Flooding & business – what does research tell us?

Workshop report prepared by the Adaptation and Resilience in the Context of Change network

October 2017

ARCC network

The Adaptation and Resilience in the Context of Change (ARCC) network is hosted by the UK Climate Impacts Programme (UKCIP) and funded by the Engineering and Physical Sciences Research Council (EPSRC).

The workshop was facilitated by Dr Pete Walton, KE Fellow, University of Oxford and forms part of the ARCC network synthesis series managed by Tanya Wilkins, Communications & Knowledge Exchange coordinator.

UKCIP helps organisations, sectors and government adapt to the changing climate through practice-based research and by providing support and advice. The programme is based at the Environmental Change Institute, University of Oxford.

UK Climate Impacts Programme (UKCIP), University of Oxford, OUCE,
South Parks Road, Oxford, OX1 3QY

arcc@ukcip.org.uk

www.arcc-network.org.uk

@ARCC_CN

+44 (0)1865 285717

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www.arcc-network.org.uk/flood-workshop

Executive summary

It is not a case of if, but when there is a next flood.

The number of major floods in Europe has risen from one per year (1900–1974) to 15 per year (1993–2001), with many parts of the UK suffering extensive inundation. This is a critical issue in light of broader societal challenges including climate change, an increasing and ageing population and increasing urbanisation.

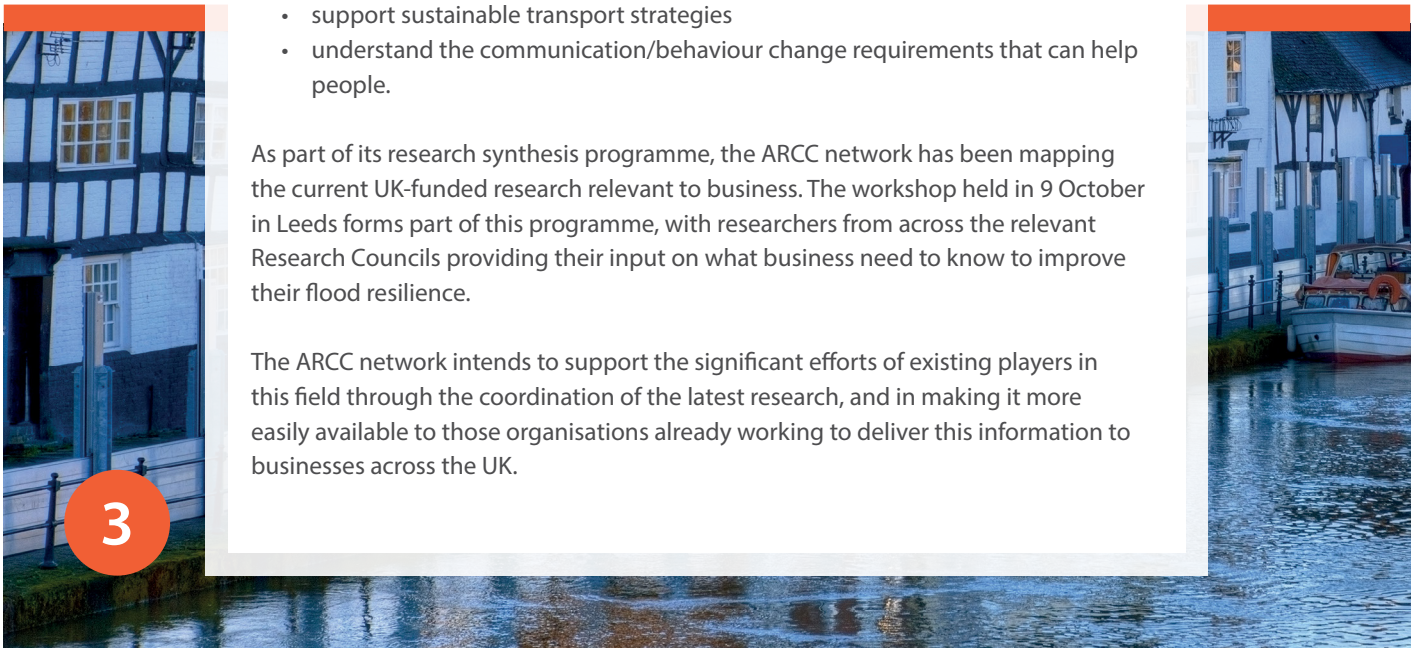
Flooding presents a range of threats to businesses. It has a disproportionate impact on the UK's 4.5 million small and medium-sized enterprises (SMEs) that represent nearly half of the country's business turnover. SMEs are particularly vulnerable as they are less likely to be prepared to manage the consequences, with fewer resources to mobilise in response. Risk exposure reduction and preparedness measures will inevitably vary with the nature of the SME business.

UK Research Councils have invested significantly in research to inform better flood resilience, including to:

- improve understanding of the scales of flooding
- better model and forecast floods
- improve the 'kit' used in flood defences
- increase the value of green infrastructure
- support sustainable transport strategies
- understand the communication/behaviour change requirements that can help people.

As part of its research synthesis programme, the ARCC network has been mapping the current UK-funded research relevant to business. The workshop held in 9 October in Leeds forms part of this programme, with researchers from across the relevant Research Councils providing their input on what business need to know to improve their flood resilience.

The ARCC network intends to support the significant efforts of existing players in this field through the coordination of the latest research, and in making it more easily available to those organisations already working to deliver this information to businesses across the UK.



Fundamentally, there is a need to raise awareness and coordination across the UK to ensure businesses can prepare for and respond to flood events. A strong theme of communication and engagement came through at this workshop, which is complementary to the themes of partnership and community building from leading industry shows such as Flood and Coast, and The Flood Expo.

In order to support the UK's flood resilience, this synthesis work will draw together the research to inform decision-makers in order to both capitalise on the knowledge and efforts of resilient communities and decrease the patchwork approach across the UK.

Introduction

There are many different types of flooding that occur in towns and regions, and thus having different impacts on the businesses that operate in these locations. Heavy rainfall or a river bursting its banks can cause a flood, as well as human influences such as urbanisation, including deforestation and building 'concrete jungles'. Damage can result from surface water flooding, flooding from rivers, the sea or groundwater.

There are broader societal changes that will result in greater impacts of flooding into the future: this damage will have an impact on businesses and thus the population. In the context of this change, the ARCC network has responded to the need to coordinate relevant research to inform the policy and practice communities.

As part of 2017 Flood and Coast conference in Telford, the ARCC network presented three EPSRC-funded projects relating to flooding and business:

