INTERNATIONAL JOURNAL OF HUMANITIES TECHNOLOGY AND CIVILIZATION
E-ISSN: 2600-8815
VOLUME 11, ISSUE 2, 2026, 200 - 209
DOI: https://doi.org/10.15282/ijhtc.v11i2.14674

RESEARCH ARTICLE

Anxiety and resilience as correlates of environmental migration in Owakurudu community in Ijebu-Ode, Ogun State

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Abstract: This study examined the relationships of anxiety and resilience with environmental migration in Owakurudu community, Ijebu-Ode, Ogun State, Nigeria, where recurrent flooding generates persistent displacement pressure. Guided by the Transactional Theory of Stress and Coping and Protection Motivation Theory, the study adopted a correlational survey design with 120 purposively selected residents who had directly experienced flooding. Data were collected using self-designed Anxiety and Resilience Scales (Cronbach's alpha = 0.85 and 0.88, respectively) and items measuring residents' propensity to migrate, and were analysed using descriptive statistics and Pearson Product-Moment Correlation. Respondents reported high levels of anxiety (M = 3.51), resilience (M = 3.61) and propensity to migrate (M = 3.44), all above the criterion mean of 2.50 on a 4-point scale. Anxiety showed a statistically significant moderate positive relationship with environmental migration (r = .472, p < .001, 95% confidence interval [.320, .600]), whereas resilience showed a moderate negative relationship with it (r = −.395, p < .001, 95% confidence interval [−.536, −.232]). Residents with higher flood-related anxiety therefore reported a stronger propensity to migrate, while those with stronger adaptive capacity reported a weaker one. Anxiety and resilience shared 22.3% and 15.6% of their variance with environmental migration, respectively. Because the design was cross-sectional, these relationships are associations rather than causal effects. Environmental migration is therefore linked not only to structural or economic pressures but also to emotional responses and coping capacities, which supports integrated policy interventions that combine mental health support and resilience-building with environmental and socio-economic measures.

Article History
Received : 2 May 2026
Revised : 24 September 2026
Accepted : 30 October 2026
Published : 6 November 2026

Keywords
Anxiety
Resilience
Environmental migration
Flooding
Adaptive capacity
Ogun State

1. Introduction

Environmental migration has become one of the defining challenges of the twenty-first century, particularly in regions where ecological instability directly threatens human habitation and livelihoods. Across many developing societies, the interaction between environmental stressors and human responses has intensified patterns of displacement, often blurring the line between voluntary and forced migration. In Nigeria, recurrent flooding, land degradation and climate variability have increasingly disrupted rural and peri-urban communities, compelling residents to reconsider their attachment to place. These dynamics are not merely physical or economic in nature but are deeply embedded in human perception, emotional response and adaptive capacity, making environmental migration a multidimensional phenomenon that demands interdisciplinary inquiry. Much recent discussion of migration in Nigeria has centred on international emigration, popularly termed *japa*, and its effects on the country (Oyewole et al., 2024); displacement driven by environmental hazards is a related but distinct form of mobility, and it is the focus of the present study.

The flood exposure of the study area is well documented. The Nigeria Hydrological Services Agency (NIHSA) has repeatedly placed Ogun State among the states at high risk of flooding; its 2025 Annual Flood Outlook, for instance, identified 1,249 communities in 176 local government areas across 33 states and the Federal Capital Territory, including Ogun State, as high flood-risk areas (Kolade, 2025). At the local level, the Ogun State Government in 2021 advised residents of flood-prone parts of Ijebu-Ode, together with those in Abeokuta North and South, Ifo, Obafemi Owode and Odeda, to vacate their homes temporarily ahead of forecast heavy rainfall (International Centre for Investigative Reporting, 2021). Owakurudu, a community within Ijebu-Ode Local Government Area, has experienced repeated flooding events that damage infrastructure, displace households and erode economic security, thereby intensifying migration pressures. This persistent exposure makes Owakurudu an appropriate setting in which to examine how residents respond psychologically to flood risk and how those responses relate to decisions to stay or leave.

Despite the increasing attention to environmental migration, there remains a notable gap in the literature regarding the interaction between anxiety and resilience at the community level. Much of the existing research has either emphasised macro-level drivers such as economic vulnerability or treated psychological variables in isolation. However, recent studies argue that migration decisions emerge from the interplay between emotional responses and adaptive capacities, rather than from a single determinant (Black et al., 2011; Hunter et al., 2015). In localised contexts such as Owakurudu, where environmental risks are persistent and community ties remain strong, understanding this interaction becomes particularly important for explaining why some residents migrate while others remain despite similar exposures.

