather and climate variability have had a negative effect on tourism activities and operations, highlighting the need for adaptation strategies that cater to both ecological vulnerability and community-based socio-economic exposure (George, 2025). Tourism destinations are highly dependent on the climate for their successful operations (Freihardt, 2024). Research suggests climate variability may cause tourism to decline in much of the Global South (Acha-Anyi, 2026; Luhunga, 2025). For example, most resorts in the Global South are threatened by climate variability through its impact on attractions and leisure for tourists. This is of particular concern because tourism-dependent communities rely on nature-based tourism for livelihoods. These communities are exposed to weather and climate variability through aspects such as reduced livelihood opportunities, ecosystem degradation, low agricultural yields, and infrastructure damage (Becken, 2023; Gómez Martín et al., 2022). Therefore, exploring tourism vulnerability caused by weather and climate variability requires understanding both destination-level environmental impacts and how local communities experience and respond to climate-induced change.

Community perceptions of weather and climate variability

Cultural values, beliefs, and indigenous knowledge influence community responses to weather and climate variability. Therefore, climate variability is understood not only through environmental challenges but also

through indigenous knowledge systems. Community members have a better understanding of their environment and their land; it is important to understand their perceptions on these issues (Phophi & Kutlwano, 2025). Perceptions of tourism-dependent communities are also shaped by local knowledge and social systems (Reyes-García et al., 2024; Smith et al., 2024). Climate variability may affect tourism activity and reduce livelihood opportunities among residents (Haque et al., 2023). Thus, the community perception of climate variability may influence residents' response to adaptive measures. Therefore, exploring the impacts of weather and climate variability on tourism requires more than just emergency responses. Community perceptions of weather and climate variability must be taken into consideration since local perceptions play an imperative role in shaping responses to climate adaptation (Freihardt, 2024). Researchers argue that perceptions of climate variability are different across demographic and social groups (Ergun et al., 2024; Poortinga et al., 2023). Thus, the need to explore how socio-demographic factors such as gender, age, and community attachment shape community responses to weather and climate variability in a tourism-dependent context.

Gendered perceptions of climate variability

Climate disruptions affect gender groups differently (Ergun et al., 2024). Therefore, perceptions of climatic variability are influenced by gendered experiences of climate change. According to Haque et al. (2023), women are more susceptible to climate variability due to greater sensitivity to livelihood insecurity and their household duties, while men in certain contexts may perceive climate disruptions through economic and infrastructural perspectives. Although weather and climate variability have been recognized as a global issue, strategies and responses have been more focused on science, neglecting gender dimensions. Limited research has been conducted in tourism-dependent communities to explore how gender influences community perceptions of weather and climate variability (Chapungu et al., 2024; Dube & Nhamo, 2021). Exploring gender-based perceptions of weather and climate variability is important because different genders may experience and perceive tourism-related climate variability differently, influencing community responses to climate disruptions. Thus, it is imperative to understand gender perceptions of weather and climate variability in tourism-dependent communities.

Age and climate perception

Research suggests that age influences perception of weather and climate variability (Di Gessa & Zaninotto, 2026; Prina et al., 2024). For example, older adults are disproportionately vulnerable to the effects of weather and climate variability; thus, they influence strategies for responding to climate variability. Extreme weather events such as heatwaves, flooding, and drought often lead to mortality, with the majority of deaths occurring among older populations (Ballester et al., 2023; Prina et al., 2024). On the other hand, younger age groups are more concerned about weather and climate variability because anxiety is taking a toll on the well-being of children and young people, as they become aware of the threats posed by climate variability (Hickman et al., 2021; Whitmarsh et al., 2022). Despite the links between age, weather, and climate variability, few studies have focused on age and climate perception (Di Gessa & Zaninotto, 2026; Ni et al., 2025). It is therefore essential to explore how different age groups perceive weather and climate variability in tourism-dependent communities.

Community attachment and climate perception

Community attachment is one of the factors influencing how people perceive weather and climatic variability. According to Lewicka (2011), individuals who have lived longer in a community have stronger attachments to it, which influence their perception of weather and climate variability in that community. Long-term residents may perceive climate changes such as droughts, floods, erratic rainfall patterns, and temperature intensity differently from short-term residents (Freihardt, 2024).

Risk perception theory

Risk perception theory was originally propounded in the 1970s and 1980s through the work of Paul Slovic and colleagues. This study is underpinned by Risk Perception Theory, which holds that risk perception is shaped not only by objective danger but also by social, cultural, and emotional factors that influence how people perceive and interpret environmental and societal threats (Slovic, 1987). Risk perception has been explored by researchers from a range of disciplines, including psychology, criminology, political science, and sociology (Camprubí, 2024; van der Linden, 2015). Therefore, Risk Perception theory can be used to determine behaviour related to climate variability, environmental risk, disaster management, and tourism, to understand climate-driven perceptions across different social groups. Understanding how communities perceive climate risks is important to explore the impacts of weather and climate variability on tourism

because community perceptions influence local adaptation strategies (Chapungu et al., 2024; Freihardt, 2024)

Construal level theory

To complement the Risk Perception Theory, this paper drew on Construal Level Theory as a theoretical lens for understanding the impacts of weather and climate variability on tourism in communities in Tanzania. Construal level theory suggests that individuals interpret risks and events at a distance (whether physical or psychological) (Trope & Liberman, 2010). According to this theory, understanding people's perceptions, feelings, and behaviors shifts as mental construals of the surrounding stimuli change. Risks viewed as immediate, personally relevant, and directly experienced are interpreted differently from risks perceived as distant. Thus, the theory suggests that weather and climate variability are viewed differently by individuals who directly experience erratic rainfall, drought, flooding, or tourism-related livelihood challenges, and are more likely to perceive climate variability as urgent. Therefore, differences in age, gender, and community attachment may influence how individuals in tourism-dependent communities perceive climate variability.

