

Feb 11, 2026

Version 2

Community Engagement for Disaster Risk Reduction (CEDRR) V.2

DOI

<https://dx.doi.org/10.17504/protocols.io.261ge5bp7g47/v2>

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Document Citation: Brian Cook, Peter Kamstra 2026. Community Engagement for Disaster Risk Reduction (CEDRR). protocols.io <https://dx.doi.org/10.17504/protocols.io.261ge5bp7g47/v2> Version created by **Peter Kamstra**

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Created: February 10, 2026

Last Modified: February 11, 2026

Document Integer ID: 243015

Keywords: Community Engagement, Flood, Household scale, Risk Reduction, community engagement for disaster risk reduction, disaster risk reduction, risk awareness, climate concern, reorientation of household engagement, behavioural relevance of awareness, familiar associations between experience, greater awareness, community engagement, prone australian municipality, familiar association, awareness, increased concern, strongest correlate of adaptation, flood, normative learning, shifts in responsibility, adaptation model, household engagement, responsibility, adaptation, flood risk adaptation, implementation of flood risk adaptation, flood experience, methods household engagement study, scale disaster risk reduction research, prone metropolitan municipalities in victoria, risk perception, engagement procedure, spillover within the same household, household context, prone metropolitan municipality, household, intervention, reflections on the engagement, qualitative account, ended qualitative prompt, subjects longitudinal

Funders Acknowledgements:

Melbourne Water

Abstract

This protocol documents a longitudinal mixed-methods household engagement study conducted in two flood-prone metropolitan municipalities in Victoria, Australia. The study examines how reported learning processes and reported flood risk adaptation co-occur over time under the conditions created by a dialogic, non-directive household engagement that is treated analytically as an intervention rather than a neutral survey instrument.

Households were engaged at two timepoints using a combination of structured survey items and open-ended qualitative prompts. Baseline engagements focused on participants' flood experience, risk perceptions, existing adaptations, and household context. Follow-up engagements conducted four to six months later elicited participants' reflections on the engagement, reported learning, reported implementation of flood risk adaptations, and reported spillover to non-participants. Learning was coded across three analytically distinct domains cognitive, normative, and relational and adaptation and spillover were coded using predefined binary criteria based on participants' qualitative accounts.

The within-subjects longitudinal design allows examination of associations between reported learning, reported adaptation, and reported spillover within the same households over time, while recognising explicit limits on causal inference arising from the absence of an untreated control group and contemporaneous measurement at follow-up. The protocol details recruitment, engagement procedures, coding rules, and analytic strategies to support transparency and reproducibility in household-scale disaster risk reduction research.

Study protocol for a method of community engagement for disaster risk reduction (CEDRR) at the household scale: a two-engagement longitudinal intervention

Background

This protocol documents a longitudinal mixed-methods household engagement study conducted in two flood-prone metropolitan municipalities in Victoria, Australia. The study examines how reported learning processes and reported adaptation co-occur over time under the conditions created by a dialogic, non-directive household engagement. The engagement was designed to be reflective and participant-led rather than instructional, and is treated analytically as an intervention rather than a neutral survey instrument.

Households were engaged at two timepoints using a combination of structured survey items and open-ended qualitative prompts. The within-subjects longitudinal design allows examination of change and association within the same households over time, while recognising that causal inference is constrained by the absence of an untreated control group and contemporaneous measurement of learning and adaptation. The protocol prioritises transparency around recruitment, engagement procedures, coding rules, and analytic limits to enable assessment of the evidentiary scope of the study.

Introduction

Flooding is a major climate related hazard affecting households in many urban regions. Household scale adaptations such as property level modifications, preparedness planning, and changes to insurance coverage are widely promoted as mechanisms for reducing vulnerability. Despite this emphasis, evidence on how households come to implement such adaptations over time remains limited, particularly where studies rely on single timepoint surveys or proxy indicators such as awareness, concern, or stated intentions.

