Department for Environment Food & Rural Affairs

Collingwood Environmental Planning

Hillingdon London

fhrc Flood Hazard Research Centre

Llywodraeth Cymru Welsh Government

Cyfoeth Naturiol Cymru Natural Resources

Environment Agency

Flood and coastal erosion risk management research and development framework: working with communities

Project FRS19209/R1

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Professor Doug Wilson
Chief Scientist and Director of Research, Analysis and Evaluation

Executive summary

Introduction

The England and Wales Flood and Coastal Erosion Risk Management (FCERM) strategies published in autumn 2020 identified the important role of communities in helping to manage the risk of flood and coastal erosion. This has driven a demand for research to understand how best to work with communities to:

- manage flood risk assets (structures)
- prepare, respond to and recover from incidents
- take part in decisions, designs and funding for schemes
- manage land to achieve flood risk benefits
- prepare and adapt homes to reduce flood impact
- take part in conversations about long-term adaptation

For these 6 FCERM activities we wanted to understand from existing studies what was already known and to determine the future research needed. To achieve this, we have developed this research and development framework.

What is an R&D framework?

We produce R&D frameworks for specific topics where the demand for applied research is high. The research framework in this report includes:

- detailed literature review
- research gap analysis
- proposals for 12 priority research projects

What did we do?

This report details how we identified and developed the priority projects and how they might be carried out.

The report takes the reader through the following main steps:

- Gathering evidence
    - literature review
    - expert interviews
    - stakeholder workshop
- Assessing the evidence and identifying any gaps
    - identifying gaps in research
    - prioritising and developing projects
- Project development
    - 12 research project proposals
- Future implementation and funding

What are the outputs of this framework?

The communities R&D framework includes 4 main outputs:

- literature review report which looks in detail at 6 FCERM activities
- one-page summaries for each FCERM activity which summarises the literature review findings
- research framework report which summarises the process identifying the research gaps and leads to the development of 12 priority project proposals
- science summary

The 12 projects which were prioritised for future research include:

1. Community and volunteer participation in FCERM

2. Sustaining effective participation in FCERM
3. Improving the flood recovery process
4. Landowner and land manager participation in natural flood management
5. Emotional and social processes of participation in FCERM
6. Community attachment to places affected by climate change
7. Improving participation in FCERM decision making
8. The role of community flood knowledge in FCERM
9. Characteristics of risk management authorities (RMAs) which influence participation in FCERM
10. Assessing the costs and benefits of participating in FCERM
11. Effective community leadership in FCERM
12. Enabling community maintenance for local flood risk management

What are the next steps?

We will use the outputs from the framework to shape existing and future research projects and to prioritise our research funding.

Research frameworks can also help inform our work with Research Councils, enabling us to influence the development of calls for funding by sharing the research needs identified in our frameworks.

Who is the audience?

This work will be used to prioritise and fund further social science research, which will support authorities involved in flood and coastal erosion risk management, including Defra and the Welsh Government, the Environment Agency and Natural Resources Wales, local councils and risk management authorities (RMAs)

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1 Introduction

This chapter introduces the communities and flood and coastal erosion risk management (FCERM) research and development framework, setting out the:

- policy context
- research landscape
- definitions used in this report

1.1 Background

The Environment Agency, Department for Environment, Food and Rural Affairs (Defra), Natural Resources Wales and the Welsh Government have a joint FCERM research and development programme (referred to as the 'joint programme' in this report)[1], which provides applied research on flood and coastal erosion risk management for all risk management authorities (RMAs) in England and Wales. The outputs from the joint programme inform FCERM policy and practice to better prepare for, protect from and prevent flooding in a changing climate.

This research programme has funded numerous social science research projects over the last 20 years for example:

- Applying behavioural insights to property flood resilience (Behaviour Insights Team, 2020)
- Co-creation of risk communications (Cotton et al, 2014; Orr et al, 2914; Fisher, 2015)
- Collecting flood memories and their role in planning (McEwen et al, 2017)
- Community participation in relation to adaptation on the coast (Kelly and Kelly, 2019)
- Flood volunteers and spontaneous volunteering (O'Brien et al, 2014)
- Institutional frameworks and governance of flooding (Priest et al, 2020)
- Public dialogues and flood risk communication (Fisher, 2015)
- The role of communities in developing resilience to flooding at the local level (Twigger-Ross et al, 2014; Twigger-Ross et al, 2015; McEwen et al, 2018)
- Understanding the uptake of property flood resilience measures (Lamond et al, 2017; 2019)

Given the increasing recognition of the role of communities in FCERM, there is a need to establish where the gaps in our knowledge lie.

The purpose of this research framework is to more systematically review and identify gaps in research, prioritise future research needs and set out main research projects to encourage communities to take part in FCERM.

1.2 Policy context

Since 2010 there has been a significant change in how flood and coastal erosion risk is managed, with a greater emphasis placed on RMAs, communities and non-governmental organisations (NGOs) working together to manage flood risk locally. These changes started to happen after the 2007 floods, the subsequent Pitt Review (Pitt, 2008) and the UK government emphasis on 'localism' and the 'big society', whereby citizens and communities were encouraged to become more active in managing their

[1] The programme is run by the Environment Agency, Defra, Welsh Government and Natural Resources Wales and aims to serve the needs of all FCERM authorities in England and Wales.

local area. Since 2010 there have been further flood events which have continued to highlight the central role that communities and RMAs play in managing flood risk.

In 2020, the following 3 documents were published, all placing an emphasis on RMAs, local communities, NGOs and the private sector working together to effectively manage flood and coastal erosion risk to improve resilience:

- Defra's policy statement on FCERM (Defra, 2020) see Box 1.1
- FCERM strategy for England (Environment Agency, 2020)
- FCERM strategy for Wales (Welsh Government, 2020) see Box 1.2

Box 1.1 Extract from Defra's policy statement

"To meet the scale of the challenge ahead we need everyone to play their part – from government to individuals, national and local public bodies, the third and private sectors, local communities and those responsible for key infrastructure. Together we can put in place actions that will build a more resilient future and help to improve health and wellbeing, create economic growth, and enhance our environment." (Defra, 2020, p. 6)

The 25 Year Environment Plan (Defra, 2018) and the FCERM strategies for England and Wales aim to reduce the impacts of flooding and coastal erosion on communities to help enhance their resilience. In Wales, both the Well-being of Future Generations Act (2015) and Planning Act (2015) encourage partnership working, collaboration and a long-term approach.

The FCERM strategy for England describes the need for shared responsibility, placing individual members of the public at the heart of developing solutions to flood risk problems. This strategy includes the following 3 themes, which are used to set out a long-term plan for tackling, preparing for, and adapting to the impacts of climate change:

- Climate resilient places
- Today's growth and infrastructure resilient to tomorrow's climate
- A nation ready to respond and adapt to flood and coastal change

The FCERM strategy for Wales includes the need to understand more about future flood risk, emphasising the roles of adaptation and community participation (see Box 1.2)

Box 1.2 Extract from the Welsh Government policy statement

"We want to encourage RMAs to have conversations with communities around their own management of risk and help them to become more resilient to the impacts of flooding. Closer collaboration between Natural Resources Wales and Local Authorities to develop and engage with communities should become common practice." (Welsh Government, 2020, p.45)

Defra's policy statement (Defra, 2020) reflects the need to move from 'flood risk management' to 'flood resilience' to enable people to live well in the context of flooding.

Participating in FCERM is relevant to individuals and communities in different ways:

- **Knowledge focused –** Developing and contributing knowledge and evidence (for example, by surveying a river in a catchment walkover, checking river gauges, monitoring water quality or collecting data as part of a citizen science project)
- **Campaign focused** – Mobilising action by raising awareness of flooding, taking part in flood planning, or promoting the uptake of local flood warden services

- **Physically focused** – Creating resilient places by building embankments, managing habitat and assets or opening and closing sea gates
- **Virtually focused** – Engaging remotely by monitoring or web-related action such as documenting the groups' activities and providing information on web pages

Extending and improving participation is going to be crucial in enabling the new approaches to FCERM set out in the Environment Agency's FCERM strategy (Environment Agency, 2020) see Box 1.3.

Box 1.3 Extract from the Environment Agency FCERM strategy

> "People want to have a voice in shaping how resilience to flooding and coastal change is achieved in the places in which they live and work. Risk management authorities need to ensure that people and places are at the heart of local decision making. They also need to invest in the engagement skills needed to take a more inclusive approach to the future challenges flooding and coastal change present." (Environment Agency, 2020, p. 95)

In order for this new approach to be realised, there needs to be further research to extend and improve participation in FCERM.

1.3 Research landscape

The current European and UK research landscape can often help fund applied research linked to policy needs. The following section summarises past social science funded by Research Councils.

European research

The EU Horizon 2020 programme (2014 to 2020) and the FP7 programme (2007 to 2014) summarised in Table 1.1 included a limited number of projects related to communities taking part in FCERM activities. Whilst some of the projects were social science led, few had participation at the heart of them.

Table 1.1 Relevant research in the EU Horizon 2020 and FP7 research programmes

Programme	Research project
Horizon 2020	▪ Improving Resilience to Emergencies through Advanced Cyber Technologies ▪ ANYWHERE (EnhANcing emergencY management and response to extreme WeatHER and climate Events)
FP7 Environment	▪ STAR-FLOOD - STrengthening And Redesigning European FLOOD risk practices: Towards appropriate and resilient flood risk governance arrangements ▪ ENHANCE - Enhancing risk management partnerships for catastrophic natural disasters in Europe ▪ ESCALATE (Evaluating Social Capital Effects on PoLicy Adaptation to Climate change in Coastal Zones of England) ▪ WeSenseIT: Citizen Observatory of Water ▪ Ground Truth 2.0 Ground Truth 2.0 - Environmental knowledge discovery of human sensed data

The next programme 'Horizon Europe' has 5 main missions, 3 of which could have relevant research:

- Adaptation to climate change, including societal transformation
- Healthy oceans, seas, coastal and inland waters

- Climate-neutral and smart cities

As this programme develops, it could potentially help address priority gaps in research identified in this report. It is also a potential source of future funding and rollout.

UK Research Council funded projects

In the UK, the Research Councils are leading funders of research and they may have the potential in the future to support projects that address research gaps identified in this report.

A UK-wide FCERM research strategy, which included social science research themes was developed in 2012 (see: Living with Environmental Change, Moores and Rees, 2012) Apart from research commissioned in response to specific flood events,[2] there have been few significant Research Council funded programmes focused on the social science side of FCERM. However, the Engineering and Physical Sciences Research Council (EPSRC) funded 3 projects with a social science component called SESAME, which studied SMEs and flooding,[3] Blue-Green cities, which looked at the role of blue-green infrastructure in mitigating flood risk[4] and Flood Memory.[5]

Fankhauser et al (2019) carried out a review of UK Research Council funded social science and climate change research. They found that across all the Research Councils social science research into FCERM was in the minority (Fankhauser et al, 2019) and they highlighted the following research gaps:

- design of risk reduction policies
- interplay between physical and behavioural responses
- role of finance and insurance
- impact of flooding on business and human welfare

Fankhauser et al (2019) suggest that some of these gaps will be filled by the UK Climate Resilience Programme.[6] This programme aims to 'enhance the UK's resilience to climate variability and change through frontier interdisciplinary research and innovation on climate risk, adaptation and services, working with stakeholders and end-users to ensure the research is useful and usable.' The 'living with uncertainty' theme within this programme is especially relevant to this research framework because it aims to 'deepen our understanding and explore how these aspects affect our sense of place, identity, decision-making and the potential for new societal environmental configurations' (UK Climate Resilience Programme, 2018, p.8) Within this programme 3 of the 29 projects are related to the issues discussed within this framework (Table 1.2).

Table 1.2 Relevant research in the UK Climate Resilience Programme

Title
Coastal resilience in the face of sea-level rise: making the most of natural systems - Review the current strengths and weakness of shoreline management plans (SMPs) (including liaising with the current SMP2-Refresh). Led by: University of Southampton
Mobilising Adaptation: Governance of Infrastructure through Co-Production (MAGIC) will demonstrate and evaluate a community-led approach to reducing flood risk, whilst providing opportunities for urban residents to improve their health and wellbeing, through better engagement with blue and green spaces. Led by: University of Sheffield

[2] After the Rain – Hull Floods Project after the 2007 floods (Lancaster University) – this was a bid put into the responsive mode for ESRC; The Winter 2013/2014 floods and Policy change (Exeter University) The Summer after the Floods (Birmingham University) both after the 2013/2014 floods via the urgency mechanism.
[3] SESAME Organisational Operational Response and Strategic Decision Making for Long Term Flood Preparedness in Urban Areas ran from 2012 to 2015 and was led by the University of Durham.
[4] Blue-Green Cities ran from 2013 to 2016 and was led by the University of Nottingham.
[5] ESRC Flood Memories Webpage
[6] This programme, worth £18.7 million, is a collaboration led by the Natural Environment Research Council (NERC) and the Met Office with the Engineering and Physical Sciences Research Council (EPSRC), the Economic and Social Research Council (ESRC) and the Arts and Humanities Research Council (AHRC)

Title
Mobilising Citizens for Adaptation (MOCA) explores whether and how household or community scale rainwater harvesting (RWH) could reduce flood risk in Hull. Led by: University of Sheffield

The research framework will enable us to proactively share our research needs and gaps with researchers and Research Councils enabling us to:

- engage with Research Councils and seek opportunities to work together on future calls for social science funding
- help shape research proposals being developed by academics

1.4 Definitions

Throughout this report, we use terms that can have different meanings, so, for clarity, here are a few definitions we use:

Community

In this report, we use the term 'community' to mean individuals and groups. We recognise that communities are dynamic and have different characteristics that will influence how they take part in FCERM. We don't assume that people living in the same place are automatically part of the same community. An important identifier of a community is the psychological element; whether people feel they belong to a community or not. Communities should be identified by those within rather than assumed by those outside.

Engagement

The term 'community engagement' is often used by institutions and public bodies to refer to their engagement with communities. It is not a term typically used by communities themselves. It can have negative connotations because it can refer to poor engagement, where something is done 'to' the community rather than 'with' them. In this report, we use the term 'participation' instead.

Participation

Participation is defined as the 'act of taking part in an activity or event' (Oxford English Dictionary) it is an umbrella term to cover the different ways in which people might take part in an activity.

Arnstein (1969) developed a 'ladder of participation', which examined the top-down approach to public engagement in the planning process. This approach is set out in a range of public participation activities developed by the International Association for Public Participation. It does not, however, enable members of the public to initiate the activity.

Participation can only become 'two-way' if communities can initiate actions. Figure 1.1 provides a more participative approach, where a range of people, including community members can initiate action. This research framework suggests alternative definitions of participation to help encourage effective participation in FCERM activities.

