

*Waking up to the Planetary Health Emergency Webinar Series,  
Thursday 5th November 2020*

# **Water – friend or foe? How to build local resilience to global threats**

**David Butler**

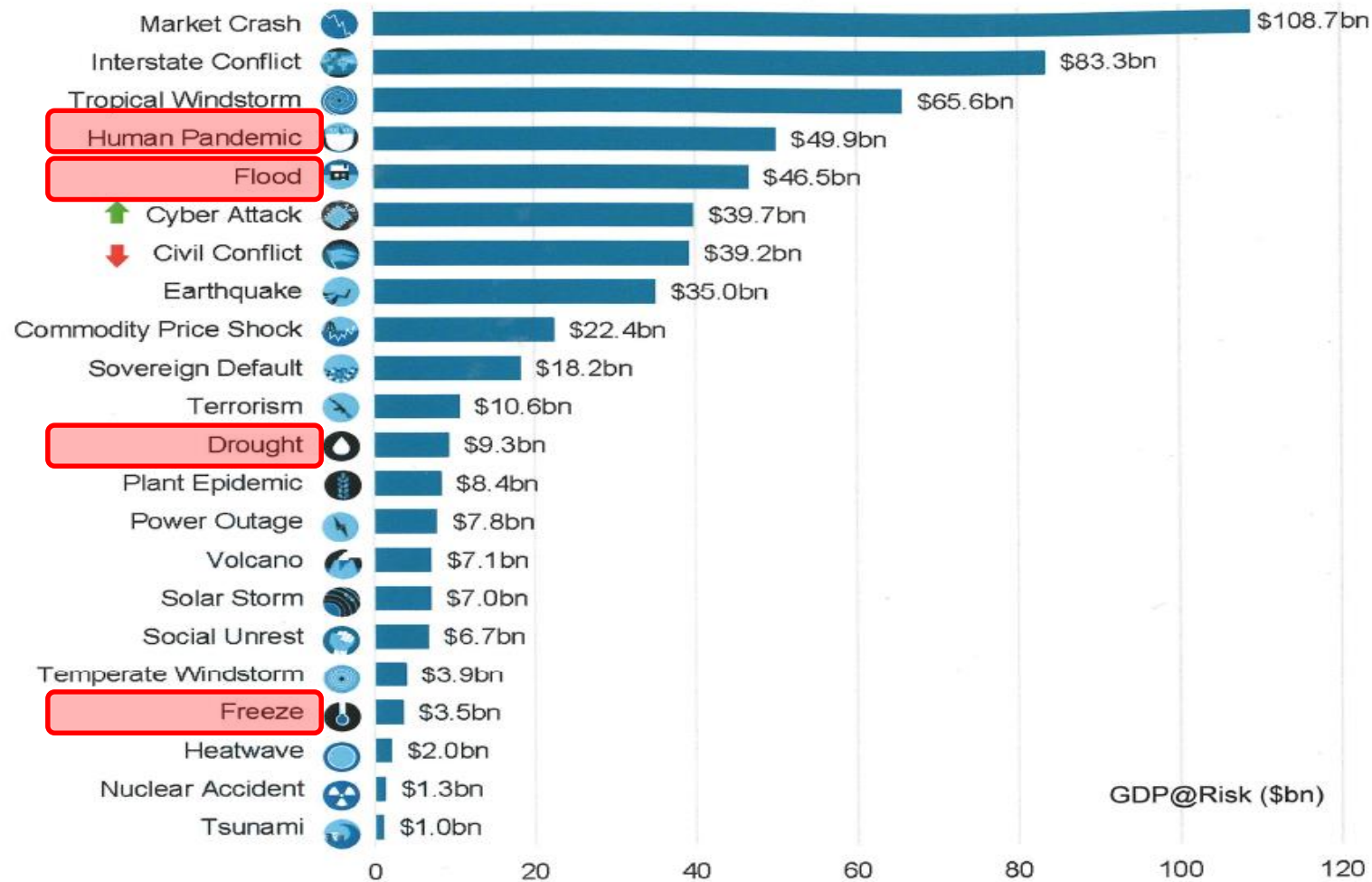
Professor of Water Engineering  
Head of Engineering,  
University of Exeter

# Outline

- Global threats
- Water - friend of foe?
- What is resilience?
- The Safe & SuRe framework
- Building local resilience
- Summary & conclusions