This protocol documents a longitudinal mixed methods study designed to examine how reported learning processes and reported adaptation co-occur within the same households over time. The study focuses on three analytically distinct learning domains cognitive, normative, and relational (Baird et al. 2014) and examines their association with reported implementation of adaptation following a dialogic household engagement. The engagement is non directive and reflective in form and is treated analytically as an intervention rather than a neutral survey instrument.

The protocol specifies recruitment, engagement procedures, measurement and coding rules, and analytic strategies used to examine associations between learning and adaptation under these conditions. It is designed to support transparency and reproducibility while making explicit the inferential limits of the design, including the absence of an untreated control group and the contemporaneous measurement of learning and adaptation at follow up.

Methods

This study employed a longitudinal mixed-methods design involving two engagements with the same households at baseline (T1) and follow-up (T2). The study was conducted in the City of Kingston and the City of Darebin, two metropolitan municipalities in Greater Melbourne identified by Melbourne Water as among the most flood-exposed urban areas based on mapped 1% Annual Exceedance Probability flood extents.

The initial sampling frame comprised all residential properties located within the mapped 1% AEP flood zones across the two municipalities. Industrial parcels, mixed-use commercial properties, schools, and other non-residential addresses were excluded. Properties that could not be accessed for door-knocking, including secure apartment complexes and gated developments, were also excluded. This process yielded 9,261 accessible residential properties eligible for recruitment.

Households were recruited primarily through systematic door-knocking conducted by trained research staff over a six-month period. To account for spatial uncertainty in flood extent modelling, a 50 metre boundary rule was applied whereby neighbouring residences were approached if a targeted flood-exposed dwelling did not respond. A supplementary community-network referral pathway was also used, whereby participants and community organisations referred additional households. Organisations facilitating referrals received a modest payment per completed engagement to support participation and transparency.

Of the 9,261 properties approached, 2,428 households answered the door. A total of 982 households completed the baseline engagement. Follow-up engagements were conducted four to six months later with 638 households, yielding a retention rate of approximately 65% relative to the baseline sample. The analytic sample comprises households that completed both engagements.

Baseline engagements lasted approximately 30 to 45 minutes and were conducted remotely via online platforms or telephone. A semi-structured, dialogic protocol was used, combining closed-ended survey items with open-ended qualitative prompts addressing flood experience, risk perceptions, existing adaptations, and household context. The engagement was non-directive and reflective in form and is treated analytically as an intervention rather than a neutral survey instrument.

Following completion of the baseline engagement, participants received a brief thank-you email. Where participants had explicitly requested additional information, the email included links to publicly available hazard preparedness resources relevant to the risks discussed. Provision of these materials was optional and participant-initiated.

Follow-up engagements lasted approximately 10 to 15 minutes and focused on participants' reflections on the initial engagement, reported learning, reported implementation of any new flood risk adaptations since T1, and any sharing of information or encouragement of action among social contacts. Learning and adaptation were measured contemporaneously at follow-up, capturing associations between reported outcomes rather than establishing temporal sequence.

Aim

This study aims to examine how reported learning processes, reported flood risk adaptation, and reported spillover co-occur over time within the same households following a dialogic, non-directive engagement.

The specific objectives are to:

1. Examine the distribution of reported cognitive, normative, and relational learning following participation in the engagement;

2. Examine associations between reported learning domains and reported implementation of flood risk adaptations at follow-up;
3. Examine whether reported spillover to non-participants or to non-flood preparedness actions is described following the engagement;
4. Examine how reported adaptation and spillover vary in relation to household characteristics, prior experience, and contextual factors measured at baseline.

Equipment and training

All engagements were conducted by trained research staff using a standardised engagement protocol. Interviewer preparation focused on consistent application of the protocol, ethical conduct, and reflexive, participant-led interviewing. No specialised equipment beyond standard audio recording and online communication platforms was required.

