Mapping Flood Recovery Gaps Phase 2: Final Report

Scaling up and creating legacy

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Executive Summary

The Mapping Flood Recovery Gaps project, led by the University of Hull and supported by the Aviva Foundation, addresses critical gaps in UK post-flood recovery processes. In Phase 1, a systematic literature review and stakeholder interviews were the foundation of an innovative and interactive tool, the bespoke serious game, "The Flood Recovery Game," created to explore this challenge. (De Ita et.al, 2022). Phase 2 of the project focused on evaluating demand, refining the Flood Recovery Game workshopping toolkit, and exploring strategies for sustainable and scalable deployment, to improve recovery outcomes across diverse regions and stakeholder groups.

Accordingly, Phase 2 provided useful insights into the demand, refinement, and scalability of the Flood Recovery Game:

Strong Demand Across Sectors: Surveys and workshops revealed significant interest in the toolkit, with up to 81% of respondents recognising its utility in disaster preparedness, education, and decision-making.

Identified Modifications: Stakeholders recommended enhancements, including user-friendly features, diverse scenarios, tailored guidance, and accessibility improvements, to ensure the toolkit's applicability across varied contexts.

Barriers to Adoption: Affordability, lack of awareness, and resource constraints emerged as key barriers, highlighting the need for flexible funding models.

Collaborative Engagement: Workshops demonstrated the toolkit's ability to bridge communication gaps, strengthen collaboration, and support community engagement around flood recovery challenges.

Phase 2 findings underscore the utility of the Flood Recovery Game toolkit and confirm potential for continued/wider deployment. Three complementary and potentially sequential routes for deployment are identified:

1. **In-house model:** least upfront investment, shortest lead-time, strong research connectivity, dependent on availability of in-house resource, smallest reach

2. **Franchise/Partner model:** modest upfront investment, relatively short lead time, good research connectivity, accesses wider delivery resources, medium reach

3. **Open market model:** requires substantial additional investment upfront, longest lead time, potential for high volume of research data but less control of data quality, potential for widest reach and impact.

It is recommended that future work should focus on implementing identified refinements to the toolkit, piloting sustainable deployment models and building capacity towards deploying widely to ensure broad impact and legacy. The University of Hull is actively exploring partnerships and strategies to scale and sustain these efforts. These next steps aim to enhance community resilience, foster collaboration, and support the optimisation of flood recovery practices in a changing climate.

1.0. Introduction

1.1. Background and context

Flooding is a pressing issue in the UK, with significant flood events occurring in recent years. It is estimated that approximately 6.8 million properties in the UK are in areas at risk from river, coastal, and rainfall flooding, comprising 6.3 million properties in England (Environment Agency, 2024), 284,000 in Scotland (Scottish Government, 2019), and 245,000 in Wales (Welsh Government, 2021). The severity and frequency of floods is predicted to rise further, as climate change and poor urban planning decisions place millions of people at risk (European Commission, 2024; PBL, 2023; Kelman, 2022). Increasingly common flood events are engendering a greater emphasis on 'post-flood recovery' and the 'effectiveness' of these recovery processes to support those affected by flooding.

This increasing flood risk highlights the need for effective recovery strategies that account for repeated flood events over time (Environment Agency, 2022; UK Health Security Agency, 2023). While current flood defences provide some protection, they are unlikely to be sufficient under future climatic scenarios (Office of Science and Technology, n.d.; Natural Resources Wales, 2024). Effective governance and better communication, coordination, and planning are crucial to addressing these challenges. However, in the UK, the fragmented flood governance – where various agencies oversee different responsibilities – makes coordinated management challenging (Hutter, 2024; De Ita et.al, 2022). This oftens results in inefficient recovery outcomes for people and communities: a challenge the Flood Recovery Game workshop tools seek to address by encouraging stakeholders to collaborate and overcome the tendency to work in silos. By fostering collaboration through tools like the Flood Recovery Game workshop, stakeholders can better

prepare for the complexities of future flood recovery efforts. Community-based approaches, which actively involve local populations, have been shown to enhance recovery outcomes and sustainability while empowering affected populations to contribute local knowledge and insights (Horney et al., 2016; Carrasco, Egbelakin and Dangol, 2023; Mahajan et al., 2022; Mfon and Olurotimi, 2023; Kristian and Mohammad, 2024). This not only improves recovery outcomes but enhances the psychological well-being of participants by giving them a sense of control over the recovery process (Mahajan et al., 2022). The Flood Recovery Game workshop tools reflect this emphasis on engagement by providing a participatory platform, where community representatives, policymakers and other stakeholders can collaborate.

Studies have emphasised the need for clearer roles and responsibilities within flood recovery governance (Pitt Review, 2007; Local Government Association, 2019), suggesting that tools like The Flood Recovery Game workshop can help clarify these roles by fostering dialogue and cooperation across different sectors and levels of government. Recent work has also explored the role of innovative tools in enhancing flood recovery efforts (Munawar et al., 2021; OCHA and UNDP, 2023). While many studies focus on digital tools and technologies, there is growing recognition of the value of simulation-based approaches, which can provide a low-risk environment for testing recovery strategies and improving stakeholder engagement (Bakhtiari et al., 2024). The Flood Recovery Game exemplifies this trend, offering a novel approach to flood recovery planning that combines experiential learning with problem-solving (Forrest et al., 2024).

The Mapping Flood Recovery Gaps project focuses on utilising innovative research approaches to engage with this key issue of post-flood recovery. The project has been led by the University of Hull in collaboration with Aviva claims teams from 2020-2025 and funded by the Aviva Foundation. The project is split into 2 phases designed to explore and understand the gaps in post-recovery processes. Phase 1 of the project focused on identifying key challenges in flood recovery processes, particularly within the Humber region in the UK. It involved systematic literature reviews and stakeholder interviews to identify gaps in flood recovery processes, laying the groundwork for developing an innovative and interactive tool to explore this challenge (De Ita et.al, 2022). The creation of a bespoke serious game, "The Flood Recovery Game," is designed to engage stakeholders, enhance communication between different agencies, and explore recovery challenges in a structured, interactive format.

Positive responses to the game from Phase 1 workshops (Energy & Environment Institute, University of Hull, 2023) and other exposure, such as in the University of Hull MSc Flood Risk Management Programme (University of Hull, 2024) in the UK and at national and international conferences, suggested that the workshop and game could offer benefits to a wide range of participants if suitably deployed. The second phase of work, described here, is concerned with methodical evaluation of demand for the toolkit and exploring the most effective deployment and scalability options. The goal is to optimise for inclusive access to these resources, ensuring that gaps in flood recovery processes can be identified and mapped so that solutions can be generated

collaboratively, and communities are made more resilient across the UK. This phase is particularly timely, given the increasing number of storm events in the UK, from Storm Babet in 2023 to Storm Bert in 2024 (Met Office, 2025), and a major incident in Greater Manchester in 2025 (Howard and Fawkes, 2025), underscoring the growing need to bridge communities and formal flood risk management actors to co-develop flood resilience together. This report outlines the outcomes of Phase 2 project activities, with specific attention to how the tools can be optimised for efficacy, creating a more resilient and adaptive approach to flood recovery that benefits a wide range of stakeholders.