# Global threats

## 2019 Threat Rankings





# Water – friend or foe?

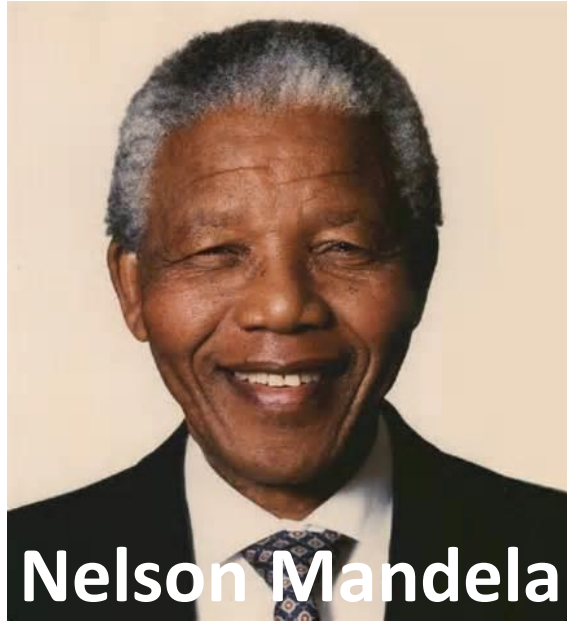




# An era of unprecedented variability



# What is resilience?



**Nelson Mandela**

“Do not judge me by my successes, judge me by how many times I fell down and got back up again.”



**Nicola Adams**

“It's not how you go down, but how you get up.”



“Life is not about how fast you run or how high you climb but how well you bounce.”

# The Safe & SuRe framework

## EPSRC 'Established Career' Research Fellowship (5 years)

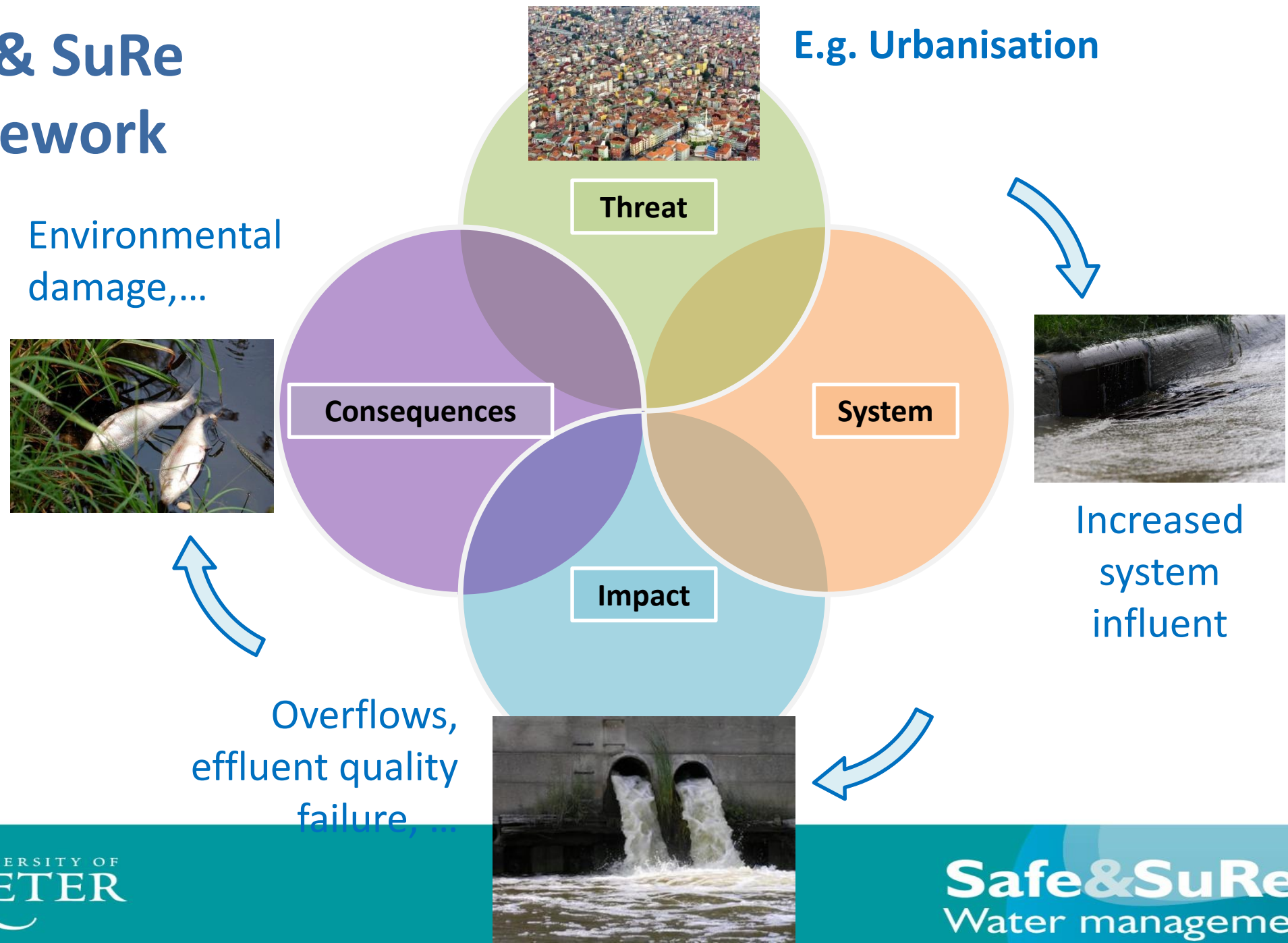
**Aim:** To develop a new paradigm for 'Safe & SuRe' urban water management in the UK in response to emerging challenges and global uncertainties