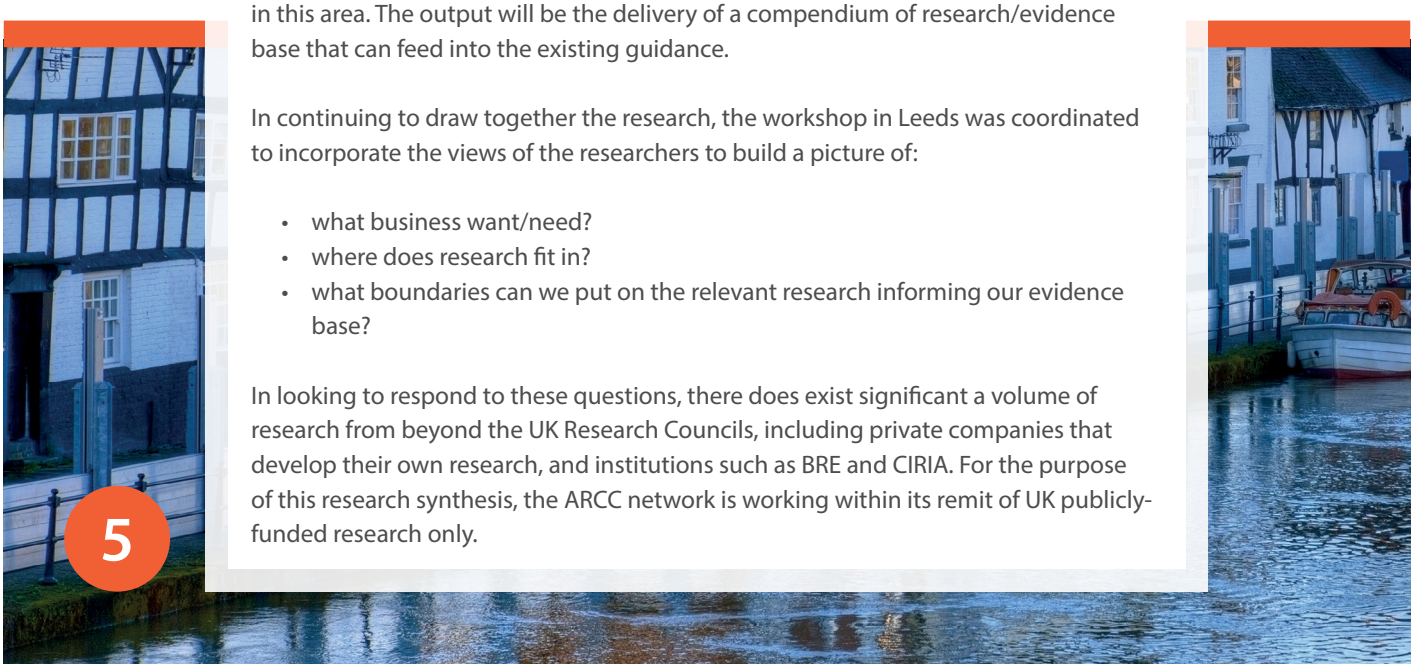
- SESAME; business continuity buddies
- UCL; drying times of buildings, potential health impacts
- Braunton report; Investigating SME resilience to flooding

There was an appetite for more research, and this resulted in the ARCC network prioritising flooding and business as part of its synthesis programme. The ARCC role is not to duplicate efforts in reaching business, rather draw together the current research in this area. The output will be the delivery of a compendium of research/evidence base that can feed into the existing guidance.

In continuing to draw together the research, the workshop in Leeds was coordinated to incorporate the views of the researchers to build a picture of:

- what business want/need?
- where does research fit in?
- what boundaries can we put on the relevant research informing our evidence base?

In looking to respond to these questions, there does exist significant a volume of research from beyond the UK Research Councils, including private companies that develop their own research, and institutions such as BRE and CIRIA. For the purpose of this research synthesis, the ARCC network is working within its remit of UK publicly-funded research only.



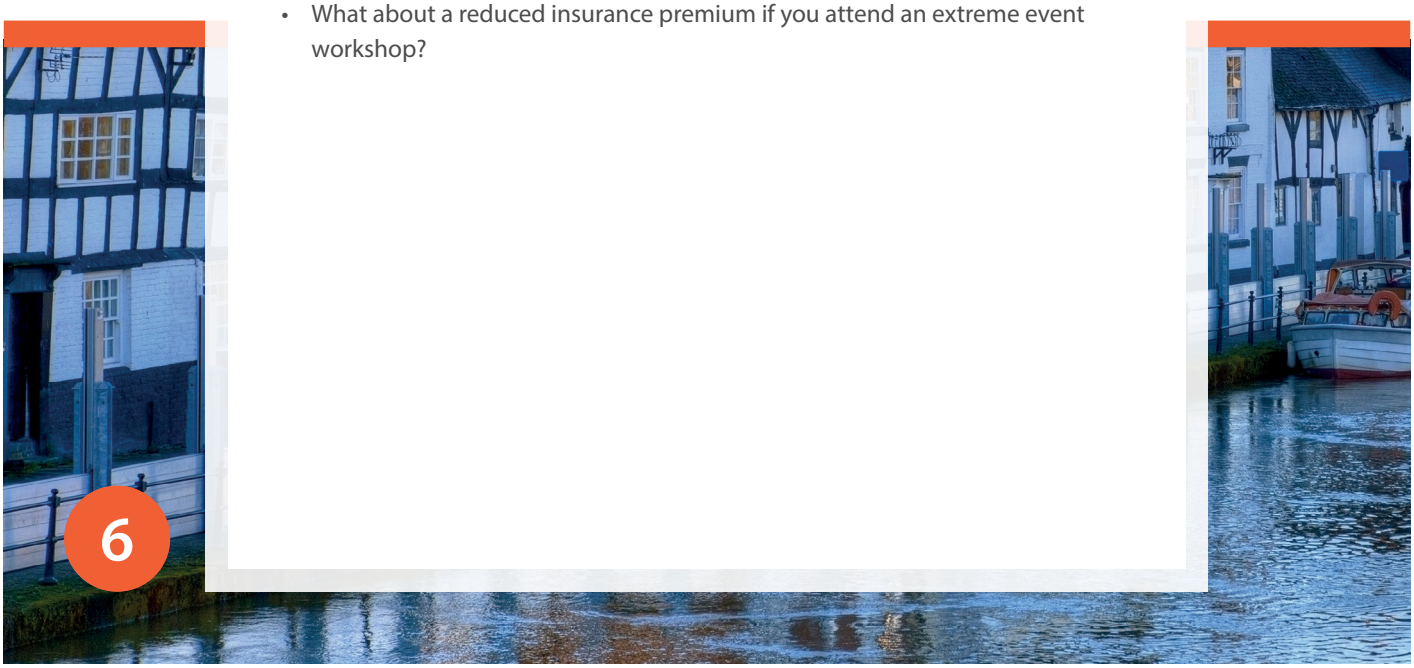
Flooding & business: Top needs & research gaps

In a perfect world, those operating a business would have every opportunity to consider and respond to all the risks before a flood event occurred. This includes disruption to their own operations, including structural and stock damage, the operations of their supply chains, and the reputational risks that can follow, just to name a few.

As a first exercise at the workshop held, each table was given the task of outlining the top needs and/or research gaps in what businesses need to know to improve their flood resilience (see appendices).

The general discussions relating to this task centred around the importance of communication and engagement with business on what needs to happen, with some of the key comments including:

- What are the current methods for engaging with business?
- Generic messages vs site specific messages
- What is the time-frame for getting this information out?
- Is there an awareness of what an extreme event is?
- Can we use visualisations better to explain probability?
- What about a reduced insurance premium if you attend an extreme event workshop?



What does business need to know?

In order to assist the discussions with the researchers, speakers were invited to present in terms of what do businesses need to know? These presentations are available online at www.arcc-network.org.uk/flood-workshop

Dr Stephen Garvin, BRE

- Defra roundtable and task grounds – industry-led
- One-stop-shop at www.floodguidance.co.uk
- Rewarding resilience database
- Difficulties with insurance no-betterment clauses

Dr Andy Moores, EA

- Need the right people to communicate
- Wider and better understanding of the impacts, including secondary and tertiary
- There is a gap to bridge between academia and business, using existing business fora