This study therefore situates itself within an evolving body of scholarship that seeks to integrate environmental, psychological and social perspectives in the analysis of migration, using the theoretical framework outlined in Section 2.4. By examining how anxiety and resilience relate to environmental migration in Owakurudu community, it provides a

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nuanced understanding of how individuals interpret and respond to environmental risks. Such an approach is essential for informing policy interventions that move beyond infrastructural solutions to include mental health support and resilience-building strategies. In doing so, the study contributes to a more comprehensive framework for addressing environmental displacement in Nigeria and similar contexts, where human responses to environmental change are as critical as the physical hazards themselves.

1.1 Research Objectives and Hypotheses

The general objective of this study is to investigate the relationships of anxiety and resilience with environmental migration in Owakurudu community, Ijebu-Ode, Ogun State. The specific objectives are to:

i) determine the relationship between anxiety and environmental migration among residents of Owakurudu community; and
ii) determine the relationship between resilience and environmental migration among residents of Owakurudu community.

The following null hypotheses were tested at the .05 level of significance:

H_o1: There is no significant relationship between anxiety and environmental migration among residents of Owakurudu community.
H_o2: There is no significant relationship between resilience and environmental migration among residents of Owakurudu community.

2. Literature Review

2.1 Environmental Hazards and Migration

Scholarly discourse has long established that environmental hazards such as flooding and climate variability contribute significantly to migration patterns, particularly in vulnerable communities where livelihoods depend heavily on environmental stability (Black et al., 2011; Hunter et al., 2015). While structural factors such as poverty and inadequate infrastructure remain central, emerging research suggests that these alone cannot fully explain migration decisions. Instead, there is growing recognition that psychological responses to environmental threats play a critical role in shaping whether individuals choose to stay or relocate (Adams, 2016; Black et al., 2011).

2.2 Anxiety and Environmental Migration

Among these psychological dimensions, anxiety has been identified as a powerful driver of environmental migration. Anxiety reflects a state of heightened fear and uncertainty regarding future environmental risks, often amplified in contexts where hazards are recurrent and unpredictable (Clayton, 2020; Fernandez et al., 2015). Empirical evidence from Nigeria indicates that populations exposed to displacement and environmental stress frequently report high levels of anxiety. Among internally displaced adults in Ogoja, Cross River State, for example, the prevalence of anxiety disorder was 66.0% (Ugbe et al., 2022), while in Maiduguri, living in a displacement camp was the strongest predictor of depression, anxiety and stress (Salihu et al., 2022). Such persistent psychological distress can accelerate migration decisions, as individuals seek to escape perceived danger and regain a sense of security. In flood-prone communities, anxiety is not merely a transient emotional response but a sustained condition that shapes long-term behavioural choices, including the decision to abandon ancestral homes.

2.3 Resilience and Environmental Migration

In contrast, resilience offers an important counterbalance to anxiety by enabling individuals and communities to adapt to environmental stressors without resorting to migration. Resilience encompasses a range of capacities, including social cohesion, access to resources, local knowledge and psychological strength, all of which contribute to the ability to withstand and recover from environmental shocks (Adger et al., 2005; Folke et al., 2010; Norris et al., 2008). Studies across sub-Saharan Africa have shown that resilient communities often develop adaptive strategies such as livelihood diversification and collective support systems, which reduce the necessity of relocation (Balgah & Kimengsi, 2022; Hoffmann et al., 2022). A review of 77 empirical studies across Africa, for instance, identified place attachment, family and cultural obligations, and coping capacity built through experience as leading drivers of decisions to remain in place despite environmental stress (Balgah & Kimengsi, 2022).

2.4 Theoretical Framework

This study is anchored in two complementary theories: the Transactional Theory of Stress and Coping (Lazarus & Folkman, 1984) and Protection Motivation Theory (PMT; Rogers, 1975), as extended to climate adaptation in the Model of Private Proactive Adaptation to Climate Change (Grothmann & Patt, 2005). Together, they explain why exposure to the same environmental hazard may lead some residents to migrate and others to remain. The Transactional Theory of Stress and Coping holds that responses to a stressor depend on two cognitive appraisals. In primary appraisal, individuals evaluate whether an event, such as recurrent flooding, threatens their well-being; in secondary appraisal, they evaluate whether they possess the personal, social and material resources needed to cope with it (Lazarus & Folkman, 1984). When the threat is appraised as severe and coping resources are judged insufficient, the resulting stress is experienced as anxiety, and individuals are motivated to escape or remove the stressor. When coping resources are judged adequate, individuals are more likely to engage in problem-focused coping where they are.