1.2. Project objective

The overarching objective of this project was to assess the scalability of the Flood Recovery Game workshop tools by evaluating demand and identifying what changes might enhance effectiveness for broader application by communities affected by flooding in the UK and potentially, globally. By following a multiple methods approach, including both quantitative and qualitative data, this phase sought to understand which sectors and communities would benefit most from the tool and how it can be effectively delivered through a sustainable model.

The following key objectives were derived from the project's Key Performance Indicators (KPIs):

1. Quantitative evaluation of demand for the Mapping Flood Recovery Gaps tools – how large is the potential market?

2. Qualitative evaluation of demand for the tools – who needs them and how will they use them? How/where will they achieve the most benefit?

3. Identification of modifications to the toolkit to produce a format suitable for use at scale and with new audiences.

4. Identification of viable and sustainable modes of delivery for use at scale – who will lead and implement the tools in future? How will this be funded/resourced?

5. Identification of research opportunities and how these will be realised from wide-scale deployment.

6. Dissemination plan and implementation strategy for the tools to achieve wider public benefit and a sustainable legacy for communities, businesses and citizens.

Figure 1: Key Project Activities

Community Workshop with Living with Water Ambassadors, Hull

Game displayed at the Students Sustainability Research Conference, Leeds

March 2024

Quantitative Survey Commissioned with Censuswide

May 2024

Flood Recovery Game Workshop at Royal Geographical Society with IBG Annual Conference, London

August 2024

Key Project Activities

April 2024

Test Workshop Hull

Community Workshop in Govan, Scotland

June 2024

Flood Recovery Game Workshop at CIWEM Annual Flood and Coast Conference, Telford

September 2024

Game displayed at Building Pathology Conference, University of Oxford Brookes

Climate Resilience Week JBA Consulting

2.0. Data Collection Approach

Phase 2 gathered data through a survey of 500 respondents and through interactive workshops with key stakeholders. This multiple methods approach enabled data collection from a nationally representative sample through the survey as well as more detailed and subjective perspectives through in-person, interactive workshops. The survey explored the demand, practical application use cases, and possible refinements for scalability of the Flood Recovery Game.

Findings emphasise the game's value in enhancing collaboration, addressing recovery gaps, and equipping communities and organisations with practical tools to improve flood resilience. The workshops were held at four locations in England and one location in Scotland, with a diverse range of stakeholders engaged (see Figure 2: Workshop Locations).

Through this research design, the project was able to address each of the KPIs in a structured and deliberate approach (see Table 1: beside with KPI – Info source).
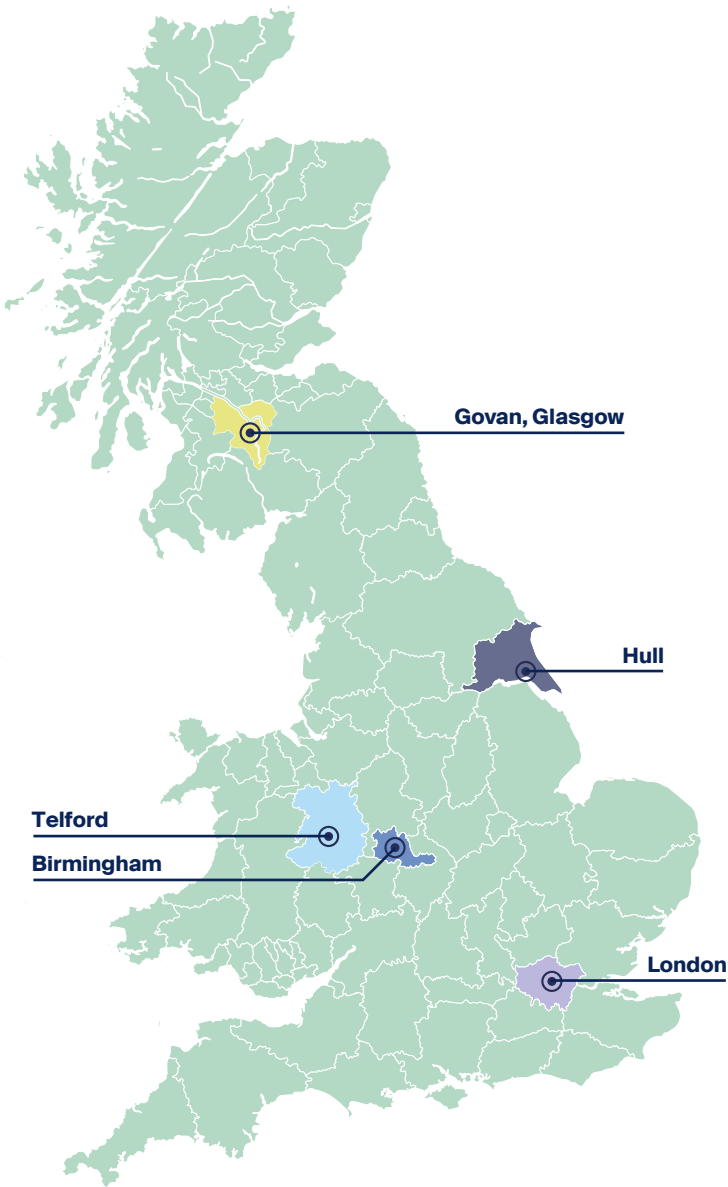
Figure 2: Workshop Locations

Table 1: KPIs with Information source

KPI/objective	Primary source of information	Additional sources of information
Quantitative evaluation of demand for the Mapping Flood Recovery Gaps tools – how large is the potential market?	Survey commissioned from Censuswide Limited[1]	Workshops, feedback and discussion with participants
Qualitative evaluation of demand for the tools – who needs them and how will they use them? How/where will they achieve the most benefit?	Workshops, feedback and discussion with participants	Survey commissioned from Censuswide Limited
Identification of modifications to the toolkit to produce a format suitable for use at scale and with new audiences.	Workshops, feedback and discussion with participants	Survey commissioned from Censuswide Limited
Identification of viable and sustainable modes of delivery for use at scale – who will lead and implement the tools in future? How will this be funded/resourced?	Survey commissioned from Censuswide Limited	Workshops, feedback and discussion with participants
Identification of research opportunities and how these will be realised from wide-scale deployment.	Workshops, feedback and discussion with participants	Synthesised by the project team from outcomes and findings
Dissemination plan and implementation strategy for the tools to achieve wider public benefit sustainable legacy for communities, businesses and citizens.	Synthesised by the project team from outcomes and findings	

[1] see 3.1 below for details

3.0. Findings for each KPI

3.1. KPI 1: Quantitative evaluation of demand

A comprehensive approach was employed to evaluate the potential market for the Mapping Flood Recovery Gaps tools. A UK-wide population survey was conducted by Censuswide Limited between May and June 2024 with 500 respondents. Participants were selected from a diverse range of sectors to ensure a broad representation of stakeholders in flood recovery and resilience. Respondents were introduced to the Flood Recovery Game workshop tools through a one-minute 'explainer' video and then invited to complete a survey comprising 17 questions.