Step-by-step methodology

1. Site Selection and Sampling

1.1 Select the City of Kingston and the City of Darebin (Greater Melbourne, Victoria) as study sites based on their high flood exposure and broadly comparable socio-demographic profiles.

1.2 Obtain Melbourne Water spatial datasets delineating residential properties within the mapped 1% Annual Exceedance Probability flood extent.

1.3 Define the initial recruitment frame as all residential properties within the mapped 1% AEP flood zones across both municipalities.

1.4 Refine the recruitment frame by removing non-residential and misclassified parcels (for example, industrial parcels, schools, churches, mixed-use commercial properties) and excluding dwellings that cannot be accessed for door-knocking (for example, secure apartment complexes, gated communities, or properties with physical access barriers).

1.5 Record the resulting operational population of accessible dwellings for recruitment (9,261 properties).

1.6 Apply stratification by flood risk type to guide recruitment coverage, prioritising drainage-system flood exposure and sampling a feasible proportion of waterway-exposed properties, consistent with the mapped distribution in the study areas.

1.7 Implement a 50 metre boundary rule during field recruitment to account for spatial uncertainty in flood mapping: if a targeted flood-exposed dwelling does not respond when door-knocked, approach immediately neighbouring residences and invite participation.

2. Recruitment Procedures: Primary method (e.g., door-knocking, outreach events, direct contact)

2.1 Primary recruitment method

2.1.1 Conduct systematic door-knocking across all accessible residential properties in the operational sampling frame (9,261 dwellings) using trained research staff.

2.1.2 Approach all drainage-system flood-exposed properties and a targeted proportion of waterway flood-exposed properties, consistent with the stratified recruitment strategy.

2.1.3 Where a targeted dwelling does not respond, apply the 50 metre boundary rule by approaching immediately neighbouring residences to invite participation.

2.1.4 When a household answers the door, provide a brief explanation of the study and invite the resident to schedule a baseline engagement (T1) at a later time via an online platform or telephone, according to participant preference.

2.2 Incentives

2.2.1 In the City of Kingston, provide participating households with an A\$50 gift card, split across baseline and follow-up engagements.

2.2.2 In the City of Darebin, provide an A\$50 donation to a community organisation nominated by the participant, split across baseline and follow-up engagements.

2.2.3 Use incentives to support participation without exerting pressure or creating undue influence.

2.3 Secondary recruitment pathway: community-network referral

2.3.1 Invite participants to refer neighbours or members of community groups who may wish to participate in the study.

2.3.2 Where community organisations facilitate recruitment, engage through a designated intermediary and provide AU\$25 per completed engagement at T1 and T2 for each participating member.

2.3.3 Retain households recruited through community networks in the analytic sample, regardless of whether they reside within the mapped 1% AEP flood zone, and record recruitment pathway as a contextual variable.

3. Initial Engagement (T1)

3.1 Conduct the baseline engagement remotely via Zoom or Microsoft Teams, with telephone offered where requested.

3.2 Allocate approximately 30 to 45 minutes per household.

3.3 Use a semi-structured, dialogic engagement protocol that combines closed-ended survey items with open-ended qualitative prompts.

3.4 Record structured measures including household flood experience, risk perceptions, existing preparedness or

adaptations (including property modifications and insurance coverage), and socio-demographic characteristics, following the protocol question order.

3.5 After each closed-ended item, use qualitative prompts to invite participants to elaborate on their responses, describe relevant experiences, and explain priorities in their own words.

3.6 Obtain consent to audio-record the engagement and transcribe recordings verbatim using Otter.ai, linking transcripts to structured survey responses at the household level.

3.7 After the engagement, send a brief thank-you email. Where participants explicitly requested additional information during the engagement, include links to publicly available hazard preparedness resources relevant to the risks discussed. Do not provide instruction or follow-up prompting as part of this email.

3.8 Inform participants that a follow-up engagement will occur approximately 4 to 6 months after the baseline engagement.