PMT offers a parallel account in which protective behaviour is driven by threat appraisal (perceived severity of and vulnerability to a hazard) and coping appraisal (perceived efficacy of available responses and one's ability to carry them out) (Rogers, 1975). Applying this logic to climate hazards, Grothmann and Patt (2005) showed that these subjective appraisals, rather than objective exposure alone, determine whether people adapt to environmental risks in place or respond in other ways. Applied to the present study, anxiety is conceptualised as the affective expression of high threat appraisal, while resilience is conceptualised as the expression of strong coping appraisal and adaptive capacity. The study therefore proposes that environmental stress (recurrent flooding) raises threat appraisal and anxiety, which increases the propensity to migrate; and that the same stress, when met with strong coping appraisal and resilience, favours in-situ adaptation and decreases the propensity to migrate. Accordingly, anxiety is expected to be positively related, and resilience negatively related, to environmental migration. This framework provides the basis for the objectives and hypotheses of the study.

3. Materials and Methods

3.1 Research Design

This study adopted a correlational survey research design aimed at investigating the relationships of anxiety and resilience with environmental migration in Owakurudu community, Ijebu-Ode, Ogun State. A correlational design was deemed appropriate as it facilitated the exploration of the relationships between the psychological variables (anxiety and resilience) and environmental migration without manipulating any variables. This design aligns with the study's objective of determining the extent to which these psychological factors are associated with environmental migration in a community experiencing environmental degradation, specifically recurrent flooding.

3.2 Population, Sample and Sampling Technique

The population for this study comprised all residents of Owakurudu community, which is located within Ijebu-Ode Local Government Area of Ogun State. Owakurudu was purposively selected because of its significant exposure to environmental risks, particularly flooding. The community's experience with recurrent flooding offers a suitable context in which to investigate how psychological factors such as anxiety and resilience influence migration decisions. A purposive sampling technique was employed to select participants who could provide relevant data for the study. Participants were eligible if they (a) were residents of Owakurudu community at the time of data collection, (b) had personally experienced or been directly affected by flooding in the community, and (c) agreed to participate in the study. Because data were collected within the community, residents who had already relocated elsewhere were not included. This approach ensured that participants had first-hand knowledge of the phenomenon under investigation, thus increasing the relevance and credibility of the data collected. From the accessible population, 120 participants who met these criteria were selected, with attention to representation across age, gender and socio-economic status.

3.3 Sample Size Justification

The adequacy of the sample was evaluated through a power analysis for a two-tailed bivariate correlation (Faul et al., 2009). Assuming a medium effect size (r = .30; Cohen, 1988) and α = .05, a minimum of 84 participants is required to achieve statistical power of .80. The sample of 120 therefore exceeds this threshold and provides statistical power of approximately .92 to detect a medium correlation.

3.4 Instruments

Data were collected using a self-designed questionnaire comprising the Anxiety Scale (AS), the Resilience Scale (RS) and items measuring environmental migration. The questionnaire was structured in two sections. Section A collected demographic data, including age, gender and socio-economic status. Section B consisted of Likert-type items rated on a 4-point scale: Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD). Positive statements were scored 4, 3, 2 and 1, respectively, while negative statements were reverse-scored to ensure consistency of the responses. The Anxiety Scale (AS) included 15 items designed to measure the level of anxiety experienced by residents due to recurrent flooding and its consequences. Items in this scale addressed emotional distress, worry about future flooding and concerns regarding displacement. Similarly, the Resilience Scale (RS) consisted of 15 items designed to assess the level of resilience in the community, focusing on individuals' ability to adapt to and recover from the negative impacts of flooding, as well as their perceived coping strategies in the face of environmental stressors. Environmental migration was operationalised as residents' propensity to relocate from Owakurudu because of flooding. It was measured using self-designed Likert-type items rated on the same 4-point format, and mean item scores were computed so that higher scores indicated a stronger propensity to migrate.

3.5 Validity and Reliability of the Instruments

The validity of the instruments was ensured through expert review by scholars in psychology, environmental science and social studies, who confirmed that the content was relevant and comprehensive for measuring the constructs of anxiety, resilience and environmental migration. Furthermore, a pilot test was conducted among a sample of 30 individuals from a nearby community with similar environmental challenges. The reliability of the Anxiety and Resilience Scales was established using Cronbach's alpha, with values of 0.85 and 0.88 respectively, indicating high internal consistency.

3.6 Method of Data Analysis

The data collected were analysed using both descriptive and inferential statistics. Descriptive statistics, including frequency counts, percentages, means and standard deviations, were used to describe the demographic characteristics of the participants and to summarise their responses to the items on the scales. The Pearson Product-Moment Correlation Coefficient was used to test the two hypotheses at the .05 level of significance. To aid interpretation, 95% confidence intervals for each correlation were computed using Fisher's *z* transformation, and the coefficient of determination (r^2) was reported as a measure of effect size. To determine the general levels of anxiety, resilience and migration propensity in the community, the mean score on each measure was compared with a criterion mean of 2.50, obtained by dividing the sum of the response weights (4 + 3 + 2 + 1 = 10) by the number of response options (4). A mean of 2.50 or above was interpreted as a high level, and a mean below 2.50 as a low level; 95% confidence intervals for each mean were computed using the *t* distribution. The strength of each correlation was interpreted using Cohen's (1988) guidelines, under which coefficients of approximately .10, .30 and .50 indicate small, medium and large relationships, respectively.