The Censuswide Limited survey revealed strong interest in the Flood Recovery Game's potential benefits. A large proportion of respondents (81%) believed the game would benefit their community, 69% their workplace, and 70% their clients or partner communities. The proportion of respondents stating that they would use the toolkit was similarly high, with 70% of respondents indicating they were likely to do so if the tools were publicly available. Workshop feedback aligned with this trend, with 79% of participants stating they were likely to use the game. These findings confirm broad interest in the tools across various sectors and contexts. Regarding

resource commitment, 77% of Censuswide Limited survey respondents expressed willingness to commit either human or financial resources, or both. Workshop participants reported slightly lower willingness at 60%, with variations attributed to participant role within the organisation, budget constraints, or other context-specific factors. Additionally, insights from a 'before and after' tracked voting approach revealed that all those who participated in a Flood Recovery Game workshop at the Flood and Coast Event in June 2024 expressed interest in using the tools, underscoring a diverse and promising potential market.

Despite the positive reception, barriers to adoption were identified. Perception of flood as a low risk was the most significant factor, cited by over 50% of respondents to the Censuswide Limited survey as a reason the game might not benefit their community or workplace. Resource allocation was another recurring concern, with about 20% of the same respondents stating more pressing concerns. These findings suggest that many individuals and businesses still do not consider the consequences of climate change to be a serious risk to their work or home life.
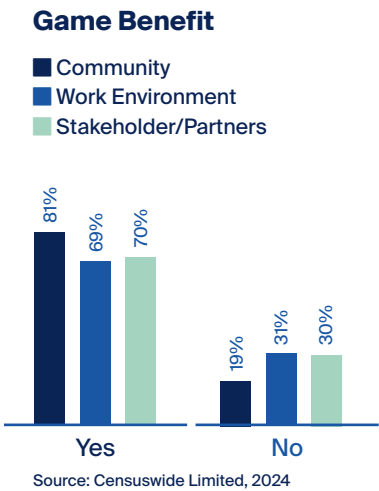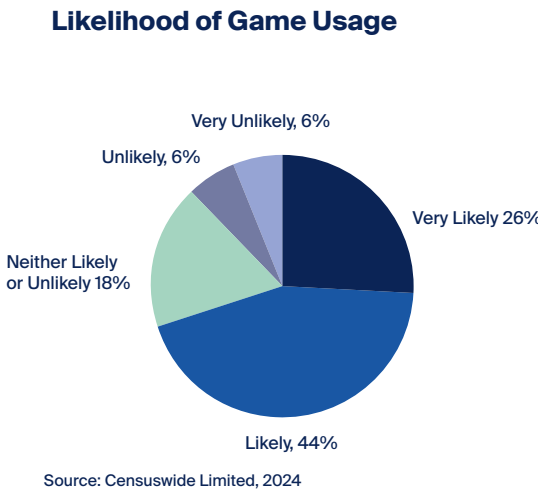
Game Benefit

- ■ Community
- ■ Work Environment
- ■ Stakeholder/Partners

Source: Censuswide Limited, 2024

Figure 3: Benefit of the Game

Likelihood of Game Usage

- Very Unlikely, 6%
- Unlikely, 6%
- Very Likely 26%
- Neither Likely or Unlikely 18%
- Likely, 44%

Source: Censuswide Limited, 2024

Figure 4: Likelihood of Game usage

Commitment of Resources

36% 20% 20% 8% 16%

- ■ Yes, both financial and human resources
- ■ Yes, financial resources only
- ■ Yes, Human resources only
- ■ No, Neither financial or human resources
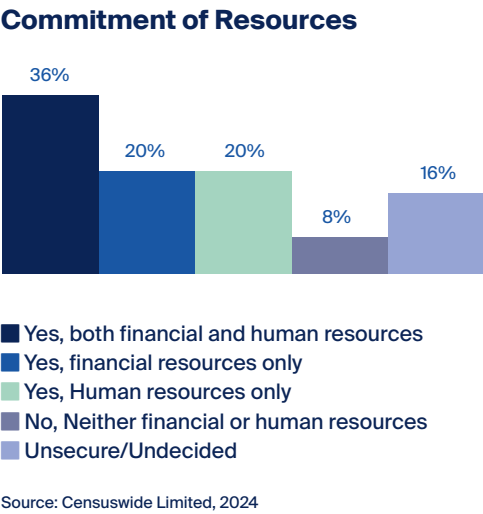- ■ Unsecure/Undecided

Source: Censuswide Limited, 2024

Figure 5: Willingness to commit resources to the Game

Section summary:

The Censuswide Limited survey and Flood and Coast event workshops highlighted strong demand for the Flood Recovery Game workshop tools, with 70%-81% of respondents recognising their value across communities, workplaces, and clients. While barriers such as perceived low flood risk and resource allocation remain, the data reveal a robust potential market and actionable insights for tailoring the tools to diverse sectors and audiences.

3.2. KPI 2: Qualitative evaluation of demand

The qualitative evaluation of demand was conducted through a series of seven workshops that utilised the Flood Recovery Game as a primary tool to engage a diverse group of stakeholders, including community members, policymakers, academics, businesses, and flood experts. Each workshop focused on a different potential audience or audience mix and tested different gameplay options to collect responses on the utility of the tools in addressing flood recovery gaps. Feedback was systematically gathered through 84 feedback forms, coded and analysed to identify recurring themes and actionable insights. Additional insights were drawn from data from the Censuswide Limited survey and discussion from participants linking qualitative findings to broader trends.

Qualitative data collected from workshops and feedback forms revealed important insights into demand for the Flood Recovery Game workshop tools, particularly in terms of who needs them, how they will be used, and where they will achieve the most benefit. The Censuswide survey shows interest across multiple sectors, including community organisations, businesses, charities, policymakers, and educators, indicating a clear recognition of the game's utility in addressing flood recovery gaps, fostering resilience, and engaging stakeholders.