Safe: *Reliable*

SuRe: Sustainable and Resilient



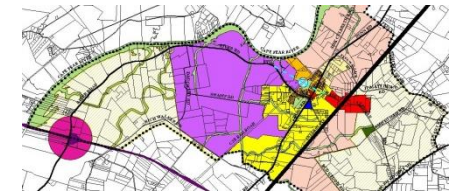
# Safe & SuRe Framework



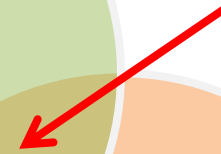




Threat



Mitigate

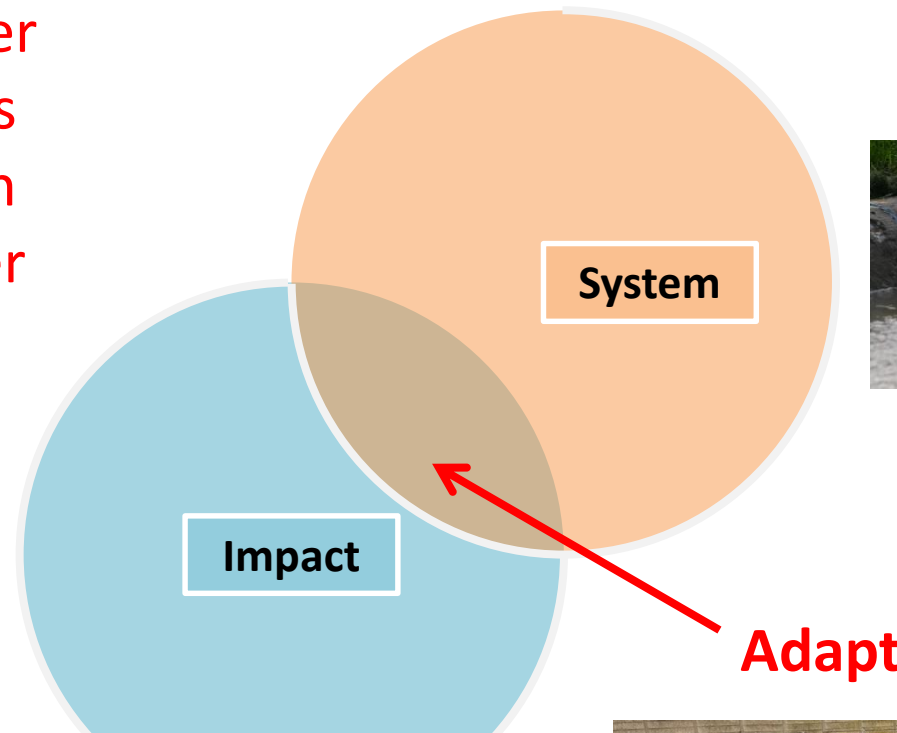


System

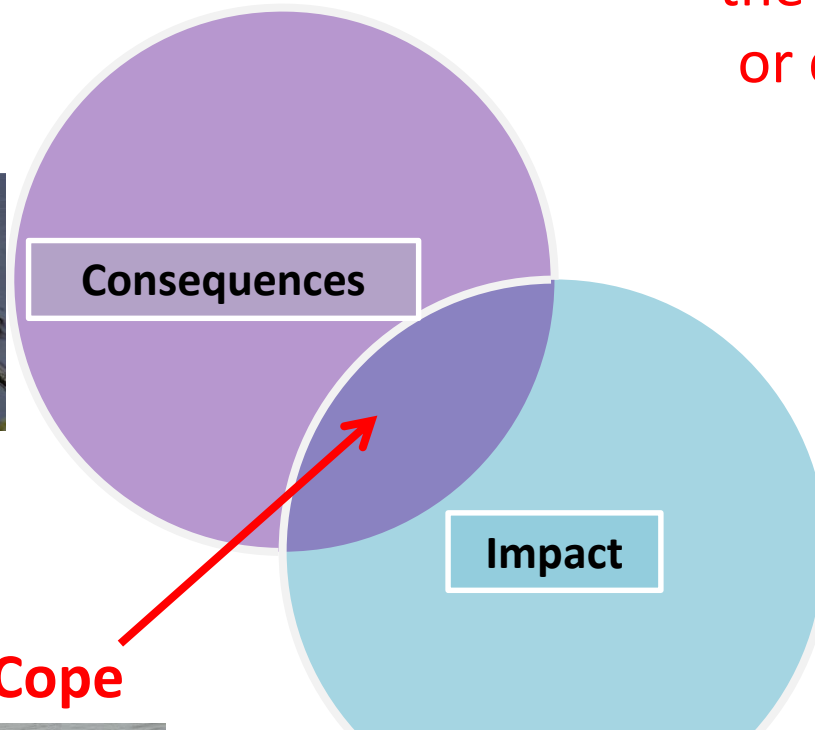


**Mitigation:** 'Any physical or non-physical action taken to reduce the frequency, magnitude or duration