4. Results and Discussion

4.1 Results

4.1.1 Descriptive findings: Levels of anxiety, resilience and migration propensity

Before the hypotheses were tested, respondents' mean scores on the three measures were examined against the criterion mean of 2.50 in order to establish the general levels of anxiety, resilience and migration propensity in Owakurudu community. The results are presented in Table 1.

Table 1

Mean scores and levels of anxiety, resilience and environmental migration among residents of Owakurudu community

Variable	*N*	*M*	*SD*	95% CI for *M*	*M* − 2.50	Remark
Anxiety	120	3.51	0.87	[3.35, 3.67]	+1.01	High
Resilience	120	3.61	0.81	[3.46, 3.76]	+1.11	High
Environmental migration	120	3.44	0.92	[3.27, 3.61]	+0.94	High

Note. *N* = number of respondents; *M* = mean; *SD* = standard deviation; CI = confidence interval. Criterion mean = 2.50 (4-point scale). A mean of 2.50 or above indicates a high level.

As shown in Table 1, the mean anxiety score ($M = 3.51$, $SD = 0.87$) exceeded the criterion mean by 1.01 points, and its 95% confidence interval [3.35, 3.67] lay entirely above 2.50. Because the Anxiety Scale covered emotional distress, worry about future flooding and concern about displacement, this result indicates that respondents, on average, agreed with statements describing these experiences. Flood-related anxiety was therefore not confined to a small group of residents but was a general feature of the sample, which is consistent with the recurrent and unpredictable nature of flooding in the community.

Resilience recorded the highest mean of the three measures ($M = 3.61$, $SD = 0.81$), exceeding the criterion mean by 1.11 points, with a 95% confidence interval of [3.46, 3.76]. Respondents generally endorsed statements about their ability to adapt to and recover from the effects of flooding and about the coping strategies available to them. This indicates that repeated exposure to flooding had not eroded residents' perceived capacity to cope; if anything, the community reported a strong sense of adaptive capacity.The mean score for environmental migration ($M = 3.44$, $SD = 0.92$) was also above the criterion mean, by 0.94 points, with a 95% confidence interval of [3.27, 3.61]. On average, therefore, respondents agreed with items expressing a propensity to relocate from Owakurudu because of flooding. This finding is notable because all respondents were still resident in the community at the time of data collection: the propensity to migrate was considerable, but it had not yet been translated into actual relocation.

A notable feature of these descriptive results is that high levels of anxiety and high levels of resilience were reported within the same sample. This suggests that, for many residents, fear of flooding and a sense of being able to cope with it coexist rather than being mutually exclusive. The standard deviations, which ranged from 0.81 to 0.92 on a 4-point scale, also show considerable variation among respondents around these high averages. It is this variation, that is, whether residents who were more anxious or more resilient than others differed in their propensity to migrate, that is examined in the tests of the hypotheses that follow.

4.1.2 Test of hypotheses

H_o1: There is no significant relationship between anxiety and environmental migration among residents of Owakurudu community.

The results in Table 2 show a moderate, positive and statistically significant relationship between anxiety and environmental migration, $r(118) = .472$, $p < .001$, 95% CI [.320, .600]. Anxiety shared 22.3% of its variance with environmental migration. As anxiety levels increased among residents of Owakurudu community, their propensity to migrate also increased. The null hypothesis was therefore rejected, indicating that anxiety is significantly related to environmental migration in the community.

In terms of magnitude, the coefficient of .472 falls within the medium range according to Cohen's (1988) guidelines and approaches the threshold for a large relationship (.50). The 95% confidence interval indicates that the population

correlation plausibly lies between .320 and .600. Because the interval excludes zero, the association is unlikely to be attributable to chance; and because even its lower limit exceeds .30, the data are consistent with a relationship of at least medium strength. The coefficient of determination shows that 22.3% of the variation in migration propensity was shared with anxiety, while the remaining 77.7% was associated with other factors not measured in this study, such as household income, housing tenure and the extent of flood damage. Read together with the descriptive findings, this result indicates that, within a sample that was generally anxious about flooding, residents who reported the most emotional distress, the greatest worry about future floods and the strongest concern about displacement were also those most inclined to relocate. Conversely, residents whose anxiety was comparatively lower expressed a weaker inclination to leave the community.