4. Follow-up Engagement (T2)

4.1 Re-contact participating households approximately 4 to 6 months after the baseline engagement.

4.2 Conduct the follow-up engagement via telephone or online call, allocating approximately 10 to 15 minutes per household.

4.3 Invite participants to recall what they remembered from the initial engagement and to describe any learning or reflections they considered salient. Use these accounts to identify reported cognitive, normative, or relational learning, rather than to verify knowledge acquisition.

4.4 Ask participants whether any new flood risk adaptations had been implemented since the baseline engagement and request detailed descriptions of these actions. Code only concrete actions with sufficient specificity to indicate implementation as adaptation.

4.5 Ask participants whether they shared information from the engagement or encouraged action among social contacts such as neighbours, friends, or family members.

4.6 Record explicit accounts of such sharing or encouragement as reported spillover to non-participants.

4.7 Administer a subset of structured items repeated from the baseline engagement to provide a descriptive check on short-term change.

4.8 Treat reported learning, reported adaptation, and reported spillover as contemporaneously measured outcomes at follow-up, capturing associations rather than establishing temporal sequence or causal effects.

5. Qualitative Data Processing

5.1 Audio-record all baseline and follow-up engagements with participant consent.

- 5.2 Transcribe recordings verbatim using Otter.ai and link transcripts to structured survey responses at the household level.
- 5.3 Code follow-up (T2) transcripts using a predefined codebook to identify reported learning, adaptation, and spillover outcomes.
- 5.4 Apply deductive coding to classify reported learning according to three analytically defined domains: cognitive learning, normative learning, and relational learning, following the typology adapted from Baird et al. (2014).
- 5.5 Code reported adaptation when participants describe concrete risk-reduction actions implemented between baseline and follow-up with sufficient specificity to indicate implementation. Do not code intentions, plans, or tentative considerations as adaptation.
- 5.6 Code reported spillover when participants explicitly describe sharing information from the engagement or encouraging action among non-participants.
- 5.7 Conduct an initial calibration exercise in which multiple researchers independently code a subset of transcripts using the draft codebook.
- 5.8 Resolve discrepancies through reflexive discussion and refine code definitions to support consistent application across the dataset.
- 5.9 Once the codebook is finalised, code the full dataset in iterative rounds.
- 5.10 Re-examine all transcript segments assigned learning, adaptation, or spillover codes in a subsequent review pass to check for internal consistency.
- 5.11 Record each learning domain, adaptation, and spillover outcome as a binary indicator at the household level, producing a structured dataset suitable for mixed-methods and quantitative analysis.
- 5.12 Do not calculate formal inter-coder reliability statistics. Emphasise transparency, reflexive discussion, and consensus in line with reflexive thematic analysis practice.

6. Statistical Modelling

- 6.1 Conduct quantitative analyses using standard statistical software suitable for logistic regression and descriptive analysis.
- 6.2 Begin with descriptive statistics to summarise sample characteristics, reported learning domains, reported adaptation, and reported spillover outcomes.
- 6.3 Examine bivariate associations among key variables to identify patterns relevant to subsequent multivariate

models.

6.4 Specify logistic regression models to examine associations between reported learning outcomes and reported adaptation at follow-up.

6.5 In adaptation models, treat reported adaptation (coded as a binary indicator) as the dependent variable and include reported cognitive, normative, and relational learning indicators as independent variables.

6.6 Include control covariates such as respondent age, housing tenure, flood-zone status, and prior flood experience to account for observable household differences.

6.7 Estimate separate logistic regression models to examine the distribution of reported learning domains across participant characteristics, recognising that all households completed the baseline engagement and that these models do not estimate treatment effects.

6.8 Progress from univariate and bivariate analyses to multivariate models using a stepped approach.

6.9 Interpret model results as patterns of association rather than evidence of causal pathways or temporal sequencing.

6.10 Examine basic model diagnostics to assess fit and stability, recognising sample size constraints and the potential for unobserved confounding.