Mary Dhonau, OBE, Property Care Association

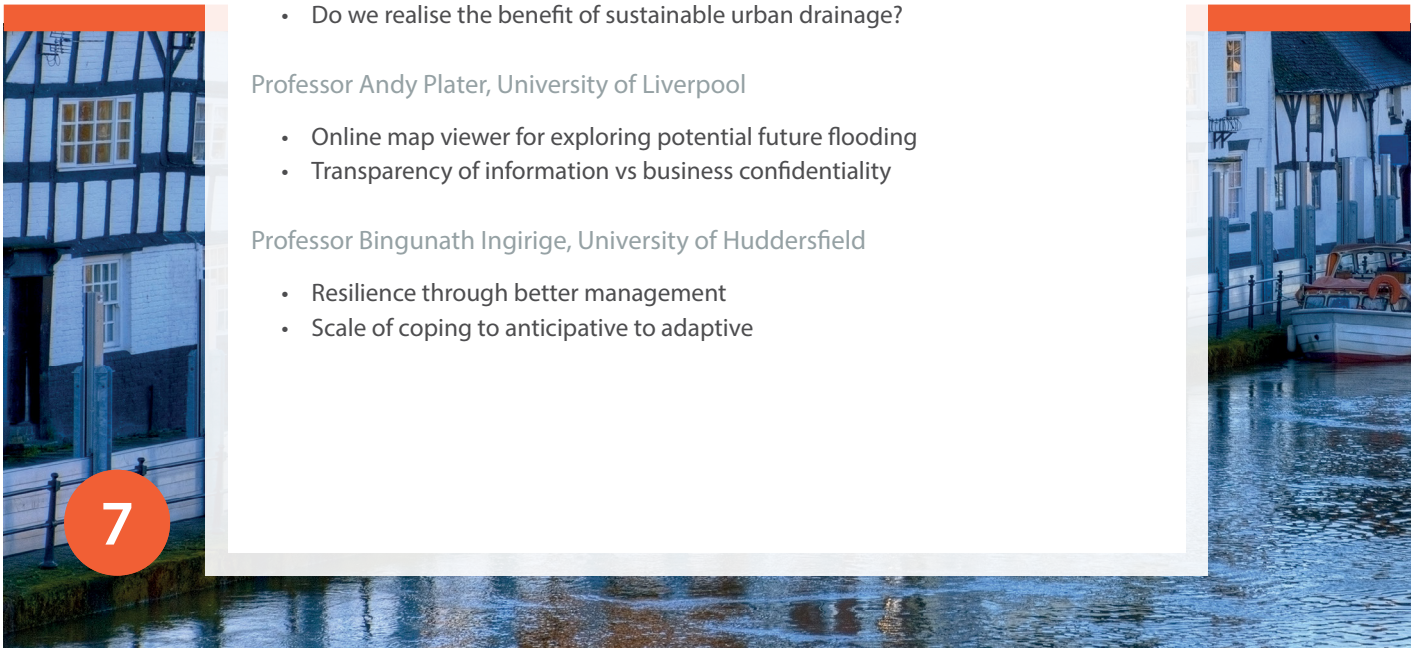
- How to make a business flood ready
- Difficulty to get people to sign up to flood warnings
- Visual aids can help people understand
- Do we realise the benefit of sustainable urban drainage?

Professor Andy Plater, University of Liverpool

- Online map viewer for exploring potential future flooding
- Transparency of information vs business confidentiality

Professor Bingunath Ingirige, University of Huddersfield

- Resilience through better management
- Scale of coping to anticipative to adaptive



Before, during and after a flood

In the context of before, during and after a flood event exercise, two discussions focused around the specific types of information that researchers felt a business would need.

Before

There was a lot of discussion around knowing about the risk, being prepared with plans, and location-specific warnings. These tie in with the strong theme of communication and engagement from the earlier identification of information needs for business. Mary Dhonau relayed the difficulty of getting businesses to sign up to receive EA flood warnings, that she had literally gone door-knocking with the sign-up sheet to get businesses involved.

During

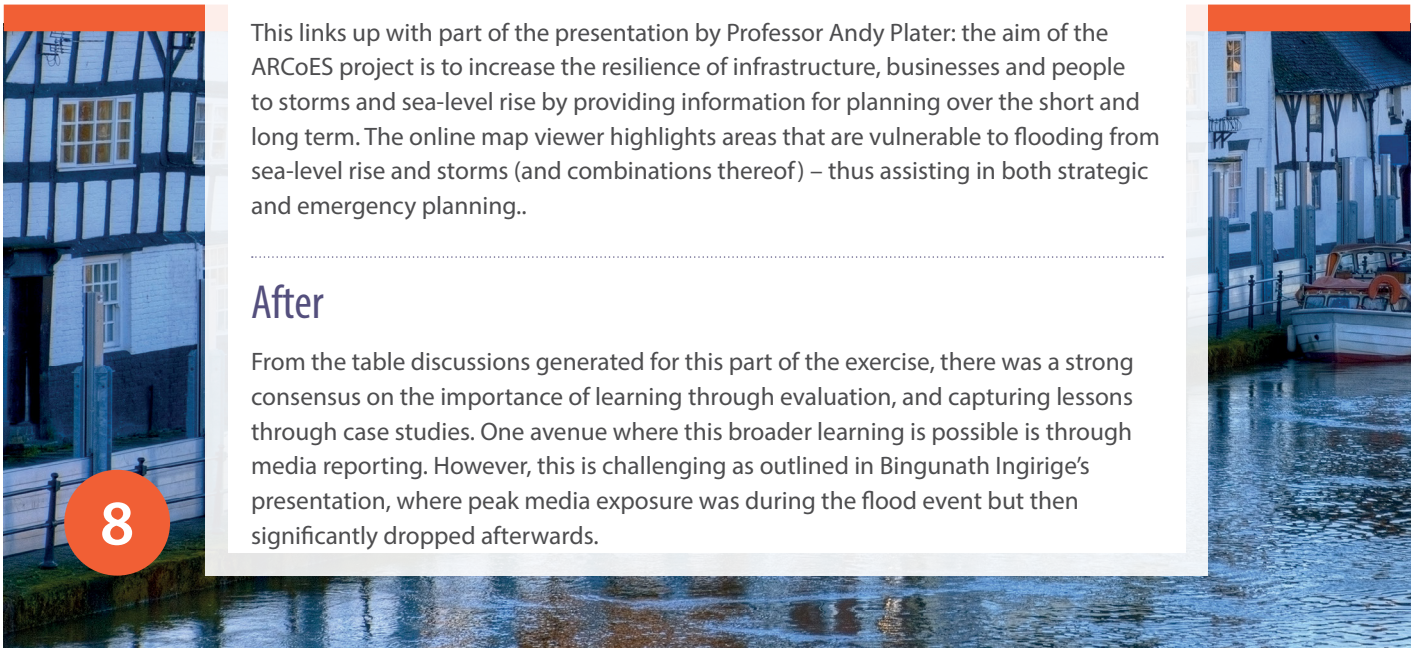
Researchers identified some of the priority information needs, including:

- knowing what to do during a flood
- how to get help and keeping people safe
- keeping communication open
- minimising damage

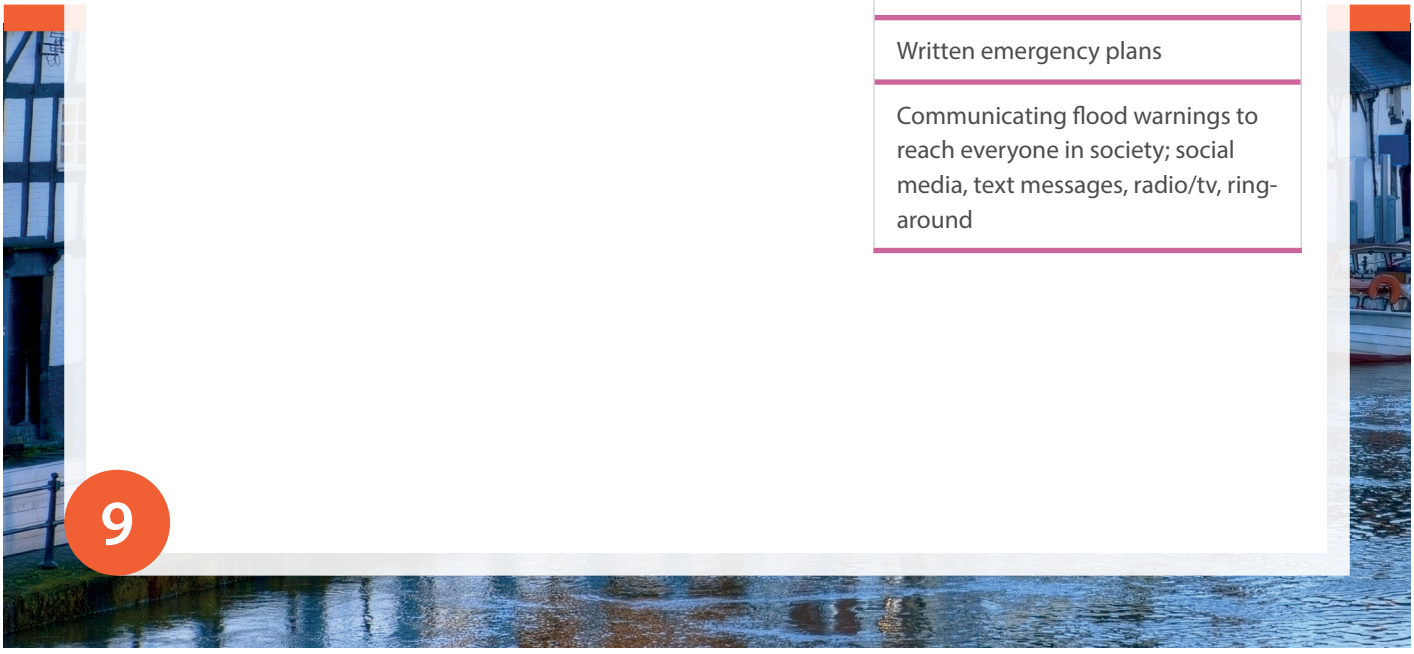
This links up with part of the presentation by Professor Andy Plater: the aim of the ARCoES project is to increase the resilience of infrastructure, businesses and people to storms and sea-level rise by providing information for planning over the short and long term. The online map viewer highlights areas that are vulnerable to flooding from sea-level rise and storms (and combinations thereof) – thus assisting in both strategic and emergency planning..