Figure 1.1 Participation goals for the initiator of activities

Participation goals for the initiator of activities:
Inform – to provide others with balanced and objective information to help them understand the problem, alternatives, opportunities and/or solutions.
Consult – to obtain feedback on analysis, alternatives and/or decisions.
Involve – to work directly with others throughout the process to ensure that all concerns and aspirations are consistently understood and considered.
Collaborate – to partner with others in each aspect of the decision making, including developing alternative solutions and identifying the preferred solution.
Empower – to place final decision making in the hands of people other than those initiating the process.

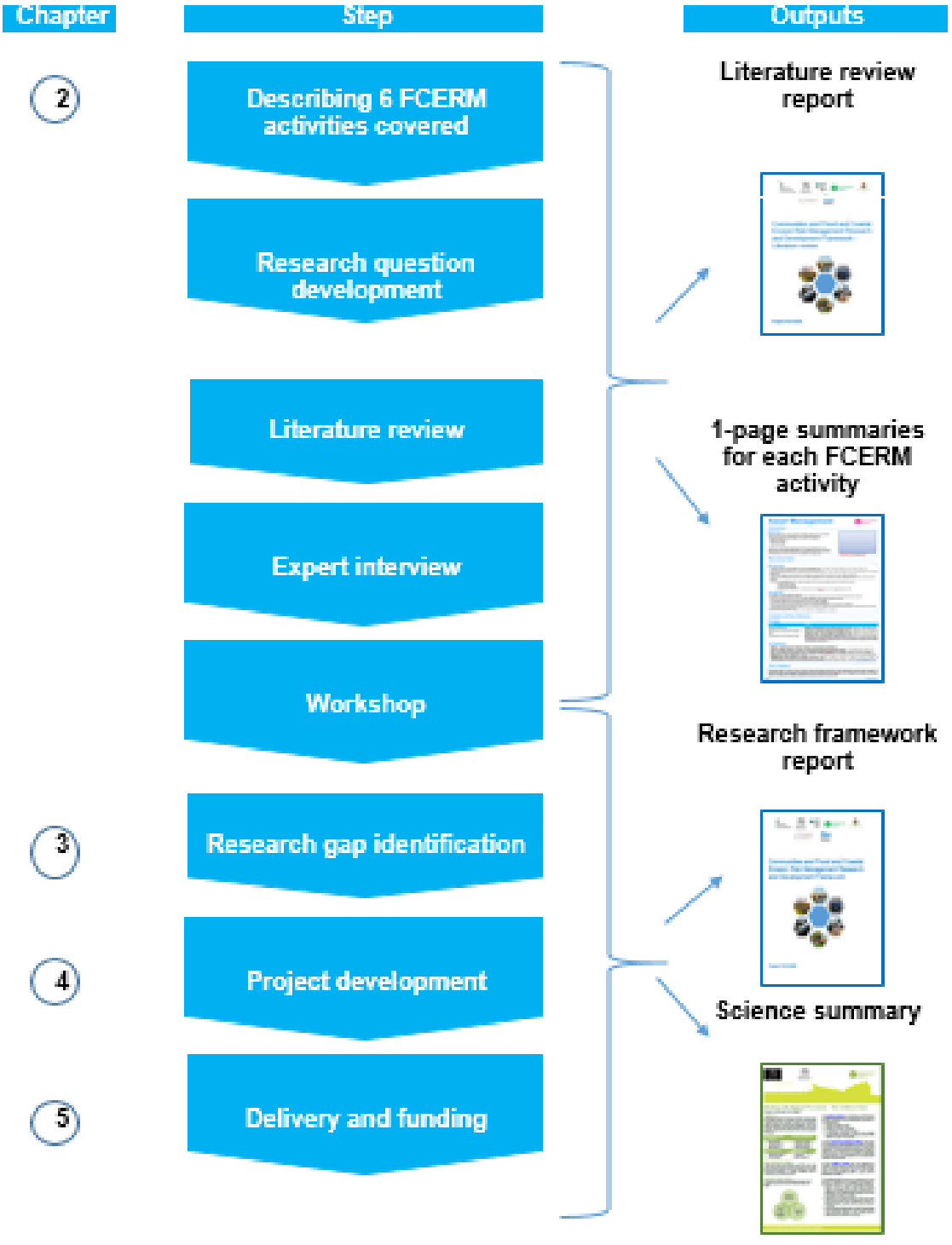
1.5 Report structure

This chapter has provided an introduction to the communities and FCERM research framework. It has set it within its policy and research landscape context and provided some definitions of the main terms used throughout this report.

The report is structured into 5 chapters as set out in Figure 1.2. This includes:

- chapter 2, which describes the evidence gathering stage of the project, covered in detail in the accompanying literature review and one-page summaries which look in detail at the following 6 FCERM activities:
    - managing flood risk assets (structures)
    - preparing, responding to and recovering from incidents
    - taking part in decisions, designs and funding for schemes
    - managing land to achieve flood risk benefits
    - preparing and adapting homes to reduce flood impact
    - taking part in conversations about long-term adaptation
- chapter 3 - describes how research gaps were identified and prioritised
- chapter 4 - describes 12 research projects that need to be carried out to address the research gaps
- chapter 5 - makes suggestion on how to rollout and fund the projects described in chapter 4

Figure 1.2 Structure of the report showing main steps in developing the framework and the main outputs



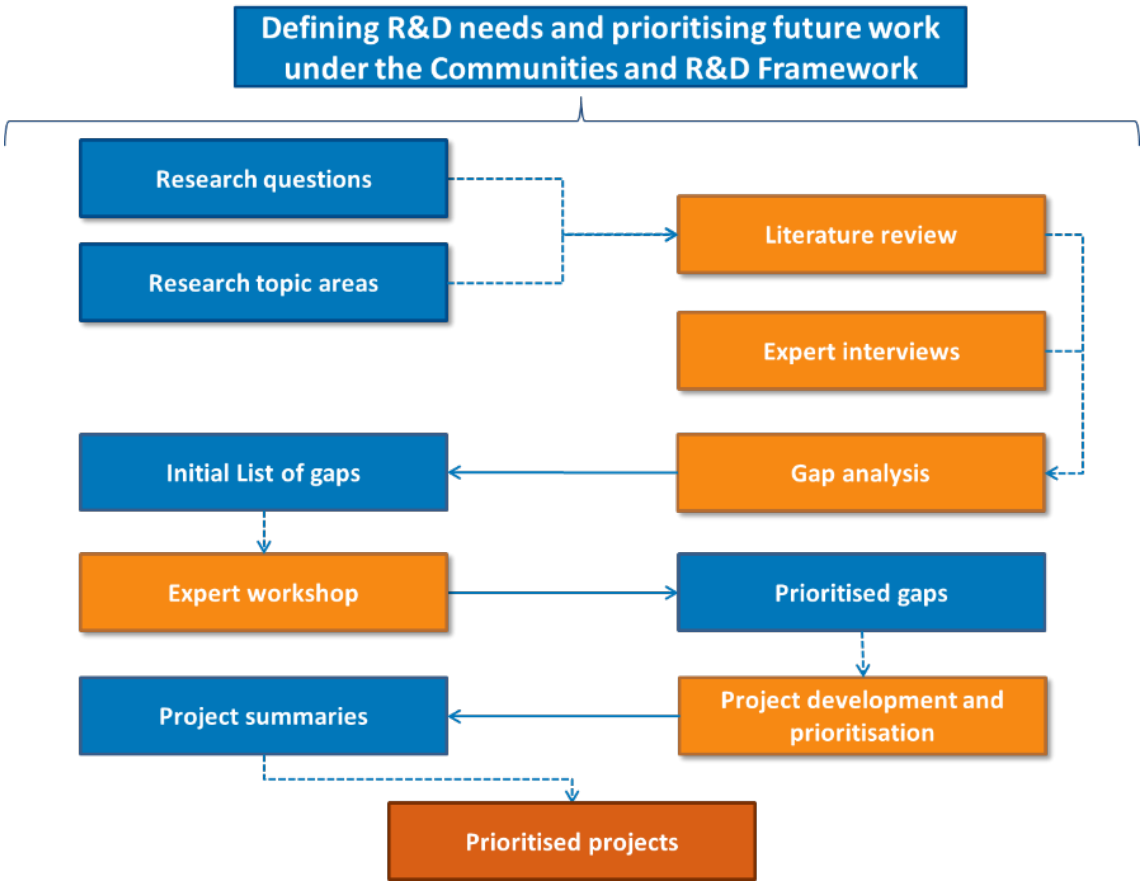
2 Gathering evidence

This chapter describes the different steps taken to develop the initial evidence base to inform the development of the communities and FCERM research framework. This chapter sets out:

- vision and aims
- target audience
- FCERM activities included
- literature review
- expert interviews
- stakeholder workshop

This research framework was developed in stages (see Figure 2.1)

Figure 2.1 Summary of approach to developing framework



2.1 Vision and aims

The overall vision for the communities and FCERM R&D framework is to develop a comprehensive programme of research and development so that communities, RMAs and other organisations can work better together to:

- manage flood risk assets
- prepare for, respond to and recover from incidents
- take part in decisions, designs and funding for schemes

- manage land to achieve flood risk benefits
- prepare and adapt homes to reduce flood impact
- take part in conversations about long-term adaptation

The aims of the research and development framework are to:

- improve institutions' understanding of how communities, RMAs and other organisations can work together to improve resilience and adapt in the face of the increased risk of flooding and coastal erosion caused by climate change (**Institutions**)
- evaluate and support improvements in the effectiveness of working together on FCERM from the perspectives of communities, RMAs and other organisations (for example, NGOs) (**Effectiveness**)
- support the development of more comprehensive approaches to participation that recognise that the capacity of different communities to become involved in flood risk management will vary (**Community capacity**)

Each of these aims link to the proposed projects presented in chapter 4.

2.2 Target audience

There is a range of audiences that may be interested in this framework, for example:

- academics
- FCERM practitioners in the public sector and local authorities
- internal drainage boards
- members of communities
- NGOs working in FCERM
- policy makers in government
- Research Councils
- water companies

2.3 FCERM activities

This research framework focuses on 6 specific FCERM activities (see Table 2.1), which individuals, groups, RMAs and other organisations take part in. Defra and the Environment Agency identified these 6 activities as areas where communities and RMAs interact. The literature review which underpins this research framework focused in detail on these 6 activities.

Table 2.1 FCERM activities

FCERM activities	What it covers
1. Managing flood risk assets	Watercourse maintenance activities, such as making sure ditches and culverts are cleared of obstructions, looking after channels, repairs to bunds and FCERM measures and monitoring river levels and assets.
2. Preparing for, responding to and recovering from incidents	**Preparedness -** issuing flood warning and flood forecasting, developing and implementing local community emergency flood plans.

FCERM activities		What it covers
		Response - using volunteers, flood stores and flood wardens, setting up rest centres **Recovery -** supporting communities and individuals through the recovery process
3.	Taking part in decisions, designs and funding for schemes	Communities are involved in both developing and funding FCERM schemes. This includes how communities take part in deciding what types of schemes are appropriate to address a specific problem.
4.	Managing land to achieve flood risk benefits	Communities are engaged in how land is managed to achieve flood risk benefits such as through natural flood management (NFM) and land management funded through Countryside Stewardship schemes.
5.	Preparing and adapting homes to reduce flood impacts	Property flood resilience - the measures that communities and individuals can put in place to reduce the impacts of floods.
6.	Taking part in conversations about long-term adaptation	Long-term adaptation specifically related to coastal erosion and sea level rise. It also includes developing FCERM strategies.

2.4 Literature review

The literature review was carried out in stages, an initial desk-based review of the literature was then supplemented by expert interviews, which were used to help shape and expand the findings of the desk-based review.

Developing the research questions

Seven research questions were developed (see Table 2.2) to help focus the literature review. The project team reviewed literature across the following 6 FCERM activities:

- managing flood risk assets (structures)
- preparing, responding to and recovering from incidents
- taking part in decisions, designs and funding for schemes
- managing land to achieve flood risk benefits
- preparing and adapting homes to reduce flood impact
- taking part in conversations about long-term adaptation

The literature review combined expert input from the project team with dedicated electronic searches of the Scopus[7] database. We also reviewed grey literature from Defra/Environment Agency past projects. Most of the reviewed literature was from UK sources and from between 2009 and 2020. Exceptions were made for important papers cited by our expert interviewees. The literature review is published as a standalone document (Twigger-Ross et al, 2020).

Table 2.2 Research questions

Question #	Research questions
1	To what extent and in what ways are members of the public participating in the 6 FCERM activities across all sources of flood and coastal erosion? ▪ Who is participating in these activities? ▪ How are they participating? ▪ Why are they participating? ▪ How sustained is their participation? ▪ What activities are they carrying out?

[7] Scopus is a bibliographic database containing abstracts and citations for academic journal articles - www.scopus.com

Question #	Research questions
2	What are the barriers and facilitators to members of the public participating in the 6 FCERM activities across all sources of flood and coastal erosion? ▪ What are the individual/psychological barriers and facilitators to members of the public participating? ▪ What are the social/institutional barriers and facilitators to members of the public participating? ▪ What are the material barriers and facilitators to members of the public participating?
3	What approaches/models of participation encourage/discourage members of the public participating in the 6 FCERM activities across all sources of flood and coastal erosion?
4	What types of governance and institutional arrangements facilitate or inhibit members of the public's participation in the 6 FCERM activities across all sources of flood and coastal erosion?
5	What are the costs and benefits (to communities and RMAs) of members of the public participating in the 6 FCERM activities across all sources of flood and coastal erosion? Why do communities and RMAs consider participation by communities in the 6 FCERM activities across all sources of flood and coastal erosion to be important/not important in tackling flood and coastal erosion?
6	What are the similarities and differences in members of the public participating across the 6 FCERM activities and all sources of flooding and coastal erosion?
7	What are the main gaps in the evidence across the research questions? Which gaps, if filled, would improve members of the public's participation across the 6 FCERM activities and all sources of flooding and coastal erosion?

Findings from the literature review

The literature review is a standalone report published alongside this framework, the main gaps identified from this review are summarised in Table 2.3. We have also developed one-page summaries for each of the FCERM activities covered in the literature review.