Table 2

Pearson product-moment correlation between anxiety and environmental migration in Owakurudu community

Variable	*N*	*M*	*SD*	*df*	*r*	95% CI	r^2	*p*
Anxiety	120	3.51	0.87	118	.472*	[.320, .600]	.223	< .001
Environmental migration	120	3.44	0.92					

Note. *N* = number of respondents; *M* = mean; *SD* = standard deviation; *df* = degrees of freedom; CI = confidence interval (Fisher's *z* transformation); r^2 = coefficient of determination. *$p < .05$.

H_o2: There is no significant relationship between resilience and environmental migration among residents of Owakurudu community.

The results in Table 3 show a moderate, negative and statistically significant relationship between resilience and environmental migration, $r(118) = -.395$, $p < .001$, 95% CI [−.536, −.232]. Resilience shared 15.6% of its variance with environmental migration. As the resilience of residents of Owakurudu community increased, their propensity to migrate decreased. The null hypothesis was therefore rejected, indicating that individuals who exhibit greater resilience are less inclined to migrate because of environmental factors. The coefficient of −.395 represents a relationship of medium strength according to Cohen's (1988) guidelines. The 95% confidence interval [−.536, −.232] excludes zero, confirming that the negative association is unlikely to be due to chance, and indicates that the population correlation may range from a relationship somewhat below medium strength to one of large magnitude. The coefficient of determination shows that resilience shared 15.6% of its variance with migration propensity, leaving 84.4% associated with other factors.

Although resilience was high on average, residents who reported the strongest capacity to adapt to and recover from flooding, and the greatest confidence in their coping strategies, expressed the weakest propensity to migrate. This suggests that resilience is associated not only with how residents manage the aftermath of flooding but also with their inclination to remain in the community rather than leave it.

Table 3

Pearson product-moment correlation between resilience and environmental migration in Owakurudu community

Variable	*N*	*M*	*SD*	*df*	*r*	95% CI	r^2	*p*
Resilience	120	3.61	0.81	118	−.395*	[−.536, −.232]	.156	< .001
Environmental migration	120	3.44	0.92					

Note. *N* = number of respondents; *M* = mean; *SD* = standard deviation; *df* = degrees of freedom; CI = confidence interval (Fisher's *z* transformation); r^2 = coefficient of determination. *$p < .05$.

4.1.3 Comparison of the two relationships

The two relationships were similar in strength but opposite in direction. The correlation between anxiety and migration propensity ($r = .472$) was somewhat larger in absolute value than that between resilience and migration propensity ($r = -.395$), and anxiety shared 6.7 percentage points more variance with migration propensity (22.3% compared with 15.6%). The two confidence intervals overlap considerably, however, and because the correlation between anxiety and resilience was not part of the analysis, the difference between the two coefficients was not tested formally. The comparison should therefore be regarded as descriptive. Taken together, the pattern indicates that residents' propensity to migrate rose with their anxiety about flooding and fell with their resilience to it.

4.1.4 Summary of findings

The results of the hypothesis tests are summarised in Table 4. The major findings of the study are as follows. First, residents of Owakurudu community reported high levels of flood-related anxiety, high levels of resilience and a high propensity to migrate, with all three means well above the criterion mean of 2.50. Second, anxiety was positively and significantly related to environmental migration, with a relationship of medium strength that approached the large range, so that residents with higher anxiety reported a stronger propensity to migrate. Third, resilience was negatively and significantly related to environmental migration, with a relationship of medium strength, so that residents with higher resilience reported a weaker propensity to migrate. Fourth, anxiety and resilience shared 22.3% and 15.6% of their variance with migration propensity, respectively, indicating that each accounted for a meaningful but partial share of the variation in residents' inclination to relocate.

Table 4

Summary of hypothesis testing

Hypothesis	*r*	95% CI	r^2	Direction and strength	Decision
H_o1: Anxiety and environmental migration	.472*	[.320, .600]	.223	Positive, medium	Rejected
H_o2: Resilience and environmental migration	−.395*	[−.536, −.232]	.156	Negative, medium	Rejected

Note. $N = 120$; $df = 118$. CI = confidence interval; r^2 = coefficient of determination. Strength interpreted using Cohen's (1988) guidelines. *$p < .001$.

4.2 Discussion

The findings of this study provide evidence on the role of psychological factors in environmental migration within Owakurudu community. The observed relationships between anxiety, resilience and migration propensity reflect an interplay between emotional responses and adaptive capacities in contexts of environmental stress. The discussion below is organised around the two hypotheses and interprets each finding in relation to previous research, the theoretical framework of the study, the Nigerian context and possible alternative explanations. Because the design is correlational, the findings are discussed as associations rather than causal effects.