After

From the table discussions generated for this part of the exercise, there was a strong consensus on the importance of learning through evaluation, and capturing lessons through case studies. One avenue where this broader learning is possible is through media reporting. However, this is challenging as outlined in Bingunath Ingirige's presentation, where peak media exposure was during the flood event but then significantly dropped afterwards.

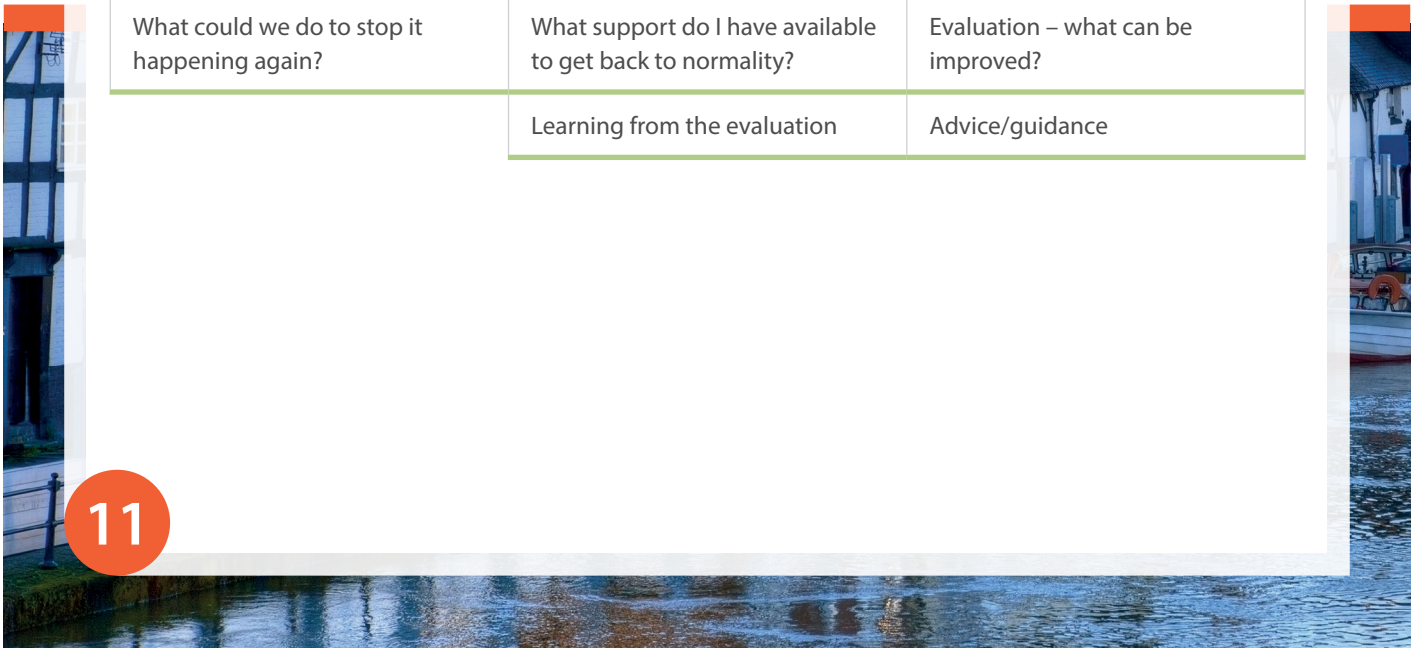


Before the flood (pink)		
Table one	**Table two**	**Table three**
Am I at risk?	Confidence in forecasts and the likely impacts	How deep?
Know the risk in advance – what does it mean for me?	What can I do to prepare for a flood; to avoid the impact and to reduce the impact	How much of my goods/services is exposed?
What will be the impact?	Ensure that all staff are aware of plans – how can this be communicated effectively?	Where are nearby temporary housing/business locations? (for use while flood in ongoing, ensuring some level of continuity)
Contingency fund	Knowledge on how flood impacts and consequences move with time	Should I stay or go? What do I need if I stay?
Options for flood protection/alleviation for me: how much can I save?	Preparedness/knowing what to do, knowledge how to minimise impacts	Changes in magnitude and frequency of floods
How do I get help?	Knowing vulnerability to flooding due to rivers, storms, rainfall and sea-level	Knowledge of flood risk before purchase, historically very low
	Understanding/having confidence in projection/prediction – uncertainty	What does a flood warning mean?
	Pre-planning	How long after flood warning until the flood?
	Flood vulnerability, realistic visualisations, pro-active engagement, what and when?	Bespoke (location specific) information
		Where to deploy temporary defences
		Written emergency plans
		Communicating flood warnings to reach everyone in society; social media, text messages, radio/tv, ring-around



During the flood (orange)		
Table one	**Table two**	**Table three**
Hazard level: to people, to things, to service	Knowing what to do, where to go, who to take advice from, ie emergency procedures	Be aware staff homes might be flooded
Contingency fund	Procedures like fire evacuation, resilience kits, social media	Staff safety
What do you want to reduce? How to install measures? When to evacuate?	Keep staff informed of safe evacuation, times and location, flood narratives	Emergency Plans in action via trained designated staff flood wardens
How do I get help?	Communicate effectively with affected customers, twitter and facebook Food supplies	Redundancy – ensuring there is redundancy in staff skills and knowledge
Business flat kit implementation	Radio/communication, local and regions scales	Keeping communication lines open
Maintain business continuity		Prioritising key tasks in minimising damage
Collect data (eg flood depth, flood duration, shared protocol)		Can my customers still get what they need from me?
		Can my customers get physically near me?

