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Urban Flooding, Road Connectivity and Tourism Resilience in a Tourism-Aspiring Nigerian Capital: Evidence from Ado-Ekiti, Southwestern Nigeria

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Abstract: This study examined how residents of flood-affected neighbourhoods in Ado-Ekiti, Nigeria, explain, experience, and cost flooding and how they adapt; reviewed dated documentary evidence of flood-related disruption to the road network; and assessed what the evidence implies for access to hospitality and tourism services and for tourism resilience in a tourism-aspiring capital city. An exploratory secondary reanalysis of a published cross-sectional questionnaire survey of five neighbourhoods (n = 195 of 200 questionnaires distributed) was triangulated with a targeted documentary review covering 2019–2026. Percentages were recomputed from reported frequencies, with Wilson 95% confidence intervals treated as nominal because the sample is not demonstrably random; no new primary data, GIS, hydrological, transport-network, or inferential modelling were used. Respondents most often named absent drainage (28.2%) and drains blocked with waste (24.6%) as the main cause of flooding; climate change was named by 9.2%. All respondents reported flooding in the previous five years, and 59.5% reported frequent flooding. Property loss was rated high or very high by 71.3%, 88.7% reported disruption of socio-economic activity, and 78.5% judged recovery costly or very costly. Building modification was frequent (68.7%), yet 54.4% received relief rarely or never. Documentary sources record repeated flooding at the Ureje, Elemi, and Afao crossings, including a bridge collapse reported on 30 September 2026. The spatial finding is confounded by sampling design, and several source tables are internally inconsistent. Flooding is perceived as frequent, costly, and drainage-driven, with household adaptation outpacing perceived institutional support. Because the survey contains no tourism items, effects on tourism are framed as exposure, risk, and testable propositions within a Flood–Access–Service Resilience framework, not as demonstrated impacts. Existing channel works should be evaluated before extension, and georeferenced, enterprise-level data are needed.

Keywords: *Urban Flooding; Tourism Resilience; Hospitality; Destination Resilience; Transport Accessibility; Flood Risk Governance; Climate Adaptation; Ado-Ekiti; Nigeria.*

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I. INTRODUCTION

➢ *Background*

Flooding is among the most frequently experienced natural hazards worldwide, and its consequences in African cities are shaped as much by drainage, land use and governance as by rainfall (Douglas et al., 2008). Douglas et al. (2008) distinguish four urban flood types (localised flooding from inadequate drainage, flooding from small streams within built-up areas, flooding from major rivers, and coastal flooding) and argue that increased storm intensity linked to climate change interacts with local factors such as occupation of floodplains, with the urban poor bearing a disproportionate burden. Most African urban flood

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scholarship concentrates on large metropolitan or coastal cities, particularly Lagos (Adeloye & Rustum, 2011). Inland secondary cities, which combine administrative functions, rapid growth, and weak infrastructure, are less studied, and flooding in them is typically flash-type rather than coastal.

Ado-Ekiti, the capital of Ekiti State, is such a city. The Ekiti State Government reports a 2006 census population of 308,621 for Ado Local Government Area, the most populous in the state (Ekiti State Government, n.d.-a); other compilations of the same census list 313,690, and official projections place the state population above four million by 2023 (Ekiti State Bureau of Statistics, 2023). Flooding in the city is documented in scholarship and in the press. Aladelokun and Ajayi (2014) and Aladelokun (2018) describe flooding as a leading environmental challenge in the metropolis, with property damage prominent and more people affected and displaced than by other disasters, although floods are not the leading cause of death.

Ado-Ekiti is also a city with visitor-economy ambitions. It is an administrative and educational centre, and the state government's listing of the city places several hospitality establishments in neighbourhoods analysed in this study, including Ajilosun, Opopogboro and the Afao Road corridor (Ekiti State Government, n.d.-b). That listing is undated and does not show that any given premises flood; it is cited only to indicate that hospitality assets and flood-affected neighbourhoods overlap spatially, and that the overlap deserves measurement.

Two gaps motivate this paper. First, urban-flood studies typically measure household losses, whereas the tourism and hospitality literature on disasters focuses on destinations, events and organisational response (Ritchie, 2004; Ritchie & Jiang, 2019). Existing work on Ado-Ekiti treats tourism and hospitality as an implication rather than a measured outcome: the survey analysed here contains no item on visitors, hotels or attractions. Second, the transport dimension is largely absent. Between household losses and destination outcomes lies a connective tissue that matters for a city such as Ado-Ekiti: the roads, bridges and drains that let residents, workers, customers and visitors reach services. If flooding repeatedly severs these links, its effects on commerce, hospitality and any visitor economy are plausibly mediated by access, not only by direct damage to premises, and recent events show that the failure of a single bridge can sever arterial movement. Whether this holds in Ado-Ekiti has not, to our knowledge, been examined empirically.

II. RELATED LITERATURE

- *Urban Flooding in African and Nigerian Cities*

Douglas et al. (2008) attribute worsening urban flooding in Africa to intensifying storms combined with local drivers, and emphasise that the poor are more often victims than contributors to environmental change. Work on Lagos links flooding to urban planning and drainage (Adeloye & Rustum, 2011). The Ado-Ekiti studies rely on surveys and simple statistics, and recommend controlling building on flood-prone land, demolishing illegal structures, and improving drainage (Aladelokun, 2018). A consistent weakness is the use of perception surveys with small or unclear samples to infer cause; perceived cause shows how residents understand risk, not hydrological causation.