4.2.1 Levels of anxiety, resilience and migration propensity

The descriptive findings showed that residents reported high levels of anxiety, resilience and migration propensity. The high level of anxiety is consistent with evidence that flooding is associated with a range of adverse mental health outcomes, including anxiety (Fernandez et al., 2015), and with Nigerian studies reporting a high prevalence of anxiety among populations exposed to displacement (Salihu et al., 2022; Ugbe et al., 2022). The high level of resilience is consistent with the view that coping capacity can be built through repeated experience of hazards, together with social ties and local knowledge (Balgah & Kimengsi, 2022; Norris et al., 2008).

The coexistence of high anxiety and high resilience within the same sample is theoretically meaningful. Within the Transactional Theory of Stress and Coping, primary appraisal of a threat and secondary appraisal of coping resources are distinct evaluations (Lazarus & Folkman, 1984), so a resident may appraise flooding as highly threatening while also judging that he or she has the resources to manage it. The high mean propensity to migrate among residents who had not yet relocated also points to a gap between the inclination to leave and actual relocation. Such a gap may reflect the financial, social and informational resources that migration requires, which the literature on trapped populations identifies as a key constraint on mobility (Black et al., 2011; Foresight, 2011). Because all three measures were self-reported, these levels should nevertheless be interpreted with some caution.

4.2.2 Anxiety and environmental migration

The first hypothesis revealed a moderate positive relationship between anxiety and environmental migration, indicating that residents who reported higher anxiety about recurrent flooding also reported a stronger propensity to relocate. This finding is consistent with research showing that psychological distress intensifies individuals' perception of environmental threats and motivates protective responses, including relocation (Clayton, 2020; Grothmann & Patt, 2005). It also mirrors evidence from Nigeria, where anxiety is highly prevalent among populations exposed to displacement and is linked to insecurity, loss of livelihoods and uncertainty about the future (Salihu et al., 2022; Ugbe et al., 2022).

Theoretically, the finding supports the threat-appraisal pathway proposed in the framework of this study. Within the Transactional Theory of Stress and Coping, anxiety reflects a primary appraisal of flooding as threatening, which motivates efforts to escape the stressor when it is perceived as uncontrollable (Lazarus & Folkman, 1984). In PMT terms, high perceived severity and vulnerability heighten protection motivation, and relocation becomes a salient protective option (Grothmann & Patt, 2005; Rogers, 1975). In the Ogun State context, where official flood warnings have urged residents of flood-prone parts of Ijebu-Ode to leave their homes temporarily (International Centre for Investigative Reporting, 2021), such threat appraisals are likely to be reinforced by risk communication.

The finding should nevertheless be read alongside contrasting evidence. Not all studies find that environmental distress translates into mobility. Research on "trapped populations" shows that households under severe environmental stress may be unable to move, because migration requires financial, social and informational resources that the most affected often lack (Black et al., 2011; Foresight, 2011). Similarly, strong place attachment can sustain decisions to stay even under considerable perceived risk (Adams, 2016). The positive association observed in Owakurudu may therefore reflect a population for whom relocation within or near Ijebu-Ode remains feasible. Alternative explanations should also be considered: because the data are cross-sectional, residents who had already decided to leave may report heightened anxiety as a consequence rather than a cause of that decision, and unmeasured factors such as the extent of flood damage, household income or housing tenure may influence both variables.

4.2.3 Resilience and environmental migration

The second hypothesis revealed a moderate negative relationship between resilience and environmental migration, indicating that residents with higher resilience were less inclined to relocate. This suggests that resilience functions as a

stabilising force that enables people to remain in place despite environmental challenges. The finding is consistent with conceptualisations of resilience as the capacity to absorb shocks, reorganise and sustain livelihoods under adverse conditions (Folke et al., 2010; Norris et al., 2008), and with African evidence showing that coping capacity developed through experience, together with social ties and place-based obligations, supports decisions to remain in place (Balgah & Kimengsi, 2022; Hoffmann et al., 2022). Theoretically, the finding supports the coping-appraisal pathway: residents who perceive that they possess the resources and skills to manage flooding appraise in-situ adaptation as feasible and effective, which reduces the motivation to relocate (Grothmann & Patt, 2005; Lazarus & Folkman, 1984). In Owakurudu, where community ties are strong, resilience is likely to operate through mutual support networks, shared local knowledge and livelihood diversification, which have been identified as key sources of community resilience (Norris et al., 2008; Olcese et al., 2024).

