

National Centre for Resilience (NCR) – Written evidence (RSK0085)

Summary

The evidence below has been gathered, collated and submitted by the National Centre for Resilience (NCR) <https://www.gla.ac.uk/research/az/ncr/> on behalf of the following authors:

- Alfie Ingram, volunteer emergency responder
- Water Resilient Cities Research Group, Heriot Watt University: Prof L Beevers, Dr M Bedinger, Dr A. Visser-Quinn, Ms K McClymont, Mr David Morrison and Mr G Aitken
- Aberdeenshire Council.

The NCR has neither amended nor checked the content in any way. It is presented in this submission as it was provided to the NCR so as not risk changing any meaning or emphasis within the content. The NCR therefore takes no responsibility for the accuracy or truth of any statements or opinions expressed within this submission.

Evidence submission one – Alfie Ingram – addresses select questions from the inquiry, offering personal insight into issues including National Contingency Plans, team working and exercising and testing to ensure plans are effective.

Evidence submission two – Water Resilience Cities Research Group – addresses question 1, 2, 3, and 10. They consider significant extreme risks to the UK arising from hydrological extremes; specifically floods and droughts. They argue that risks should not be viewed as discrete but as linked due to the interconnected nature of infrastructure, hazards, and their impacts across sectors. Climate change will exacerbate natural hazards, however the degree to which these will worsen is uncertain because projections are the result of a complex modelling chain. It is necessary to quantify and account for these modelling uncertainties, and cascade these through to risk assessments for future planning, by using novel and efficient probabilistic methods. In light of these uncertainties, and our increasingly interconnected infrastructure, society must look to build resilience across sectors. Future approaches to developing resilience must move beyond dealing with one sector or hazard at a time, or risks may be assessed and prioritized in a way that neglect interdependent technical, natural, and social impacts. The Urban Systems Abstraction Hierarchy (USAH) enables a “big picture” systems view of interdependencies in urban areas. This hazard-agnostic method can account for different technical, natural, and social hazards as well as test possible interventions. In future, these approaches could be used to support systemic risk assessments.

Evidence submission three – Aberdeenshire Council – The Council have addressed all 12 questions individually. Their responses are from a Scottish perspective but also look at the UK picture as a whole. Various recommendations and suggestions are made based on their own experiences and views on the questions posed. No specific research is cited.

Evidence from: Alfie Ingram (author), Volunteer Emergency Responder,
independent submission
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- 1.** Question 1a. Cyber Security. Terrorism. Power outage, IT Failure, Flooding.
b. Extreme = National. Threat to life.
- 2.** Question 3. The degree to which it is open to scrutiny and input of experts
- 3.** Question 4. Confirmation should be sought from suppliers, providers, authorities, and responder organisations that they have in place, and tested, plans, together with procedures implemented to resolve, supersede or mitigate the effect of an emergency.
- 4.** Question 5. Ensure effective feedback / input / advice from Local Resilience Forums and similar is taken cognisance of, discussed and acted upon as appropriate.
- 5.** Question 8a. National Contingency Plans not well communicated (or taken on board – rather than understood) to local level.
b. Disinterest unless effecting local area.
c. Increasing the capability of local responders will only come by highlighting relevance to them, thereby increasing interest, and supporting same with appropriate well-presented and regular training.
- 6.** Question 9a. Role of individual important. But important that they understand their part/position in ensuring effective team working.
b. Transparency essential, engendering respect and understanding.
c. Positive communication vital.
- 7.** Question 10a. Exercising / Testing imperative, to ensure plans / procedures work, and to identify where improvements can be made.
b. Exercising is also imperative towards enhancing personal knowledge and skill levels, as well as maintaining a high degree of interest.
- 8.** Question 11. The culture of a countries people has considerable influence on public attitude to emergencies – et al - and not easy to change.
- 9.** The Civil Contingencies Secretariat document "Preparing. Planning – for Emergencies: GOV.UK" found at www.gov.uk/guidance/preparation-and-planning-for-emergencies extensively considers and advises on Risk Planning and Assessment.