Place attachment theory

The study is also informed by Place Attachment Theory, which describes how people's social and emotional bonds to physical environments influence perceptions and responses to environmental changes (Lewicka, 2011). The theory suggests that Place attachment is the emotional bond between a person and a place or context. It is shaped by personal experiences and the meanings evoked by a particular place. Therefore, individuals who develop stronger attachments to their communities are more sensitive to climate variability, which may influence how they interpret weather and climate variability (Lewicka, 2011). Together, Risk Perception Theory, Construal Level Theory, and Place Attachment Theory will enable the researchers to explore the impacts of weather and climate variability on Tourism in communities in Tanzania.

Materials and methods

This study uses a multiple-case study approach. Case study research design, as described by Yin (2018), involves examining phenomena or events as they unfold, using empirical evidence. In this regard, the case study approach offers the researcher the opportunity to study a phenomenon in its current reality. In the view of Bertrand & Hughes (2005), researchers who adopt the case study approach examine the incident or event from various perspectives, such as engaging with respondents and observing the unfolding of the event. Veal (2011), on the other hand, appreciates the pragmatism that the case study approach brings to research by viewing a phenomenon through multiple lenses. In this regard, the tourist city of Dar es Salaam, along with its neighbouring peri-urban communities of Kisarawe, Mkuranga, and Vikindu to the south/southwest, Kibaha to the west, and Bagamoyo to the north, provided the ideal site for data collection. Despite the close proximity of these communities, the rich tapestry of tourist attractions ensured the vibrant tourism economy required for the study. Hence, engaging with communities and residents in these diverse settings increases the credibility and generalizability of the study findings (Yin, 2018). A quantitative research approach was employed to gather information from as many community members as possible during the study period. Data were gathered simultaneously across the study sites to minimise seasonal and other discrepancies. The sections below provide details regarding the development of the study instrument, ethical compliance, data collection, population and sampling and data analysis. Following an extensive literature review, a self-administered questionnaire was developed as the main instrument for collecting data from respondents. This data collection instrument consisted of three parts, labelled A, B, and C. The questions in section A requested demographic information from respondents, such as gender, the number of years they have lived in the community, and the percentage of their income earned from tourism, among others. The questions in Sections B and C used a five-point Likert scale to rate respondents' perceptions of the impacts of weather and climate variations on tourism in their community (Section B) and the actions they are taking to limit those impacts (Section C). Key literature consulted on the impacts of weather and climate on tourism in communities included Hahn et al. (2009). On the other hand, the climate action section of the questionnaire was informed by existing indicators and guidance provided by Hürlimann et al. (2025) and the United Nations Development Programme (UNDP, 2022).

Prior to commencing data collection, copies of the respondent consent document, the study instrument, and the research proposal detailing the research process were submitted to the institutional ethics review and approval committee for consideration. This was to ensure that the research process was ethically sound, the respondents consented to freely participate in the study and that the privacy and anonymity of the respondents were respected. Upon satisfying itself that all these ethical conditions were met, ethical clearance to proceed with the study was accorded on the 22nd of March 2023, referenced 2023/staff/1352.

Data collection for this study began on the 23rd of April 2023 and ended on the 30th of June 2023. Before the commencement of the data collection exercise, fieldworkers were selected based on their prior experience with field research and knowledge of the communities in which they would conduct fieldwork. Training for the selected eighteen (18) workers took place in Dar Es Salaam from the 15th of March 2023 to the 29th of March 2023. To ensure minimal variation in data collection, the training of fieldworkers emphasised ethical considerations, respondents' freedom to withdraw from the study, and a detailed understanding of the research instrument. While on the study site, the protocol for data collection was retained as follows: the field worker randomly visits households within or in the precincts of the tourist attractions, explains the study's motivation, and asks whether any family member has consented to participate. People who agreed to take part in the study and signed the consent form were handed the questionnaire to complete. The field workers also answered any content-related questions the respondents had.

The data were analysed using both descriptive and exploratory statistics. While the descriptive analysis focused on getting the general trends and characteristics from the data, the exploratory analysis aimed at checking for any underlying patterns and associations. The data were initially captured on Microsoft Excel spreadsheet and analysed using the IBM Statistical Package for Social Sciences (SPSS) version 27. Weather sensitivity was operationalised using an 18-item five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The composite mean score reflects the extent to which respondents perceive weather variability as impactful on tourism in their community. A mean score above 3.5, for instance, therefore, indicates agreement that weather variability significantly affects tourism-related livelihoods.

Findings

Results of the descriptive analysis are presented in Table 1 below.