- *Health and Livelihood Impacts*

A systematic review of epidemiological studies (2004–2011) found that flood health effects depend on flood characteristics and vulnerability, that long-term effects are poorly understood, that disease-outbreak risk rises where hygiene is poor and populations are displaced, and that psychological distress among survivors can be substantial (Alderman et al., 2012). A later review for sub-Saharan Africa found mental health, non-communicable disease and pregnancy outcomes understudied (Suhr & Steinert, 2022). Respondents' ratings of disease or mortality in the present data are therefore perceptions, not measured burdens.

- *Vulnerability, Resilience and Place*

Adger (2006) frames vulnerability as a function of exposure, sensitivity and adaptive capacity within social-ecological systems. Cutter et al. (2008) propose the disaster resilience of place (DROP) model linking antecedent conditions, event characteristics, and inherent and adaptive resilience at community scale. Two ideas are retained: resilience is place-based, so neighbourhood and node-level analysis is appropriate, and adaptive capacity depends on institutions as well as households.

- *Tourism and Disaster*

Ritchie and Jiang (2019) reviewed 142 papers on tourism risk, crisis and disaster management published between 1960 and 2018. Aliperti et al. (2019) argue for dialogue between tourism and disaster-risk research communities; Ritchie (2004) proposed a strategic framework for crisis management in tourism, and Mair et al. (2016) outlined a research agenda for post-disaster recovery in destinations. This work explains why destinations need disaster planning; it does not show how recurrent, low-magnitude urban floods in a secondary city affect service continuity. Tourism is therefore treated here as a downstream outcome to be tested, not assumed.

- *Transport Geography*

Transport geography treats networks as nodes and links whose failure has spatially uneven consequences. We apply this logic descriptively: a bridge on a primary route is a critical link whose failure isolates places regardless of local rainfall. We did not locate Ado-Ekiti-specific network or accessibility studies in our searches; this is reported as an evidence gap, not as a finding about the literature as a whole.

- *Conceptual Framework: Flood–Access–Service Resilience (FASR)*

Synthesising the above, the framework has four linked components: (i) hazard generation, in which rainfall acts as a trigger and runoff is amplified by drainage deficits, waste blockage, impervious surfaces and encroachment on watercourses; (ii) exposure geography, concentrated in low-lying neighbourhoods, along channels and at crossings, where housing, businesses and hospitality assets may be located;

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(iii) functional disruption, where damage to property and livelihoods is accompanied by loss of access to work, markets, schools and services, and whose severity depends on the *connectivity criticality* of the flooded locations, that is, the extent to which they carry arterial or institutional traffic without alternative routes (this is the channel through which hospitality and tourism are plausibly affected); and (iv) adaptive and institutional response, in which household adaptation, public works, relief and planning enforcement shape recovery and feed back on hazard generation. In a compact capital, floods act through nodes: when a bridge or culvert fails, consequences extend beyond the flooded neighbourhood to every trip that depends on it, including trips by visitors, students, traders and emergency services. Household surveys cannot capture this. The propositions in Table 1 are hypotheses organised by a conceptual argument; no causal inference is drawn.

Table 1 Propositions Derived from the FASR Framework and their Evidence Status

#	Proposition	Evidence in this paper	Status
P1	Residents attribute flooding mainly to proximate infrastructure, waste, and land-use factors, with climate seen as a background trigger.	Survey causes (Table 3); government statements (Table 9)	Supported as perception only
P2	Exposure is spatially concentrated in particular neighbourhoods and at river crossings.	Survey nominations (Table 4); events at Ureje, Elemi, Afao (Table 9)	Partially supported; survey design confounds
P3	Impacts extend beyond property to loss of access and service continuity, and are greater where flooded locations coincide with high-criticality network nodes.	88.7% report disruption (Table 6); documented bridge overtopping and collapse (Table 9)	Partially supported; access not measured directly
P4	Household adaptation substitutes for, rather than complements, institutional provision where relief is perceived as infrequent, producing a trust gap.	Building modification 68.7%; relief rarely or never 54.4% (Table 7)	Partially supported; items ambiguous, cost not measured
P5	Effects on hospitality and tourism are mediated by access and service continuity, so that visitor-facing businesses on flood-prone arterials report greater interruption than those on less exposed routes.	None collected	Untested

P = Proposition. Status Refers to the Strength of Evidence Presented in this Paper; None of the Propositions is Tested Inferentially.

➢ *Objectives*

The objectives are (a) to compare residents' perceived causes of flooding with documentary accounts; (b) to describe flood experience and cost across the surveyed neighbourhoods and state what can and cannot be concluded about spatial vulnerability; (c) to describe reported functional disruption, household adaptation, institutional support and the measures residents endorse; (d) to assess what dated documentary evidence for 2019–2026 indicates about road-network criticality; and (e) to specify the framework and data needed to assess implications for hospitality and tourism. The paper contributes a transparent reanalysis and audit of a Nigerian neighbourhood flood survey, a dated record of flood-related access disruption in Ado-Ekiti, and the FASR framework with testable propositions. It does not claim to have measured tourism or hospitality outcomes.