Table 2.3 High-level summary from literature review

FCERM activity	What do we still need to understand?
Managing flood risk assets	We do not have a comprehensive list of the groups that are currently managing flood assets, what they do, how they are organised and how successful they have been. Some RMAs are coordinating the work of a few self-help groups, but we do not know how widespread this is or what approaches other RMAs are taking. We need research on the relationship between communities and farmers with respect to managing flood assets located on private land. There are few examples of how farmers who wish to take responsibility for assets on their own land can work with local residents and RMAs. We need a better understanding of volunteers' experience of participation in asset management as the basis for developing guidance for community groups and other volunteers. This should cover both the practical work involved in maintaining assets of different kinds and for different types of flood risk (for example, inland watercourses, flood defence structures, coastal flood gates) as well as the formation and organisation of flood groups (for example, organisational structures, working with RMAs, training and skills development) Better evidence of the asset management activities that local groups are carrying out and their effectiveness would enable RMAs to assess the cost

FCERM activity	What do we still need to understand?
	effectiveness of different approaches to supporting the work of local flood groups. There is also a need to better understand how RMAs can overcome barriers to participation to avoid the emphasis on 'community flood resilience' leading to inequalities between places in terms of flood resilience practice.
Preparing for, responding to and recovering from incidents	We do not know whether what is suggested above applies to all types of flooding (fluvial, surface water and coastal) and to coastal erosion. We do not know enough about how to successfully encourage participation in communities: ▪ in flood areas, where the risk is very infrequent but the consequences may be significant (including those living in areas already protected where some flood risk remains) ▪ where community identity is unclear to those living in it ▪ that experience deprivation on one or more levels ▪ to encourage businesses to participate where participation has been limited or non-existent in the past We need to understand much more about how people participate in flood recovery; the mental, physical and financial problems they experience, the barriers to rapid recovery and how to reduce them. We need to understand more about what makes good leadership which encourages successful community participation, leading to greater flood resilience, and what is likely to sustain participation over time.
Taking part in decisions, designs, and funding for schemes - What do we still need to understand?	What are the opportunities for individuals and groups to participate in FCERM scheme decision-making? This is an identified gap in the research evidence. The limited research carried out implies that there is little evidence of this type of participation. As a result, whilst consultation is a core part of the process of developing FCERM schemes, there is little research on how those opportunities are used by individuals and groups and how they can be improved. It is an area where it is thought there is considerable experience, yet it has not been drawn together and systematically examined with a view to improving the processes.
Managing land to achieve flood risk benefits	There is a need to better understand people's preferences towards different FCERM measures and their perception of the costs and benefits (Everett and Lamond, 2013) More knowledge is required to mainstream blue-green infrastructure, how long this takes and how it can be encouraged (Everett and Lamond, 2014) Similarly, there is a gap in knowledge about how farmers become involved in decision making about NFM schemes. In addition, more needs to be understood about the tools and approaches that flood authorities need to help engage and work with farmers and landowners (Boeuf and Fritsch, 2016) There is also a lack of evidence of the complexities of engaging upstream and downstream communities together. The research indicates a need to better understand how to introduce and communicate uncertainty with land managers in the context of blue-green infrastructure as a measure that will reduce, but not prevent flooding.
Preparing and adapting homes to reduce flood impacts	Five main gaps arose from the evidence review, workshops and expert interviews: ▪ At what point do the positive aspects of having the property flood resilience (PFR) measures in place (for example, increased feeling of security or ability to stay living in a beautiful environment) outweigh the negative psychological costs such as being reminded that one is at risk? ▪ What is the role of emotions and social identities in increasing participation in PFR schemes and uptake during the reinstatement and recovery phase? How can approaches be developed that enable PFR to be part of a positive adaptive approach to managing flood risk? ▪ How does the experience of flooding affect the idea of home as a safe place, in the context of the uptake of water entry measures?

FCERM activity	What do we still need to understand?
	▪ How does a sense of responsibility and a desire to take action develop among people living in flood risk areas? People need to believe they can act and that the actions they take will be effective. Are there psychological impacts of having to sustain property resilience measures over the long term? ▪ How do perceptions of who is responsible for protecting properties (particularly in rented properties and businesses) affect the uptake and effectiveness of measures and what should owners, buyers and renters be told about flood risk and their roles and responsibilities?
Taking part in conversations about long-term adaptation	Research is needed into the challenges associated with adapting to severe climate change impacts, particularly where communities face potential relocation (Kelly and Kelly, 2019) Research is needed into how to change expectations of responsibilities for managing coastal flood and erosion risks (Maiden et al, 2017) Better understanding of the benefits (and costs) of public participation in long-term adaptation, particularly the benefits (and costs) for communities themselves is needed. The evidence of costs and benefits of public participation in long-term adaptation was disjointed and sometimes contradictory. For example, public participation boosts collaborative decision-making, which is thought to be beneficial for long-term adaptation but, in some cases, high levels of public participation prevented adaptive approaches to FCERM being taken (Young et al, 2014) In this example, underlying socio-economic issues existed that made the adaptation option unacceptable to the community (Young et al, 2014) RMAs could benefit from a better understanding of how issues such as these influence communities' willingness to engage with long-term adaption and how to manage this in the future.

2.5 Expert interviews

Expert interviews were conducted alongside the literature review to help draw out additional sources of literature that may have been missed during the desk-based review. We interviewed 7 experts who provided additional information and references, and incorporated this evidence into developing this research framework.

Important themes that came out of the expert interviews included:

- importance of considering the costs to communities, as well as to RMAs, of engaging in FCERM. For example, the costs to the public include time to be involved in formal consultations and informal participation. There are also financial costs to homeowners and farmers/landowners from purchasing floodgates and insurance or installing blue-green infrastructure
- there is a need for those who are responsible for implementing FCERM measures to have strong communication skills. Two-way discussions and more creative and interactive participation methods, such as role-playing activities, can help communities participate more
- there are many psychological factors that influence a community's ability or willingness to participate in FCERM. For example, perceiving that flooding could directly affect their lives and/or livelihoods in the future can increase a community's interest in participating. Engaging in FCERM can also have negative psychological costs to communities. It is important to understand where/when the negative psychological costs (for example, increased anxiety about flood risk)

outweigh the positive psychological costs (for example, installing PFR can lead to an increased feeling of security)

- lack of awareness of flood risk was repeatedly reported as a barrier to communities participating in FCERM. However, awareness of current and future risk can also cause anxiety, especially when taking part in conversations about long-term adaptation
- an individual's personality and their existing engagement in other community activities (for example, parish councils/town councils) were also noted to have an impact on their likelihood of participating in FCERM

Alongside these interviews, throughout the project we discussed the development of this research framework with the National Flood Forum to gain their valuable input as the voice of flooded communities. This enabled us to check that the evidence we had collated was comprehensive and the research questions and gaps identified needed to be addressed.

2.6 Stakeholder workshop

A stakeholder workshop was also held to consult and engage a range of organisations in developing this research framework.

During the workshop, the participants shared their knowledge of research and practice of community participation for the 6 FCERM activities and they:

- reflected on how the findings from the literature review fit with their own experience
- discussed gaps in research and potential research needs
- identified the sort of evidence that could address research gaps

The participants highlighted a range of research needs, including the need for more evidence of the scale at which communities get involved in asset management and the consequences of working at different spatial scales to communities.

Some of the findings from the literature review resonated strongly with the experience of workshop participants. For example, the evidence that existing participation approaches typically attract skilled people (often retired) from higher socio-economic backgrounds. This raised an additional research need to help understand how to better work with the most vulnerable (for example, deprived) and ethnically/culturally diverse communities. The workshop participants suggested that there is a lack of evidence of the complexities of engaging communities across whole catchments.

The workshop also explored how to communicate effectively with land managers on natural flood management (NFM) when NFM measures will often reduce flood risk but not eradicate it completely. The participants also highlighted the issue of trust - it takes time to build trust, so RMAs need to recognise that as communities change they will have to make ongoing efforts to build trust and reflect this in the way they work with those communities.

Participants also noted that the nature of a partnership can vary (positively and negatively) according to the different people involved in a partnership.

The workshop participants provided feedback on the list of gaps prepared before the meeting. They noted that it is difficult to integrate measures of non-financial costs and benefits into practice/decision-making and this could be a potential research gap. The participants also identified the need for research into multi-agency flood responses.

Finally, the participants were then asked to prioritise the identified research gaps using the MoSCoW[8] method. The outcome of this exercise is included in the overall project assessment discussed in the following chapter.

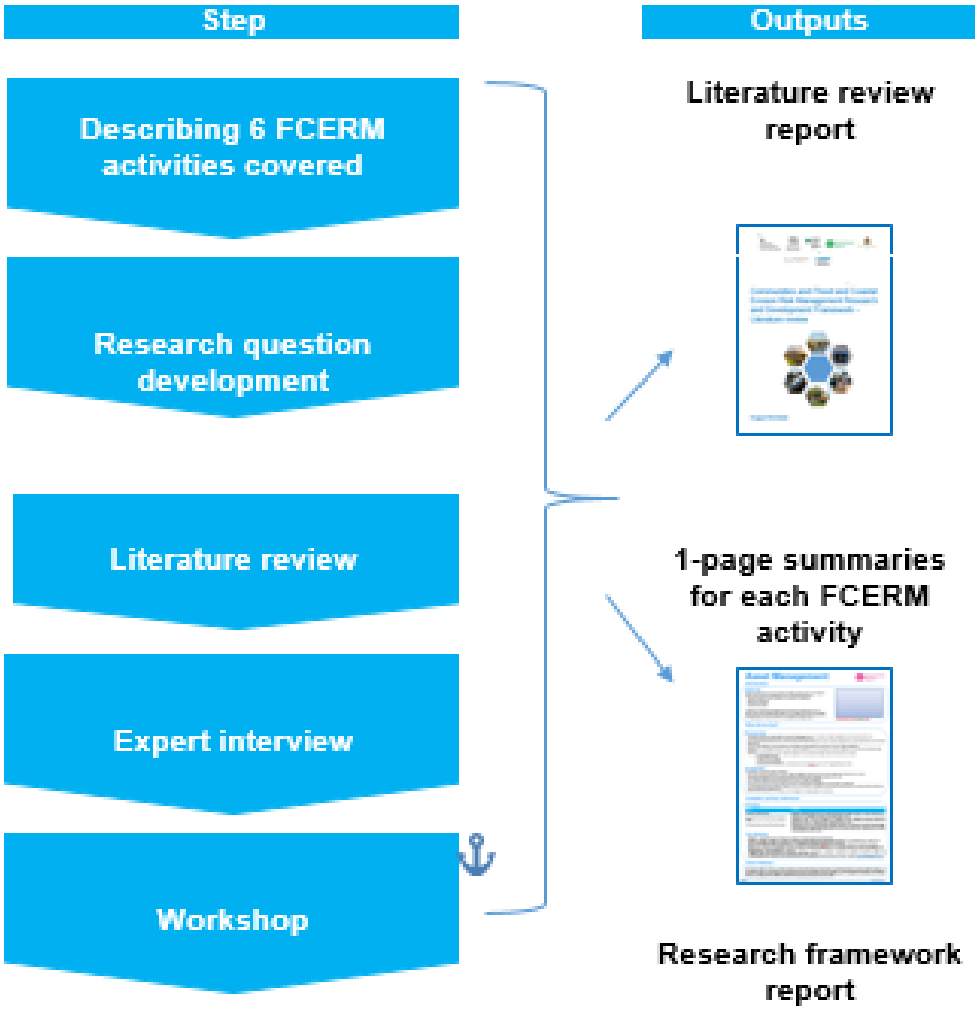
2.7 Outputs from gathering the evidence

This chapter has described how we collated the evidence to inform the development of this research framework. These steps are summarised in Figure 2.2 below. More detail on this stage of the project can be obtained from 2 other documents published alongside this framework:

- Literature review
- Summary document that provides one-page summaries of the science for 6 FCERM activities.

The next chapter will describe how research gaps were identified and prioritised.

Figure 2.2 Steps in gathering evidence and main outputs



[8] The method is commonly used to help key stakeholders understand the significance of initiatives in a specific release. The acronym, MoSCoW, stands for 4 different categories of initiatives: must-haves, should-haves, could-haves, and will not have at this time.

3 Assessing evidence and identifying gaps in research

This chapter describes the different steps taken to assess the evidence presented in chapter 2 to help identify gaps in research and develop research proposals. This chapter:

- assesses the evidence
- identifies and analyses gaps in research
- identifies, assesses and prioritises projects

3.1 Assessing evidence

As part of developing this framework, the project team assessed the strength of the evidence for each of the 6 FCERM activities against each of the 5 research questions described in chapter 2 (Table 2.2)

The evidence was assessed using a red, amber and green traffic light system:

- **Green** - 3 or more studies which either agree with or build on each other, forming a clear body of work with findings that could be translated into practical action for RMAs.
- **Amber** - 3 or more studies focused on the same area of research but didn't necessarily build on past research. Findings need more verification and there needs to be greater connection between past research.
- **Red** - Less than 2 empirical studies in the area, which don't build on each other and provide very limited findings. Needs more basic research.

Table 3.1 summarises the results of this evidence assessment and shows that for each of the FCERM activities and research questions there are few instances of extensive past research which address all of the research questions. The 2 areas with the greatest strength of evidence are FCERM activities 2 and 4.

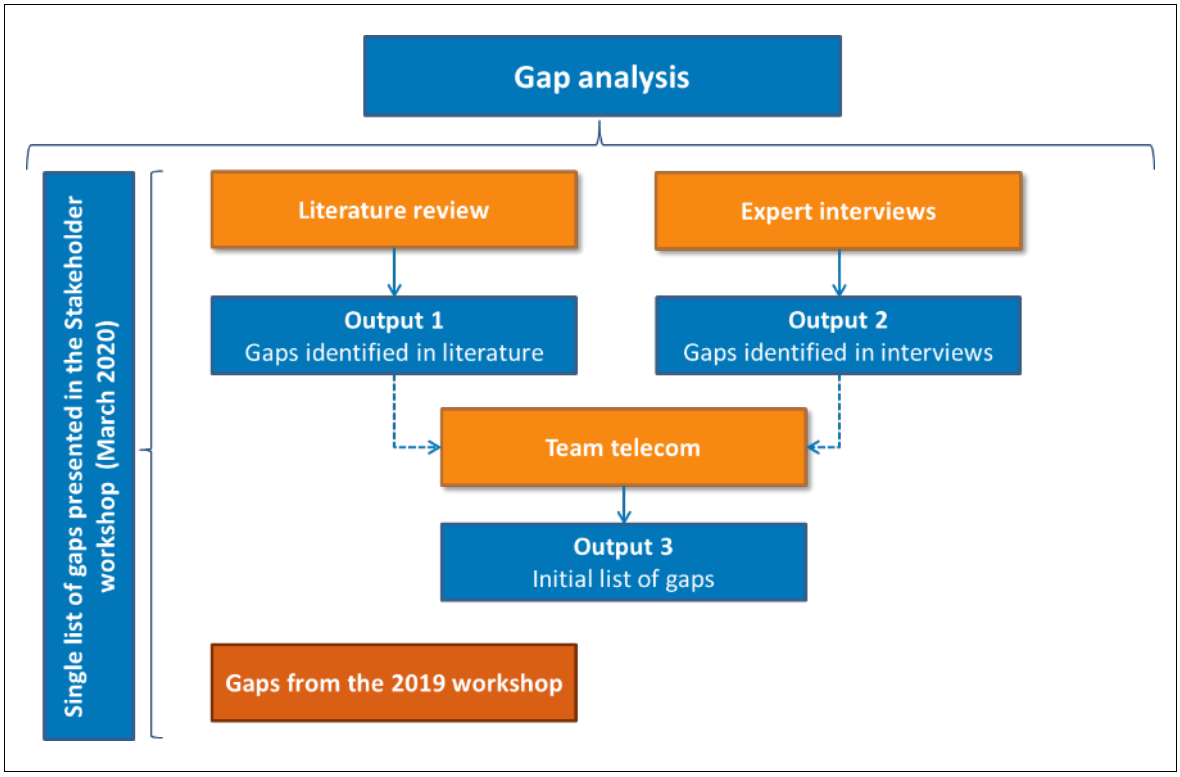
Table 3.1 Outcomes from strength of evidence assessment for each FCERM activity

FCERM activity	RQ1	RQ2	RQ3	RQ4	RQ5
1. Managing flood risk assets					
2. Preparing for, responding to and recovering from incidents					
3. Taking part in decision, designs and funding for schemes					
4. Managing land to achieve flood risk benefits					
5. Preparing and adapting homes to reduce flood impact					
6. Taking part in conversations about long-term adaptation					

3.2 Identifying and analysing gaps in research

Following on from the evidence assessment, the next stage of the project involved identifying and analysing the gaps in research described in Figure 3.1.