Procedure Study Design and Setting

Apply Protocol to a Case Study:

Study population and eligibility

Households were eligible to participate if they met the following criteria:

- At least one household member aged 18 years or over was available to participate.
- The household was located within the City of Kingston or the City of Darebin, Victoria.
- The dwelling was either located within the mapped 1% Annual Exceedance Probability flood zone or approached under the 50 metre boundary rule applied to neighbouring residences.
- The participating household member was able to engage in a conversational interview conducted in English via online platform or telephone.

Eligibility was assessed at the point of recruitment during door-knocking or community-network referral.

Households recruited through community organisations were retained in the study regardless of mapped flood-zone status and analysed as part of the same longitudinal sample, with recruitment pathway recorded as a contextual variable.

Recruitment

Participants were recruited through systematic door-knocking and a supplementary community-network referral

pathway. Recruitment focused on residential properties located within the mapped 1% Annual Exceedance Probability flood zones identified by Melbourne Water in the City of Kingston and the City of Darebin.

Door-knocking was conducted across all accessible residential properties in the operational sampling frame. Where a targeted flood-exposed dwelling did not respond, a 50 metre boundary rule was applied, whereby immediately neighbouring residences were approached to account for spatial uncertainty in flood extent modelling. Recruitment was stratified by flood risk type, prioritising coverage of drainage-system flood exposure while sampling a feasible proportion of waterway-exposed properties.

To supplement door-knocking and reach households less likely to respond to cold-contact methods, a community-network referral pathway was used. Participants and local community organisations were invited to refer additional households who may wish to participate. Organisations facilitating recruitment received a modest payment per completed engagement to support participation and transparency. Households recruited through community networks were retained in the analytic sample regardless of mapped flood-zone status, with recruitment pathway recorded as part of the study context.

Recruitment procedures were designed to balance coverage, feasibility, and ethical responsibility, recognising practical limits on full-frame engagement of all flood-exposed households.

Targeted door knocking participant elicitation

Targeted door-knocking and participant elicitation

Melbourne Water spatial datasets delineating the mapped 1% Annual Exceedance Probability flood extents for waterways and regional drainage systems were used to identify residential properties with estimated flood exposure across the City of Kingston and the City of Darebin. The two municipalities were selected due to their broadly comparable population sizes and the presence of more than nine thousand flood-exposed residential properties in each area.

Because full-frame engagement of all technically eligible properties was not feasible given known constraints of door-knocking, including limited contact rates, restricted access, and resource demands, the recruitment frame was refined to include only residential properties accessible to in-person recruitment. Non-residential parcels, gated communities, secure apartment complexes, and properties under construction or otherwise inaccessible were excluded.

To account for spatial uncertainty in flood extent modelling, a 50 metre boundary rule was applied during field recruitment. Where a targeted flood-exposed dwelling did not respond, immediately neighbouring residences were approached and invited to participate. Recruitment coverage was stratified by flood risk type to reflect the distribution of exposure in the study areas, prioritising drainage-system flood exposure while sampling a feasible proportion of waterway-exposed properties. After all exclusions were applied, door-knocking was conducted at 9,261 accessible residential properties.

Invited participant elicitation

A supplementary community-network referral pathway was used to support recruitment alongside door-knocking. After completing an engagement, participants were invited to refer neighbours or members of community groups

who may wish to participate. Where community organisations expressed interest, the research team engaged through a designated intermediary to explain the study and recruitment process.

Community organisations that facilitated recruitment received AU\$25 per completed engagement at baseline (T1) and AU\$25 per completed engagement at follow-up (T2) for each participating member. This arrangement was adopted to support transparency, acknowledge organisational effort, and avoid perceptions of coercion or individual inducement. Recruitment through community networks introduced variation in recruitment pathways, which was recorded as part of the study context rather than treated as a control condition.

Households recruited through community networks were retained in the analytic sample regardless of whether they were located within the mapped 1% Annual Exceedance Probability flood zone, enabling examination of whether recruitment pathway or flood-zone status was associated with reported learning, adaptation, or spillover outcomes.