III. MATERIALS AND METHODS

➢ *Research Design*

The source study reports a descriptive cross-sectional questionnaire survey and states that interviews were also conducted, but reports no interview data or protocol. Respondent-level data were not available, so a new empirical study was not possible. The most defensible design was an exploratory secondary reanalysis of published tabulations, combined with documentary triangulation. This permits transparent recomputation and auditing of the survey results, and a dated record of events from independent sources, without claims about tourism, GIS or causal mechanisms that the data cannot support.

➢ *Study Area*

Ado-Ekiti lies in the humid tropical southwest of Nigeria at roughly 7.6° N, 5.2° E and is the administrative capital of Ekiti State. The source reports a wet season of seven to eight months and annual rainfall of 2,000–3,000 mm. We could not corroborate this rainfall figure: the 2026 Southwest Climate Outlook derived from NiMet's seasonal prediction lists a normal annual range of 1,610–1,772 mm for Ekiti (Development Agenda for Western Nigeria [DAWN] Commission, 2026), and a secondary compilation of 1970–2000 climate normals reports about 1,363 mm (Population Review, n.d.). These figures differ in scope and period, and none is a station series, so rainfall is not characterised quantitatively here; it should be reconciled with NiMet station records. The source also gives an area of 18 km² and a density of 95.8 persons/km² for Ado-Ekiti; these imply about 1,700 residents and are incompatible with a census population in the hundreds of thousands, so they are not used (Table S1). The state government publishes a listing of tourist and historical places in the city and identifies the Ewi's palace as a place of prime importance (Ekiti State Government, n.d.-c); we take this as evidence of an aspiration to a visitor economy, not as evidence of its size. Other heritage claims in the source were not verified and are not used.

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➢ *Survey Evidence Reanalysed*

The source reports that 200 questionnaires were distributed to residents of five neighbourhoods (Ajilosun, Olorunda, Opopogboro, Adehun and Olorunsogo) and 195 were analysed (97.5%), using simple random sampling from a population stated as about 497,000 (a United Nations projection, no source cited). The self-structured questionnaire had five sections: demographics; perceived causes of flooding; effects of flooding; human adjustment; and measures for preventing flooding. Effects were rated on a five-point scale (not at all, low, moderate, high, very high); other items were categorical or yes/no. The source does not describe a sampling frame, selection procedure, allocation across neighbourhoods, instrument validation, pilot testing or ethics approval, and its tables cite fieldwork years of both 2024 and 2025. Moreover, no respondent reported never having experienced flooding, and the sample is 61.5% male and 56.4% tertiary-educated. The data are therefore treated as a non-probability sample of flood-affected residents of five pre-selected neighbourhoods, not as a representative sample of Ado-Ekiti. Confidence intervals are presented only as nominal indicators of precision, not as design-based inference, and no prevalence estimate for the city is claimed.

➢ *Analytical Procedures*

- Extraction of all tables from the source and recomputation of percentages from reported frequencies. Where reported percentages or totals did not match the counts, the count-derived value is reported and the discrepancy is listed in Table S1.
- Internal-consistency checks of totals, percentages and text against tables.
- Wilson 95% confidence intervals for proportions; for ordinal impact items, the mean score (1 = not at all to 5 = very high) and the share rating the impact high or very high, used descriptively only.
- Grouping of causes into infrastructure and waste, land use and planning, and climate.

No GIS analysis, hydrological modelling, regression, spatial statistics or accessibility modelling was performed, and no interviews, fieldwork or new surveys were conducted by the authors. The semi-structured interviews described in the source are not used because no interview data were available.

➢ *Documentary review*

Targeted web searches were run on 23 October 2026 using combinations of Ado-Ekiti, flood, neighbourhood names, bridge names, NiMet, NEMA and relief. The search was purposive, not systematic, and is not a PRISMA-style review. Inclusion criteria were reports of flooding or flood policy in Ado-Ekiti or Ekiti State from official bodies or established news organisations with an identifiable publication date, and official climate outlooks. Items were excluded if undated, duplicated, aggregator summaries without a source, or not about Ado-Ekiti. For each item, the report date and, where stated, the event date were recorded, because the two differ. Press content is used only as evidence that an event was reported, not as a measurement of magnitude; statements by government agencies are labelled as official claims; and casualty claims are not repeated unless stated by an official body. Bibliographic details of cited items were checked against publisher, index, official, or news pages; references in the source manuscript that could not be verified were excluded. The absence of a report is not evidence that no event occurred.

➢ *Validity and Bias*

Principal threats to validity are sampling bias, self-report and recall bias, single-source perception data, ordinal items treated as continuous, and the absence of biophysical measurements. The paper uses aggregated tables and public documents only; ethical and consent details for the original survey are given in the declarations.

IV. RESULTS AND DISCUSSION

➢ *Sample Characteristics and Design Implications*

Table 2 presents the profile of the 195 respondents. The sample is more highly educated (56.4% tertiary) and more male (61.5%) than would be expected of a random sample of residents, which suggests selection effects. Because the five neighbourhoods were pre-selected, the survey cannot establish which parts of the city are most flood-prone relative to others; it can only describe experience within places chosen because flooding was expected. Long residence (50.8% for more than ten years) supports the credibility of recall but does not remove recall or perception bias.