After the flood (green)		
Table one	**Table two**	**Table three**
What's causing this problem? Should I move?	Encouraging ownership of own resilience – take responsibility for yourself	Support from others who have been flooded
Capture lessons learned	Testing different strategies, link property owners to understand strategy for resilience, celebrate these resilient examples, create neighbourhood champions	Floodtoolkit.com
Opportunity or improvement/ retrofitting	Not necessarily mending and returning but rethinking, step change adaptation	Flood resilience info
Not to get flooded next time	How do you get footfall in the township/city after a flood, how do you plan the recovery better?	Business in the community support
Quick recovery	Adaptation framework; consult, options, appraise, consult, implement Business models, incentivise change	Will it be the same type of event next time?
How to build back better – resilience improvement	Community/city multi-stakeholder workshop to test scenarios	What resistance/resilience products/interventions do I need or next time?
Who did better than you and why?	Reduced premiums for flood resilience if re-occupying	Practical case studies
Is there a business opportunity?	Understand ways in which staff are affected, routes to work etc	Insurance/funding application advice
What could we do to stop it happening again?	What support do I have available to get back to normality?	Evaluation – what can be improved?
	Learning from the evaluation	Advice/guidance

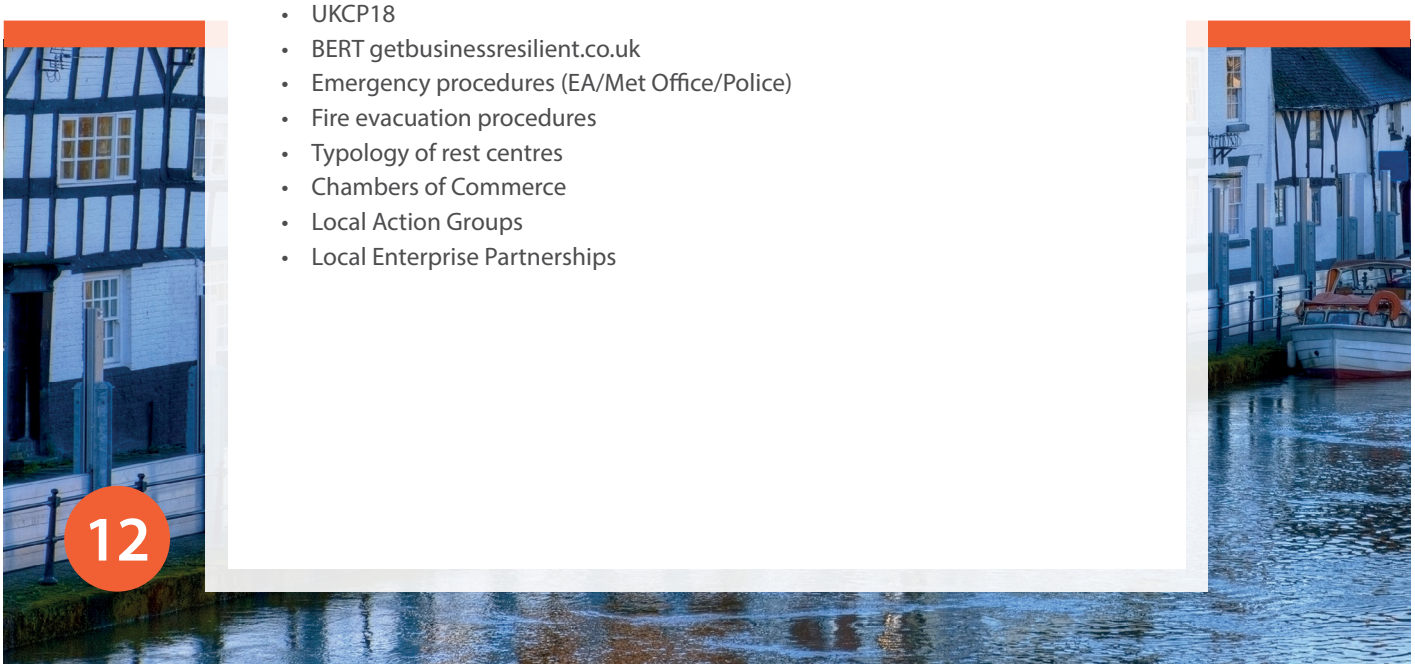


What existing guidance is available?

It is not the intention of the ARCC network to create another industry guidance document for business; that is not the place of ARCC as we do not have those direct contacts with business, and it would be an unnecessary duplication of efforts.

Therefore, we sought input from our workshop attendees in building a picture of the guidance that is currently available that our compendium/evidence base could feed into:

- UKCIP for business
- Know your flood risk
- Defra one-stop-shop
- Risk Registry
- BRE/CIRIA Code of Practice
- CityCAT model
- Floodtoolkit.com
- BRE Blue Pages
- Property Care Association
- BITC
- EnviroCheck
- Centre4resilience.org
- UK Met Office
- UKCP18
- BERT getbusinessresilient.co.uk
- Emergency procedures (EA/Met Office/Police)
- Fire evacuation procedures
- Typology of rest centres
- Chambers of Commerce
- Local Action Groups
- Local Enterprise Partnerships



Next steps. . .

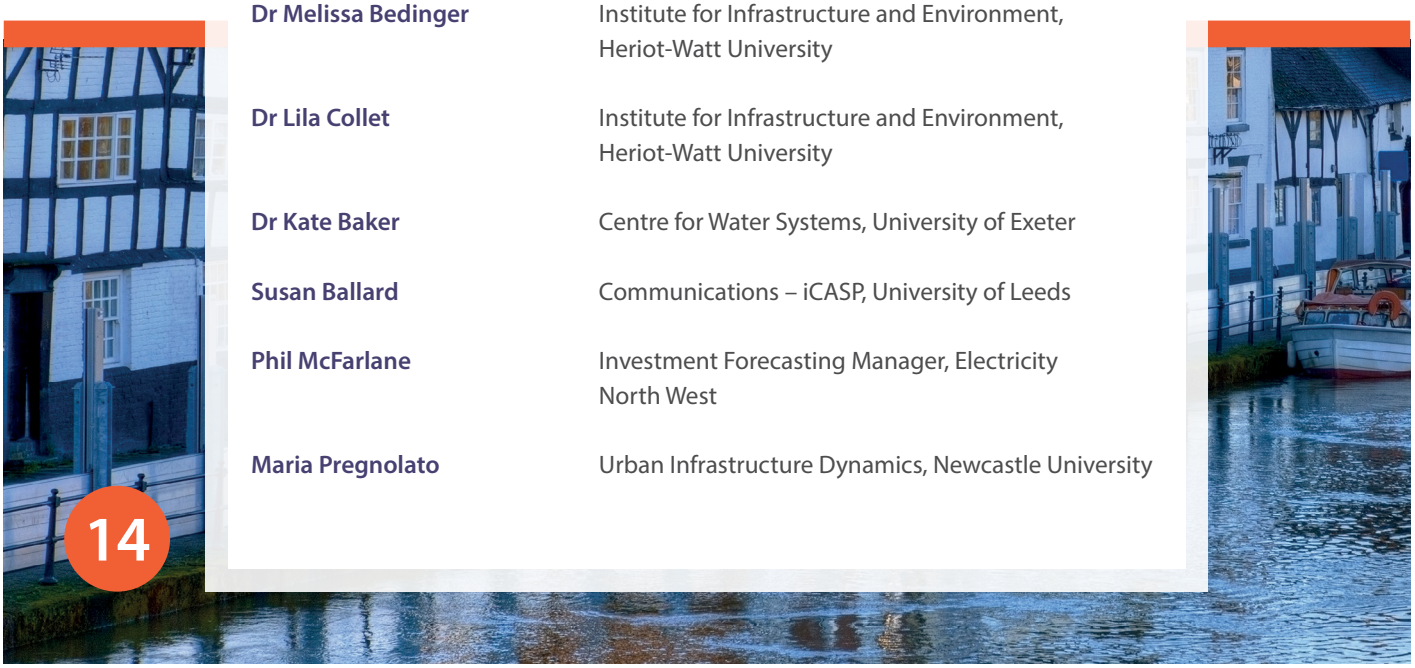
The ARCC network warmly thanks the speakers and those who gave up time in their day to attend the workshop. Although not able to attend the workshop, thanks are given to Professor Lindsey McEwen and Associate Professor Jessica Lamond from the University of the West of England for their advice in the development of this process.

The ARCC network seeks and welcomes direct involvement in the next phases of this synthesis process, which will include the identification of research to meet the information needs of business identified at the workshop, as well as the exploration of opportunities to include more research for business (with that 'ideal world' lens).

Further mapping of existing industry guidance will also take place; led by the ARCC network. It is intended that this will form the basis of the compendium/evidence base to detail the relevant research.