Table 1. Demographic profile of the respondents

Variable	Description	Frequency	Percentage
Gender	Male	266	55.2
	female	231	44.8
Years spent in the community	1	197	39.6
	2	171	34.8
	3+	128	25.6
Age	18 – 24	119	23.8
	25 – 34	169	33.8
	35 – 44	105	21.0
	45 – 54	54	10.8
	55 – 64	35	7.0
	65+	18	3.6
Percentage of household income from tourism	0	177	35.4
	1-20	58	11.6
	21- 40	45	9.0
	41-60	56	11.2
	61-80	70	14.0
	81-99	57	11.4
	100	37	7.4
Highest level of education	No formal education	24	4.8
	Primary education	76	15.2
	Secondary school	146	29.2
	High school	50	10.0
	National Diploma	80	16.0
	First degree	107	21.4
	Postgraduate qualification	17	3.4

The findings presented in Table 1 above reveal greater male participation (55.2%) than female participation (44.8%). The majority of respondents (39.6%) had lived in the community for one year or less, and were mostly within the 25-34 age group (33.8%). Surprisingly, tourism did not provide any household income for many respondents (35.4%), even though most (29.2%) had received a secondary education. To gain further insight into the data, a Mann-Whitney U test was conducted to determine whether there were statistically significant differences in perceived impacts of weather and climate variability on tourism by gender. Results of the analysis are presented in Table 2 below.

Table 2. Mann-Whitney U Test results of a gender perspective on the impacts of weather and climate variability on tourism

Weather and climate variability have impacted tourism in our community through …	Gender					
	Male N1=266		Female = N2=231			
	Mean Rank	Sum Ranks	Mean Rank	Sum Ranks	Z	p-value
Drought	258.14	68666.00	238.47	55087,00	-1,56	,12
Heatwaves	251,11	66796,00	246,57	56957,00	-,36	,72
Increased rainfall	259,02	68898,00	237,47	54855,00	-1,71	,09
Higher temperatures	258,44	68746,00	238,13	55007,00	-1,62	,11
Rising sea levels	248,95	66220,00	249,06	57533,00	-,01	,99
Cold temperatures	250,69	66684,00	247,05	57069,00	-,29	,77
Extreme temperatures	261,62	69590,50	234,47	54162,50	-2,17	,03
Hurricanes	254,08	67330,50	242,10	55925,50	-,98	,33
Wildlife migrating out	252,82	67250,50	244,60	56502,50	-,66	,51
Wildlife migrating in	251,95	67019,00	245,60	56734,00	-,51	,61
Animals becoming extinct	257,29	68181,50	238,42	55074,50	-1,50	,14
Increased mosquitoes	254,89	67801,00	238,42	55074,50	-1,01	,31

Increased storms	239,51	63710,50	259,92	60042,50	-1,63	,10
Power outages	256,96	68352,00	239,83	55401,00	-1	
Damage to infrastructure	254,79	67773,00	242,34	55980,00	,36	,17
Food scarcity	254,79	67773,00	248,13	57318,50	-,99	,32
Water scarcity	249,80	66446,50	248,08	57306,50	-,13	,90
Disease outbreak	255,01	67833,50	242,08	55919,50	-1,03	,30

The Mann-Whitney U test was considered appropriate in this case due to the ordinal nature of the Likert-scale data. Most of the results indicated no statistically significant gender differences for the examined variables, such as drought ($Z = -1.56$, $p = .12$), heatwaves ($Z = -0.36$, $p = .72$), increased rainfall ($Z = -1.71$, $p = .09$), higher temperatures ($Z = -1.62$, $p = .11$), rising sea levels ($Z = -0.01$, $p = .99$), cold temperatures ($Z = -0.29$, $p = .77$), hurricanes ($Z = -0.98$, $p = .33$), wildlife migration (out: $Z = -0.66$, $p = .51$; in: $Z = -0.51$, $p = .61$), animal extinction ($Z = -1.50$, $p = .14$), increased mosquitoes ($Z = -1.01$, $p = .31$), increased storms ($Z = -1.63$, $p = .10$), power outages ($Z \approx -1.00$, $p > .05$), damage to infrastructure ($Z = 0.36$, $p = .17$), food scarcity ($Z = -0.99$, $p = .32$), water scarcity ($Z = -0.13$, $p = .90$), and disease outbreaks ($Z = -1.03$, $p = .30$). However, a statistically significant difference was found for extreme temperatures ($Z = -2.17$, $p = .03$). Male respondents (Mean Rank = 261.62) reported significantly higher perceived impacts compared to female respondents (Mean Rank = 234.47). In order to understand the magnitude of the statistical difference, the effect sizes (t) were calculated using the formula:

$$\text{Eta squared} = \frac{\text{Sum of squares between groups}}{\text{Total sum of squares}}$$

The results revealed a minimal effect size of .10 (Cohen, 1988), indicating that while the gender difference is statistically significant, its practical magnitude is limited. For all other variables, effect sizes would be very small ($|r| < 0.10$), consistent with their non-significant results. The data were further subjected to a Kruskal–Wallis H Test to determine whether there were statistically significant differences across the six age groups: 18–25 (n = 119), 26–35 (n = 169), 36–45 (n = 105), 46–55 (n = 54), 56–65 (n = 35), and 65+ (n = 18) in the perceived impacts of weather and climate variability on tourism. The results are presented in Table 3 below.