Table 2 Profile of Respondents (n = 195)

Variable and category	n	%
Neighbourhood		
Ajilosun	60	30.8
Olorunda	41	21.0
Opopogboro	38	19.5
Adehun	36	18.5
Olorunsogo	20	10.3
Gender		
Male	120	61.5
Female	75	38.5
Marital status		
Single	77	39.5

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Married	115	59.0
Widowed	3	1.5
Divorced	0	0.0
Highest education		
No formal education	20	10.3
Primary	27	13.8
Secondary	38	19.5
Tertiary	110	56.4
Length of residence		
Below 5 years	39	20.0
5–10 years	57	29.2
Above 10 years	99	50.8

Source: Recomputed from the Source Study's Respondent-Profile Table; Percentages are of 195.

➢ *Perceived Causes*

Respondents selected one principal cause (Table 3). The source's causes table reports a total of 102, text describing 194 "normalised" multiple responses, and percentages calculated on a base of 195; category frequencies sum to 195 and percentages to 99.9%, so the item is treated as single-choice with n = 195 (Table S1).

Table 3 Perceived Principal Cause of Flooding (n = 195; Recomputed)

Perceived cause	n	%	Nominal 95% CI
Absence of drainage	55	28.2	22.4–34.9
Drains blocked with waste	48	24.6	19.1–31.1
Poor physical planning	26	13.3	9.3–18.8
Building along water channels	24	12.3	8.4–17.7
Climate change	18	9.2	5.9–14.1
Poor waste management	16	8.2	5.1–12.9
Collapsed bridge	8	4.1	2.1–7.9
Total	195	100.0	–

Source: Recomputed from the Source Study; Counts Sum to 195. CI = Wilson Interval, Nominal because the Sample is Not Demonstrably Random.

Grouped, drainage and waste categories account for 61.0% (119/195), land-use and planning categories (planning and channel encroachment) for 25.6% (50/195), and infrastructure, waste and land-use categories together, including collapsed bridges, for 90.8% (177/195). Absent drainage and blocked drains alone account for 52.8%. Waste management as a separate category (8.2%) overlaps conceptually with blocked drains, so the two should not be read as independent mechanisms. Climate change was named by 9.2%. Because respondents chose a single cause, this does not show that climate is unimportant: residents observe proximate mechanisms (a blocked drain, a missing culvert) more readily than changes in rainfall regime. The item measures perceived dominant cause, not contribution. Collapsed bridges were named by only 4.1%, a modest share that, as Section 3.7 shows, understates the system-level importance of bridge points.

The emphasis on drainage, waste and land use matches the Nigerian urban-flood literature (Adeloye & Rustum, 2011; Aladelokun, 2018) and the state's public messaging, but the two accounts differ on responsibility: residents most often point to missing drainage, official statements to residents' behaviour (Table 9). Both are claims about attribution, not measured hydrology. This supports P1 only as a statement about perception, and it carries a practical risk: if communication frames flooding mainly as a behaviour problem, investment in the drainage provision that residents regard as the first-order gap may be under-prioritised.

➢ *Spatial Pattern: What the Survey can and Cannot Show*

The source reports the most flood-prone areas as Ajilosun (30.8%) and Opopogboro (29.7%), followed by Olorunda (21.0%), Olorunsogo (10.3%) and Adehun (8.2%). Table 4 compares these nominations with where respondents lived.

Table 4 Neighbourhoods Named as Flood-Prone Compared with Residence of Respondents (n = 195)

Neighbourhood	Flood-prone (n)	Flood-prone (%)	Residence (n)	Residence (%)
Ajilosun	60	30.8	60	30.8
Olorunda	41	21.0	41	21.0
Opopogboro	58	29.7	38	19.5
Adehun	16	8.2	36	18.5
Olorunsogo	20	10.3	20	10.3
Total	195	100.0	195	100.0

Source: Recomputed from the Source Study; the Source Reported a Total of 102, but Counts Sum to 195.

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For three neighbourhoods, the flood-prone counts are identical to residence counts, which is either a coding artefact or evidence that respondents named only their own area. The two columns differ for Opopogboro (58 versus 38) and Adehun (16 versus 36), although the two differences cancel. Either way, the finding that Ajilosun and Opopogboro are "most vulnerable" is confounded with who was sampled, and Ajilosun's lead partly reflects its supplying the largest share of respondents. Independent documentary evidence is consistent with flooding in Ajilosun: the Ekiti State Government listed it among locations where flood-control efforts were under way in August 2021 (Ekiti State Government, 2021). We did not locate documentary reports naming Opopogboro in our limited searches, which is not evidence of absence. The spatial conclusion is suggestive, not established, and no map was produced.

The documentary record also names crossings and channels (Ureje, Elemi, Afao, Ayemi), whereas the survey describes neighbourhoods. A neighbourhood survey may miss hazards operating along river corridors and at bridges whose failure affects people who do not live nearby, which supports the network component of P2 and shows why future work should combine household data with georeferenced inundation records and a bridge and culvert inventory.