Table 2: Other Game Use Cases (Source: Censuswide Limited, 2024)

Other Use Cases	Count
Disaster Preparedness	184
Community Engagement	168
Emergency Response Drills	160
Education/Academic Use	152
Risk Assessment Workshops	147
Urban Planning	120
Testing system and processes	111
As a space for communities and agencies to collaborate	11
Business Continuity Planning	106
Infrastructure Development	104
Policy Development	102
Interagency Coordination	75
Not sure	29
Other, please specify and explain	4

Geographically, regions such as Greater London, the Northwest, Southeast, and Yorkshire and the Humber reported strong interest in Flood Recovery Game workshops, particularly areas vulnerable to flooding (fig. 6). The data suggest that the game is needed by those directly involved in disaster recovery and resilience-building, as well as by educators and community leaders aiming to enhance awareness and preparedness. A practical example from this project phase was when the Flood Recovery Game featured at Hull City Council's first ever pop-up Flood Awareness Centre (BBC, 2024; University of Hull, 2024a).

Responses from the Censuswide Limited survey also revealed how the game would be used in practice. Disaster preparedness was one of the most cited uses, as respondents noted the game's capacity to help align recovery strategies with local risk plans and foster readiness for future flood events. Workshop participants also saw value in its ability to promote collaboration, decision-making, and internal knowledge sharing, enabling teams to address recovery challenges more effectively, particularly for organisational settings. Similarly,

overwhelmingly positive responses were received to a Flood Recovery Game session conducted at the first ever JBA Climate Resilience Week (JBA Consulting, 2024; Forrest, Amen-Thompson and Mucherera, 2024), providing further confirmation of perceived value.

Another prominent theme from workshop feedback was the potential for educational utility, with strong interest in using the tools for teaching flood-related concepts in schools, universities, and professional development programmes. The game was also viewed as a practical tool for engaging STEM students in problem-solving activities and educating communities about the risks and impacts of climate change and about flood preparedness. Several responses also highlighted its potential for being adapted to tackle other climate-related challenges, such as extreme heat, fire or hurricane, highlighting further options for broader scope of use.

Participants agreed that the game would achieve its greatest impact in community engagement, professional and organisational use, and education. For community use, the game's ability to raise awareness about flood risks and to strengthen local resilience was frequently emphasized. Organisationally, it was expected to help streamline communication and improve inter-agency collaboration by simulating discussion of recovery challenges in a structured environment. Educational value was recognised in simplifying complex recovery concepts, making them accessible to diverse audiences, encouraging collaboration and innovative thinking.

Across all categories, the Flood Recovery Game tools were seen as effective for improving communication, fostering collaboration amongst stakeholders, raising awareness, strengthening local resilience and enhancing preparedness in flood-prone regions.
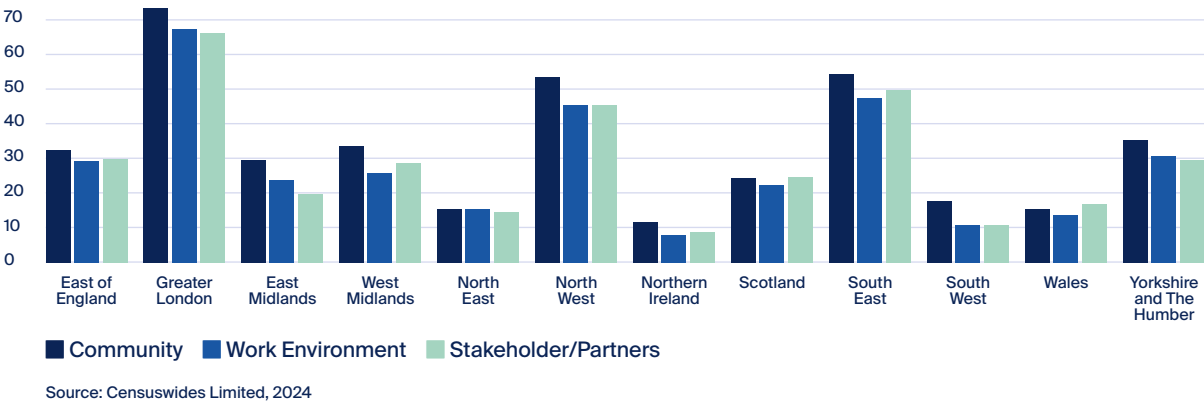
Positive responses to the game by region

Community ■ Work Environment ■ Stakeholder/Partners

Source: Censuswides Limited, 2024

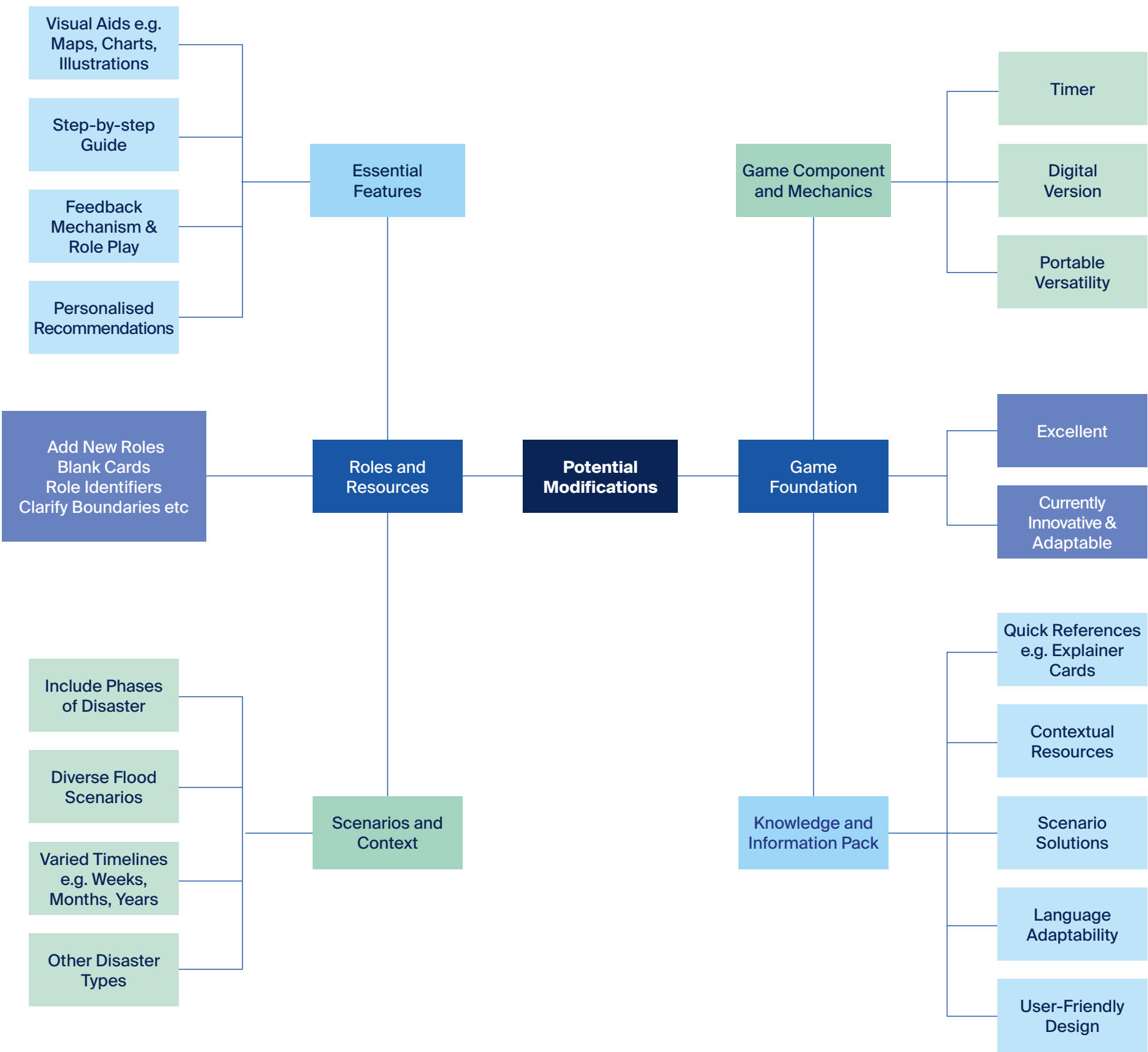**Figure 6:** Positive Responses to the Game by Region