Figure 3.1 Process of gap analysis



Research gaps were identified through the:

- literature review
- expert interviews
- knowledge from the project team
- outputs from a past Environment Agency/Defra workshop run in 2019

These gaps were then collated into a single list of research gaps (see Table 3.2), which were presented to a range of stakeholders at a workshop in March 2020.

Table 3.2 List of gaps identified from the literature review

Research gaps
1. **Systematic identification and evaluation of individual members of the public and groups working with RMAs in England and Wales -** Who is participating? How are they participating? How effective is the participation? How can successes and challenges be shared and built upon?
2. **Sustaining participation -** What does 'sustained participation' look like for all types of activity? What are the influencing factors and how can participation be resilient? How do people get involved and stay involved in flood groups?
3. **Flood recovery** - How are individual members of the public and groups engaging in flood recovery? What types of activities and actions are they carrying out? How can those activities be supported to increase personal resilience within the recovery process, particularly for people who are temporarily relocated? How can those who are most vulnerable be supported?
4. **Farmers' and landowners' participation in FCERM -** How do farmers make decisions about natural flood management? What are the factors that contribute to their decision-making? How do farmers work with communities around asset maintenance? What tools

Research gaps
and approaches do RMAs need to improve participation with farmers and landowners, specifically, around natural flood management.
5. **The role of emotions and identities (individual and group) in participation -** How do emotions, personal and social identities influence participation? What are the psychological challenges associated with place detachment? Forming attachments to altered or completely different places is an aspect of climate change adaptation - how does this affect participation in conversations about long-term adaptation?
6. **Managing the emotional aspects of flooding for professionals** - How do professionals (for example, loss adjustors, surveyors, builders) become engaged in property flood resilience and reinstatement. What training and support might be appropriate for RMAs and others to help them work effectively with individual members of the public and groups during recovery?
7. **Influence of participation on FCERM decision-making schemes, strategies and long-term adaptation** - What influence do individual members of the public and groups have on FCERM decisions? How do different types of participation (from consultation to co-creation) really influence FCERM decision-making? What are the mechanics of those processes and whose views are represented?
8. **The role of community flood knowledge -** What role can/does community flood knowledge play? To what extent is community flood knowledge considered and how does it influence decisions taken? How do communities learn about flood risk and how can that enable participation in assessment and modelling by RMAs?
9. **Links between formal statutory consultation processes/wider political processes and local participation in FCERM activities** - What are the links between statutory processes and participation in FCERM activities, for example, within the planning systems or for flood schemes? How do these two interact? How can they complement each other and how does trust in one relate to action in another?
10. **Characteristics of RMAs that influence participation in FCERM activities** - What are the characteristics of institutions (for example, RMAs) that facilitate/inhibit participation with individual members of the public and groups? How do organisational cultures including language used by RMAs facilitate or inhibit participation across the FCERM activities? What is the role of trust? What are the specific issues for NFM?
11. **Decision-making in flood recovery** - How are decisions made by the insurance industry and the related professionals during flood recovery and when insurance is bought by members of the public? How are members of the public and communities involved in those processes?
12. **Cost and benefits of participation.** What are the financial costs and benefits of participation for individual members of the public and groups and RMAs? How to evaluate costs and benefits of the different activities? What is the value given to this work by the local community, the Environment Agency and other RMAs and by the individuals involved?

The workshop participants prioritised this list of gaps using the MoSCoW method, which resulted in:

- all groups at the workshop listing gap 2 ‘sustaining participation’ as an area that must be addressed
- two of the three groups listed gap 3 ‘flood recovery’, gap 7 ‘influence of participation on FCERM decision making’ and gap 8 ‘role of community flood knowledge’ as research gaps that must be addressed

- gap 12 ‘the costs and benefits of participation’ was rated a top priority by Environment Agency staff, but the researchers and academics had it as the least important

3.3 Project development, assessment and prioritisation

Project development

The research gaps described in section 2.3 were then turned into 12 research project proposals which are described in detail in chapter 4. The final list of projects is shown in Figure 3.2.

Figure 3.2 Aims linked to projects

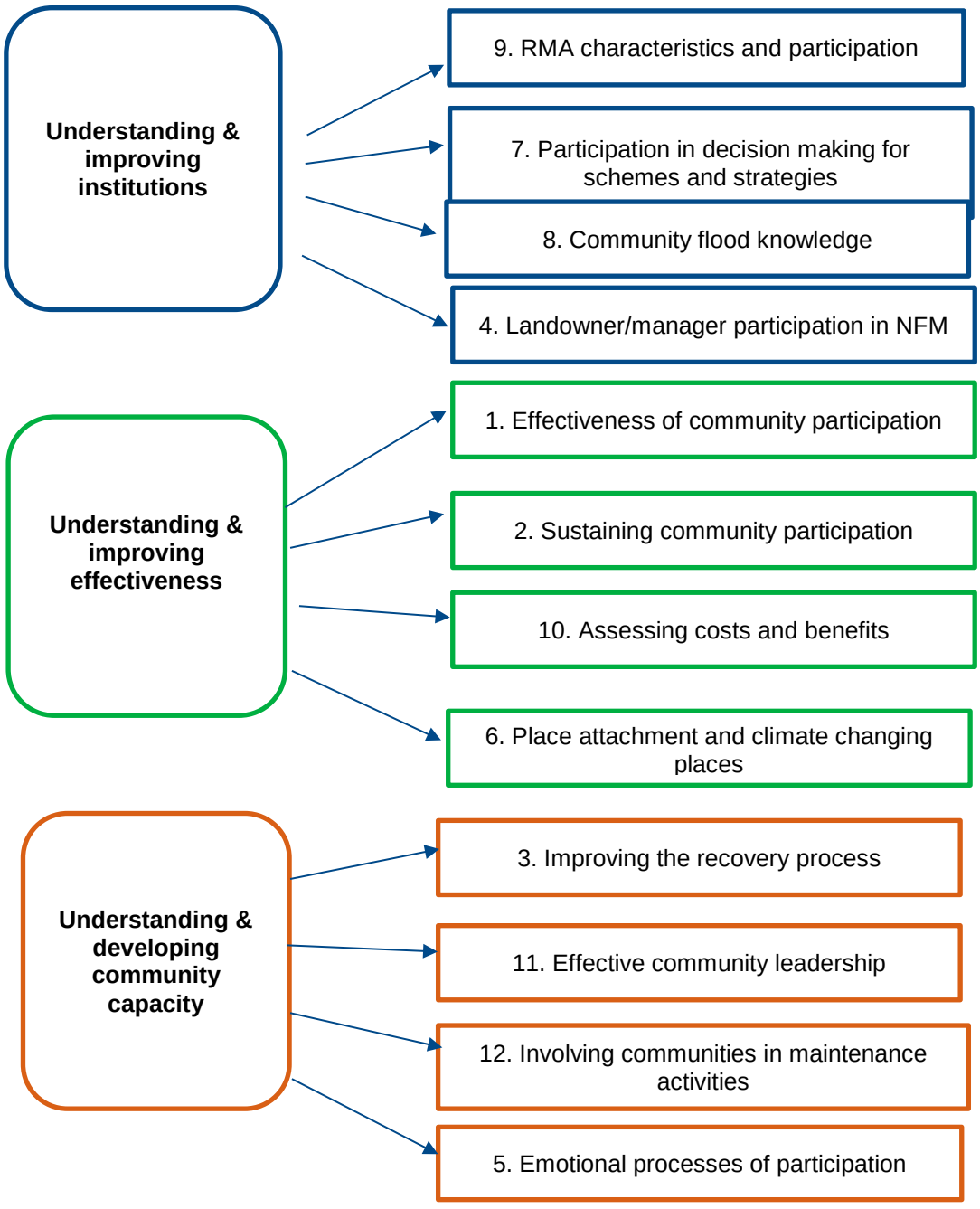


Figure 3.2 shows how each of the proposed projects links back to the 3 main aims of this research framework:

- Improve institutions' understanding of how communities, RMAs and other organisations can work together to improve resilience and adapt in the face of the increased risk of flooding and coastal erosion from climate change (**Institutions**)
- Evaluate and support improvements in the effectiveness of working together in FCERM from the different perspectives of communities, RMAs and other organisations (for example, NGOs) (**Effectiveness**)
- Support the development of an all-encompassing approach to participation which recognise place-based issues that differentiate communities' capacity to take on local responsibilities for flood risk management. To develop a community of practice of community members, RMAs, other organisations, researchers to share and engage in research and development of FCERM activities (**Community capacity**)

Project assessment

Each of the 12 projects were assessed by the project team against 9 criteria:

1. Clear business need/ask (alignment with the objectives and priorities of Defra/Environment Agency/Natural Resources[9])
2. 'Quick win' - possible to translate knowledge into practical action)
3. Addresses multiple community participation activities
4. Is of relevance to FCERM policy influencing factors[10]
5. Prioritised by project workshop participants (the gap was considered as a priority – 'must have' or 'should have' – by participants in the March 2020 stakeholder workshop)
6. Relevance of outputs to a range of stakeholders
7. Potential to attract funding from outside Defra/Environment Agency
8. Inequalities impact (addressing issues relevant to the participation of deprived areas or groups)
9. Geographical extent of impact

Table 3.3 shows the results of this assessment when each project was assessed against each of these criteria where they are given a score of high (H), 'medium (M) or low (L)

Table 3.3 Project scores against assessment criteria

Project title	C1:Business need	C2: Quick win	C3: Multiple areas	C4: Policy drivers	C5: Workshop	C6:S/H interest	C7: Funding	C8: Inequalities	C9: Geog extent.
1. Effectiveness of community participation	H	M	H	H	L	H	M	H	H
2. Sustaining participation	H	M	H	H	H	H	M	H	H
3. Improving the recovery process	H	M	M	H	H	H	L/M	H	H

[9] For example, Environment Agency Asset Management Effectiveness Programme, Environment Agency Asset Management Strategy to 2022, Environment Agency Flood Incident Management Action Plan and Road Map, Shoreline Management Plan Review); National Infrastructure Commission National Infrastructure Assessment (2018); Defra Group Strategy: Creating a Better Place for Living (2018)

[10] For example, UK climate change policy (Climate Change Risk Assessment 2017, UK National Adaptation Plan 2018, Welsh Government Climate Change Adaptation Delivery Plan for Wales 2019); Wales sustainability policy (Well-being of future generations (Wales) Act 2015); Environment policy (UK 25 Year Environment Plan

Project title	C1:Business need	C2: Quick win	C3: Multiple areas	C4: Policy drivers	C5: Workshop	C6:S/H interest	C7: Funding	C8: Inequalities	C9: Geog extent.
4. Landowner/manager participation in NFM	H	H	L	H	M	H	L	L	H
5. Emotional and social processes of participation	M	L	H	M	M	M	M	M	H
6. Place attachment and climate changing places	H	L	L	M	N/A	M	H	M	H
7. Participation in decision-making	H	M	H	H	H	H	M	M	H
8. Community flood knowledge	M	L	H	M	H	H	M	M	H
9. RMA characteristics and participation	H	M	H	H	M	H	M	H	H
10. Assessing costs and benefits	M	L	M	H	M	M	L	L	H
11. Effective community leadership	H	M	H	H	N/A	H	M	H	H
12. Enabling community maintenance for local flood risk management	H	H	M	H	NA	H	L	L	H

As can be seen from this table, most projects scored high for most of the criteria. Projects 2, 3, 7, 9 and 11 scored the highest across all the criteria. Most of the projects have high scores for the 'policy drivers' and 'stakeholder interest' criteria.

Projects generally had lower scores for criteria 7 'Potential for accessing funding from sources outside Defra,' criterion 2 'quick wins' and criterion 8 'inequalities.' Some projects scored low against the 'inequalities' criteria. This is because the projects focus on operational challenges of providing guidance to volunteers taking part in maintaining FCERM assets and mechanisms for farmers to work with communities and other stakeholders on NFM.

Four of the five projects (Projects 2,3,9 and 11) that score most highly across all the criteria also score highly on their inequalities impact. Including these projects early in the programme could help to demonstrate the value of considering inequalities in project design.

Three projects have the lowest scores across all the criteria, these are:

- project 4 - Landowner/manager participation in NFM
- project 5 - Emotional processes of participation
- project 10 - Costs and benefits of participation

Project prioritisation

As part of the development of this research framework, the project's steering group was asked to rank its top priority projects to help define the order in which they should be rolled out. Project 12 was not included in this exercise because it already had a potential funding route through the Construction, Industry Research and Information Association (CIRIA) and a lead local flood authority (LLFA) Table 3.4 shows the priority order that the steering group recommended. There is some consensus between the top 5 prioritised during this exercise and the top 5 prioritised during the workshop.