➢ *Perceived Severity of Impacts*

Table 5 Perceived Severity of Flood Impacts: Number of Respondents by Rating (n = 195; Scale 1–5, Descriptive)

Impact	1	2	3	4	5	% high or very high	Mean score
Property loss	0	40	16	44	95	71.3	3.99
Soil infertility (leaching, erosion)	0	38	20	80	57	70.3	3.80
Destruction of farms, food and cash crops	0	22	76	24	73	49.7	3.76
Building collapse	19	40	43	20	73	47.7	3.45
Injury	19	43	60	56	17	37.4	3.05
Loss of lives	22	20	91	62	0	31.8	2.99
Disease outbreak	0	35	143	17	0	8.7	2.91

Source: Recomputed from the Source Study. Scale: 1 = Not at all, 2 = Low, 3 = Moderate, 4 = High, 5 = Very High. Cell Positions for the Soil-Infertility and Crop-Destruction Rows were Reconstructed from the Source Layout; Each Row Sums to 195. Ordinal Means are Descriptive Only.

Property and agricultural-land impacts dominate: property loss was rated high or very high by 71.3%, soil infertility by 70.3%, crop destruction by 49.7% and building collapse by 47.7%. Injury was rated high or very high by 37.4% and loss of life by 31.8%. Disease outbreak was rated moderate by 73.3% and very high by no respondent (8.7% high), giving a high "moderate or above" share (82.1%) but a low "high or very high" share; it is best read as a widespread moderate concern, not a dominant perceived impact. Ratings of loss of life and injury are perceptions of severity; the survey recorded no casualty counts, and the source's suggestion that lower ratings reflect "underreporting or improved survival rates" is unsupported. In light of the health literature (Alderman et al., 2012; Suhr & Steinert, 2022), these items indicate concern, not measured morbidity or mortality.

➢ *Frequency, Disruption and Cost*

No respondent reported never experiencing flooding in the previous five years; 8.2% reported very frequent and 51.3% frequent flooding, so 59.5% reported frequent flooding (Table 6). Disruption of socio-economic activity was affirmed by 88.7%, and 78.5% judged recovery costly or very costly. The absence of any "not at all" response confirms that the sample comprises flood-affected residents and is another reason these proportions should not be extended to the whole city. The questionnaire printed the five-year window as 2015–2020 whereas the source tables label it 2019–2024; the authors have not been able to reconcile this, and the item is reported as "the previous five years".

Table 6 Flood Frequency, Disruption of Activities and Cost of after-Effects (n = 195)

Item and response	n	%	Nominal 95% CI
Flood experience, previous five years			
Very often	16	8.2	5.1–12.9
Often	100	51.3	44.3–58.2
Not often	79	40.5	33.9–47.5
Not at all	0	0.0	0.0–1.9
Often or very often (combined)	116	59.5	52.5–66.1
Flooding affects socio-economic activities			
Yes	173	88.7	83.5–92.4
No	22	11.3	7.6–16.5
Cost of after-effects			
Very costly	21	10.8	7.2–15.9
Costly	132	67.7	60.8–73.9

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Cheap	20	10.3	6.7–15.3
Very cheap	22	11.3	7.6–16.5
Costly or very costly (combined)	153	78.5	72.2–83.7

Source: Recomputed from the Source Study. "Very Cheap" is 11.3% by Count (the Source Reported 10.3%).

The disruption item is a single yes/no question and cannot separate transport disruption from other effects, which is the main reason access effects (P3) are only partially supported. The source's description of the hazard as "worsening" is not supported by a single cross-sectional frequency question.

➢ *Household Adaptation, Institutional Support and Preferred Measures*

Building modification was common: 18.5% modified very often and 50.3% often (68.7% combined by count; the source reported 68.8%). Of respondents, 68.2% judged that widening and concretising water channels had helped. By contrast, only 45.6% often received relief, and 54.4% received it rarely or never, including 20.0% who never did (Table 7). Household adaptation is therefore widespread while institutional support is perceived as inconsistent, a pattern consistent with P4 but not a test of it: the instrument did not capture what households spent on adaptation or whether their modifications worked, and the relief item does not say who delivered relief or for which event. The "effectiveness" of channel works is likewise a perception, not a hydrological evaluation.

Table 7 Household Adaptation and Receipt of Relief (n = 195)

Item and response	n	%	Nominal 95% CI
Building modification			
Very often	36	18.5	13.6–24.5
Often	98	50.3	43.3–57.2
Not often	61	31.3	25.2–38.1
Not at all	0	0.0	0.0–1.9
Often or very often (combined)	134	68.7	61.9–74.8
Channel widening and concretisation helped			
Yes	133	68.2	61.4–74.3
No	62	31.8	25.7–38.6
Receipt of relief			
Very often	0	0.0	0.0–1.9
Often	89	45.6	38.8–52.6
Not often	67	34.4	28.1–41.3
Not at all	39	20.0	15.0–26.2
Rarely or never (combined)	106	54.4	47.4–61.2

Source: Recomputed from the Source Study.

Support for preventive measures was high (Table 8): public sensitisation (91.8%), improved drainage (89.2%), prohibiting certain buildings or activities in high-risk zones (80.0%) and floodways (79.0%). Only 50.3% agreed that government provides flood adaptation measures from time to time. Two cautions apply. The items were yes/no statements, mostly positively worded, which invites acquiescence, so endorsement indicates acceptability, not effectiveness. And 91.8% also endorsed deepening, widening or straightening streams for rapid runoff, which sits uneasily with the hydrological concern that conveyance-focused channelisation can transfer flood risk downstream; the survey cannot adjudicate this and an engineering assessment would be required.