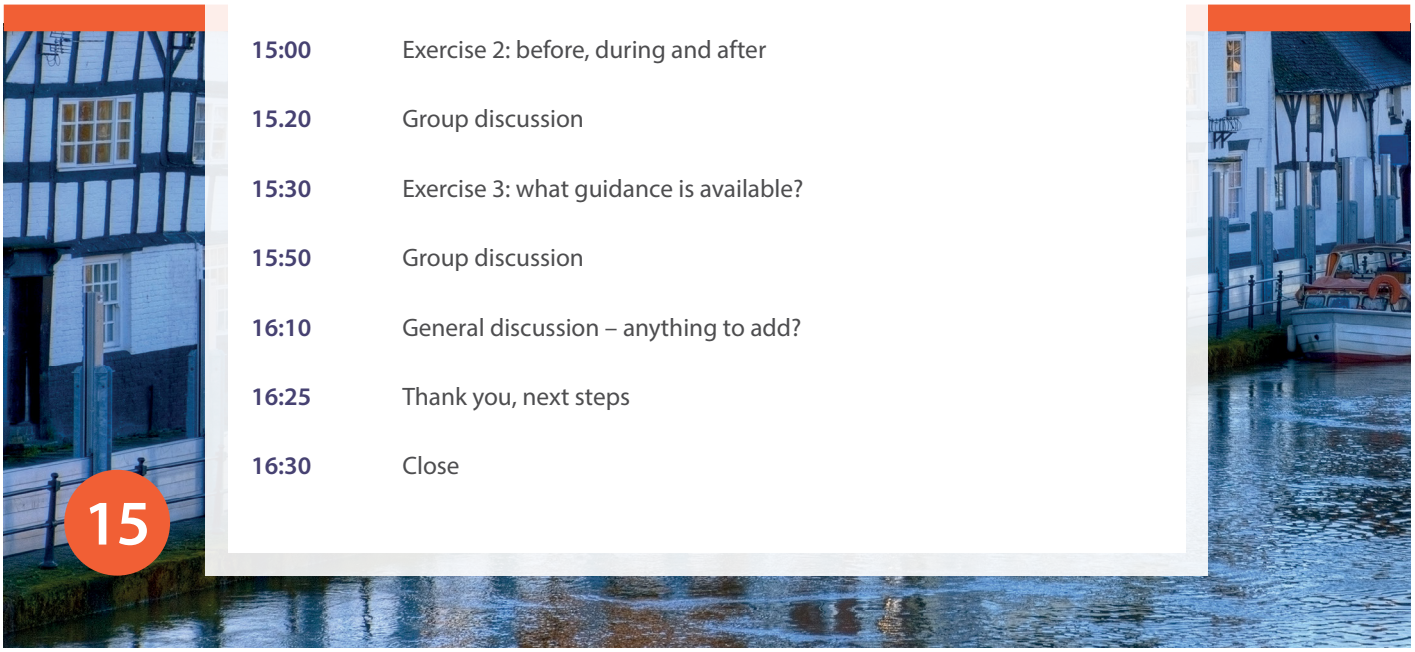
Attendees

Dr David Dawson	Institute for Resilient Infrastructure, University of Leeds
Dr Stephen Garvin	Head of Resilience, BRE
Mary Dhonau	Cumbria Showcase Project
Professor Bingu Ingirige	Project Management and Resilience, University of Huddersfield
Professor Andy Plater	Geography and Planning, University of Liverpool
Professor Onno Bokhove	Geophysical Fluid Dynamics, University of Leeds
Dr Andy Moores	Environment Agency
Dr Namrata Bhattacharya-Mis	Centre for Floods, Communities and Resilience, University of the West of England
Dr Edward Barsley	Director, The Environmental Design Studio Ltd
Dr Melissa Bedinger	Institute for Infrastructure and Environment, Heriot-Watt University
Dr Lila Collet	Institute for Infrastructure and Environment, Heriot-Watt University
Dr Kate Baker	Centre for Water Systems, University of Exeter
Susan Ballard	Communications – iCASP, University of Leeds
Phil McFarlane	Investment Forecasting Manager, Electricity North West
Maria Pregnolato	Urban Infrastructure Dynamics, Newcastle University



Agenda

12:00	Welcome, lunch and networking
12:35	Exercise 1: Top needs & research gaps
12:50	Table reporting
13:00	Presentation session
	Dr Stephen Garvin, BRE Defra Flood Roundtable & Task groups
	Dr Andy Moores, Environment Agency National picture of business risk
	Mary Dhonau OBE How to make a business flood ready
	Professor Andy Plater, University of Liverpool Coastal examples
	Professor Bingunath Ingirige, University of Huddersfield Decision-making of an SME
14:30	Questions?
15:00	Exercise 2: before, during and after
15.20	Group discussion
15:30	Exercise 3: what guidance is available?
15:50	Group discussion
16:10	General discussion – anything to add?
16:25	Thank you, next steps
16:30	Close