of a threat'

**Adaptation:** 'Action taken to modify specific properties of the water system to enhance its capability to maintain levels of service under varying conditions'



**Coping:** 'Any preparation or action taken to reduce the frequency, magnitude or duration of an impact on a recipient'

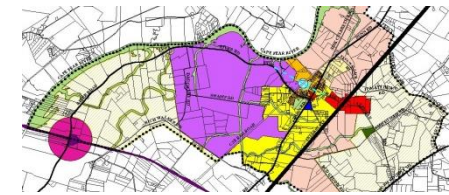
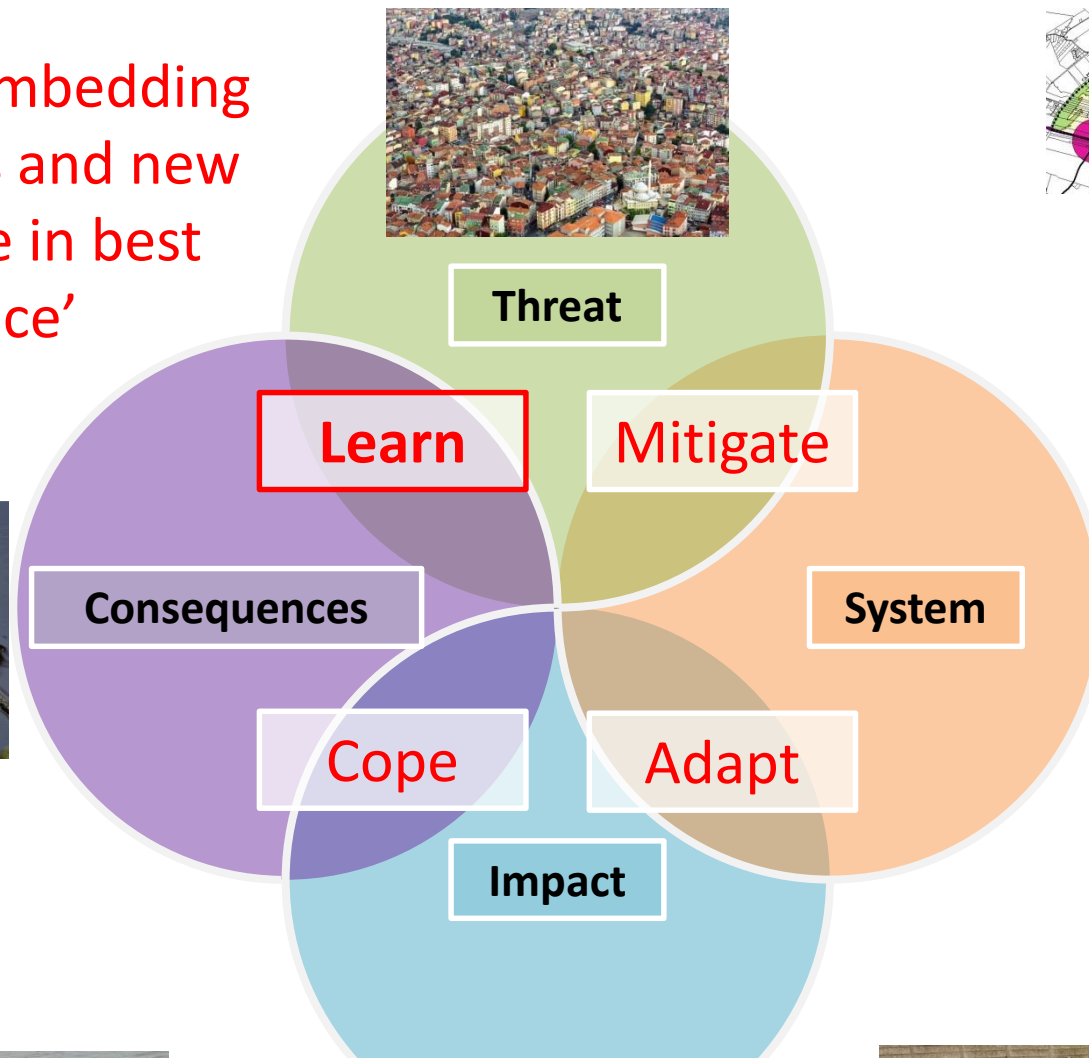