Table 8 Endorsement of Flood Prevention Measures (n = 195)

Measure	Yes (n)	Yes (%)	Nominal 95% CI
Sensitisation towards environmental best practices	179	91.8	87.1–94.9
Deepening, widening or straightening of streams for rapid runoff	179	91.8	87.1–94.9
Adequate drainage system	174	89.2	84.1–92.8
Prohibition of certain buildings or activities in high-risk zones	156	80.0	73.8–85.0
Floodway allowing floods to pass with minimal damage	154	79.0	72.7–84.1
Government provides adaptation measures from time to time	98	50.3	43.3–57.2

Source: Recomputed from the Source Study; the Remaining Respondents Answered "No". The Last Item was Printed as Agree/Disagree in the Questionnaire and as Yes/No in the Source Table.

➢ *Documentary Evidence on Network Disruption, 2019–2026*

Table 9 lists dated reports of flood-related events and responses in Ado-Ekiti. Report dates and event dates differ and are distinguished where the source allows.

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Table 9 Dated Documentary Evidence on Flooding, Access and Response in Ado-Ekiti

Date reported	Source	Content (event date given where stated)	Relevance / nature of evidence
29 Aug 2019	ThisDay (2019)	Overnight downpour; bridge on the Ado–Ijan–Ikare road linking the city to the Federal Polytechnic area overrun about 1–6 a.m.; commuters waited about six hours. Exact event date not stated.	Crossing as critical link; news report
21 Aug 2021	Ekiti State Government (2021)	Flood alert release lists Ajilosun, Afao Road, Eminrin and other locations where efforts were ongoing.	Corroborates Ajilosun; official statement
11 May 2023	ThisDay (2023)	NEMA places Ekiti on a flood danger list; sensitisation held in Ado-Ekiti markets.	Early warning
Early Sep 2023 (copy dated 7 Sep 2023)	Leadership (2023)	Ureje River overflowed after about five hours of rain; gridlock of about 2.5 km from Ureje Bridge toward Odo Ado; commuters trapped for hours; houses and business premises submerged, including about 10 buildings in Emirin Estate.	Crossing; commerce; news report
6 Oct 2024	Peoples Gazette (2024)	Governor inspected areas flooded the previous Saturday; cited 2022 dredging and channelisation of the Elemi and Ureje rivers.	Prior works; recurrence
Mar 2025 (copy dated Jun 2025)	Daily Trust (2025)	Rainstorm damaged houses in Ado, Ijero, Moba and Ekiti East LGAs; in Ado LGA, 87 houses partially destroyed and 59 lost rooftops (citing NEMA).	Windstorm damage, not flood; context only
2025 (date not retrieved)	Voice of Nigeria (2025)	Deputy governor stated that Ekiti suffered repeated flooding and windstorms in 2024 and 2025; directed marking of structures on waterways; said NiMet flagged Ekiti as a possible flood flashpoint.	Enforcement intent; official statement
27 Sep 2025	Peoples Gazette (2025)	State environmental agency reported a new round of dredging of the Ureje, Elemi and Iremide rivers and claimed a further 10 km dredged; officials urged residents to stop building on waterways.	Response; official claim, unverified
19 Oct 2025	AllAfrica (2025)	Federal early-warning centre urged Ado-Ekiti and Ijero-Ekiti residents to be on alert for October flooding.	Early warning; effectiveness unassessed
10 Sep 2026	Peoples Gazette/News Agency of Nigeria (2026)	Cash and materials worth ₦105 million disbursed to 159 rainstorm and flood victims; government states ₦460.8 million in rainstorm assistance since 2022.	Relief; state-reported
30 Sep 2026	Arise News (2026)	Flooding at Elemi Bridge, Afao Road and Ayemi Bridge; civil defence reports Afao Bridge collapsed completely, cutting vehicle movement between Ado-Ekiti and Afao; loss of life reported (no count given). Event date not stated.	Link failure; news report

Source: Sources as Cited. Publication Dates are Given; Event Dates are Shown where the Source States them. Press Content is Evidence that an Event was Reported, Not a Measure of its Magnitude.

The same river corridors and crossings recur across years: Ureje (2019 and 2023), Afao Road (2021 and 2026) and Elemi (dredged by 2022; flooding reported in 2026). The 2023 report describes a gridlock of about 2.5 km after the Ureje River overflowed (Leadership, 2023). The 2026 report describes the complete collapse of Afao Bridge, severing vehicular movement between Ado-Ekiti and Afao, together with loss of life; it gives no figure (Arise News, 2026). Official responses combine early warning, dredging, enforcement directives and relief. The institutional response described in 2025 is mainly structural (dredging) and regulatory (marking and demolishing structures on waterways; Peoples Gazette, 2025; Voice of Nigeria, 2025), and its outcomes are not evaluated in the sources. One event does not establish causation, but the 2026 collapse indicates that these measures did not prevent severe disruption on a named arterial.

Government communications emphasise residents' blocking of waterways and drains (Peoples Gazette/News Agency of Nigeria, 2026), whereas the largest survey category is absent drainage, a public-infrastructure deficit. The relief figures are government statements and cannot be reconciled with the survey's relief item. The March 2025 item concerns wind damage and is retained only as context for the scale of storm-related losses in Ado Local Government Area.