Table 3. Kruskal–Wallis H Test between age groups and weather and climate variation impacts on tourism

Weather and climate variability have impacted tourism in our community through …	**Age groups (in years)**							
	(18-25)	(26-35) N2=169	(36-45) N3=105	(46-55) N4=54	(56-65) N5=35	65+ N6=18		
	Mean	Mean	Mean	Mean	Mean	Mean	H	P
Drought	251,40	258,37	253,92	253,63	204,0	231,61	4.7	.4
Heatwaves	251,96	241,95	261,90	240,58	261,06	263,81	1.9	.8
Increased rainfall	235,95	271,92	253,02	251,55	201,76	222,47	10.1	.07
Higher temperatures	249,24	260,76	248,06	239,20	233,20	244,19	1.8	.8
Rising sea levels	230,35	254,74	268,45	265,31	241,03	213,14	6.4	.2
Cold temperatures	221,51	276,80	256,66	264,31	205,99	204,39	17.2	.004
Extreme temperatures	264,87	248,96	237,57	219,15	283,74	274,78	7.4	.1
Hurricanes	226,08	267,88	280,07	233,59	205,33	198,00	18.7	.002
Wildlife migrating out	258,07	255,61	239,63	258,87	217,84	254,28	3.3	.6
Wildlife migrating in	220,62	265,15	274,86	257,64	208,76	228,17	14.3	.01
Animals becoming extinct	242,45	259,44	250,80	252,81	222,31	252,53	2.4	.7
Increased mosquitoes	267.02	252.63	256.91	210.29	218.49	266.72	8.4	.1
Increased storms	221.93	262.13	279.34	252.85	213.34	227.17	13.5	.01
Power outages	220.12	269.30	269.67	246.73	226.70	220.58	12.4	.03
Damage to infrastructure	216.96	277.37	266.69	247.86	201.14	229.42	19.1	.002
Food scarcity	218.51	273.03	282.48	231.49	214.63	190.67	22.4	<.001
Water scarcity	245.68	260.49	270.70	238.25	190.36	224.39	10.5	.06
Disease outbreak	249.87	260.10	242.81	258.45	239.03	207.81	3.1	.6

The analysis (Table 3) indicates that most climate-related impacts did not differ significantly across age groups (ps > .05), suggesting broadly shared perceptions across age groups. Specifically, no statistically significant differences were observed for drought, heatwaves, increased rainfall, higher temperatures, rising sea levels, extreme temperatures, wildlife migrating out, animals becoming extinct, increased mosquitoes, water scarcity, and disease outbreaks. However, statistically significant differences were observed among several variables as follows: Cold temperatures, $H(5) = 17.20$, $p = .004$, Hurricanes, $H(5) = 18.70$, $p = .002$, Wildlife migrating in, $H(5) = 14.30$, $p = .010$, Increased storms, $H(5) = 13.50$, $p = .010$, Power outages, $H(5) = 12.40$, $p = .030$, Damage to infrastructure, $H(5) = 19.10$, $p = .002$ and Food scarcity, $H(5) = 22.40$, $p < .001$. Inspection of mean ranks indicated a consistent pattern in which respondents aged 26–35 and 36–45 years reported higher perceived impacts across most significant variables, whereas respondents aged 56–65 and 65+ generally reported lower perceived impacts. Variables such as increased rainfall, $H(5) = 10.10$, $p = .070$, and water scarcity, $H(5) = 10.50$, $p = .060$, approached statistical significance. The effect size for food scarcity was moderate to large, indicating meaningful practical differences across age groups. It was also deemed necessary to scrutinise the data for possible statistically significant differences among participants

based on attachment to the community, as measured by length of stay: 1 year (n = 197), 2 years (n = 171), and ≥3 years (n = 128). The results are found on Table 4 below.

Table 4. Kruskal–Wallis H Test exploring the effect of community attachment on perceived weather and climate variation impacts on tourism

Weather and climate variability have impacted tourism in our community through …	Community attachment (in years)				
	(1 year) N1=197	(2 years) N2=171	(≥3 years) N3=128		
	Mean Rank	Mean Rank	Mean Rank	H	P
Drought	252,87	259,49	227,09	4.2	.11
Heatwaves	253.73	249.53	239.07	.87	.64
Increased rainfall	278.76	255.61	192.43	30.23	<.001
Higher temperatures	254.42	249.42	238.16	1.07	.58
Rising sea levels	253.50	264.29	219.71	8.0	.01
Cold temperatures	270.06	253.83	208.20	15.72	<.001
Extreme temperatures	269.24	241.01	226.59	8.10	.01
Hurricanes	255.63	258.74	221.70	6.53	.03
Wildlife migrating out	271.20	235.25	231.27	8.84	.01
Wildlife migrating in	265.33	248.61	222.46	7.47	.02
Animals becoming extinct	250.11	269.04	216.81	10.24	.006
Increased mosquitoes	264.76	251.91	218.92	8.56	.01
Increased storms	240.73	271.07	230.31	7.35	.02
Power outages	258.63	263.55	212.79	11.44	.003
Damage to infrastructure	263.44	265.35	202.99	18.41	<.001
Food scarcity	268.34	259.91	202.73	18.92	<.001
Water scarcity	256.90	266.34	211.74	12.38	.002
Disease outbreak	256.24	258.26	223.55	5.55	.06