Study Procedure

Recruitment, scheduling, and consent

Potential participants were approached through door-knocking or community-network referral. During initial contact, the study purpose, voluntary nature of participation, and engagement process were explained verbally. Households that expressed interest were invited to schedule a baseline engagement (T1) at a later time via an online platform or telephone, according to participant preference.

Informed consent was obtained at the start of each engagement. Participants received verbal and written information describing the study aims, procedures, data handling practices, and their right to withdraw at any time without penalty. Consent was recorded verbally or electronically prior to commencing the engagement. No standalone online registration form or paper questionnaire was used.

Initial engagement (T1)

Baseline engagements were conducted remotely via Zoom or Microsoft Teams, with telephone offered where requested, and lasted approximately 30 to 45 minutes. The engagement followed a semi-structured, dialogic protocol combining closed-ended survey items with open-ended qualitative prompts. The purpose of the engagement was to elicit participants' accounts of prior experience, perceptions of household risk, existing adaptations, and household context, rather than to provide instruction or education.

Engagement content included structured questions on flood experience, risk perceptions, prior preparedness or adaptation actions, community connection, and demographic characteristics. Each closed-ended item was followed by qualitative prompts inviting participants to elaborate on their responses in their own words. The engagement was non-directive and reflective in form and is treated analytically as an intervention rather than a neutral survey instrument.

All baseline engagements were audio-recorded with consent and transcribed verbatim using Otter.ai.

Post-engagement contact

Following completion of the baseline engagement, participants received a brief thank-you email. Where participants had explicitly requested additional information during the engagement, the email included links to publicly available hazard preparedness resources relevant to the risks discussed. Provision of these materials was

optional, participant-initiated, and not accompanied by instruction or follow-up prompting. The email also reminded participants that a follow-up engagement would occur approximately four to six months later.

Follow-up engagement (T2)

All participants were invited to take part in a follow-up engagement approximately four to six months after the baseline engagement. Invitations were issued via email or telephone. Follow-up engagements were conducted via telephone or online call and lasted approximately 10 to 15 minutes.

The follow-up engagement focused on participants' reflections on the initial engagement, reported learning, reported implementation of any new flood risk adaptations since T1, and any sharing of information or encouragement of action among social contacts. Questions concerning spillover were based on explicit accounts of whether participants spoke with non-participants about risk or encouraged action. Learning, adaptation, and spillover were measured contemporaneously at follow-up, capturing associations between reported outcomes rather than establishing impact, temporal sequencing, or causal effects.

Feasibility and acceptability measures

Recruitment, retention, and descriptive engagement measures

Recruitment and retention were documented descriptively to characterise sample composition and attrition over time. Records were kept of:

- The number of residential properties approached during door-knocking.
- The number of households recruited through door-knocking and community-network referral pathways.
- The number of households completing the baseline engagement (T1).
- The number of households retained at follow-up (T2).

Where households were excluded from recruitment due to inaccessibility or ineligibility, these exclusions were documented as part of the sampling process.

Participant reflections on the engagement were collected at follow-up as part of the qualitative dataset. Follow-up questions included whether participants found the engagement enjoyable, whether they described any learning or reflections as salient, and whether they reported taking any actions or sharing information with others following the engagement. These items were used to characterise participants' accounts of their experience and reported outcomes under the conditions created by the engagement.

Measures of enjoyment or feedback were treated descriptively and were not used to evaluate feasibility, fidelity, or effectiveness of the engagement, nor to establish causal or impact claims. Participants' suggestions or reflections were recorded as part of the qualitative material and analysed contextually rather than as formal acceptability metrics.

Time taken

Field recruitment and baseline engagements were conducted over a six-month period. During this period, systematic door-knocking and community-network referral were used to recruit households and complete baseline engagements (T1).