➢ *Climate Context*

NiMet's 2026 Seasonal Climate Prediction, presented on 10 February 2026, indicated a predominantly neutral ENSO phase (Nigerian Meteorological Agency [NiMet],

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2026). The derived Southwest outlook lists normal onset (18–25 April), a seasonal length of 203–214 days and normal annual rainfall of 1,610–1,772 mm for Ekiti (DAWN, 2026), and press reports state that a prolonged Little Dry Season of 28–40 days was expected in Ekiti, Lagos, Ogun and parts of Oyo (BusinessDay, 2026). The state government cited NiMet's 2026 prediction in warning that Ekiti could experience flooding at the peak of the rainy season (Peoples Gazette/News Agency of Nigeria, 2026). These are seasonal forecasts, not observations. No station rainfall series was analysed, so no claim is made about trends in rainfall intensity in Ado-Ekiti. The low share naming climate change (9.2%) is compatible with the argument that climate intensifies but does not replace local drivers (Douglas et al., 2008), but this dataset cannot test that argument.

➢ *Access, Hospitality and Tourism*

The evidence shows that flooding repeatedly disrupts road movement at named crossings and that residents report broad disruption to commerce and services. For a city seeking to attract visitors this matters more than the 4.1% of respondents who named bridge collapse as a cause suggests. The evidence does not show effects on accommodation, food service, visitor numbers or heritage sites, and the source's statements to that effect are untested assertions.

What the evidence supports is a conditional, exposure-based argument. Guest houses and hotels listed in affected neighbourhoods and along Afao Road (Ekiti State Government, n.d.-b) are plausibly exposed to access interruption: if destination services in Ado-Ekiti depend on staff, supplies and customers moving across flood-prone links, flood-driven access failure is a plausible pathway to service interruption (P5). Occupancy, revenue and cancellation effects have not been measured. This is consistent with the tourism–disaster emphasis on preparedness and recovery (Ritchie, 2004; Ritchie & Jiang, 2019) and with calls to integrate tourism and disaster-risk perspectives (Aliperti et al., 2019), but it remains a hypothesis.

The source also asserted that floods threaten named heritage assets, including a palace attributed to the "Deji" and an "Iye-Ile archaeological site". These claims are not evidenced by the survey; the traditional ruler of Ado-Ekiti is the Ewi, and the archaeological site could not be verified (Table S1). We found no evidence that the Ewi's palace or other heritage assets have been flooded, and no heritage-flooding claim is made here.

➢ *Channel Works: What the Evidence can and Cannot Show*

Channel modification attracts strong approval (Tables 7 and 8). Dredging and channelisation of the Elemi and Ureje rivers were reported as completed in 2022 and extended in 2025, while flooding and a bridge collapse at the same river corridors were reported in 2024 and 2026 (Table 9). This sequence does not show that the works failed, because rainfall, upstream conditions and maintenance are unknown. It shows that no evaluation of the works is available. Channel modification can alter flow velocity and downstream conditions, so resident approval is not a substitute for hydraulic assessment; this caution rests on general hydrological reasoning, not on a source retrieved for this paper.

➢ *Implications and Recommendations*

The following implications are offered as hypotheses for decision-makers and not as tested findings.

- Treat crossings as critical infrastructure. Repeated overtopping at the same bridges justifies a condition and capacity inventory of crossings on primary routes, prioritising nodes that recur in flood reports, before further channel works.
- Evaluate before extending channelisation. Commission before-and-after assessments of the 2022 and 2025 works, including hydraulic modelling, downstream and ecological effects and maintenance records, before adopting the channel straightening that most respondents endorsed.
- Close the drainage gap and the information gap together. Residents' emphasis on absent drainage and official emphasis on blocked waterways point to joint action on provision, waste collection and enforcement; locations, dates and monitoring results of dredging and demolition programmes should be published so outcomes can be evaluated.
- Make relief transparent. Publish disbursement criteria and beneficiary counts by event and neighbourhood, so that survey perceptions (54.4% receiving relief rarely or never) can be checked against records.
- Include tourism and hospitality operators in flood planning. Bring hotel, guest-house and tourism operators into flood warning and continuity planning along exposed corridors, and build the tourism evidence base now by collecting visitor, accommodation and enterprise data alongside flood records so that P5 can be tested.

➢ *Limitations and Data Required*

The principal limitations are:

- The sample is a non-probability sample of unclear selection from five pre-selected neighbourhoods; its frame and randomisation are undocumented.
- All survey measures are single-item, self-reported perceptions; no objective inundation, rainfall, damage, casualty or loss data were used.
- Neighbourhood vulnerability cannot be ranked from the current Table 4, and internal inconsistencies in the source tables cannot be resolved without respondent-level data.
- The survey contains no tourism or hospitality items, so tourism implications are inferential; no GIS, hydrological, transport-network, tourism or hospitality analysis was performed.
- The interviews described in the source were unavailable and are not reported.
- Documentary evidence is non-systematic, dominated by news reports and includes untested official claims; event and report dates sometimes differ or are unstated.

Table 10 lists the evidence needed to test the propositions.