Responses from exercise one

Table 1

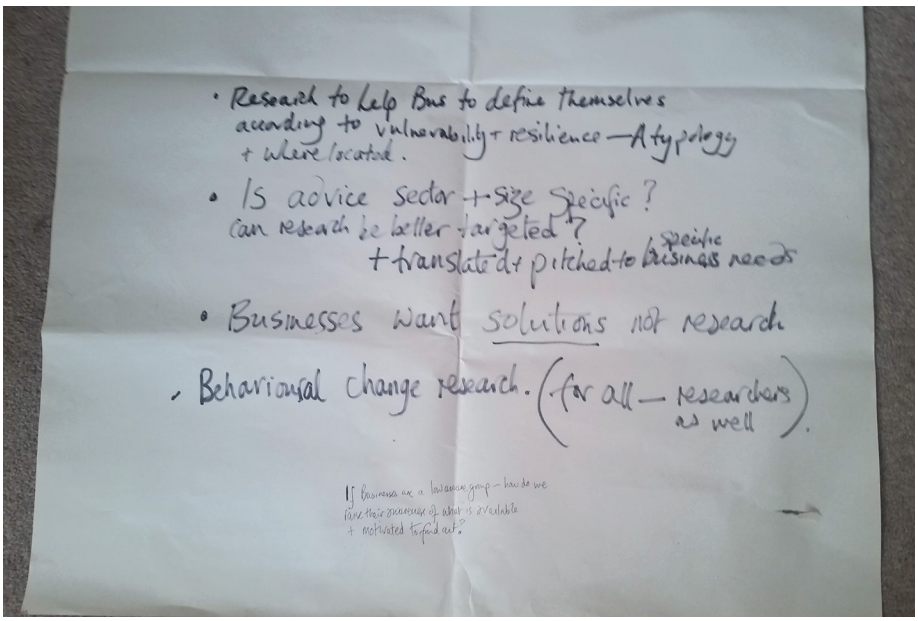


Table 2

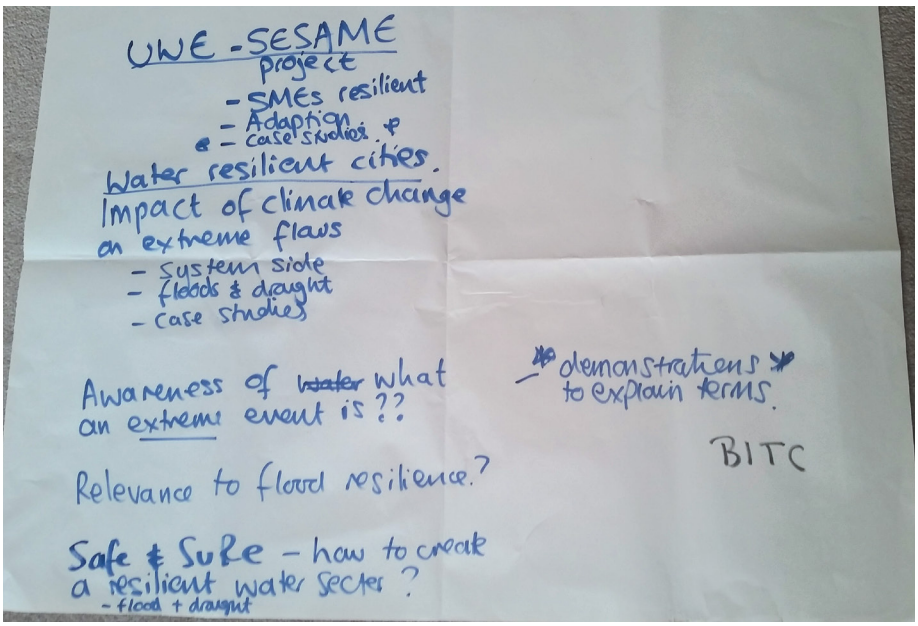
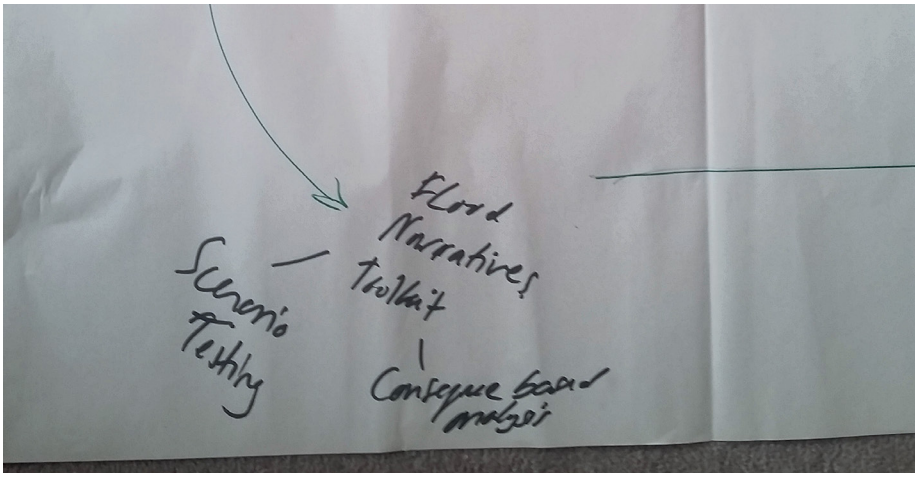
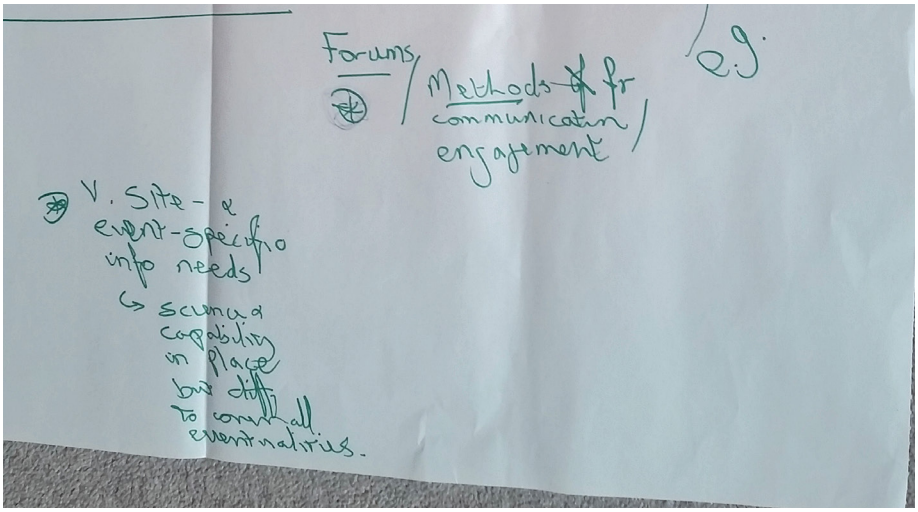
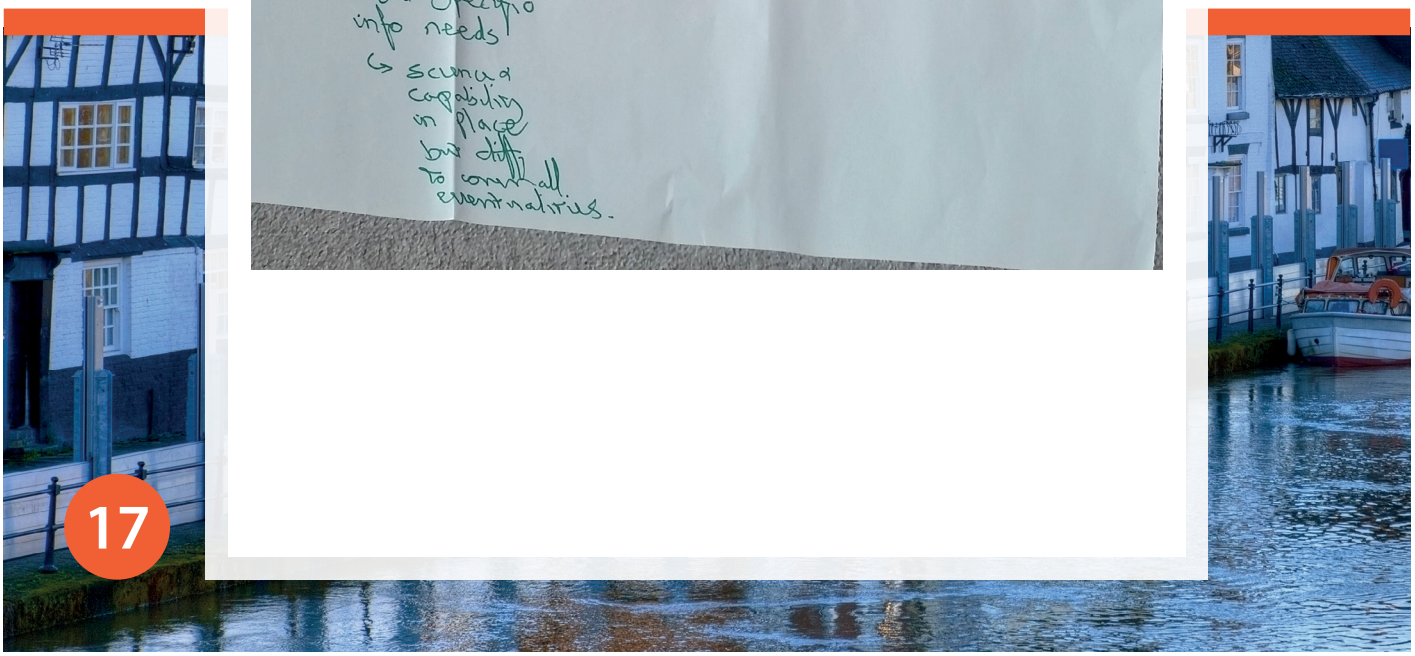


Table 3


Flood
Narratives
Toolkit
Scenario
Testing
Consequence based
analysis


Forums
Methods for
communication
engagement
e.g.
V. Site - &
event-specific
info needs
scenario
capability
in place
but diff
to cover all
eventualities.