**Cope**



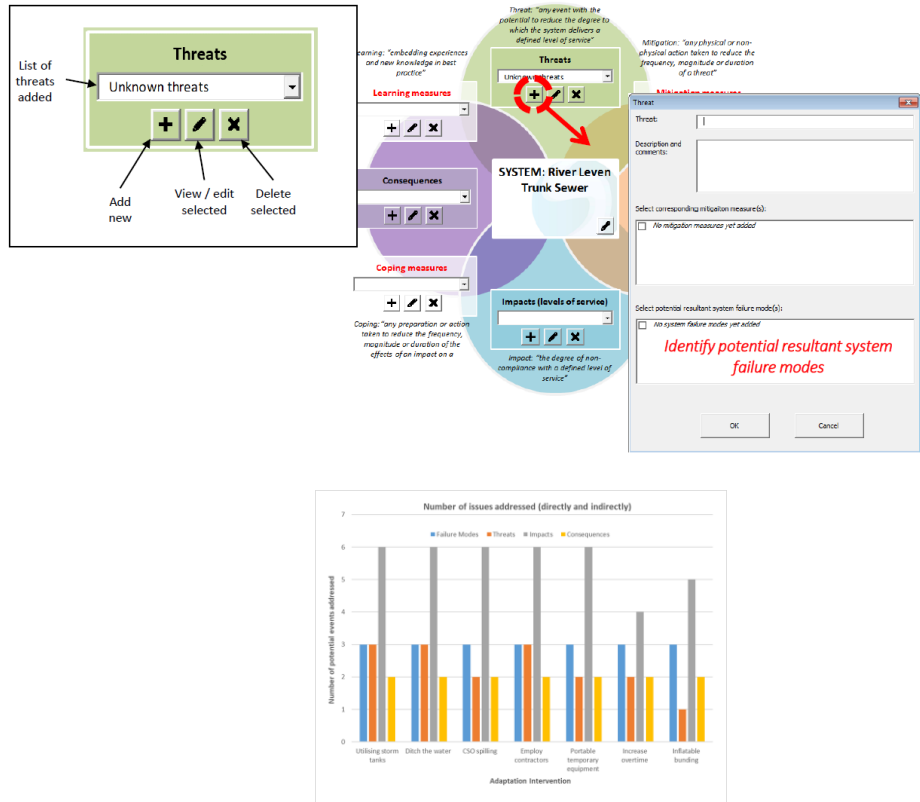


**Learning: 'Embedding experiences and new knowledge in best practice'**

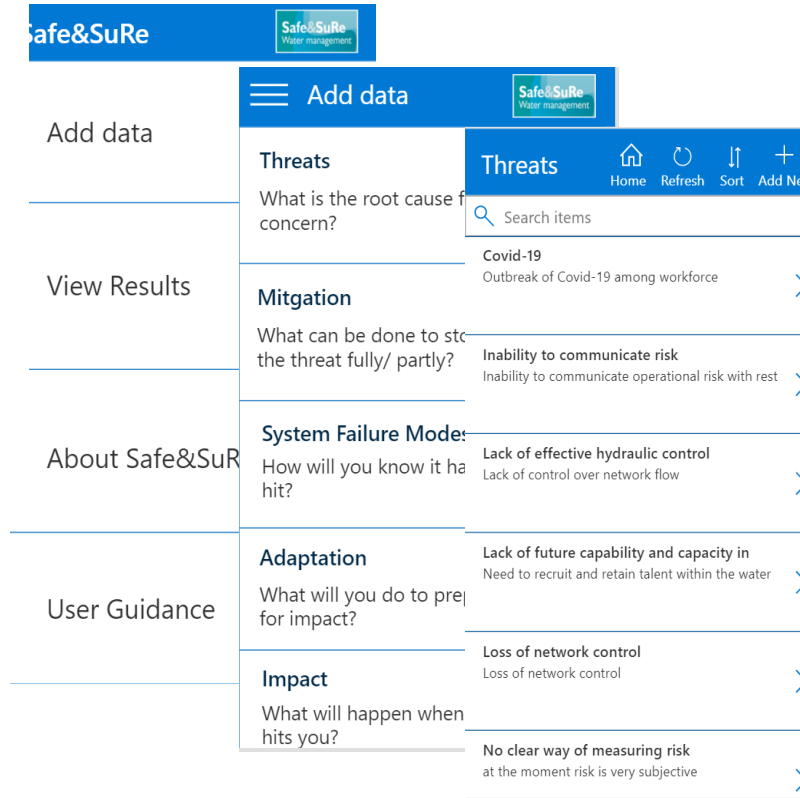


# Applications of the framework

## Spreadsheet tool



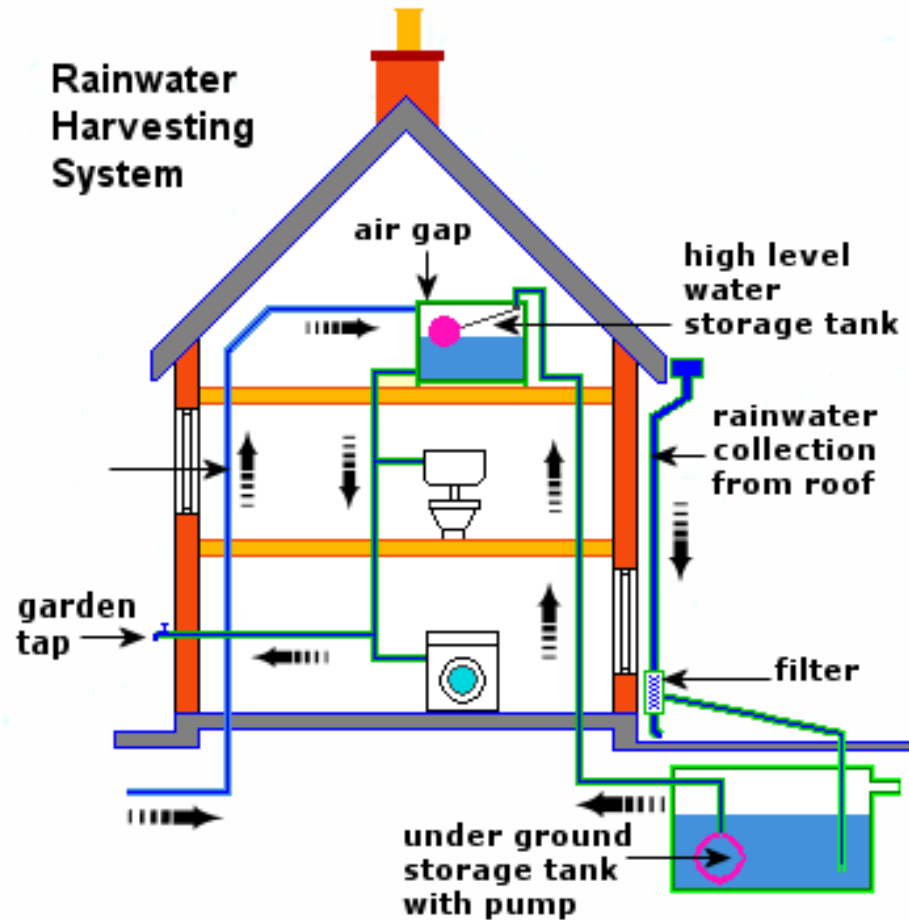