Table 3.4 Results of participant prioritisation in steering group workshop

Project (short title)	% of respondents (number)	Part of top 5 from the prioritisation process
Project 7. Participation in decision-making	100% (8)	Yes

Project (short title)	% of respondents (number)	Part of top 5 from the prioritisation process
Project 1. Effectiveness of community participation	88% (7)	No
Project 10. Assessing costs and benefits	88% (7)	No
Project 9. RMA characteristics and participation	75% (6)	Yes
Project 2. Sustaining participation	50% (4)	Yes
Project 3. Improving the recovery process	50% (4)	Yes
Project 5. Emotional and social processes of participation and Project 6 Place attachment and climate changing places	25% (2)	No
Project 4. Landowner/manager participation in NFM	13% (1)	No
Project 8. Community flood knowledge	13% (1)	No
Project 11. Effective community leadership	0% (0)	Yes

3.4 Peer review

As the research framework was developed, we discussed its development with the National Flood Forum to gain their valuable input as the voice of flooded communities. Paul Cobbing and Phiala Mehring from the National Flood Forum peer reviewed the draft research framework.

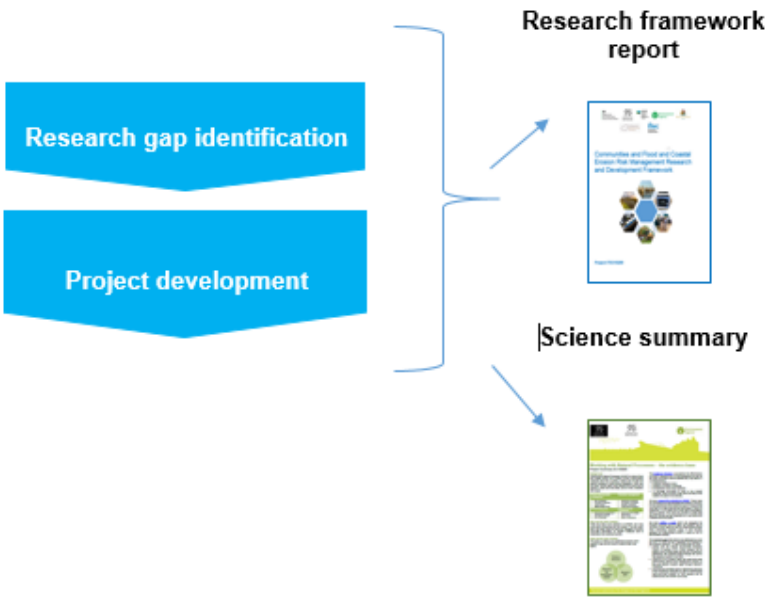
We also gained invaluable input from Professor Edmund Penning-Rowsell who also acted as an independent peer reviewer.

This peer review process enabled us to check that the evidence we had collated was comprehensive and the research questions and gaps identified definitely needed to be addressed.

3.5 Outputs from the evidence assessment

This chapter has described how we assessed evidence, identified gaps and prioritised the research projects. Steps are summarised in Figure 3.3 below.

Figure 3.3 Steps in assessing evidence and identifying gaps



4 Priority projects

This chapter takes the 12 projects prioritised in chapter 3 and describes these in detail. Each project is presented in a consistent format so that it could be taken and used to inform the development of a business case to obtain funding or to inform calls for research funding.

4.1 Community and volunteer participation in FCERM

Project summary

Few of the organisations involved in engaging individuals and groups in FCERM systematically collect data on this participation. Lack of data on this topic means that organisations do not have a full picture of community and volunteer participation in different areas of FCERM. This data could help to answer questions such as:

- What are the characteristics of the individuals and groups that currently participate in FCERM?
- What activities and types of flood risk do they get involved in?
- What are the results of their involvement?

Understanding that community and volunteer participation is dynamic, changing with the local needs for FCERM activities, this project would also set up a network of FCERM community activities, linking up different communities and their RMAs/other organisations.

The project could have 3 strands of activity:

- The first will focus on collecting quantitative and qualitative information on volunteer and community participation in FCERM across England and Wales. This will update, build on and expand previous work on flood volunteering for the Environment Agency ('Investigating and appraising the involvement of volunteers in achieving FCERM outcomes', carried out by Forest Research) This will provide quantitative data on basic aspects of FCERM participation, including the number of people involved, their geographical distribution, distribution by socio-economic characteristics such as age, gender, ethnicity, their areas of activity and the types of flood risk covered. The project will consider where qualitative data could add the greatest value and which research methods would be best suited for collecting this data. This strand will examine experiences of collecting and managing data on community and volunteer participation in other fields and develop a data collection and management system that can be trialled.
- The second strand will develop a network of FCERM community activities, linking up different communities and their RMAs/other organisations. The aim of this is to be able to collect, share and evaluate evidence, facilitate peer-to-peer learning and share skills. The project will also set up some specific Learning and Action Alliances (LAAs)[11] to tackle important participation challenges.
- The third strand will provide an approach for evaluating FCERM community and volunteer participation. This will need to assess the activities volunteers

[11] "A Learning and Action Alliance is a social learning framework and structure for collaborative working between a group of individuals or organisations with a shared interest in innovation and implementing change. Within LAAs participants work together to understand a problem and its possible solutions through discussion. LAAs enable two-way communication and co-production of knowledge between academic, institutional and industry stakeholders.

Project summary

carry out, the results of this activity, the range of benefits provided and any gaps or weaknesses. The assessment would compare results across types of flood risk and activities and could potentially look at other aspects, depending on the priorities agreed by the partners' organisations. The approach would be used to develop a baseline assessment of FCERM participation.

Creating a network of community and volunteer participation in FCERM will help provide the evidence for analysis, evaluation and learning to increase and improve flood volunteering and participation. Community flood groups will be able to use the data to target local initiatives and to support peer-to-peer learning; RMAs will draw on it to develop effective volunteering activities for specific groups of volunteers.

Objectives

- Develop and consolidate a system for collecting data on volunteer participation in FCERM that will increase understanding of who volunteers, for which types of activities and flood risk, and with what results.
- Develop a network of FCERM community activities, linking up different communities and their RMAs/other organisations.
- Establish up to 5 Learning and Action Alliances around specific participation challenges.
- Assess the effectiveness of volunteer participation for all those involved (members of communities, RMAs and NGOs).
- Draw out successes and challenges of volunteer participation from the perspective of individual volunteers, communities and RMAs.
- Develop principles and guidance for communities and authorities to improve volunteer participation in FCERM.

Outputs

- Evidence on FCERM participation, including quantitative data on basic aspects of FCERM participation (such as the number of people involved, their geographical distribution, distribution by socio-economic characteristics such as age, gender, ethnicity, their areas of activity and the types of flood risk covered) and some qualitative data to be agreed by project partners.
- Network of FCERM participation activities across England and Wales, together with LAAs to tackle specific participation challenges.
- Evaluation of effectiveness, successes and challenges of flood volunteering in England and Wales.
- Principles and guidance on flood volunteering for flood authorities and communities.

Impact

The project will improve the relationships between communities and RMAs. It will increase information available on how communities are working with RMAs and other organisations in FCERM activities, which, in turn, improve ways of working.

Types of research (Y/N)

Basic:	N	**Applied:**	Y	**Development:**	Y
Dissemination:	Y	**Training:**	N	**Implementation:**	Y

Research end users (Y/N)							
Government depts/agencies:	Y	**Risk management authorities (RMAs):**	Y	**Water companies:**	N	**Research Councils:**	Y
Communities:	Y	**NGOs:**	Y	**Academia:**	Y	**Others:**	N

Partnership/collaborative working opportunities
This should be a partnership project involving the National Flood Forum, local authorities, Natural Resources Wales and the Environment Agency. There will also be opportunities to share evidence with NGOs such as Groundwork, the British Red Cross and the Trust for Conservation Volunteers (TCV) who may have relevant information. Local authorities (for example, Hillingdon Borough Council, Warwickshire County Council and Northampton County Council) have worked with flood volunteers and will be able to draw on this experience.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	N	**UK Research Council**	?	**Other**	?
Other: Regional Flood and Coastal Committee							

Start year	Duration (years)
2021/22	3

4.2 Sustaining effective community and volunteer participation in FCERM

Project summary
Sustained effective[12] participation means keeping communities and RMAs working together on FCERM activities over time. Currently communities become involved in FCERM activities immediately after a flood event but their involvement can dissipate once clean-up and recovery is over. Understanding how to retain resilient community networks is important. People that take part in activities will be more prepared for flood events, more able to recover and can potentially contribute to the resilience of their communities and places. The literature review found that developing good relationships between RMAs and individuals and groups is an important part of resilience. Participation activities will only flourish within relationships of trust. This project will explore what 'sustained participation' looks like for all types of participation activity, the influencing factors and how participation can be resilient. It aims to understand how people get involved in and stay involved in flood groups. It will also examine how continuity can be maintained given levels of organisational change within RMAs, which make developing sustained relationships between community members and RMAs/other organisations more challenging.

[12] 'Effectiveness' here means adhering to best practices of participation (for example, transparency, two-way communication) as well as potentially contributing to positive outcomes such as reducing the risk of flooding and reducing flood damages. The project will need to establish how different stakeholders and communities understand effectiveness.

Project summary

Sustained effective relationships between communities, RMAs and other relevant authorities is essential to the resilience of both communities and places, as set out in the FCERM strategies for England and Wales. It is hard to re-engage with people once the initial momentum has been lost.

The project also needs to find out if there are certain groups/communities that find it harder to become involved and stay involved in FCERM.

The project could start with a short review of existing literature from the UK, looking at sustained community participation in activities other than FCERM. This project should follow on from the data collection phase of project 1, as this will make it possible to categorise individuals and groups by the length of time they have been involved in FCERM.

Through the networks and data collected in project 1 we will be able to identify a number of areas in which community groups, RMAs and others are already working together, and these groups could be invited to participate in qualitative research. Action research is suited to this research topic because it allows the researchers to work alongside a wide range of groups whilst they engage in different aspects of FCERM, to identify changes in their approach to or experience of engagement and to encourage all those involved to reflect on their experience. This will provide strong evidence and could potentially be used to develop guidance on sustaining relationships between RMAs, communities and other organisations, with a view to participating in FCERM activities.

Objectives

- To examine current or recent examples of sustained participation and to define what sustained participation looks like from both an RMA and community perspective.
- To understand the role of trust and relationship development in the context of sustained participation.
- To identify the costs and benefits of sustained participation for all those involved.
- To explore the need for sustained participation in different contexts, for example, post flood, post scheme development; the barriers and facilitators to sustained participation; and the governance or institutional approaches that might support or inhibit it.
- To identify any specific barriers to and proposed approaches to encourage the sustained participation of deprived or marginalised communities.

Outputs

- The project will produce a report examining what sustained FCERM participation looks like in different contexts and analysing the contribution of sustained participation to community flood resilience.
- The project will provide evidence on:
    - the barriers and facilitators to sustained participation
    - the governance or institutional approaches that support or inhibit sustained participation
    - the types of relationships between RMAs, communities and other organisations that encourage sustained participation
    - how RMAs and other organisations can support sustained community participation and help it change to respond to changing flood contexts and challenges.
- The project could produce a good practice guide, identifying barriers and challenges to sustained participation and describing approaches and initiatives

Outputs
that are most likely to be sustainable. This could include case studies of effective long-term participation and suggestions of how RMAs can develop relationships to enable community participation over time.

Impact
The research will help identify the factors that contribute to or hamper sustained FCERM engagement. It will collate information that RMAs and others can use in practice to maintain and develop relationships at the local level, thereby maintaining or increasing resilience. It will also focus on 'hard to reach' communities will help to address the problem of inequalities in flood resilience.

Types of research (Y/N)					
Basic:	Y	**Applied:**	Y/N	**Development:**	Y
Dissemination:	N	**Training:**	N	**Implementation:**	Y

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	Y	**Research Councils:**	?
Communities:	Y	**NGOs:**	Y	**Academia:**	Y	**Others:**	N

Partnership/collaborative working opportunities
This project should be implemented using an action research approach. There is potential for collaboration between RMAs, NGOs (for example, Groundwork, Trust for Conservation Volunteers) and community flood groups (for example, National Flood Forum and groups at the regional and local levels, for example, Cornwall Community Flood Forum and others.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	?	**Other**	?
Other: Regional Flood and Coastal Committee							

Start year	Duration (months)
2022/23	18

4.3 Improving the flood recovery process

Project summary
The recovery process is complex and involves many different groups such as LLFAs, builders, surveyors, insurance, loss adjusters, NGOs. There is evidence from previous research (Medd et al, 2015; Lamond et al, 2019) that the recovery process leads to stress and mental health effects for those who have been flooded beyond the stress of the actual flood itself. There is a need to improve the recovery process for communities so that it causes fewer mental health effects and helps develop resilience to ensure 'better' recovery from subsequent floods. The purpose of this project is to understand the process of recovery after flooding, including the immediate consequences of a flood, getting back into properties, dealing with practical problems as well as the longer term personal and community impacts.

Project summary

The project will examine the challenges members of communities face when trying to recover from flooding. Looking at how activities can be supported to increase personal resilience within the recovery process, especially for people who are temporarily relocated. It will examine how participation in short-term recovery can be effective so that it enables adaptation (communities can bounce back better) and not just a return to how things were before. The project will also focus on how the most vulnerable are supported.

The project will map the recovery system. It will also look at the differences between how both planned and spontaneous participation to establish how they affect the recovery of individuals (psychological, social and material) and communities. The project will also focus on the interaction between individuals, community groups and organisations with responsibilities for recovery. Understanding individual and community experiences of recovery will provide valuable information to improve future engage with such groups, ultimately ensuring people are better prepared before, during and following a flood.

The project will explore:

- How communities and partners (e.g. NGOs) view and experience flood recovery?
- How the participation of communities affects the flood recovery process. For example, does being involved with a community group before or after flooding improve recovery? Do different types of engagement affect flood recovery differently?
- How different social groups (e.g. children, young people, older people, disabled people, BAME groups) engage with the flood recovery process. Are there different experiences of being engaged in flood recovery for different social groups? Are there different ways of engaging with different social groups?
- How less well-connected and less vocal communities recover from flooding compared to communities who are better connected/more vocal
- Whether socio-economic/cultural differences lead to different recovery experiences and recovery times.
- How people who have not been directly affected by flooding been engaged in flood recovery.
- Different examples and experience of the 'recovery gap,' providing solutions that could alleviate them.

Objectives

- Describe and map the recovery process for individuals, communities, NGOs and RMAs, including actions, communications and responsibilities.
- Identify a range of scenarios where recovery is helped by engaging and interacting with informal and formal support/services.
- Using case studies, explore and evaluate different experiences of flood recovery. Including a range of different social groups, people who have been repeatedly flooded.
- Identify main lessons to be learned and good practice from the case study experiences and provide recommendations for community groups and relevant RMAs to improve recovery, tailored for different individuals/ societal groups.
- Develop training and workshops on recovery for communities, RMAs and other organisations.

Outcomes

- Better understanding of the challenges of recovery for different societal groups and the benefits of effective community engagement – better identification of the recovery gap.

Objectives

- Improvements in how community groups are able to engage with local individuals (from different societal groups) about recovery, including communities being better prepared before an event.
- Better enable effective engagement between individuals/communities experiencing flood recovery, insurance industry professionals and RMAs tasked with recovery responsibilities.

