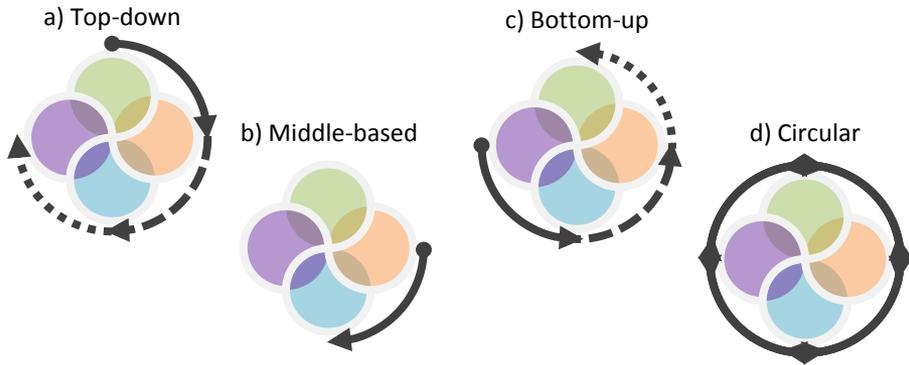


# Safe and SuRe Project Technical Note 2 (TN2)

This second technical note builds on the Safe&SuRe interventions framework presented in TN1 to provide a brief overview of some of the approaches being applied in the project.



## Which way around the interventions framework?

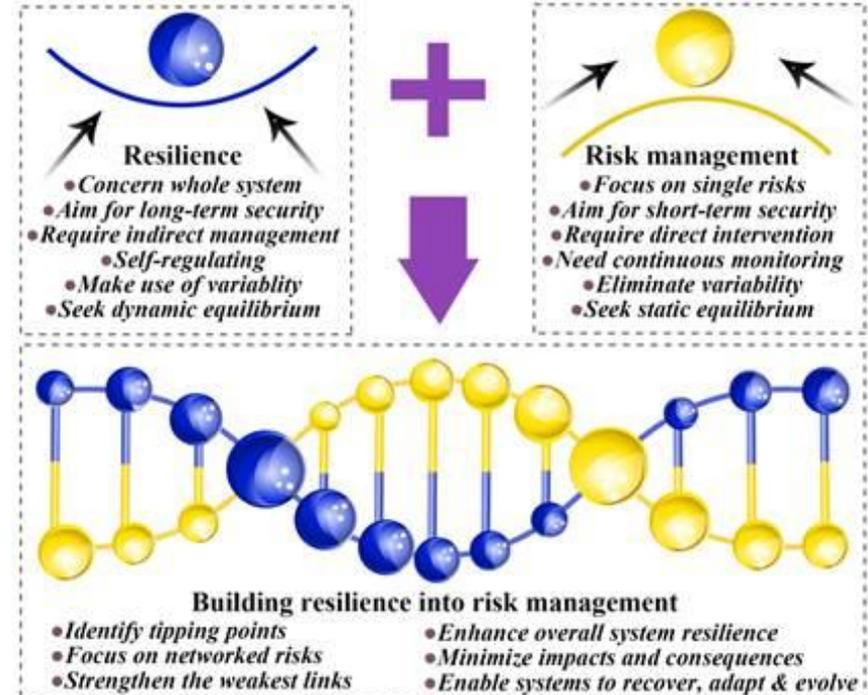


The interventions framework graphic started off as linear, then changed to a circular format. But what does that actually mean? It means that an analysis of threats, systems, impacts & consequences and corresponding mitigation, adaptation, coping and learning actions can go in different directions – as exemplified in the graphic above. What are the differences?

- **Top-down:** represents the conventional process, which starts with identifying potential threats. Not great for examining unknowns or feedbacks, but useful for developing mitigation measures;
- **Middle-based:** novel approach considering system failure modes irrespective of threat. By focusing on system response and level of service multiple threats resulting in the same system failure mode are represented in a single, more comprehensive, resilience analysis (P.T.O for more information on *'global resilience analysis'*);
- **Bottom-up:** represents another conventional process, which starts with identifying potential consequences. Threats or impacts do not need to be known as the focus is how an individual or group would cope with the loss of a critical system (P.T.O for more information about *'coping'*);
- **Circular:** encompasses all the framework components and the focus on learning ensures the efficacy of other interventions is reflected upon and updated. Capacity can be built across levels and preparedness enhanced leading to improved resilience and sustainability. Coordination and ownership are ongoing challenges.

## How are risk & resilience related?

Risk and resilience are concepts that are often conflated or used interchangeably. The S&S team have thought about how the boundaries between the two can become blurred, with risk being concerned with direct management of individual, short-term events and resilience focusing on long-term security of the whole system under a more self-regulating process. S&S Co-I Dr Guangtao Fu is taking this research further, in parallel with S&S, under his new EPSRC project 'BRIM' (Building Resilience into Risk Management), which is summarised in the graphic below.