## Mobile phone app



## Covid-19 & water industry



# Building local resilience: Rainwater Harvesting



## Advantages:

- Reduced potable water consumption
- Emergency water supply
- Flood reduction (potentially)

## Disadvantages:

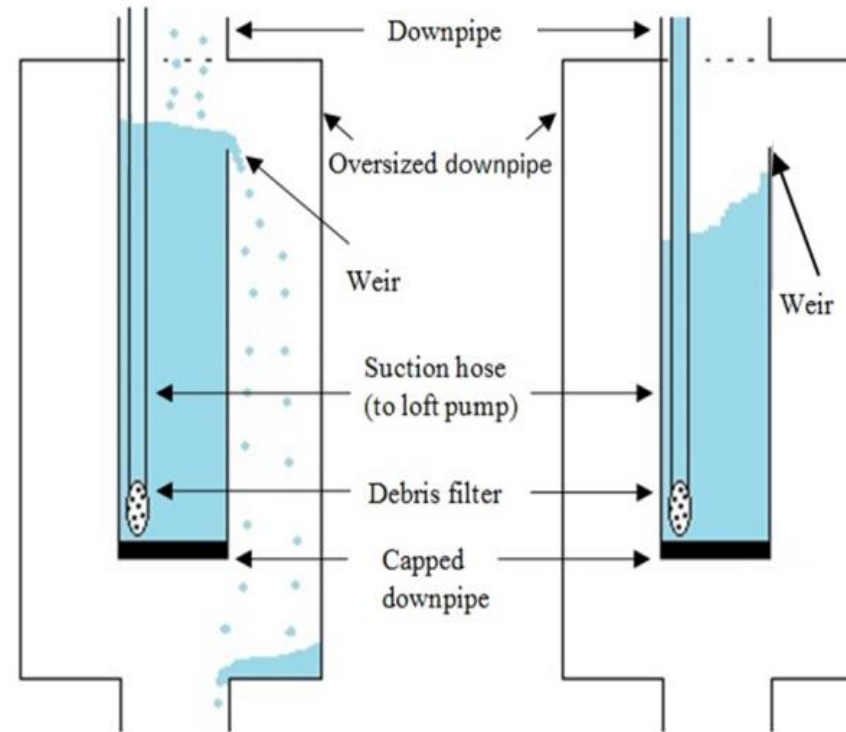