Outputs

- A map of the full recovery process within England and Wales, detailing the responsibilities and actions of each organisation, together with a definition of recovery from different perspectives (RMAs, communities and other organisations)
- Identify the range of scenarios where recovery may occur – in other words, the types of experiences that might be encountered.
- Case study experience of real individuals/communities and an evaluation of how engagement with community groups, informal and formal services and different organisations have impacted on recovery.
- Recommendations/guidance for community groups, insurance industry professionals and RMAs involved in recovery about how they can improve the recovery process.
- Workshops and training for RMAs, communities, insurance industry professionals on the recovery process.

Impact

Recovering from flooding is often considered to be more stressful for those affected than the actual flood event itself. Improving the recovery process, therefore, can potentially have significant impacts on the experiences of individuals and communities affected. There is a lack of systematic information about flood recovery. A clearer understanding of how individuals and community groups help each other, interact with organisations and access support services will provide valuable information about how recovery support can be provided throughout the recovery process.

The Environment Agency has recovery procedures and a recovery manual. It has also recruited staff as flood support officers to talk to communities after a flood. This project can provide evidence to help this support and improve this process.

Types of research (Y/N)

Basic:	Y	**Applied:**	Y	**Development:**	Y/N
Dissemination:	N	**Training:**	N	**Implementation:**	Y/N

Research end users (Y/N)

Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	Y/N	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	Y/N	**Others:**	Y

Partnership/collaborative working opportunities

This project will require organisations who are involved in recovery to work together to gather evidence of how recovery is currently working and any issues. There are clear opportunities to work with existing community groups to identify best practices and to look for innovative ways in which communities are engaging and being supported in recovery. The insurance industry should also be involved.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	Y
Other: Insurance companies							

Start year	Duration (months)
2022/23	12

4.4 Landowner and land manager participation in NFM

Project summary

RMAs work with a range of stakeholders on land owned by others to deliver to deliver FCERM projects such as natural flood management (NFM), managed realignment and asset maintenance. These stakeholders include farmers, landowners, land managers and infrastructure providers.

This project would involve working with stakeholders to understand what effective engagement looks like from their perspective and how it could be delivered more effectively.

The project will examine the following questions:

- How do farmers, landowners, land managers and infrastructure providers make decisions about whether their land can be used to deliver FCERM activities? What are the factors that contribute to their decision-making?
- How do farmers, landowners, land managers and infrastructure providers work with communities around asset maintenance?
- What tools and approaches do RMAs need to help work with farmers, landowners, land managers and infrastructure providers to deliver FCERM activities on their land?

Objectives

- Explore the stakeholder decision-making process used when farmers, landowners and land managers are engaged over potential changes to the land they manage or own to facilitate FCERM.
- Explore the different tools and approaches for engaging farmers, landowners and land managers in discussions about flood and coastal change and how they could contribute.
- Through interviews and a survey draw out the views on how stakeholders themselves would prefer to participate in changes in land management to facilitate FCERM activities.
- Identify main lessons to learnt and good practice, identifying suitable tools and approaches to ensure stakeholder participation in changes in land management to facilitate FCERM.

Outputs

- A report examining stakeholder perception and decision making on land management and NFM.
- Identify principles and guidance on engaging farmers/landowners/land managers/infrastructure providers in land management for FCERM (Including NFM and asset management).

Impact
This research will help RMAs better understand how to work with farmers, land owners and land managers to deliver FCERM activities such as NFM and managed realignment which may affect their land. This will include information on tools and approaches that will help to improve relationships with these stakeholders and the ways of working with them. It will also help to negotiate implementation of NFM measures and sustained asset maintenance.

Types of research (Y/N)					
Basic:	Y	**Applied:**	Y	**Development:**	Y/N
Dissemination:	Y/N	**Training:**	N	**Implementation:**	Y/N

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	N	**Others:**	N

Partnership/collaborative working opportunities
There is potential to collaborate with landowner organisations (such as NFU, CLA) to scope research, which would develop evidence on the experience of participation in FCERM. Also, there could be an opportunity to collaborate with the Farming and Wildlife Advisory Group and Countryside Stewardship advisors in Natural England who have significant experience in engagement with farmers.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	N

Start year	Duration (months)
2022/23	12

4.5 Emotional and social processes of participation in FCERM

Project summary
This project will investigate the emotional and social processes of participating in FCERM and the extent to which participation might be a useful psychological strategy for communities or individuals living in an area at risk of flooding. Being flooded causes a wide range of emotions (Medd et al., 2015). Emotions and social processes influences individual's perceptions of risk and associated coping strategies. The recovery process also causes stress and, for some, longer term anxiety and serious mental health issues. For example, Harries (2014) has shown that fitting a flood door can trigger negative emotions linked to flooding, which may prevent some people from installing property flood resilience measures. Harries' previous work has found that in some cases people can feel safer by denying that they have been flooded, as that protects their psychological sense of security. Participation in local activities can contribute to someone's wellbeing (e.g. self-esteem, self-efficacy). Wellbeing can be created through a sense of group belonging and identifying with others, which is at the heart of building social networks within communities. Participation and belonging to a group can act as a coping mechanism

Project summary

to reduce the negative emotions associated with living with flood risk. However, participation in flood activities can also be frustrating, time consuming and remind those involved of how they have been impacted by flooding. This project is interested in whether RMAs and members of communities can work together to increase the positive aspects of participation.

The project will:

- Provide a focused summary of evidence on the role of emotional and social processes in participation in flooding and other natural hazards.
- Identify several areas at risk of flooding or recently flooded in England and Wales and carry out interviews/focus groups to gather data from members of communities who have either participated in FCERM activities or decided not to.
- Bring together members of these communities and RMAs who have participated in the research to establish how to apply the research practically

There could be a second phase to this project which would develop guidance and advice for RMAs.

Objectives

The objectives of the project are to:

- Investigate how members of at risk/flooded communities balance the negative impacts of flooding with the positive benefits of planning and volunteering. This will help understand the aspects of that participation that need to be in place to have a positive outcome?
- Understand how emotions affect (barriers and facilitators) whether someone takes part in FCERM activities (e.g. incident management, flood response and recovery and conversations about long-term adaptation).
- Explore how social identities are formed in relation to taking part in FCERM activities, specifically in areas of deprivation.
- Explore how far participation in FCERM activities acts as a strategy for coping with living in a location at risk of flooding.
- Improve ways of working between RMAs and communities by recognising the emotional and social processes experienced by those at risk of flooding.

Outcomes

- Better understanding for RMAs, members of communities and other organisations of the emotional and social processes involved in taking part in FCERM activities.

Outputs

- Report to help understand the role of emotional and social processes of taking part in FCERM.
- Practical applications of the research (for example, input into guidance/training).

Impact

Understanding emotions and influencing factors (positive and negative), will help RMAs and other organisations to better understand what motivates those who are at risk of flooding to become involved in FCERM activities.

Types of research (Y/N)					
Basic:	Y	**Applied:**	Y	**Development:**	N
Dissemination:	N	**Training:**	N	**Implementation:**	N

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	Y	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	Y	**Others:**	N

Partnership/collaborative working opportunities
National Flood Forum, Red Cross, local flood action groups. If the project were funded by a Research Council, academics could be linked up with existing pilots such as the resilience pilots and the adaptive pathway pilots.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	Y	**Other**	N

Start year	Duration (months)
2022/23	12

4.6 Community attachment to places affected by climate change

Project summary
Climate change will alter landscapes as flooding and coastal erosion become more frequent, these changes to landscapes will be further exacerbated by sea level rise. There will be a need to have conversations with communities about the impacts of climate change on the places in which they live to understand how land is adapted and managed to improve flood resilience. Emotional attachment to a place plays an important part in people's relationships to the places in which they live. Developing ways of supporting individuals and groups with strong emotional attachments to specific places, which are changing due to the climate, is an important part of building resilience over time. There is extensive research on 'place attachment' and 'sense of place' (defined as an emotional attachment to place). There is also evidence that when places are changed or threatened, this can impact on individuals' and communities' attachment to places and identity. This can mean people may find it hard to accept certain changes or, in extreme cases, leave a place if they need to. It is a factor that has been identified specifically in relation to conversations about long-term adaptation on the coast and coastal erosion. Place attachment is also relevant in towns and on rivers where FCERM schemes are planned that significantly affect a landscape (e.g. proposals for engineered schemes through towns). This project could involve: ▪ A review of current literature on place attachment in the context of flooding and other natural hazards ▪ Fieldwork with members of communities who live in areas at risk of flooding and coastal erosion. This could include ethnographic research (study of human society) in one place over time, investigating the processes of place attachment. Also developing case studies of different types of changing landscapes to understand place attachment in different types of location. ▪ developing and piloting approaches for RMAs and communities to incorporate place attachments during long-term conversations about adaptation

Objectives
The objectives of the project are to:

Objectives

- Investigate the psychological issues associated with place attachment in the context of altered, completely different or changing places
- Understand how place attachment is affected by changed in a landscape
- Assess how place attachment affects individual and group participation in conversations about long-term adaptation
- Explore how placement attachment extends beyond geographical proximity
- Explore how place attachment might be discussed during conversations with communities about long-term climate change adaptation

Outputs

- Short evidence review.
- Report on approaches and pilots.
- Discussions with RMAs and other organisations, including charities and those helping communities over time address place attachment issues as part of the development of climate change adaptation strategies

Impact

This research will help RMAs and communities have more productive conversations about long-term adaptation in the face of climate change.

Types of research (Y/N)					
Basic: Y		**Applied: Y**		**Development: N**	
Dissemination: N		**Training: N**		**Implementation: N**	

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	Y	**Others:**	N

Partnership/collaborative working opportunities

This project could form part of a research council research call. Other partners could include the Red Cross, Local flood action groups, National Flood Forum.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	N	**UK Research Council**	Y	**Other**	N

Start year	Duration (months)
2022/23	12

4.7 Improving participation in FCERM decision making

Project summary

This project focuses on the opportunities for individuals and groups to take part in FCERM schemes and strategy decision-making. Whilst consultation is a core part of the process of developing FCERM schemes and strategies, there is little research on how individuals and groups input to these consultations and whether the process of consultation could be improved. There is considerable experience in this area, yet it

Project summary

has not been drawn together and systematically examined with a view to improving the processes. The project could focus on specific types of FCERM schemes and strategies or take a sample across a range of FCERM activities.

The project could be undertaken in 2 phases.

Phase 1 will:

- A desk-based review of the current process, drawing out the opportunities for community members to take part in FCERM schemes and strategies in England and Wales. This would include a mix of completed and ongoing consultations to see how the opportunities had been used or not, and what impact the participation has had on the scheme or strategy's development.
- Collect data via interviews with all relevant stakeholders (professionals and community representatives participating or not participating) and collect and review consultation documents.
- Develop a typology to describe different decision-making approaches and to draw out for each approach the facilitators and barriers to communities participating in the consultation, the degree of influence and the overall benefits of their engagement.
- Suggest areas for improvement and new ways of working with individuals and groups to improve decision-making using collaborative approaches.

Phase 2 will:

- Pilot new ways of working on a sample of up to 10 schemes/strategies and evaluate their effectiveness (against criteria developed in Project 1).

Objectives

- Identify what opportunities currently exist for members of communities to participate in the different stages of scheme or strategy development.
- Explore opportunities that are/are not taken up by members of communities and explain why. Examine how participation is defined by both RMAs and members of communities.
- Explore the views of both communities and professionals to better understand their opportunities to contribute to scheme or strategy development. For example, awareness of those opportunities, ability to engage (technical knowledge/language/time), the processes of decision making (representation, influence) and available resources (voluntary time, transactional costs)
- Identify different types of participation (from consultation to co-creation) that could benefit FCERM decision making. Explore how those processes work and whose views are represented.
- Explore the strengths and weaknesses of the current process in terms of participation of individuals and groups.
- Explore how the process can be improved, and what needs to change for those improvements to be put in place?

Outcomes

- New opportunities for professionals to plan and work with the relevant individuals and groups identified.
- A range of practical approaches for involving people in making decisions that could be used at all stages of developing and implementing schemes or strategies.
- RMAs better understand what motivates communities to get involved and what communications can help to improve that participation.

Outputs
▪ Report on main findings of good and bad practice and recommendations. ▪ Guidance documents for professionals, including a toolkit and 'opportunity for participation' guidance for communities.

Impact
Better informed decisions on planning engagement. A closer and stronger relationship with communities that continues after schemes and strategies have ended. Greater ownership by communities of the schemes and strategies they have helped develop with the relevant professional organisation. Ownership that includes concern and involvement in scheme and strategy monitoring and basic maintenance.

Types of research (Y/N)					
Basic:	Y	**Applied:**	Y	**Development:**	Y
Dissemination:	Y	**Training:**	Y	**Implementation:**	Y

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	Y	**Others:**	N

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	Y

Start Year	Duration (months)
2021/22	Phase 1 - 12 months + Phase 2 pilot time (availability of opportunities)

4.8 The role of community flood knowledge

Project summary
RMAs work with communities when delivering FCERM to obtain their local knowledge, improve decision-making and share information. Communities can become frustrated when RMAs don't acknowledge local knowledge about flooding or involve them in decisions that affect them locally. We need to understand how communities can build on their 'collective' memories and knowledge of flooding and share this knowledge with RMAs to improve how flood risk is managed locally. There has been past academic research on this topic. In particular there has been a focus on the use of lay knowledge in the development of natural flood management projects (e.g. Whatmore and Landstrom, 2012; and Short et al, 2019). McEwen (2014) also developed an understanding of communities' flood memories. This project aims bring together theoretical insights from past research into lay knowledge to help understand how communities have used their local knowledge to influence different types of FCERM activities. The next stage of the project could develop approaches to help RMAs be able to collect and incorporating local flood knowledge into the delivery of FCERM activities.

Objectives
The objectives of this project are to:

Objectives

- Understand how RMAs and communities currently capture community flood knowledge and what mechanisms are most effective in capturing this knowledge and data.
- Explore understanding and perceptions of community flood knowledge from the perspectives of communities, RMAs and local authority planners. What and whose knowledge counts? How is it shared?
- Explore the ways in which RMAs currently incorporate community flood knowledge into FCERM assessments, modelling, scheme options appraisal and decision-making.
- Understand the 'social' elements of community knowledge, the importance of the area that floods to people, and the role that place plays in community life.
- Examine how communities learn about flood risk and how they can share their knowledge with RMAs to contribute to flood risk assessments and modelling.
- Facilitate dialogue between members of communities and RMAs around local flood knowledge.