Results of the Kruskal-Wallis Test (Table 4) revealed that community attachment significantly influences perceptions for several climate-related impacts, although not all variables reached statistical significance. Mean rank comparisons indicate a consistent pattern in which respondents with shorter community attachment (1–2 years) tend to report higher perceived impacts, whereas those with longer attachment (≥3 years) generally report lower perceived impacts. Statistically significant differences were found for multiple variables: Increased rainfall, $H(2) = 30.23$, $p < .001$; rising sea levels, $H(2) = 8.00$, $p = .010$; cold temperatures, $H(2) = 15.72$, $p < .001$; Extreme temperatures, $H(2) = 8.10$, $p = .010$; Hurricanes, $H(2) = 6.53$, $p = .030$; Wildlife migrating out, $H(2) = 8.84$, $p = .010$; Wildlife migrating in, $H(2) = 7.47$, $p = .020$; Animals becoming extinct, $H(2) = 10.24$, $p = .006$; Increased mosquitoes, $H(2) = 8.56$, $p = .010$; Increased storms, $H(2) = 7.35$, $p = .020$; Power outages, $H(2) = 11.44$, $p = .003$; Damage to infrastructure, $H(2) = 18.41$, $p < .001$; Food scarcity, $H(2) = 18.92$, $p < .001$; Water scarcity, $H(2) = 12.38$, $p = .002$. Inspection of mean ranks shows that respondents with 1 year and 2 years of residence consistently reported higher mean ranks compared to those with ≥3 years, particularly for high-impact variables such as increased rainfall (278.76 vs. 192.43), infrastructure damage (263.44/265.35 vs. 202.99), and food scarcity (268.34/259.91 vs. 202.73). Nonetheless, no statistically significant differences were observed for: drought, $H(2) = 4.20$, $p = .110$; heatwaves, $H(2) = 0.87$, $p = .640$; higher temperatures, $H(2) = 1.07$, $p = .580$; and disease outbreak, $H(2) = 5.55$, $p = .060$. These findings suggest that perceptions of these climate impacts are relatively uniform regardless of the length of community attachment. These results indicate that community attachment plays a significant role in shaping perceptions of climate variability impacts on tourism, with newer residents perceiving greater impacts than longer-term residents.

Discussion

The purpose of this study was to explore how respondents living in communities around tourist attractions perceive the impacts of weather and climate variability on tourism. The following insights are derived from the analysis of statistical differences in the demographic variables reported in the previous section. The findings suggest that gender does not substantially influence perceptions of how weather and climate variability affect tourism in the community. Across a wide range of environmental stressors—including drought, rainfall variability, temperature changes, and ecological disruptions—male and female respondents demonstrated broadly similar views. This consistency indicates a shared understanding of climate-related tourism impacts, which may reflect common exposure to environmental changes and their consequences within the community. The only exception was extreme temperatures, where male respondents reported significantly higher perceived impacts than females. However, the associated effect size was small ($r \approx -0.10$), suggesting that this difference, while statistically detectable, is not practically substantial. This pattern may reflect slight variations in risk perception, occupational exposure, or engagement with tourism-related activities, though further investigation would be required to substantiate these explanations. Importantly, several variables (e.g., increased rainfall and increased storms) approached statistical significance, which may indicate emerging gender-based perceptual differences that could become more pronounced under changing climatic conditions. From a policy and planning perspective, the results imply that gender-specific interventions may not be necessary for most aspects of climate-related tourism adaptation, as perceptions are largely aligned. Instead, strategies can be designed to address the community as a whole. Nonetheless,

slight differences in perceptions of extreme temperature impacts suggest that targeted communication or awareness initiatives could enhance engagement and responsiveness among different demographic groups.
The present study examined age-based differences in perceptions of how weather and climate variability impact tourism using the Kruskal-Wallis Test. Two broad patterns emerged: (1) a high degree of consensus across age groups for most climate-related impacts, and (2) statistically significant age-related differences for more immediate, disruptive, and resource-sensitive climate events. Interpreting these findings through established theoretical lenses—particularly risk perception theory and construal level theory—provides a deeper understanding of the observed patterns. The absence of statistically significant differences across most variables (e.g., drought, heatwaves, temperature increases, and sea-level rise) suggests that perceptions of climate change impacts on tourism are widely shared across age groups. This supports the growing body of literature indicating that climate change has become a normalized and widely acknowledged global risk, particularly within tourism systems (Gössling & Scott, 2018; Scott et al., 2020).

Risk perception theory

From a risk perception theory perspective, risks that are frequent, observable, and socially communicated tend to produce convergence in public perception (Slovic, 1987). Climate-related phenomena such as heatwaves and droughts are increasingly visible and widely covered in media, reducing variability in how different demographic groups interpret their impacts. Recent empirical studies similarly show minimal demographic variation in general climate awareness, particularly in tourism-dependent communities (Becken, 2023; Gómez Martín et al., 2022). Thus, the non-significant findings in this study reinforce the argument that climate change has transitioned from a contested issue to a broadly accepted environmental reality, especially in contexts where tourism livelihoods are directly affected.