- Capital & running costs
- Energy use & GHG emissions



# Low energy rainwater harvesting (RWH)



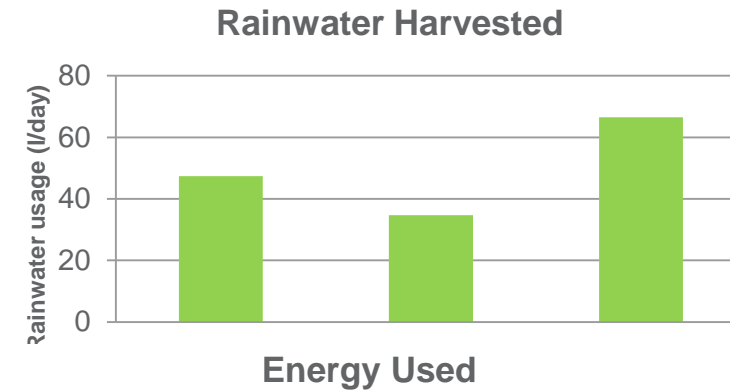
A) Chamber connected to downpipe



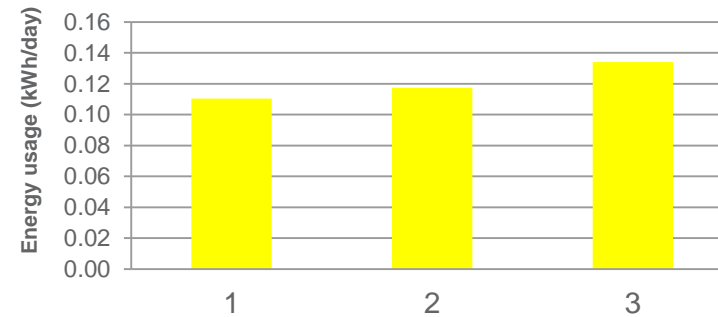
B) Illustration of chamber discharging to downpipe