The project outcomes will be:

- Improved relationships between community members and RMAs because communities better understand the roles and responsibilities of different authorities in flood management and they know how to share their knowledge and data.
- Identifying ways for communities to share local flood knowledge so that RMAs, communities and planners can use it to inform FCERM activities.
- Understand how local knowledge can be used to improve activities such as flood mapping, modelling and flood warning.

Outputs

The outputs of the project will include:

- Evidence of how community knowledge can be used and incorporated into FCERM activities.
- Advice for RMAs on how to use and incorporate community flood knowledge into FCERM activities.
- Case studies to share examples of how local knowledge has informed FCERM activities in different communities.

Impact

- The knowledge and evidence collated by community members could be used to inform the delivery of FCERM locally within their community.
- Communities will feel their knowledge is valued and as a result this will increase their understanding of FCERM processes and buy-in to how FCERM is delivered locally.

Types of research (Y/N)

Basic:	N	**Applied:**	Y	**Development:**	Y
Dissemination:	Y	**Training:**	N	**Implementation:**	N

Research end users (Y/N)

Government depts/agencies:	N	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	Y
Communities:	Y	**NGOs:**	N	**Academia:**	Y	**Others:**	N

Partnership/collaborative working opportunities

RMAs.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	Y	**Other**	N

Start year	Duration (months)
2022/23	18

4.9 Characteristics of RMAs which influence participation in FCERM

Project summary

Institutional trust and buy-in are important aspects in the successful participation of individuals and groups in FCERM. Institutional practices and cultures can affect this trust which can in turn influence whether a community of an individual decides to participate in FCERM.

This project will develop a detailed understanding of different RMAs involved in FCERM and how that affects the extent, nature and influence of participation. Drawing on experience, good practice will be drawn out to structure and develop organisations in terms of processes and skills, to enable participation or even remove barriers. This will also provide understanding of why some parts of organisations might be more effective at taking part in FCERM activities than others. It will also be an opportunity to show those RMAs how they are perceived by communities in terms of participation in FCERM. This might mean RMAs have to develop (or further develop) dedicated engagement roles, resources and improve staff skills to build capabilities and confidence to change. This, in turn, may influence deeper cultural change.

The project will involve first identifying and designing a target sample of communities and their representatives based on different FCERM challenges and engagement successes across England and Wales. Evidence on RMAs' practices and culture will be collected using a questionnaire survey. Survey responses will be further explored and supported by interviews. Both the survey and interviews will gather the views of communities on the kinds of institutional practices that facilitate/inhibit their involvement. This work will be further supported by collaborative workshops in selected locations based on important characteristics and issues revealed in the research. The workshops will enable RMAs and communities to hear from each other and then work together to create conditions within organisations that encourages further participation in FCERM.

Objectives

- Identify the characteristics of institutions (for example, RMAs) that facilitate or inhibit participation with individual members of the public and groups.
- Explore how organisational cultures, including language used by RMAs facilitate or inhibit participation across the FCERM activities.
- Identify the characteristics and role of trust in influencing participation across the FCERM activities.
- Explore in what ways individuals and groups in flood risk areas perceive the structures and processes of RMAs and their ability to enable effective participation. This includes perceived roles and responsibilities.

Outcomes

- An evidence based understanding of community perceptions of the RMA organisation.
- Clarity on main challenges RMAs face in improving participation.
- Guidance for RMAs on where to better direct resources to improve participation.

Outputs

Report with recommendations on how to improve participation, remove barriers and increase trust. Understand how RMA cultures/language/structures can be improved to encourage more public participation in FCERM. This will be based on the voices of communities themselves and how they would like to participate.

Impact

- Inform training or guidance for RMAs to improve community participation in FCERM.

Types of research (Y/N)					
Basic:	Y	**Applied:**	N	**Development:**	Y
Dissemination:	Y	**Training:**	Y	**Implementation:**	N

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	N
Communities:	Y	**NGOs:**	N	**Academia:**	Y	**Others:**	Y

Partnership/collaborative working opportunities

National Flood Forum membership input and RMA training initiatives.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	N

Start year	Duration (months)
2021/22	24

4.10 Assessing the costs and benefits of participating in FCERM

Project summary

This project will develop a framework for assessing the costs and benefits associated with individuals and groups taking part in FCERM. It will investigate the value (not just financial) of public participation in FCERM for RMAs, local communities and others involved.

Involving communities in FCERM decision-making leads to better decision-making, increased trust (in authorities) and increased local knowledge (Involve, 2005). Members of communities benefit from being involved in FCERM activities because this enables them to influence decisions that affect the places they live and work in, it enables their voices to be heard and also enables them to share their local knowledge. Participating in FCERM also has costs associated with it (e.g. time, resources, and psychological impact). Having a systematic approach which helps to establish the costs and benefits associated participation will help RMAs justify the importance of community participation in FCERM activities.

The project will develop an understanding of the costs and multiple benefits of taking part in FCERM activities. It will also develop an approach to working out the financial value of the identified costs and benefits.

The project will:

- Summarise evidence on costs and benefits of participation in FCERM activities
- Collect evidence of different approaches to assessing costs and benefits of participation. This may need to draw on literature and examples from outside of the field of FCERM.
- Develop an approach for assessing the costs and benefits of participating in FCERM and test it on case study examples using data from selected RMAs and community groups
- Investigate how to put a monetary value on the costs and benefits of taking part in FCERM and trial different ways of doing this using case study examples
- Develop workshops and training for RMAs, communities and other organisations to share findings from this study and use these events to develop guidance on assessing costs and benefits of participation

Objectives

- What are the individual, social and material costs and benefits of taking part in FCERM activities for individual members of the public, community groups and RMAs?
- How can the costs and benefits of the different participation activities be measured?
- What evidence is needed so that these costs and benefits can be integrated into FCERM appraisal and investment decisions?

Outputs

- An approach for assessing the costs and benefits of taking part in FCERM activities.
- An understanding of the total costs and benefits of communities participating in FCERM.
- Develop approaches to help place a financial value on the costs and benefits of taking part in FCERM activities. Test approaches on different case study examples.
- Develop consistent ways of calculating the costs and benefits of participation, show a breakdown of costs and benefits for different activity types.
- Training, guidance and workshops for RMAs, communities and other organisations on how to calculate the costs and benefits of participation.

Impact
If costs and benefits of participation can be measured, then they can be accounted for by staff in RMAs and other organisations. If a way of measuring costs and benefits can be found, this could be included in the FCERM appraisal process.

Types of research (Y/N)					
Basic:	Y	**Applied:**	Y	**Development:**	Y
Dissemination:	N	**Training:**	N	**Implementation:**	N

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	?	**Research Councils:**	N
Communities:	Y	**NGOs:**	N	**Academia:**	N	**Others:**	N

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	N

Start Year	Duration (months)
2023	24

4.11 Effective community leadership in FCERM

Project summary
Members of at-risk communities can find it difficult to take part in FCERM activities in the absence of effective local community leadership by an individual or a group. This leadership helps to create and maintain high quality participation, with communities helping to produce community flood plans. Effective community leadership also ensures continuity so that a community's participation is sustained and their flood plan is kept up to date over time. Participation and its continuity over time often depends on one or a small number of important individuals. Once lost, community engagement is difficult to re-establish and can lead to a local flood group disbanding. For RMAs it can be hard to develop good relationship with an at-risk community in the absence of recognised and effective local community leader. This leadership has an important role to play in raising community needs, demands and ensuring preparedness for a flood. There has been limited research in to FCERM community leadership. Not enough is known about individuals or leadership groups to understand what makes them effective or ineffective. Effective community leadership can be even more challenging in communities with socio-economic disadvantage/deprivation and/or in communities without a coherent identity. This project could include: ▪ Working with local community leaders and RMAs to develop a series of case studies that examine what factors have led to effective community leadership ▪ Interviews with leaders to better understand what factors made their leadership effective. The outcomes of these interviews will be reviewed against existing models of effective leadership to establish if there are preferred/more suitable leadership models.

Project summary

- Creating and disseminating a good practice guide and a mentoring guide on effective FCERM community leadership. These guides would be piloted to get feedback.

Objectives

The objectives are to find out:

- What has led to effective and successful community leadership in at-risk communities?
- Who provided effective leadership and what are their attributes and qualities (e.g. backgrounds, skill sets, experiences, motivations)?
- How they went about their leadership task; what styles of leadership did they use (for example, autocratic, democratic); how they retained volunteers; how they overcame obstacles and took people with them; how they communicated both with members of the community and RMAs and other involved parties
- What they and others believe was been important in providing effective leadership.
- The approaches that they used to ensure leadership continuity and sustained participation over time.
- The characteristics of effective FCERM local community leadership which actively engages community members in FCERM.

Outputs

- Case studies of effective FCERM community leadership, identifying the:
  - Characteristics and styles of effective leadership in preparedness, response and recovery and community transformation
  - Approaches required to sustain community participation over time
  - Approaches that can be taken to engage disadvantaged communities and ones without a coherent identify.
- A tested good practice guide and mentoring guide on effective FCERM community leadership.

Impact

- Improved local community flood plans, better awareness, response and recovery as a consequence, and fewer gaps in plan coverage.
- Improved continuity of community engagement with RMAs and updating of local community flood plans.
- Fewer at-risk communities without effective community leadership.
- Better participation in at-risk disadvantaged communities and ones without coherent identity.
- Ultimately, reduced flood impacts and more satisfied at-risk communities.

Types of research (Y/N)

Basic:	Y	**Applied:**	Y	**Development:**	N
Dissemination:	Y	**Training:**	Y	**Implementation:**	N

Research end users (Y/N)

Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	N	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	N	**Others:**	N

Partnership/collaborative working opportunities

Potential collaboration with National Flood Forum, selected local flood groups, community councils.

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	N

Start year	Duration (months)
2023/24	12

4.12 Enabling community maintenance for local flood risk management

Project summary

Community resilience to flood risks is essential, there is potential for them to become climate champions and get actively involved in the management of their flood risk. This project will explore approaches to enable and empower local community groups to undertake simple maintenance of local flood risk management infrastructure (surface water and ordinary watercourses).

Some community groups are willing and able to manage their own flood risk and are capable of maintaining their own flood risk management assets, or are able to 'top-up' maintenance by RMAs if they are willing and actively enabled to do so. Environmental NGOs (e.g. River Trusts, Wildlife Trusts, RSPB, WWT) and organisations like The Conservation Volunteers (was BTCV) regularly run sessions where volunteers and communities undertake simple landscaping activities in their communities

The FCERM strategies identify the potential for communities, and voluntary groups to become involved in appropriate operational and maintenance activities normally the sole responsibility of Risk Management Authorities (RMAs) through in-kind (i.e. time) contributions. These local contributions for local flood risk management (surface water and ordinary watercourses) are likely to be akin to simple gardening or DIY tasks and do not require specific skills, or specialist equipment. Some community groups are already undertaking maintenance and they would benefit from RMAs understanding how to more effectively work with them and provide support by having clearer protocols, guidance and training to enable community-led maintenance.

RMAs are required to make efficiencies and savings on operating costs to respond to budget constraints and investment allocations. Government is also committed to decentralise FCERM in England and Wales and to work collaboratively with RMAs and local communities. Enabling community maintenance can assist with this and fits in with the Government's localism agenda. However, it is important to have the right people managing the right assets in the right way with the right support from RMAs. Local flood risk management approaches like SuDS and NFM where runoff is often managed on the surface and with more natural and vegetative approaches provides a significant opportunity for routine maintenance by communities.

Research suggests that tasks like debris clearance and conveyance management for streams could be undertaken. Simple maintenance of local flood risk management infrastructure and SuDS using techniques such as vegetation management and grass cutting can also be achieved. The research also suggested that community maintenance can also be undertaken by:

Project summary

- Encouraging local communities to influence their local environment through maintenance of the flood risk management assets, aligning management regimes to their passion for the local community and places.
- Formalising commitments for long-term, ongoing routine maintenance through local councils and other democratic institutions (e.g. parish councils)
- Provision of insurance for community groups (e.g. Zurich scheme available through BTCV)
- Simplified consenting procedures

This project would be de a two phased project to develop a framework and supporting guidance for the implementation of collaborative community-led approaches to FCERM maintenance activities (and any associated funding mechanisms). This would cover:

- Identification of the behaviours, processes and procedures to enable routine community operation and maintenance activities;
- Identification and description of the range of activities that can be carried out by community groups and more detailed guidance for common activities such as: risk assessment process for all activities; weed and debris clearance from streams; vegetation management including embankment and swale grass cutting; weed/invasive species management; litter picking and; inspecting and clearing inlets and outlets; and operating simple flood gates;
- Identification of specific training and guidance needs both for the community groups and those working within RMAs;
- Identification of a process for monitoring the activities carried out by communities.

Objectives

The overall objective of the project is to provide a framework of principles and guidance to enable community groups (possibly facilitated by Third Sector organisations) to deliver routine maintenance and asset management activities. The specific objectives include.

- Engage with relevant stakeholders to understand the challenges and opportunities of enabling community maintenance of local flood risk management infrastructure.
- Undertake a review of case studies, practices and experience related to community maintenance of flood risk management assets to determine challenges, opportunities and good practice.
- To develop and engage on a principles document for RMAs and community groups providing high-level guidance to support community maintenance and asset management activities
- To develop separate guidance for policy makers, RMA practitioners and local community groups that help interpret and implement these principles. The guidance documents will:
    - set the policy level context for the work
    - define procedures for determining the right level and frequency of maintenance (defined frequency vs ad-hoc)
    - capture and appropriately present the good practice and lessons learnt where community groups have delivered routine maintenance and asset management tasks and/or paid others to carry out maintenance (e.g. for trash screen clearance); and
    - identify the processes and procedures that would be necessary to set up and deliver such arrangements routinely,

Objectives

- identify the specific training and guidance needs both for the community groups and for FCRM staff, including provision of 1-2 page guides to at least the following: risk assessment process for all activities; weed and debris clearance from streams; embankment or SuDS vegetation management, checking of SuDS inlets and outlets and weed/invasive species management;
- identifies a process, tools and guidance for community-led visual condition assessment

- Disseminate the guidance to a wide audience.

Outputs

Outputs would include:

- Principles document – this will present case studies and capture the good practice from the case studies as principles for RMAs and community groups. (First phase of the project)
- Guidance for RMAs focused on approaches to facilitating and enabling community groups to undertake maintenance within the policy context and inclusion of good practice.
- Guidance for community groups outlining approaches, and maintenance activities for specific flood risk management assets.
- Short policy briefing document for policy makers setting out the reasons for progressing community maintenance

The guidance documents will provide an overview of the policy context setting out how it can influence the approach to enabling and empowering community groups to maintain flood management assets. It will also summarise the key success factors, lessons learnt from case studies. The processes and procedures that would be required to enable and empower communities to undertake maintenance will also be included.