Follow-up engagements (T2) were conducted approximately four to six months after each baseline engagement. Follow-up data collection therefore extended beyond the baseline recruitment period. In total, data collection spanned approximately 10 to 12 months from commencement of baseline recruitment to completion of follow-up engagements.

A total of 982 households completed the baseline engagement, and 638 households completed the follow-up engagement.

Sample size

No formal power calculation was undertaken for this study. The sample size reflects the scale achievable through large-scale, community-based recruitment under practical and ethical constraints rather than a priori statistical optimisation.

The longitudinal analytic sample comprises 638 households that completed both baseline and follow-up engagements. This sample size is sufficient to support descriptive analysis and multivariate regression models examining associations between reported learning domains, reported adaptation, and reported spillover, while recognising that smaller effects and unobserved confounding may not be detectable.

All analyses are interpreted as identifying patterns of association within the engaged sample rather than estimating population-level effects, testing causal hypotheses, or evaluating intervention efficacy. The study design and sample size are documented to support transparency regarding the evidentiary scope and inferential limits of the findings.

Quantitative data analysis

Quantitative analyses were used to describe the sample and to examine associations among reported learning, reported adaptation, and reported spillover outcomes. Descriptive statistics were calculated for all structured variables, including participant characteristics, flood experience, reported learning domains, reported adaptation, and reported spillover. Continuous variables were summarised using means and standard deviations or medians where appropriate, and categorical variables were summarised using counts and percentages.

Multivariate analyses were conducted using logistic regression models. Two classes of models were specified. First, logistic regression models examined the distribution of reported cognitive, normative, and relational learning at follow-up across participant characteristics such as age, housing tenure, and prior flood experience. Because all households completed the baseline engagement, these models describe patterns within the engaged sample rather than estimating engagement effects.

Second, logistic regression models examined associations between reported adaptation at follow-up, coded as a binary indicator, and reported learning domains. Reported cognitive, normative, and relational learning were included as independent variables alongside control covariates including age, tenure, flood-zone status, and prior flood experience. These models assess whether reported learning domains co-occur with reported adaptation, conditional on observed covariates.

Analyses progressed from univariate description to bivariate associations and then to multivariate models using a stepped approach. All results are interpreted as patterns of association rather than evidence of causal mechanisms, temporal sequencing, or intervention impact.

Qualitative data analysis

Qualitative data generated through the follow-up engagements were analysed using reflexive thematic analysis following Braun and Clarke (2006, 2021). Analysis focused on participants' accounts of learning, adaptation, and spillover as described during the follow-up engagement.

Deductive coding was used to classify reported learning according to three analytically defined domains adapted from Baird et al. (2014): cognitive learning, normative learning, and relational learning. Cognitive learning was coded when participants described acquiring new information or re-evaluating prior knowledge relevant to flood risk. Normative learning was coded when participants described changes in values, priorities, or perceived responsibility in relation to risk reduction. Relational learning was coded when participants described changes in how they understood others, their community, or social relationships in relation to risk management.

Reported adaptation was coded when participants described concrete risk-reduction actions implemented between baseline and follow-up with sufficient specificity to indicate implementation. Reported spillover was coded when participants explicitly described sharing information from the engagement or encouraging action among non-participants. Inductive coding was used to capture the content and variety of actions described, as well as contextual factors and constraints raised by participants.

Coding was guided by a predefined codebook specifying inclusion criteria and illustrative examples for each learning domain, adaptation, and spillover outcome. An initial calibration exercise was conducted in which multiple researchers independently coded a subset of transcripts, followed by reflexive discussion to resolve discrepancies and refine code definitions. Once finalised, the codebook was applied to the full dataset in iterative rounds. Formal inter-coder reliability statistics were not calculated; instead, transparency, reflexive discussion, and consensus were prioritised.

Qualitative findings were used to contextualise and interpret quantitative associations rather than to compare groups or establish causal mechanisms.

Data availability statement

Due to ethical limitations, we are unable to share the raw data. De-identified codebooks, instruments, and analytic specifications are available upon reasonable request.

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