Age differences and construal level theory

Despite this overall consensus, significant differences were found for variables such as cold temperatures, hurricanes, storms, infrastructure damage, power outages, wildlife migration, and food scarcity. These findings can be effectively interpreted through construal level theory (CLT) (Trope & Liberman, 2010), which posits that individuals perceive risks differently depending on their psychological distance (temporal, spatial, social, and hypothetical). Respondents aged 26–45 years consistently reported higher mean ranks, indicating stronger perceptions of climate impacts. This suggests that this group perceives climate risks as psychologically closer and more immediate, likely due to their active involvement in economic production, travel decision-making, and family responsibilities. In contrast, older respondents (56+) reported lower perceived impacts, suggesting greater psychological distancing from climate-related risks. This pattern aligns with recent studies showing that younger and middle-aged adults exhibit higher climate risk salience, particularly when risks are framed in terms of economic disruption and livelihood impacts (van Valkengoed & Steg, 2019; Whitmarsh & Capstick, 2018). CLT thus provides a useful explanatory framework for understanding why age moderates perceptions of high-impact climate events.

Salience of extreme events: A risk perception perspective

The significant variables identified—such as hurricanes, storms, and infrastructure damage—share a common characteristic: they represent high-impact, low-predictability events with immediate consequences for tourism systems. According to risk perception theory, such risks are perceived as more severe because they are catastrophic, uncontrollable, and associated with high uncertainty (Slovic, 1987). Recent tourism studies confirm that extreme weather events are among the most salient risks influencing tourist behavior and destination resilience (Scott et al., 2019; United Nations World Tourism Organization [UNWTO], 2022). These events directly disrupt accessibility, safety, and service delivery, which are critical components of tourism experiences. The higher sensitivity observed among the 26–45 age group may reflect their greater exposure to and dependence on functional tourism systems, including transportation, accommodation, and service infrastructure.

Resource scarcity and socioeconomic sensitivity

The strongest effect in this study was observed for food scarcity, followed by infrastructure damage and power outages. These findings highlight the importance of resource-based risks, which are increasingly recognized as central to climate change impacts on tourism (Becken & Scott, 2024). From a theoretical standpoint, risk perception is shaped not only by hazard characteristics but also by perceived personal relevance and economic vulnerability (van der Linden, 2015). Individuals in economically active age groups are more likely to perceive disruptions in food systems and infrastructure as direct threats to both tourism and household stability. This explains the higher mean ranks among respondents aged 26–45. Empirical studies further support this interpretation, showing that perceptions of climate risk intensify when linked to

basic needs such as food, water, and energy security (IPCC, 2022; Scott et al., 2020). In tourism contexts, these factors also influence destination competitiveness and visitor satisfaction, amplifying their perceived importance. The findings demonstrate that community attachment significantly shapes perceptions of climate variability impacts on tourism, with shorter-term residents (1–2 years) consistently reporting higher perceived impacts than long-term residents (≥3 years). This pattern provides important insights when interpreted through risk perception theory, place attachment theory, and construal level theory (CLT).

Community attachment and risk perception

From a risk perception theory perspective, individuals who are less familiar with a place tend to perceive environmental risks as more uncertain and potentially severe (Slovic, 1987). Newer residents may lack experiential knowledge of local climate patterns, leading them to interpret climate variability as more disruptive to tourism systems. In contrast, long-term residents may develop risk normalization, whereby repeated exposure to environmental variability reduces perceived severity (van der Linden, 2015). This helps explain why respondents with ≥3 years of residence consistently reported lower mean ranks across most variables.

Place attachment and environmental perception

The results strongly align with place attachment theory, which posits that individuals who have lived longer in a community develop emotional bonds, familiarity, and adaptive coping mechanisms (Lewicka, 2011). These bonds can influence how environmental changes are perceived. Long-term residents may perceive climate variability as part of the normal environmental context. They also possess adaptive knowledge of coping strategies and exhibit greater resilience and optimism bias. This may reduce their perception of climate impacts on tourism compared to newer residents, who have not yet developed such attachments or adaptive frameworks.

Psychological distance and construal level theory

Construal level theory (Trope & Liberman, 2010) provides further explanatory power. Longer-term residents may perceive climate risks as psychologically distant, even when experienced locally, due to familiarity and perceived control. Conversely, newer residents may perceive these risks as more immediate and uncertain, increasing perceived severity. This is particularly evident for high-impact variables such as increased rainfall, infrastructure damage and food and water scarcity. These are tangible and immediate risks, which tend to reduce psychological distance and amplify perceived impact, especially among less attached individuals.

Salience of resource and infrastructure impacts

The strongest effects were observed for increased rainfall, infrastructure damage, food scarcity and water scarcity. These findings are consistent with recent tourism literature emphasising that resource availability and infrastructure resilience are central to tourism sustainability under climate change (Becken, 2023; Scott et al., 2020). Newer residents may be more sensitive to these disruptions because they have not yet developed coping mechanisms or local knowledge. They rely more heavily on formal tourism infrastructure and perceive disruptions as threats to livelihood stability and destination attractiveness.

Ecological changes and environmental awareness

Significant differences in perceptions of wildlife migration and species extinction further suggest that community attachment influences environmental awareness and interpretation. While newer residents may perceive these changes as alarming disruptions, long-term residents may interpret them as part of gradual ecological shifts. This aligns with studies showing that environmental perception is shaped by both experience and socio-cultural integration within a place (Gössling & Scott, 2018).