Section summary:

Qualitative evaluation revealed demand for the Flood Recovery Game tools across a broad spectrum of stakeholders, including community members, educators, and professionals in post-flood recovery. The tools were perceived to have potential to achieve the most benefit in community engagement, organisational use, and education, with applications ranging from preparedness and resilience-building to training and decision-making. The insights highlight the adaptability of the tools and potential to address diverse recovery challenges across different sectors and regions.

3.3. KPI 3: Identification of modifications to toolkit

Figure 7: Possible Modifications Identified

Insights into modifications for the Flood Recovery Game toolkit were gathered from both the Censuswide survey and feedback collected during workshops. These data sources provided recommendations on how to adapt the toolkit to meet the needs of diverse audiences, ensuring its suitability for use at scale and in varied contexts. Feedback was analysed and categorised into themes to identify potential changes (fig 7).

Visual Aids e.g. Maps, Charts, Illustrations

Step-by-step Guide

Feedback Mechanism & Role Play

Personalised Recommendations

Essential Features

Add New Roles Blank Cards Role Identifiers Clarify Boundaries etc

Roles and Resources

Potential Modifications

Include Phases of Disaster

Diverse Flood Scenarios

Varied Timelines e.g. Weeks, Months, Years

Other Disaster Types

Scenarios and Context

Game Component and Mechanics

Timer

Digital Version

Portable Versatility

Game Foundation

Excellent

Currently Innovative & Adaptable

Knowledge and Information Pack

Quick References e.g. Explainer Cards

Contextual Resources

Scenario Solutions

Language Adaptability

User-Friendly Design

Source: Censuswide Limited Survey and Project Workshops

3.3.1. Workshops held and adaptations tested

Workshop sessions included diverse variations of gameplay (ranging from competitive, semi-collaborative, and fully collaborative, with some of the workshops playing only the competitive and semi-competitive rounds), timings, and formats to explore how best to deliver the game across different contexts and audiences. A range of gameplay workshop durations was tested, including full-day sessions, half-day sessions, and shorter sessions lasting approximately 45 minutes.

Each format provided unique insights into participant engagement and the depth of discussions generated during the sessions:

- The full-day sessions allowed participants to immerse themselves fully in the game, enabling comprehensive exploration of the dynamics of flood recovery, stakeholder roles, and decision-making strategies. These sessions provided the richest experience, as participants had the time to delve deeply into the scenarios, engage in meaningful collaboration, and fully utilise game components and mechanics.

- The half-day sessions offered a balance between engagement and time efficiency, allowing participants to cover a substantial part of the game while still facing some constraints in exploring all the game's layers.

- Shorter sessions of 40 to 45 minutes presented a significant challenge. While these condensed versions were useful as taster sessions to introduce the game and its concepts, the richness and complexity of the game were inevitably compromised, affecting impact and value. The limited time restricted participants' ability to engage deeply with the scenarios, understand the roles fully, and appreciate the collaborative decision-making process integral to the game. As such, these shorter sessions were effective primarily for demonstration purposes, rather than providing a comprehensive experience of the game's potential.

Section summary:

The analysis reveals that while the Flood Recovery Game tools have a solid foundation, targeted modifications would enhance scalability and appeal to diverse audiences. These include incorporating more user-friendly features, refining roles and scenarios, expanding knowledge resources, and improving gameplay mechanics.

With these enhancements, the toolkit was perceived to be better equipped to support flood recovery efforts at scale and across various contexts. The tool offered considerable flexibility around duration although utility as a toolkit for identifying and mapping gaps in flood recovery was reduced in the shortest sessions (below 1 hour). Such experiences were better seen as 'tasters', allowing participants to gain a sense of how the tools might be used with clients, colleagues or communities.

Figure 8: Workshops held, and adaptations tested

Location: Govan
Date: 29/04/2024
Audience: Community
Game Variations Played: 1-3
Board: A
Time Played: 2 Hours
Number of Players: 10
Adaptations Made: Employed pooled resource strategy; adjusted time; variations 1 and 2 conducted competitively.

Location: Telford
Date: 06/06/2024
Audience: Specialist
Game Variations Played: 1-4
Board: A & B
Time Played: 1 Hours 40 Minutes
Number of Players: 40
Adaptations Made: Different scenarios applied to various tables; resource cards (e.g., media, utilities/ infrastructure) introduced at select tables; gameplay time adjusted; competitive and fully collaborative variations executed.

Location: Birmingham
Date: 26/09/2024
Audience: Consultancy
Game Variations Played: 1-4
Board: A & B
Time Played: 3 Hours
Number of Players: 10
Adaptations Made: Maintained pooled resource strategy; implemented deck-based resource distribution; increased resource restrictions; executed competitive, semi-collaborative, and fully collaborative variations; adjusted gameplay time.

Location: Hull
Date: 01/03/2024
Audience: Community
Game Variations Played:
Board: A & B
Time Played: 6 Hours
Number of Players: 9
Adaptations Made: None

Location: Hull
Date: 25/04/2024
Audience: Academia {Internal Test Team}
Game Variations Played: 1-4
Board: A
Time Played: 2 Hours
Number of Players: 9
Adaptations Made: Resources pooled; scoring sheet implemented; gameplay time and process adjusted.