However, the literature does not uniformly treat resilience and migration as opposites. A growing body of scholarship views migration itself as an adaptation strategy that can strengthen household resilience, for example through remittances and translocal livelihoods (Black et al., 2011; Sakdapolrak et al., 2024). From this perspective, greater resources may enable rather than prevent mobility. The negative relationship observed in this study suggests that, in Owakurudu, resilience is expressed primarily through in-situ adaptation rather than planned migration, but this interpretation may not hold in settings where migration is an established livelihood strategy. It is also possible that residents who intend to stay rate their coping capacity more favourably in order to justify that decision, an alternative explanation that longitudinal designs could test.

4.2.4 Integrating the two findings

Taken together, the two findings are consistent with the dual-appraisal logic of the theoretical framework: anxiety, reflecting threat appraisal, was positively related to migration propensity, while resilience, reflecting coping appraisal, was negatively related to it (Grothmann & Patt, 2005; Lazarus & Folkman, 1984). This pattern accords with broader migration research emphasising that environmental migration arises from the interplay of perceived risk and available coping resources (Black et al., 2011; Hunter et al., 2015), and with cross-national evidence that self-reported exposure to environmental stress raises migration intentions, with the strongest effects in low- and middle-income countries in Africa and Latin America (Bekaert et al., 2021). The present study examined each relationship separately; whether anxiety and resilience contribute uniquely to migration propensity when considered together, and whether resilience buffers the association between anxiety and migration, remain important questions for future research using multivariate models.

From a practical perspective, these results suggest that addressing environmental migration requires more than infrastructural or economic interventions. The association between anxiety and migration propensity points to the need for targeted mental health support in environmentally vulnerable communities, including counselling services and stress management initiatives. At the same time, efforts to strengthen resilience through community-based adaptation, livelihood diversification and social support systems are essential for reducing migration pressures, since such capacities enable affected populations to cope with environmental risks without displacement (Balgah & Kimengsi, 2022; Hoffmann et al., 2022).

In conceptual terms, this study advances the understanding of environmental migration by demonstrating that psychological and adaptive factors are not peripheral but central to migration outcomes. Anxiety and resilience operate in opposite directions yet are deeply interconnected, shaping how individuals interpret environmental threats and evaluate their options. The Owakurudu case illustrates that migration is neither an automatic response to environmental hazards nor solely determined by material conditions. Rather, it reflects a complex negotiation between fear, capacity and the perceived feasibility of staying or leaving.

4.3 Limitations of the Study

Several methodological constraints should be considered when interpreting these findings. First, the sample size (N = 120) was adequate to detect medium-sized correlations but limits the precision of the estimates, as reflected in the width of the confidence intervals, and the power to detect small effects. In addition, participants were selected purposively from a single community, so the findings cannot be statistically generalised to all residents of Ijebu-Ode, to Ogun State or to other flood-affected communities in Nigeria.

Second, all variables were measured through self-reported survey instruments. Such measures are susceptible to social desirability, recall bias and common method variance, which may have inflated the observed relationships among anxiety, resilience and environmental migration. The instruments were also self-designed; although their content was reviewed by experts and the Anxiety and Resilience Scales showed high internal consistency, their factor structure was not confirmed through factor analysis, and a separate reliability coefficient for the environmental migration items is not reported. In addition, formal diagnostic statistics for the correlation analyses (such as tests of normality and linearity) are not reported, so the results should be interpreted with appropriate caution.

Third, the cross-sectional scope of the study captured participants' responses at a single point in time. It therefore does not permit causal inference, cannot establish the temporal ordering of anxiety, resilience and migration decisions, and cannot track how these variables change across successive flood seasons. The analysis was also limited to bivariate relationships, so the joint and unique contributions of anxiety and resilience, and the possible influence of confounding variables such as income, housing tenure and the extent of flood damage, were not examined. Finally, because only current residents were sampled, the dependent variable reflects migration propensity rather than actual migration behaviour, and residents who had already relocated are not represented. Future studies should address these constraints

by using larger, multi-community probability samples, standardised and validated instruments, multivariate and longitudinal designs, and multi-method data, including interviews and records of actual relocation.

5. Conclusions

This study provides important insight into the psychological and adaptive factors associated with environmental migration in Owakurudu community. The findings demonstrate that anxiety and resilience are significantly related to residents' propensity to migrate in the face of environmental stressors such as recurrent flooding. Descriptive results further showed that residents reported high levels of anxiety, resilience and propensity to migrate, and that high anxiety and high resilience coexisted within the community. Higher levels of anxiety were associated with a stronger propensity to migrate, as individuals seek safety and stability, while stronger resilience was associated with a weaker propensity to migrate, consistent with the capacity to cope with and adapt to environmental challenges. These results indicate that migration decisions are linked to both emotional responses and adaptive capacity, and they underscore the need for interventions that address both psychological well-being and community resilience, including mental health support, improved access to resources and strengthened local adaptation strategies. At the same time, migration outcomes cannot be fully understood without considering broader economic, social and political influences, which suggests the importance of a more integrated approach in future research and policy development aimed at managing environmental migration effectively.