Impact

Community groups and RMAs are likely to be the primary beneficiaries of the guidance. Many of the benefits would be shared by them, however specific benefits are:

Benefits for community groups include:

- Actively managing their flood risks – community groups would be empowered and enabled to manage flood risks and to improve their local environment.
- Easy to use guidance on maintenance - approaches to maintaining local flood risk management infrastructure will be developed enabling communities to take an active role in maintenance.
- Improving a shared understanding - guidance written for community groups and RMAs on approaches to manage flood risks will provide opportunities to share an understanding of flood risk management and approaches to enhance the local environment.
- Developing successful and longer-term relationships with RMAs – expectation of RMAs and communities will be better appreciated by each other. The concerns and potential contribution of community groups will also be better understood.

Benefits for RMAs include:

Impact
▪ Enabling community maintenance – 'success factors' for establishing good procedures and working practices to enable community-led maintenance will be shared. ▪ Delivery of multiple benefits – the involvement of communities to manage flood risk assets may help deliver multiple benefits through improving the quality of places and spaces, amenity and improving local social cohesion. ▪ Savings in operational and maintenance budgets – community maintenance will enable RMAs to more cost-effectively manage their flood risk management infrastructure that may otherwise be uneconomic to maintain.

Types of research (Y/N)					
Basic:	N	**Applied:**	Y	**Development:**	Y
Dissemination:	Y	**Training:**	Y	**Implementation:**	Y

Research end users (Y/N)							
Government depts/agencies:	Y	**RMAs:**	Y	**Water companies:**	Y	**Research Councils:**	N
Communities:	Y	**NGOs:**	Y	**Academia:**	N	**Others:**	Y

Partnership/collaborative working opportunities

▪ Environment Agency, Natural Resources Wales and SEPA
▪ Risk management authorities
  o Lead Local Flood Authorities
  o Water and Sewerage Companies
  o Highways England
  o IDBs
▪ Private, riparian landowners
▪ Community flood resilience groups
▪ Rivers Trusts, Wildlife Trusts
▪ Other relevant Third Sector Groups

Possible funders (Y/N)							
Defra/ Environment Agency	Y	**RMA**	Y	**UK Research Council**	N	**Other**	Y
Other: Highways authorities; developers. CIRIA could help to coordinate funding.							

Start year	Duration (months)
Started summer 2020	12-18

5 Rolling out and funding the framework

Previous chapters have set up the process we went through to develop this research framework setting out the process of:

- gathering evidence (Chapter 2)
- assessing evidence and identifying gaps in research (Chapter 3)
- prioritising projects (Chapter 4)

This chapter builds on these earlier stages, discussing potential sources of funding, the links between projects and the potential order in which these projects could be rolled out.

5.1 Potential sources of funding and rollout

There are different potential sources of funding to complete the projects discussed in chapter 4 (see Table 5.1) The Defra/Environment Agency Joint FCERM R&D programme may be able to carry out some of the projects. However, other projects may be best carried out by other non-governmental funders or through academic research.

Projects 5 and 6 would be best carried out by academia and may be of interest to Research Councils.

There are other organisations who it would be useful to contact to see if there are synergies with this framework such as Public Health England, Public Health Wales, the Ministry of Housing, Communities and Local Government, the Cabinet Office, and the Wellcome Foundation.

Table 5.1 Sources of funding

Potential sources of funding	Summary
Research Councils	ESRC open call social science research grants from £350,000 to £1 million.
	Strategic Priorities Fund.
	Global Challenges Research Fund.
	NERC Environmental Risks to Infrastructure Innovation Programme (ERIIP) is a five-year (started 2017), £5 million initiative (infrastructure sector focused)
Defra/Environment Agency/Welsh Government/Natural Resources Wales	Joint FCERM R&D programme.
Regional Flood and Coastal Committees	There are cases where local levy funding has been used to fund community engagement work.
CIRIA	CIRIA has carried out collaborative projects – it collaborates with a range of partners to help fund and roll out priority projects.
National Lottery Community Fund (needs to be led by a charity or local authority)	Much of the funding is focused on supporting charities affected by or directly involved with COVID-19.
National Heritage Lottery Fund (needs to be led by a charity or local authority)	Suspended until winter 2020 except for emergency funding. But possible after that – main categories: culture and memory; community heritage.

5.2 Project timings and interdependencies

Out of the 12 proposed research projects some of them are interrelated and there is, therefore, merit in carrying them out in a specific order as set out in Figure 5.1.

Project 1 (Evaluating effectiveness) would need to run for up to 3 years.

Project 3 (Improving recovery) should ideally start at the same time as Project 1 because there are synergies between the two project and by delivering the two project at a similar time helps target relevant case studies.

Project 9 (RMAs and participation) is linked with Project 1, so starting this project early is necessary to connect the 2 projects.

Project 10 is linked to Projects 1, 2, 3 and 5 as information on costs and benefits will emerge from those projects. Project 10 will provide a systematic approach to identifying costs and benefits. Providing it earlier within this framework would be useful as it would help understand the benefits and costs of those projects.

Project 7 (Participation in decision-making) should be linked into those teams working on rolling out FCERM capital projects across England and Wales. Participation in scheme decision-making has not been examined systematically in any recent research, making it a priority.

Project 4 (Landowners/managers and NFM) should build on the findings of the Defra-funded NFM programme.

Project 2 (Sustaining participation) is linked to Project 1 and it is suggested that it is started at the end of the first year of Project 1. This would allow case studies to be identified to use in the research. Project 11 would need to be informed by Project 2 and it would, therefore, be worth considering if the 2 projects could be combined as they both focus on inequalities and improving participation in areas of deprivation.

Project 5 (Emotional and social processes) and Project 6 (place attachment) are related and could be combined to form a larger project which might be suitable for Research Council funding.

Project 12 (Community maintenance) has already attracted funding from CIRIA and a Lead local flood authority and is at an early scoping stage.

5.3 Rollout and monitoring progress

Once this framework is published and rolled out, Defra and the Environment Agency will seek opportunities to fund proposed research projects themselves and influence other organisations to see if they could potentially carry out research outside of the public sector.

As the framework starts to be rolled out, progress in carrying out the projects set out in this framework will be tracked by the Defra/Environment Agency joint programme and their associated advisory groups.

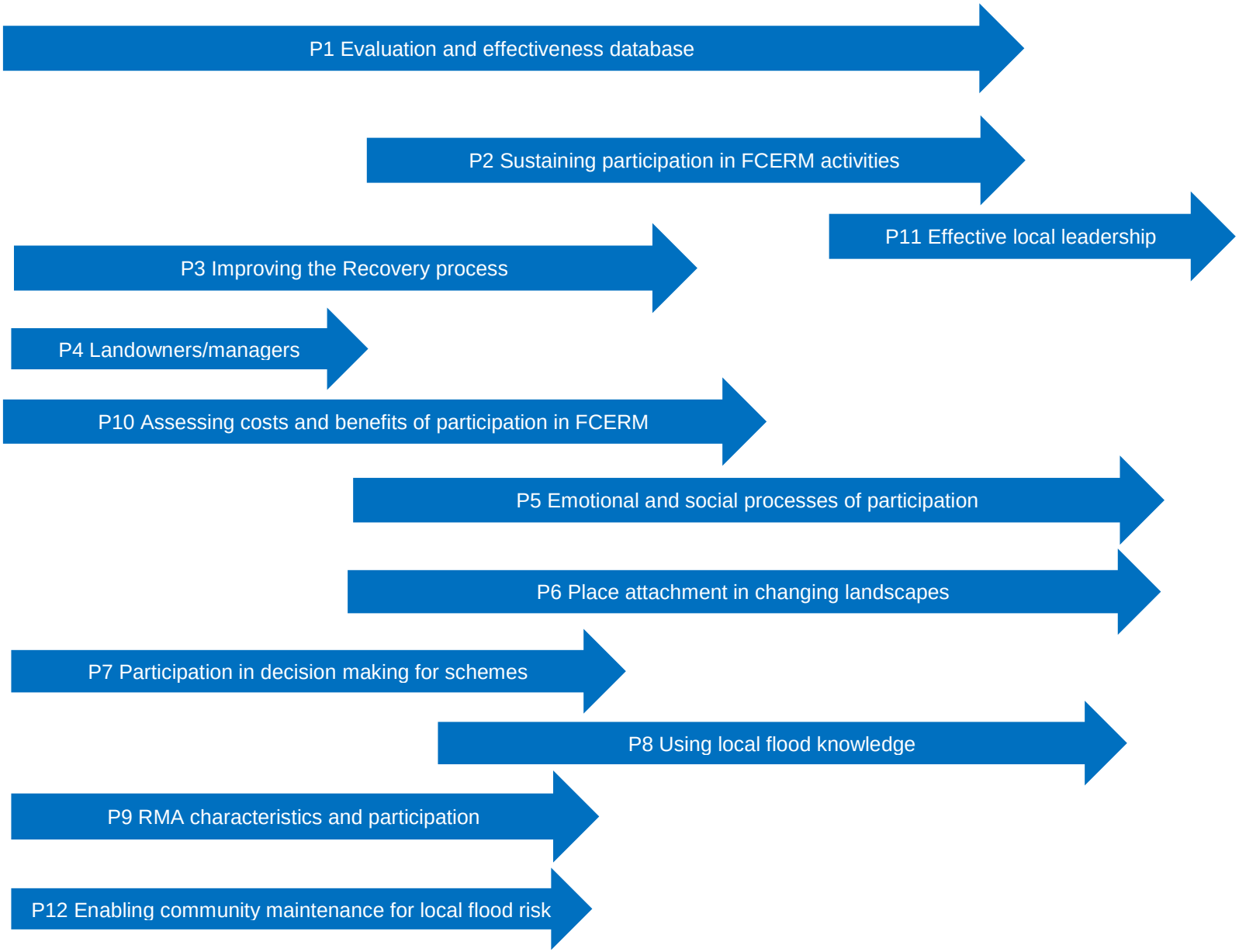
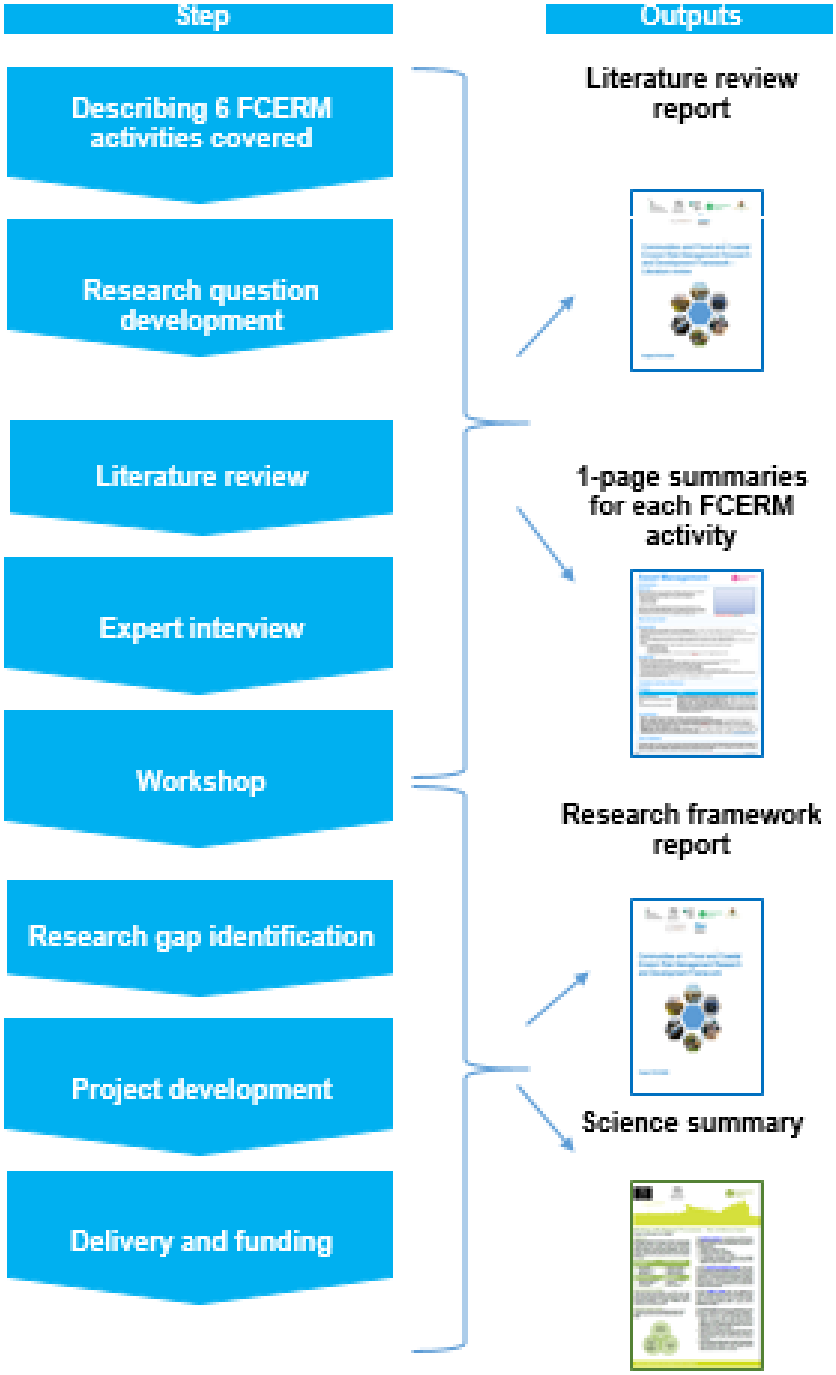


Figure 5.1 Suggested order for rolling out the projects

6 Conclusions and next steps

This report has described a series of steps (Figure 6.1) that we have gone through to help us identify and prioritise future FCERM and social science research. This has resulted in identifying and prioritising 12 future research projects (see Chapter 4). The next step is to share the results of this research and to find ways of funding and advancing it.

Figure 6.1 Steps in developing the framework and the main outputs



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Acronyms

BID	Business improvement district
CAG	Coastal Action Group
CEP	Collingwood Environmental Planning
EDD	Engage, deliberate, decide
DASH group	Direct action self-help group
Defra	Department for Environment, Food and Rural Affairs
FCERM	Flood and coastal erosion risk management
FFC	Fairbourne Facing Change
FRMP	Flood risk management plan
FWMA	Flood and Water Management Act (2010)
ISM	Individual, social, material
LLFAs	Lead local flood authorities
NFF	National Flood Forum
NFM	Natural flood management
NGO	Non-governmental organisation
PICO	Problem/Patient/Population, Intervention/Indicator, Comparison, Outcome and Time/Type of study
PFR	Property flood resilience
RMAs	Risk management authorities
SMEs	Small and medium-sized enterprises
SMP	Shoreline management plan
SuDS	Sustainable urban drainage system

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