Location: Hull
Date: 09/05/2024
Audience: Local Authority/ Community
Game Variations Played: 1-4
Board: A & B
Time Played: 4 Hours 30 minutes
Number of Players: 8
Adaptations Made: Maintained pool resource approach

Location: London
Date: 30/08/2024
Audience: Academia
Game Variations Played: 1
Board: A
Time Played: 40 Minutes
Number of Players: 10
Adaptations Made: Pooled resource maintained; limited to four scenarios.
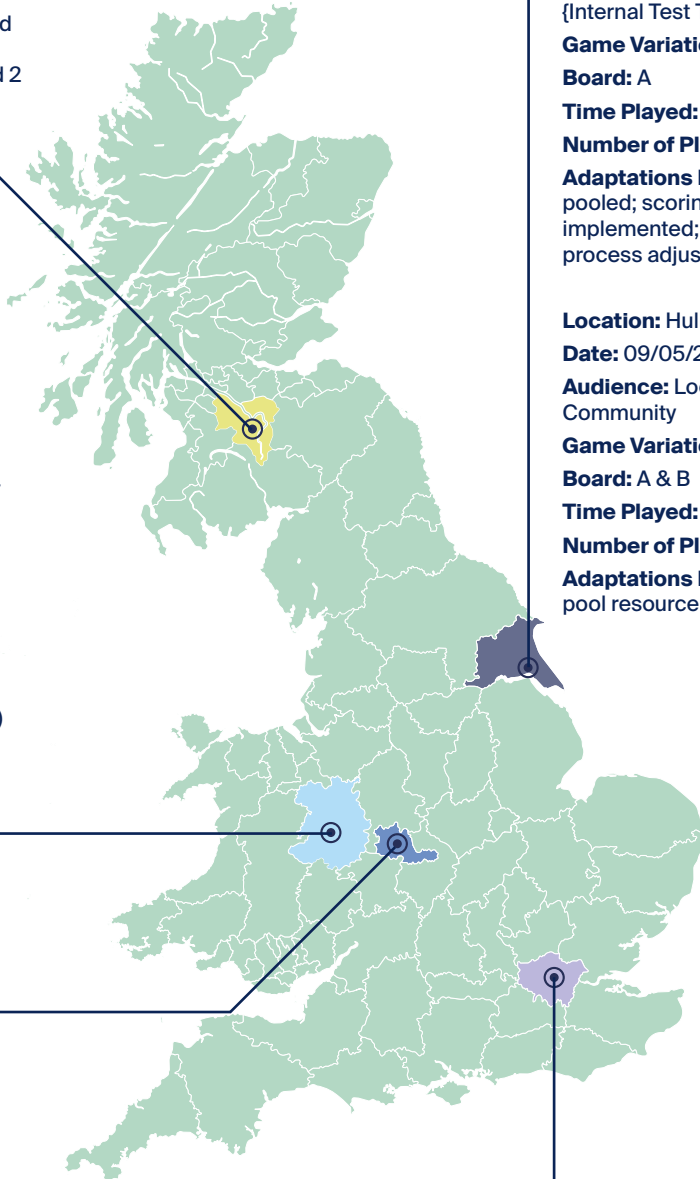
3.4. KPI 4: Identification of viable and sustainable modes of delivery for use at scale

To address this KPI, both the Censuswide Limited survey and workshop feedback were analysed. Respondents were asked about their resource requirements, willingness to commit resources, and preferred methods of support to effectively use the game. Additional insights were gathered on potential barriers to adoption and resource allocation to identify suitable pathways for scaling the game's deployment.

The analysis provided insights into who might lead and implement the toolkit and how it could be funded and resourced for effective deployment.

3..4.1. Leadership and implementation needs

Survey respondents identified the critical resources required for effective deployment, emphasising training, guidance, and facilitation. Training was the most frequently cited need, with 49% of survey respondents identifying it as essential. Respondents preferred varied delivery methods, including in-person training (49%), video demonstrations (49%), and training manuals or documentation (41%). By contrast, 40% of workshop participants indicated a need for facilitators to lead workshop sessions effectively, while 24% highlighted the importance of clear instructions and scenarios.

These findings suggest that for successful implementation, leadership will likely rely on trained facilitators equipped with detailed knowledge packs, scenario guides, and technical support. Organisations and agencies engaged in environmental hazard planning are particularly well-positioned to lead, as 56% of these respondents indicated a need for guidance on integrating the game into their protocols.

Resources Needed

Source: Project Workshops, 2024

Figure 9: Resources needed

3.4.2. Funding and resource allocation

Survey evidence concerning willingness to commit resources demonstrated strong potential for scaling the game. From the Censuswide survey, 77% of respondents expressed readiness to invest financial or human resources or both (see KPI 3.1 above). Respondents involved in environmental hazard planning showed the highest commitment (92%), followed by those in practice roles (87%), indicating that these sectors may lead funding and resource mobilisation efforts. However, affordability was identified as a significant barrier, cited by 152 respondents as a factor that could prevent adoption. Further work is needed to understand price sensitivity in detail. Other barriers included limited knowledge of facilitation (114 responses), budget constraints (117 responses), and time constraints (112 responses). These findings indicate the importance of designing flexible, cost-effective funding models to support organisations with limited budgets.
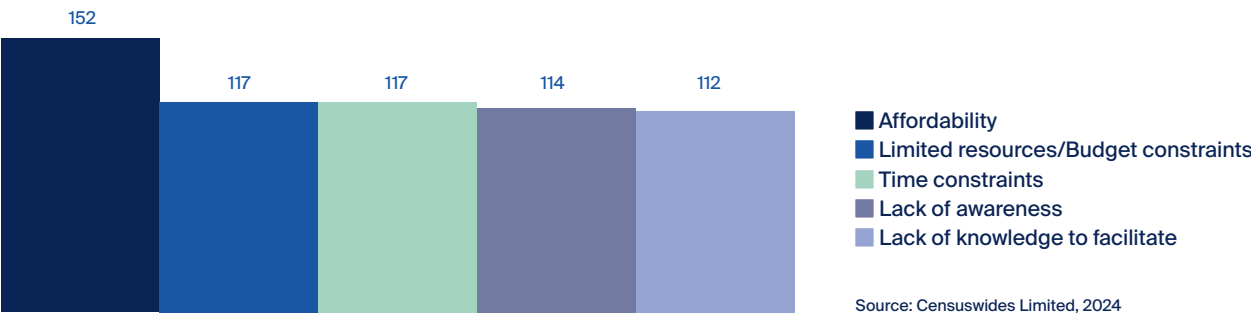
Barriers to Adoption

Source: Censuswides Limited, 2024

Figure 10: Barriers to Adoption

3.4.3. Barriers and solutions

While resource commitment levels indicated strong potential for wide deployment, key barriers must be addressed to enable broader adoption. Lack of awareness about innovative tools like the Flood Recovery Game (117 responses) and scepticism about using games for serious purposes (112 responses) were frequently mentioned. To overcome these challenges to widescale deployment, outreach and education campaigns will be critical to raising awareness and demonstrating the game's effectiveness in recovery planning.

Feedback from workshops reinforced the need for tailored solutions, such as shorter game versions and digital formats to make the toolkit more accessible for organisations with diverse needs and constraints. Addressing these barriers will be essential for ensuring sustainability and scalability.