C) Illustration of chamber being pumped empty

# Low energy RWH – field trials



**BENEFITS**  
= £120/year



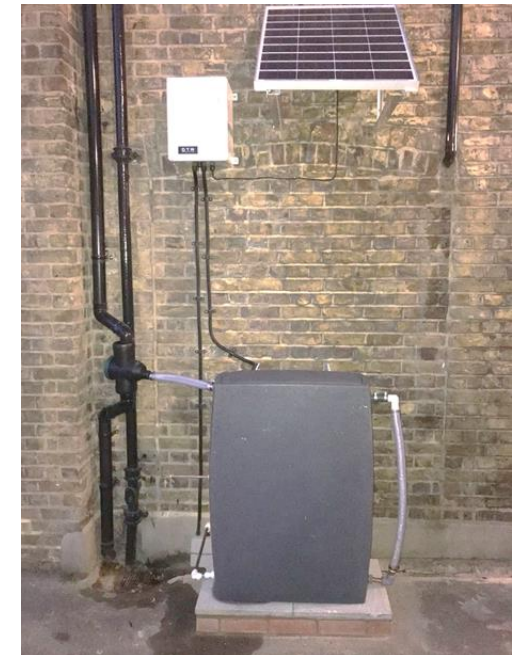
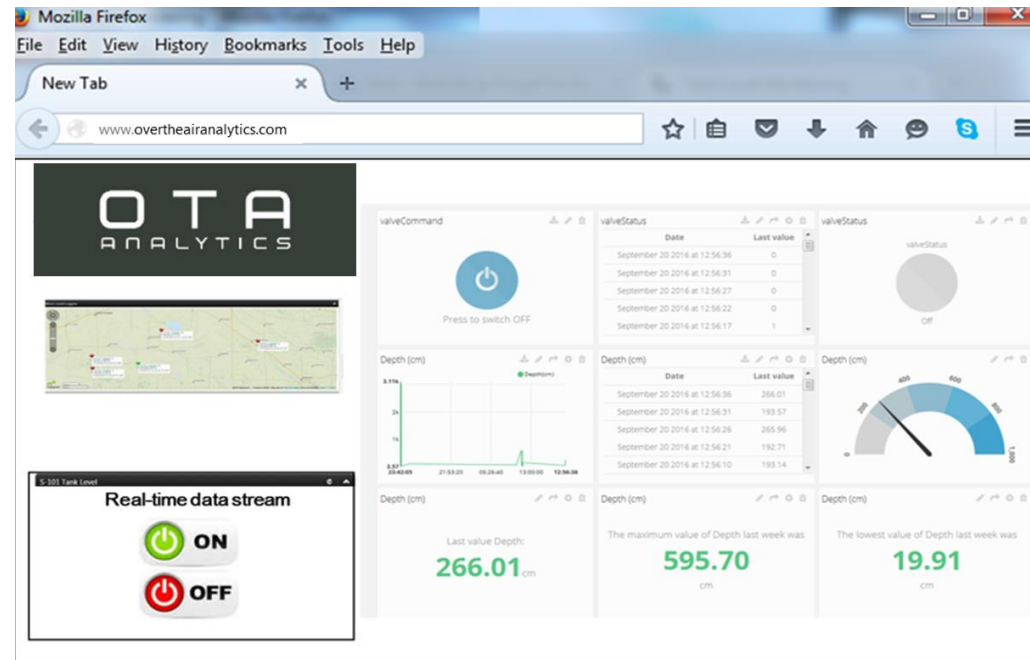
**COSTS**  
= £6/year

# Zero energy RWH – lab testing





# Smart systems



# Summary & conclusions

- Water is both our friend and foe, with unprecedented variability presenting the greatest global threat.
- Safe & SuRe provides a useful framework for linking threats to consequences and for identifying interventions to build resilience & sustainability.
- The framework is generic and has application beyond water.
- Rainwater harvesting provides one way of building local resilience to global water threats with great potential.

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