Implications for theory and practice

This study contributes to existing theory by demonstrating that risk perception theory explains the convergence of perceptions for widely experienced climate phenomena and the heightened salience of extreme events. It has also demonstrated that construal level theory explains why age influences perceptions of psychologically proximal risks, particularly those with immediate economic and social consequences. From a practical standpoint, the results suggest that climate communication strategies should be tailored to different age groups, emphasising immediacy and personal relevance for older populations. Similarly, tourism planning should prioritise resilience to extreme events and resource disruptions, which are perceived as the most impactful. Policymakers should therefore consider demographic differences in risk perception

when designing adaptation and mitigation strategies. It is also important to highlight the new insights and contributions this study makes to the literature on tourism planning and policy, noting that risk communication strategies should differentiate between new and long-term residents. While new residents may require orientation and education on local climate patterns and adaptation strategies, long-term residents may benefit from renewed awareness campaigns to counter risk normalisation. Tourism planners should prioritise infrastructure resilience and resource management, given their perceived high impact.

Conclusion

In conclusion, while climate variability is broadly recognised as impacting tourism, age remains a significant determinant of how specific risks are perceived. The integration of risk perception theory and construal level theory provides a robust framework for understanding these differences. The findings underscore the need for context-sensitive and demographically informed approaches to climate adaptation in tourism, particularly in addressing high-impact events and resource vulnerabilities. This study demonstrates that community attachment is a critical determinant of how climate variability impacts are perceived in tourism contexts. While some climate impacts are universally recognised, newer residents consistently perceive greater vulnerability, particularly for resource-related and disruptive events. By integrating risk perception theory, place attachment theory, and construal level theory, the findings provide a nuanced understanding of how social and psychological factors shape climate risk perceptions in tourism-dependent communities.

This study adopted a quantitative approach, focusing on selected tourism-dependent communities within a specific context. Consequently, the findings cannot be generalised to other tourism destinations with different socio-economic contexts. Future research could explore these trends using larger samples, diverse tourism destinations or mixed method approaches to better understand underlying dynamics. Despite potential limitations, the findings that emerged from this study have significant implications for understanding the impacts of weather and climate variability on tourism in communities in Tanzania.

References

Acha-Anyi, P. N. (2026). The Impacts of Weather and Climate Variability on Communities in Tourism Precincts. Journal of Tourism and Leisure Studies, 10(2), 27–51. https://doi.org/10.18848/2470-9336/cgp/a51

Ballester, J., Quijal-Zamorano, M., Méndez Turrubiates, R. F., Pegenaute, F., Herrmann, F. R., Robine, J. M., Basagaña, X., Tonne, C., Antó, J. M., & Achebak, H. (2023). Heat-related mortality in Europe during the summer of 2022. *Nature Medicine, 29*(7), 1857–1866. https://doi.org/10.1038/s41591-023-02419-z

Becken, S., & Scott, D. (2024). Tourism and climate change stocktake: A call to action. *Journal of Sustainable Tourism, 32*(9), 2018–2038. https://doi.org/10.1080/09669582.2024.2390577

Bertrand, I., & Hughes, P. (2005). *Media research methods: Audiences, institutions, texts*. Palgrave Macmillan.

Camprubí, R. (2024). Residents' risk perception in developing destinations: A conceptual model. *Sustainability, 16*(8), Article 3186. https://doi.org/10.3390/su16083186

Chapungu, L., Maoela, M. A., Mashula, N., Kunene, H., & Nhamo, G. (2024). Climate change perceptions and experiences from tourists visiting popular destinations in South Africa. *Cogent Social Sciences, 10*(1), Article 2407024. https://doi.org/10.1080/23311886.2024.2407024

Cohen, J. W. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Lawrence Erlbaum Associates.

Di Gessa, G., & Zaninotto, P. (2026). Attitudes toward climate change risk among older people: New evidence from the English Longitudinal Study of Ageing. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 81*(5), Article gbag029. https://doi.org/10.1093/geronb/gbag029

Dube, K., & Nhamo, G. (2021). Climate change and tourism in Africa: Policy implications for sustainable tourism development. *Environmental Development, 39*, Article 100617. https://doi.org/10.1016/j.envdev.2021.100617

Ergun, S. J., Karadeniz, Z. D., & Rivas, M. F. (2024). Climate change risk perception in Europe: Country-level factors and gender differences. *Humanities and Social Sciences Communications, 11*, Article 1573. https://doi.org/10.1057/s41599-024-03761-4

Freihardt, J. (2024). Perceptions of environmental changes among a climate-vulnerable population from Bangladesh. *Climatic Change, 177*, Article 25. https://doi.org/10.1007/s10584-024-03678-6

George, W. (2025). Economic contributions of international tourism receipts in Tanzania: Evidence from 1990–2023. *Cogent Economics & Finance, 13*(1), Article 2541263. https://doi.org/10.1080/23322039.2025.2541263

Gössling, S., & Scott, D. (2018). The decarbonisation impasse: Global tourism leaders' views on climate change mitigation. *Journal of Sustainable Tourism, 26*(12), 2071–2086. https://doi.org/10.1080/09669582.2018.1529770

Hahn, M. B., Riederer, A. M., & Foster, S. O. (2009). The livelihood vulnerability index: A pragmatic approach to assessing risks from climate variability and change—A case study in Mozambique. *Global Environmental Change, 19*(1), 74–88. https://doi.org/10.1016/j.gloenvcha.2008.11.002

Haque, A. T. M. S., Kumar, L., & Bhullar, N. (2023). Gendered perceptions of climate change and agricultural adaptation practices: A systematic review. *Climate and Development, 15*(10), 885–902. https://doi.org/10.1080/17565529.2023.2176185

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet Planetary Health, 5*(12), e863–e873. https://doi.org/10.1016/S2542-5196(21)00278-3

Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability*. Cambridge University Press.