## What is 'Global Resilience Analysis'?

Differing from traditional risk analysis, the global resilience analysis (GRA) approach shifts the objective from analysing multiple and unknown **threats** to analysing the more identifiable and measurable **system responses** to extreme conditions i.e. **the potential failure modes**. Steps in a GRA are:

**Step 1.** Identify the failure mode to be considered (e.g. structural failure, excess demand);

**Step 2.** Identify the system stress associated with the failure mode and the way to simulate it (e.g. excess load at a node for a specified period);

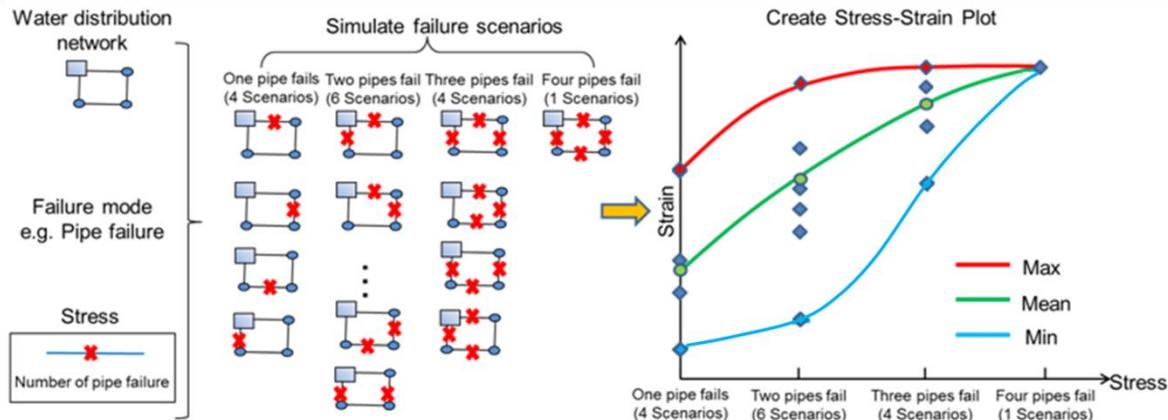
**Step 3.** Identify the appropriate system strain and how to measure it (e.g. ratio of unsupplied demand to total demand in the strain duration);

**Step 4.** Simulate failure mode strains under increasing stress magnitude (0%-100% of maximum stress).

GRA provides: (i) an overview of a water system's resilience to various failure modes ; (ii) visualisation of similarities or differences in responses of different systems to various failure modes; (iii) insight into trade-offs e.g. increased resilience to one failure mode may decrease resilience to another and the same fraction of component failure could result in a very different level of failure impacts. The GRA process is summarised graphically below.

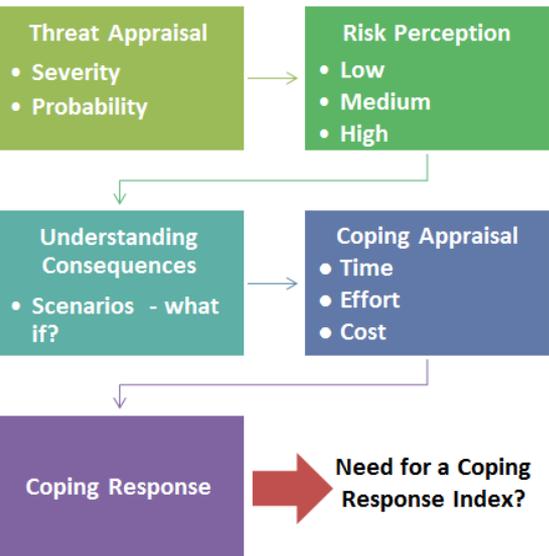
### Coming Up in TN3...

- What's the regulatory view on resilience?
- How does resilience fit with emergency planning?
- Least regret SuDS?



## Can Protection Motivation Theory help us cope?

Protection Motivation Theory is being used as a framework within S&S to analyse coping and resilience at the householder level in response to flooding and drought. The stages of PMT (summarised in the graphic to the left) have been explored within two communities in Exeter (St Thomas and Topsham) through questionnaires, interviews and a forthcoming workshop. Additionally, policy analysis reveals that flood risk management (in the UK) has begun to frame the householder as a **citizen** with social capacity and a corresponding role to play in flood planning and management. In contrast to this, drought management is still in an era of crisis management, where the householder is framed as a passive **customer** with a behavioural change (water efficiency) role rather than an active role in water resource management. Results to date highlight differences in perceived risk, impacts and consequences of floods and drought, with limited willingness for action in relation to floods, but greater willingness for action and more coping responses to drought at the household level. Community level action appeared to be of greater importance for flooding, with the development of action and emergency groups. Further work is being undertaken to assess the feasibility of developing a Coping Response Index.



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