5.1 Recommendations

The recommendations arising from this study call for a careful integration of psychological support, environmental management and community-based adaptation strategies. First, there is a clear need to institutionalise community-oriented mental health interventions within environmentally vulnerable areas such as Owakurudu. The Ogun State Ministry of Health, working through the Ogun State Primary Health Care Development Board and the health department of Ijebu-Ode Local Government, should develop structured programmes that address flood-related anxiety through counselling services, psychoeducation and stress management initiatives, in collaboration with non-governmental organisations. Such interventions should not be episodic but embedded within primary healthcare systems to ensure continuity and accessibility, given the persistent nature of environmental stressors.

Second, strengthening resilience must be approached as a long-term developmental priority rather than a reactive measure. This requires deliberate investment in livelihood diversification, access to credit facilities and skill acquisition programmes that reduce economic vulnerability. In addition, the Ogun State Ministry of Environment and Ijebu-Ode Local Government should prioritise infrastructural improvements such as effective drainage systems, flood control mechanisms and climate-resilient housing, which are essential in enhancing the community's capacity to withstand environmental shocks. Equally important is the reinforcement of social capital through the promotion of cooperative societies, local leadership structures and community networks that can provide mutual support during periods of environmental stress.

Third, there is a pressing need to deepen environmental awareness and knowledge at the grassroots level. The Ogun State Emergency Management Agency (OGSEMA), working with traditional and community leaders, schools and local media, should equip residents with practical information on climate change, flood preparedness and locally appropriate adaptation strategies. When individuals possess a clearer understanding of environmental risks and available coping options, they are more likely to engage in proactive adaptation rather than resorting to migration as a default response. Such awareness programmes should be culturally grounded and delivered in accessible languages and channels.

Fourth, at the policy level, OGSEMA and the National Emergency Management Agency (NEMA) should adopt an integrated framework that recognises the intersection between environmental risk, mental health and migration. Disaster management policies should incorporate psychosocial support services alongside physical relief measures, ensuring that the emotional consequences of environmental hazards are addressed alongside material losses. Flood forecasts issued in the NIHSA Annual Flood Outlook should be translated into timely, community-level early warnings, and policy efforts should prioritise land-use regulation and sustainable urban planning to reduce exposure to recurrent flooding. These measures should be supported by adequate funding and effective monitoring mechanisms to ensure their sustainability and impact.

Finally, future research should extend beyond the present scope by incorporating additional variables such as socio-economic status, governance structures and attachment to place, which may further illuminate migration behaviour. Multivariate models, such as multiple regression and moderation analyses, should be used to test whether anxiety and resilience contribute uniquely to migration propensity and whether resilience buffers the association between anxiety and migration. Longitudinal studies are particularly necessary to capture the evolving nature of anxiety and resilience over time in response to repeated environmental events. Such scholarly efforts will contribute to a more comprehensive understanding of environmental migration and support the development of evidence-based interventions that are responsive to both the psychological and structural realities of affected communities.

Acknowledgements

The authors gratefully acknowledge the support and resources provided by the University of Ibadan. They also sincerely thank the residents of the Owakurudu community, Ijebu-Ode, Ogun State, for their cooperation, time, and valuable contributions during data collection, as well as all those who facilitated access to the community and supported the fieldwork.

Funding
This study was not supported by any grants from funding bodies in the public, private, or not-for-profit sectors.

Declaration of Competing Interests
The authors declare no conflicts of interest.

CRediT Authorship Contribution Statement
O. Oyewole: Conceptualisation; Methodology; Validation; Formal analysis; Investigation; Data curation; Writing – original draft; Writing – review & editing; Project administration.
S.O. Fabode: Conceptualisation; Methodology; Validation; Formal analysis; Investigation; Data curation; Writing – original draft; Writing – review & editing; Project administration.

Data Availability Statement
The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics Declaration
The study was conducted in accordance with the Declaration of Helsinki (2013 revision). Appropriate approval was obtained from the relevant authorities before the commencement of the research, and the study adhered to the approved protocol. Participation was voluntary, and informed consent was obtained from all participants before data collection.

Generative AI Disclosure
Artificial intelligence tools (Claude Opus 5.5, Anthropic) were used solely to format the manuscript into the journal's required template, including arranging the sections in the prescribed order, shortening the abstract to the 250-word limit and preparing the standard declaration statements from the authors' instructions. No AI tool was used to generate research content, analyse data or interpret findings. All AI-assisted output was reviewed and verified by the authors, who take full responsibility for the content of this manuscript.

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