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Table 10 Evidence needed to test the FASR propositions

Data	Likely source	Purpose
Daily rainfall series and exceedance thresholds	NiMet station records	Trend and event magnitude
Georeferenced flood extents, depths and event logs with damage records	EKSEMA, NEMA, post-event surveys	Map exposure; test P2
Digital elevation model, drainage and channel network	Survey authorities, open elevation data	Hydrological and spatial analysis
Bridge, culvert and road inventory; closure logs; traffic counts	Ministry of Works, transport agencies	Network criticality; test P3
Georeferenced, dated inventory of hotels, guest houses and attractions, with operator surveys	Primary data collection; state tourism agencies	Service interruption; test P5
Visitor and event records	State tourism agencies, venue operators	Destination outcomes; test P5
Relief disbursement records by event; household cost and adaptation-expenditure data	EKSEMA, local councils; probability household survey	Test P4 against perceptions

EKSEMA = Ekiti State Emergency Management Agency; NEMA = National Emergency Management Agency.

A design combining a probability-based household survey with a documented frame, georeferenced event data, a road-network inventory and enterprise-level interviews would allow the spatial regression, accessibility modelling and mixed-methods analysis that the present evidence cannot support.

V. CONCLUSION

The reanalysed survey shows that residents of five Ado-Ekiti neighbourhoods perceive flooding as frequent, costly and disruptive, attribute it chiefly to missing or blocked drainage and weak land-use control, and adapt largely on their own, with 54.4% receiving relief rarely or never. Documentary evidence from 2019 to 2026 adds that floods repeatedly interrupt movement at river crossings, culminating in the reported collapse of Afao Bridge in September 2026, and that state responses are substantial but unevaluated. The evidence does not establish effects on tourism or hospitality; it motivates a framework and a data agenda for testing them. For a city whose administrative, commercial and prospective visitor-economy functions depend on mobility, treating drainage and crossings as critical access infrastructure is a defensible priority, and rigorous evaluation of existing works should precede further expansion.

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SUPPLEMENTARY MATERIAL

Table S1. Data-Quality Audit of the Source Survey Tables and Treatment in this Paper

#	Issue identified	Treatment in this paper
1	Area of 18 km² and density of 95.8 persons/km² (about 1,700 people) are incompatible with a population of ~497,000 (UN projection, no source) or the 2006 census figure of 308,621 for the local government area.	Not used; spatial unit and source to be stated.
2	Annual rainfall of 2,000–3,000 mm is unsourced; the 2026 Southwest outlook lists 1,610–1,772 mm (normal) for Ekiti, and a secondary compilation of 1970–2000 normals gives about 1,363 mm.	Flagged; rainfall not characterised; reconcile with NiMet station records.
3	Causes table: total shown as 102 and text says 194 multiple responses, but frequencies sum to 195 and percentages use 195.	Treated as single-choice, n = 195.
4	Flood-prone areas table: total shown as 102 but frequencies sum to 195; counts for Ajilosun, Olorunda and Olorunsogo equal residence counts (60, 41, 20); Opopogboro 58 vs 38 residents; Adehun 16 vs 36.	Spatial finding downgraded to suggestive.
5	Cost table: “Very cheap” n = 22 shown as 10.3% (should be 11.3%); percentages sum to 99.1%.	Count-derived values reported.
6	Fieldwork dated 2024 in some tables and 2025 in others; abstract states 200 respondents while 195 were analysed.	Both counts reported; dates to be clarified by the authors.
7	Interviews described in abstract and methods; no interview findings, number or protocol reported. An objective promises mapping; no map produced.	Interview and mapping claims removed.
8	Traditional palace called the Deji’s in one chapter and the Ewi’s in another; the state government identifies the Ewi’s palace. An “Iye-Ile archaeological site” was not verified.	Only the Ewi’s palace, as stated by the state government, is used; no heritage-flooding claim made.
9	Unsupported inferences: hazard “worsening”; low life-loss ratings reflect “underreporting or improved survival”; tourism sites and investor confidence damaged by floods.	Removed or reframed as hypotheses.
10	Prevention-measures item on government provision is a perception, not a measure, and was printed as Agree/Disagree in the questionnaire but Yes/No in the table; endorsement of channel straightening (91.8%) conflicts with the source’s own caution on channelisation.	Reported as perceptions with an evaluation caveat.
11	Questionnaire printed the five-year flood-experience window as 2015–2020, whereas source tables label it 2019–2024.	Reported as “the previous five years”; window to be reconciled by the authors.
12	Building modification: often plus very often reported as 68.8% but 134/195 = 68.7%.	Count-derived 68.7% reported.
13	One press item (March 2025) concerns wind damage rather than flooding.	Retained in Table 9 as flagged context only.
14	Reference list contained duplicate entries with conflicting details for the same citation (e.g., Adefolalu 2013, Hashizume 2013, Chapagain and Raizada 2017, Collins and Simpson 2007, Aladelokun 2004 and 2018, Etuonovbe 2011); Aladelokun (2018) was listed under a journal that differs from the verified record. Claims attributed to unverified entries (e.g., 2.8 billion people affected and 200,000 deaths over three decades) were not confirmed.	Verified entries retained; the remainder excluded. Wider literature on flood typology, hazard adjustment, health, agriculture and water and sanitation may be reinstated once each source is checked against publisher or DOI records.