Intergovernmental Panel on Climate Change. (2023). *Climate change 2023: Synthesis report*. https://doi.org/10.59327/IPCC/AR6-9789291691647

Kitogo, A. S., Lovett, J., & Nkiaka, E. (2026). Multi-level analysis of climate change mainstreaming in Tanzania. *Climate Policy*. Advance online publication. https://doi.org/10.1080/14693062.2026.2648065

Lewicka, M. (2011). Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology, 31*(3), 207–230. https://doi.org/10.1016/j.jenvp.2010.10.001

Luhunga, P. M. (2025). Projected changes in climate extremes over Tanzania. Scientific Reports, 15(1), 292. https://doi.org/10.1038/s41598-024-79432-w

Ni, Q., Dong, H., Kaniadakis, A., Wang, Z., & Ge, C. (2025). Investigating older adults' response to climate change. *International Journal of Environmental Research and Public Health, 22*(2), Article 154. https://doi.org/10.3390/ijerph22020154

Phophi, M., & Kutlwano, M. (2025). Local perceptions, experiences and responses to climate variability and change in the desertification hotspot of Boteti, Botswana. *South African Geographical Journal*. https://doi.org/10.1080/03736245.2025.2534986

Poortinga, W., Demski, C., & Steentjes, K. (2023). Generational differences in climate-related beliefs, risk perceptions and emotions in the UK. *Communications Earth & Environment, 4*, Article 229. https://doi.org/10.1038/s43247-023-00870-x

Prina, M., Khan, N., Khan, S. A., Caicedo, J. C., Peycheva, A., Seo, V., Xue, S., & Sadana, R. (2024). Climate change and healthy ageing: An assessment of the impact of climate hazards on older people. *Journal of Global Health, 14*, Article 04101. https://doi.org/10.7189/jogh.14.04101

Reyes-García, V., García-Del-Amo, D., Porcuna-Ferrer, A., Schlingmann, A., Abazeri, M., Attoh, E. M. N. A. N., Ávila, J. V. D. C., Ayanlade, A., Babai, D., Benyei, P., Calvet-Mir, L., Carmona, R., Caviedes, J., Chah, J., Chakauya, R., Cuní-Sanchez, A., Fernández-Llamazares, Á., Galappaththi, E. K., Gerkey, D., ... Torrents-Ticó, M. (2024). Local studies provide a global perspective of the impacts of climate change on Indigenous Peoples and local communities. *Sustainable Earth Reviews, 7*(1), Article 1. https://doi.org/10.1186/s42055-023-00063-6

Scannell, L., & Gifford, R. (2017). The experienced psychological benefits of place attachment. *Journal of Environmental Psychology, 51*, 256–269. https://doi.org/10.1016/j.jenvp.2017.04.001

Scott, D., Gössling, S., & Hall, C. M. (2019). Global tourism vulnerability to climate change. *Annals of Tourism Research, 77*, 49–61. https://doi.org/10.1016/j.annals.2019.05.007

Scott, D., Hall, C. M., & Gössling, S. (2020). *Tourism and climate change: Impacts, adaptation and mitigation* (2nd ed.). Routledge.

Slovic, P. (1987). Perception of risk. *Science, 236*(4799), 280–285. https://doi.org/10.1126/science.3563507

Smith, G., Chowenga, M., & Karsters, J. (2024). Local knowledge matters: Understanding the decision-making processes of communities under climate change in Suriname. *Frontiers in Climate, 5*, Article 1294271. https://doi.org/10.3389/fclim.2023.1294271

Troncarelli, L. T., Ataide, M. T., & Morsello, C. (2023). Existing evidence of conceptual differences in research on climate change perceptions among smallholders: A systematic map. *Environmental Evidence, 12*, Article 28. https://doi.org/10.1186/s13750-023-00321-2

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review, 117*(2), 440–463. https://doi.org/10.1037/a0018963

United Nations Development Programme. (2022). *The state of climate ambition*. https://www.undp.org/publications/state-climate-ambition

United Nations World Tourism Organization. (2022). *Tourism and climate action report*. UNWTO.

van der Linden, S. (2015). The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. *Journal of Environmental Psychology, 41*, 112–124. https://doi.org/10.1016/j.jenvp.2014.11.012

van Valkengoed, A. M., & Steg, L. (2019). Meta-analyses of factors motivating climate change adaptation behaviour. *Nature Climate Change, 9*, 158–163. https://doi.org/10.1038/s41558-018-0371-y

Veal, A. J. (2011). *Research methods for leisure and tourism: A practical guide* (4th ed.). Prentice Hall.

Whitmarsh, L., & Capstick, S. (2018). Perceptions of climate change. In S. Clayton & C. Manning (Eds.), *Psychology and climate change: Human perceptions, impacts, and responses* (pp. 13–33). Elsevier. https://doi.org/10.1016/B978-0-12-813130-5.00002-3

Whitmarsh, L., Player, L., Jiongco, A., James, M., Williams, M., Marks, E., & Kennedy-Williams, P. (2022). Climate anxiety: What predicts it and how is it related to climate action? *Journal of Environmental Psychology, 83*, Article 101866. https://doi.org/10.1016/j.jenvp.2022.101866

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). SAGE Publications.