Exercise two: Post-it responses

Table one

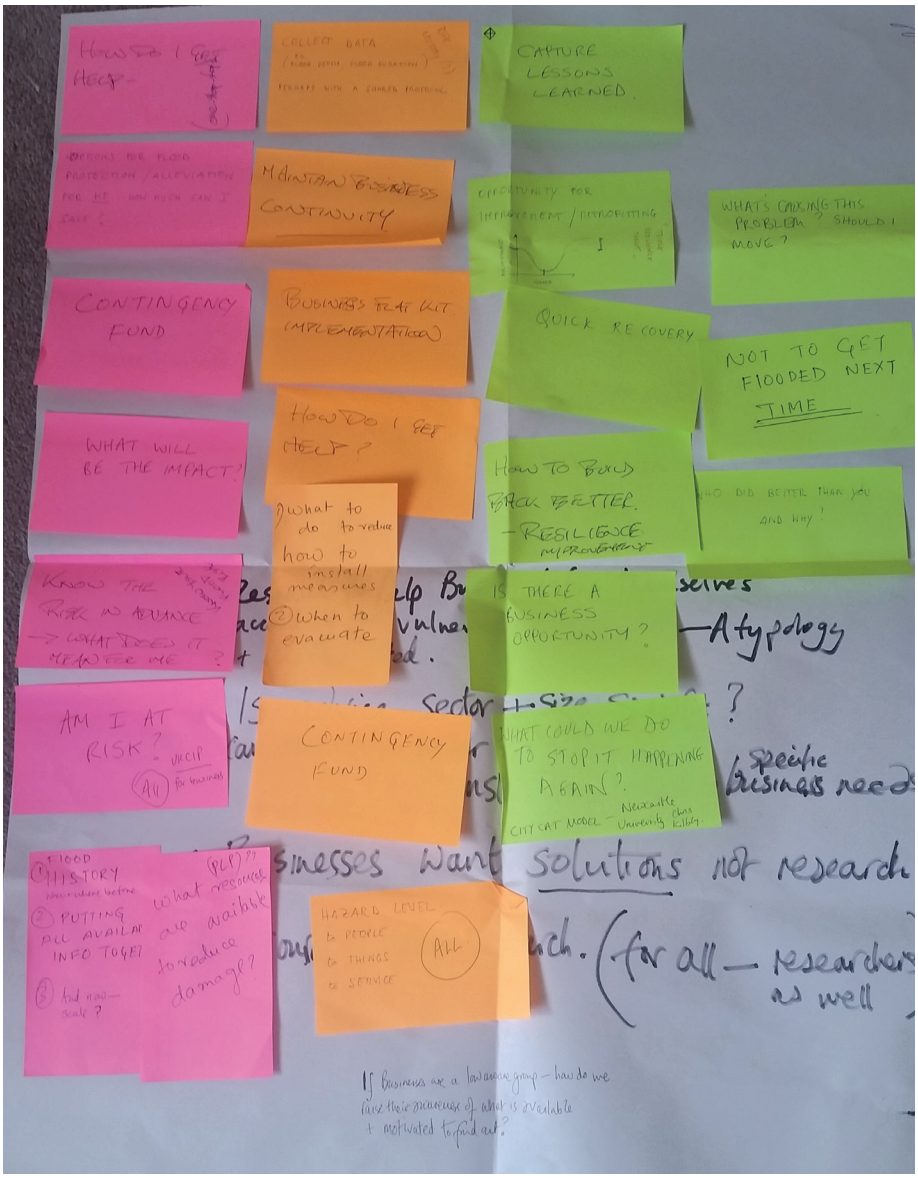


Table two

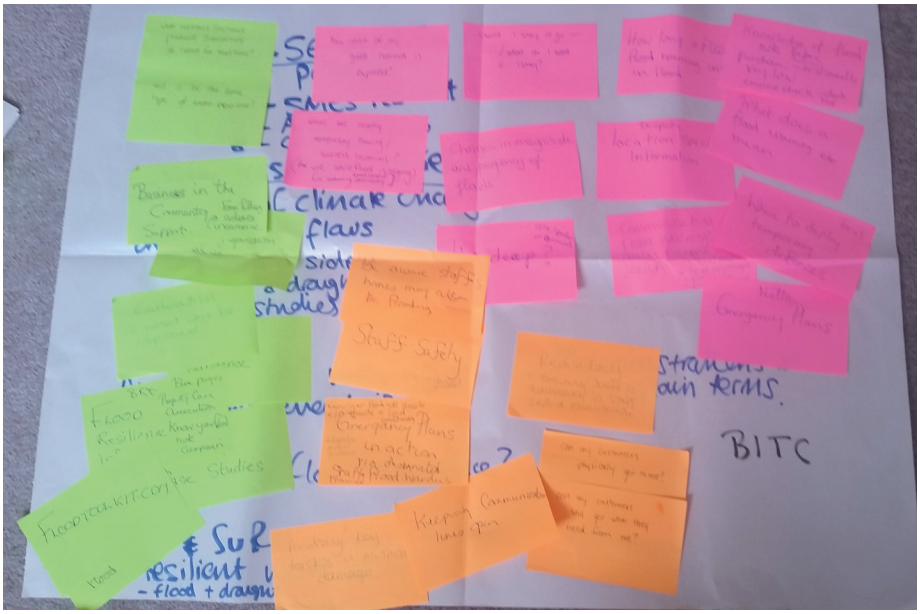
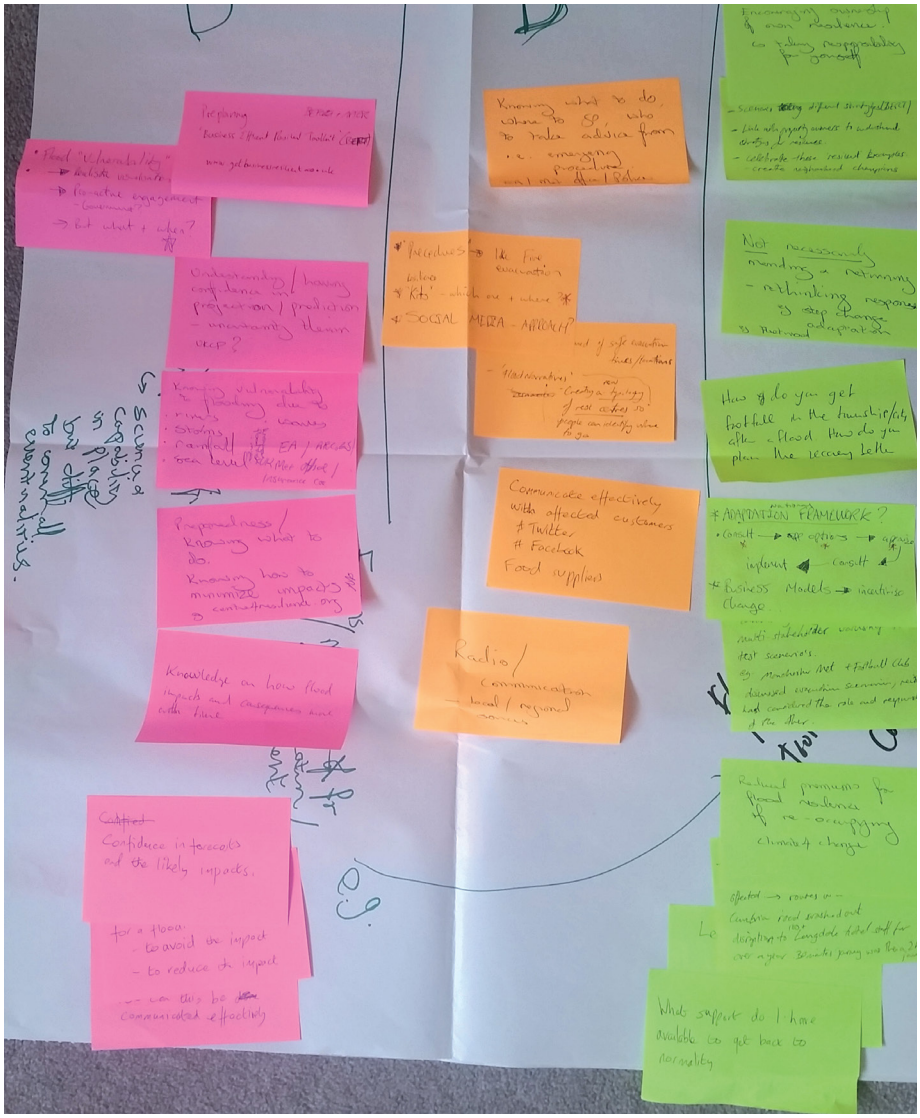


Table three



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