Section summary:

The findings highlight that the Flood Recovery Game's successful delivery at scale will require strong leadership from trained facilitators, support from agencies engaged in environmental hazard planning, and flexible funding models to accommodate varying budgets. Addressing barriers such as affordability and lack of awareness through tailored solutions, outreach, and diverse training methods will be crucial for enabling widespread adoption and effective implementation.

3.5. KPI 5 & 6: Identification of research opportunities and dissemination plan and implementation strategy

Synthesising evidence from the information collected - workshops, surveys, formal and informal conversations, post-game discussions - three main strategy options for future deployment and dissemination emerged (Tables 3a-3c).

These approaches are seen as complementary rather than mutually exclusive and a blended approach is recommended which levers elements from each model. Moreover, such an approach enables incremental development, balancing scalability and sustainability. The framework exposes potential 'resource voids' that need to be bridged – in particular moving to the open market model. However, growing reach and capacity through models 1 and 2 presents a potential solution to support the generation of resource and capacity to facilitate the investment needed to realise wider scale deployment. Incorporating digital components and CPD-accredited training can further enhance accessibility and credibility. All options will continue to utilise the game for internal education and further research at the Energy and Environment Institute (EEI), ensuring ongoing academic and practical advancements.

Phases 1 and 2 of the project have primarily been delivered using the In-house model, with some elements of the Franchise/Partner model employed, such as collaboration with Aviva Insurance to test their Incidence Management Response Plan and with JBA at the Climate Resilience Week. For the immediate future, the toolkit will continue to be deployed through the In-house Model, while additional funding and partnerships are sought to expand its reach and impact. By addressing challenges such as affordability and quality control, the toolkit can achieve its goal of delivering significant public benefit and fostering a sustainable legacy for communities, businesses, and citizens.

Table 3: Emergent Strategies; a: In-house model

Options ➔ / Themes ⬇	1.'In-house' model	
	Deployed by the EEI on a consultancy basis for external clients or as part of internal education or research programmes • Game and workshop tools retained in-house and deployed by EEI only • Utilises EEI staff to deploy and potentially provides opportunities for PhD/master's students to become trained facilitators • Range of fees for external clients: highest cost to private sector, mid-range cost for authorities/government, and low/subsidised cost for civil society and community groups.	
	Pros • Provides an opportunity for direct interaction with users, enabling the EEI to maintain strong control over how the toolkit is implemented • Promotes quality assurance, as expert in-house facilitation ensures the toolkit is used as intended • Continued resourcing for EEI allows game to be adapted and further developed to respond to changes in the FRM landscape • Continued resourcing for EEI allows greater expansion to international markets and clients • High level of selectivity over deployment options and section of participants • Tried and tested	**Cons** • Resource-intensive, requiring skilled personnel to deliver consultancy services. • Limits scalability due to the need for direct involvement in each engagement. • Interest needs to be evidenced (i.e. by having a certain number of workshops arranged/financed by external organisations) before EEI capacity can be committed and resourced
Digital	Could develop a digital version for in house deployment. Non-trivial development required.	
CPD	Offer CPD-accredited training sessions, led by the Energy and Environment Institute to help organisations integrate the toolkit into their professional practices. Partner with external organisations, such as CIWEM or the Environment Agency, to deliver CPD-accredited training to reach broader audiences and establish credibility in professional sector.	
Research Opportunities and Implications	This model allows data collection to be embedded into the workshop processes, enriching academic research opportunities. Areas for potential research identified include: **Ecological Adaptation and Inclusion of Lived Experiences** • Implication: Direct control over data collection and analysis during workshops. Researchers can design activities to capture nuanced perspectives, ensuring high-quality, targeted insights into the role of children's experiences in ecological adaptation. **Empathy and Collaborative Recovery** • Implication: Facilitators can observe and record real-time interactions during workshops, gathering rich, qualitative data on empathy-building and collaborative strategies. The in-house model would ensure a researcher-controlled environment for detailed research.	

Table 3b: Franchise / Partner model

Options ➜ Themes ⬇	2.'Franchise/Partner' model	
	Work with trusted 'partners' who will deploy the game workshop to their internal or external audiences • Partners may be consultants delivering for their clients, large companies (such as Aviva) or other organisations e.g. Local Authorities, Environment Agency • Deliver Training of Trainers (ToT) sessions to empower organisations with the skills and knowledge to facilitate the game independently, fostering long-term capacity building • Partners buy/rent game sets or pay a fee (e.g. per participant or annualised) • Additional 'expert' services could be offered (e.g. analysis, bespoke adaptations) for an additional fee.	
	Pros • Works at small scale but flexible according to demand and EEI capacity • EEI retains some control/oversight of use • Some assurance of quality of deployment • Builds relationships with organisations, increasing the likelihood of long-term collaborations • Stepwise development with partners enables potential for organic growth without at-risk upfront investment • Efficient use of EEI resources – initial training and occasional support only	**Cons** • Possibly slower to reach wide audience • Need to find appropriate, interested partners • Some ongoing EEI resources needed • May exclude smaller organisations or communities with limited budgets • Potential users may be put off by non-academic partners (who may have different values or be competitors) • Open to abuse/copying • Any reputational issues or controversial choices of the partner/franchisee may affect the credibility of the game
Digital	Could produce a digital or hybrid digital version – possibly in collaboration with partner. Could develop online facilitator training relatively easily. Teams – based interaction possible with partner facilitators. Online video instructions and support materials possible	
CPD	Offer CPD-accredited training sessions, led by the Energy and Environment Institute to help organisations integrate the toolkit into their professional practices. Partner with external organisations, such as CIWEM or the Environment Agency, to deliver CPD-accredited training to reach broader audiences and establish credibility in professional sector.	
Research Opportunities and Implications	For this model, there is clear potential to collaborate with partners to exercise options to integrate data collection for research, subject to commercial or other sensitivities of partner client groups. Areas for potential research identified include: **Policy Advocacy and Budget Allocation** • Implication: Partner organisations deliver workshops and provide data on how the toolkit influences decision-makers. This approach leverages external networks, expanding reach while requiring quality assurance measures to ensure consistent data collection. **Community Awareness and Preparedness** • Implication: Partners can gather data on how the toolkit impacts community preparedness over time. This enables a scalable approach but may require clear guidelines and standardised reporting to ensure research integrity.	

Table 3c: Open market model

Options ➜ Themes ⬇	3.'Open market' model	
	Produce and sell workshop game boxes complete with comprehensive guidance material • Wide dissemination as 'self-drive' version for public use • Available for purchase • Structured, detailed support materials for game play and workshop facilitation including templates for gap recording and prioritisation discussions.	
	Pros • Potentially wide reach & benefit • Some potential to offer additional 'expert services' • Potential direct revenue stream to support ongoing development • If takes off, could become self-sustaining with little ongoing input from project team	**Cons** • Significant upfront investment required at-risk (marketing, production, packaging, distribution etc) • Further work required to substantiate business case • Difficult to measure impact • Largely 'one size fits all' – hard to tailor for individual users at scale • Little control or knowledge of how it is used or adapted by end-users • Difficult to control quality of deployment (reputational and delivery risk) • Model relies on reaching large scale to work • Limited interest as an off-the shelf commercial game, would be most relevant to organisations and not the general public • Relatively high risk of failure
Digital	Could produce a fully digital version (significant development investment required). Online video instructions and support materials possible. Online capture of outcomes for research use possible (but research utility limited).	
CPD	CPD options possible but limited.	
Research Opportunities and Implications	In this model, whether/how to capture research data remains unresolved. Areas for potential research identified include: **Community Awareness and Preparedness** • Implication: The self-drive version allows broad data collection from diverse end-users. However, the lack of direct oversight limits the depth and reliability of the data that would be generated. Mechanisms for voluntary feedback (e.g., surveys) would be essential. **Empathy and Collaborative Recovery** • Implication: Users can provide feedback on how the toolkit fosters empathy and collaboration. Limited control over deployment means research outcomes may be inconsistent or incomplete without a structured feedback mechanism.	

4.0. Conclusion

Phase 2 of the Mapping Flood Recovery Gaps Project has built upon the foundational work of Phase 1, focusing on evaluating demand, identifying opportunities for refinement, and exploring strategies for broader deployment of the Flood Recovery Game workshop tools. This phase has further demonstrated the potential of the toolkit to address gaps in post-flood recovery through engagement with a diverse range of stakeholders by evaluating responses to a number of workshops and surveys.

The findings confirm significant demand for the game across multiple sectors, including communities, policymakers, and educators, highlighting its broad applicability for disaster preparedness, education, and decision-making. Feedback gathered during this phase has provided critical insights into modifications needed to enhance the toolkit's scalability, including user-friendly features, diverse scenarios, and tailored guidance to meet the needs of different contexts and audiences. The exploration of viable dissemination models - Open Market, Franchise/Partner, and In-House - revealed that a blended approach offers the best potential for achieving scalability and sustainability.

While Phases 1 and 2 have primarily utilised the In-House Model, the current work has provided direct evidence that the Franchise/Partnership model is feasible (Aviva and JBA workshops). Strategic partnerships and digital adaptations are recommended to expand the toolkit's reach and impact. Additionally, this phase identified key research opportunities that can drive innovation and inform policy development, further contributing to the long-term legacy of the project. Phase 2 has reaffirmed the importance of fostering collaboration among stakeholders and embedding recovery preparation within broader resilience strategies. The Flood Recovery Game has proven to be an effective tool not only for surfacing recovery gaps but also for enabling meaningful discussions and building relationships across sectors. These efforts have set the stage for the next steps in scaling the toolkit and embedding its use in flood recovery frameworks, ensuring a lasting and transformative impact in the face of an increasingly uncertain future climate.

Picture: The Flood Recovery Game

5.0. Recommendations and Next steps

This current phase of work has confirmed the existence of demand and utility for the tools that have been developed. A range of different delivery modes have been tested with a variety of potential beneficiary groups. Value has been identified in both large-scale deployment and smaller scale, bespoke, delivery options. Additional funding would enable progress towards more expansive dissemination options, whilst unfunded incremental implementation remains possible with a realistic prospect of organic growth potential. Thus, feasible implementation options are available with or without additional funding, as set out below.

1. If funding support for additional resources is not available:

- Continue to use the Flood Recovery Game toolkit with in-house resources for university teaching and research purposes, building the evidence base for use and benefit,

- Maintain a watching brief for opportunities to deploy the tools using in-house resources for clients such as companies, community groups, and public sector organisations, subject to available capacity and resources,

- Seek opportunities to build partnerships with trusted third parties such as consultancies, local authorities, foundations or research partners to trial and develop the Franchise/Partnership model, subject to the availability of resources, with a view to growing a sustainable deployment operation

2. If funding support is available to employ a dedicated project officer and development resources:

- Continue to implement the options in 1. above and

- Pro-actively build partnerships with large organisations, consultancies and public sector organisations such as local authorities and the Environment Agency to test, develop and establish a Franchise/Partnership deployment model, seeking to grow this to a self-sustaining critical mass,

- Work-up and test the modifications identified within this report,

- Investigate and trial prototype digital and hybrid versions of the tools,

- Develop a version of the toolkit for use within a continuing professional development (CPD) context, ideally in collaboration with a national accredited training provider such as the Chartered Institute of Water and Environmental Management (CIWEM),

- Develop a costed business case and financial model for large-scale deployment including market evaluation, production, distribution, marketing and communications and management costs.

5.1. Next steps

- Continue to deploy the tools as set out in 1. above

- Work with partners and collaborators to explore funding opportunities to support a third phase of work to undertake the tasks set out in 2. above.

Picture: Flood and Coast Workshop, June 2024

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Appendix: Research and Management Teams and Advisory Group Members

Operational teams

University of Hull Team

Name	Organisation	Job Title	Project Role
Dr Giles Davidson[1]	Energy and Environment Institute University of Hull.	Lead, Strategic Projects; Lead, National Flood Resilience Centre	Principal Investigator
Ejuma Amen-Thompson[2]	Energy and Environment Institute, University of Hull.	Project Delivery Officer	Researcher
Dr Steven Forrest[1]	Energy and Environment Institute University of Hull.	Lecturer in Flood Resilience & Sustainable Transformations	Academic Lead
Dr Kate Smith[1]	Energy and Environment Institute, University of Hull	Lecturer in Flood Risk Management	Academic Lead
Amy Richardson[1]	Energy and Environment Institute, University of Hull	Marketing & Communications Manager	Marketing & social media support

[1]Funded by the University of Hull (part time in-kind contribution to the project).
[2]Funded by the Aviva Foundation (full time contribution to the project) .

Aviva Co-ordination Team

Name	Organisation	Job Title
Liz Kennett	Aviva	Media Relations Manager
Vicky Saunders	Aviva	Claims Sustainability Lead
Craig Spence	Aviva	Technical Consultant & Building Surveyor

NB: The Aviva team supports the work of the research team but is not funded by the Aviva Foundation

Advisory Group Members

Name	Organisation	Job Title
Louise Clark	Association of British Insurers (ABI)	Policy Adviser, Property Insurance
Graham Brogden	GJB Consultancy – Oxford Ltd	Independent Flood Resilience Specialist
Dr Jessica Fox	Hull City Council	Senior Flood Risk Officer
Liz Kennett	Aviva	Media Relations Manager
Vicky Saunders	Aviva	Claims Sustainability Lead
Jonathan Kaissan	FloodRe	Head of Research

Picture: Flood and Coast Workshop, June 2024

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