Evidence from: Heriot-Watt University: Water Resilient Cities Research Group
Authors: (submission on behalf of authors and Water Resilient Cities Research Group not Heriot-Watt University)

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Questions Addressed:

10. 1) What are the most significant extreme risks that the UK faces? Are these kinds of risks discrete, linked or systemic? What do you understand the term 'extreme risk' to mean?

11. 2) Are there types of risks to which the UK is particularly vulnerable or for which it is poorly prepared? What are the reasons for this?

12. 3) How could the Government's approach to risk assessment be strengthened to ensure that it is rigorous, wide-ranging and consistent? Your answer could refer to any aspect of the risk assessment process including, for example, its governance, the evidence base, or the degree to which it is open to scrutiny and the input of experts.

13. 10) (a) What challenges are there in developing resilience capability? Your answer could refer to critical infrastructure, but also to systems and networks beyond those elements.

Summary:

14. In this report we consider significant extreme risks to the UK arising from hydrological extremes; specifically floods and droughts. We argue risks should not be viewed as discrete but as linked due to the interconnected nature of infrastructure, hazards, and their impacts across sectors. Climate change will exacerbate natural hazards, however the degree to which these will worsen is uncertain because projections are the result of a complex modelling chain. We argue it is necessary to quantify and account for these modelling uncertainties, and cascade these through to risk assessments for future planning, by using novel and efficient probabilistic methods. In light of these uncertainties, and our increasingly interconnected infrastructure, society must look to build resilience across sectors. Future approaches to developing resilience must move beyond dealing with one sector or hazard at a time, or risks may be assessed and prioritized in a way that neglect interdependent technical, natural, and social impacts. The Urban Systems Abstraction Hierarchy (USAH) enables a "big picture" systems view of interdependencies in urban areas. This hazard-agnostic method can account for different technical, natural, and social hazards as well as test possible interventions. In future, these approaches could be used to support systemic risk assessments.

Hazards and risk

15. In this report we consider significant extreme risks to the UK arising from hydrological extremes – specifically floods and droughts. Climate change is significantly altering hydrological dynamics, with a general tendency to amplify hydrological extremes. Climate change will increase the UK’s risk of flood exposure and future water shortages (DEFRA, 2017). National projections indicate an increase in magnitude and frequency of extreme hydrological events (floods and droughts) as a direct consequence of these changes (Collet et al. 2018; Visser-Quinn et al. 2019).

16. Typically, hydrological extremes (hydro-hazards) are considered independently in water management planning. Inconsistencies in methodology lead to conflicting reports of the hydrological impact of climate change in the UK. To ensure a holistic understanding, Visser-Quinn et al. (2019) show that there is a clear need to consider changing hydro-hazards concurrently, i.e. both ends of the hydrological cycle must be explored at the same time. The authors identify specific hotspots of change, where the largest concurrent increase in flood and drought occur: the north-east of Scotland, the midlands and the south-west.

17. In the context of hydro-hazards an extreme risk can be characterised by a low probability event with highly consequential impacts (Beevers et al., 2020). The potential societal and economic impacts of larger flood (Collet et al. 2017; Ellis et al. 2021) and drought (Visser-Quinn, et al. in review) events in the future, combined with these occurring at an increased frequency, pose an extreme risk to the UK.

18. These risks should not be viewed as discrete but as linked due to the interconnected nature of these natural hazards. The Sendai Framework (UNDRR, 2019), states that: “*the global community must come to terms with a new understanding of the dynamic nature of systemic risks, new structures to govern risk in complex, adaptive systems and develop new tools for risk-informed decision-making that allows human societies to live in and with uncertainty*”. The adverse consequences of future hydrological extremes will affect a growing number of properties and civilians. The ability of governments and societies to adapt will determine their resilience to these global and national changes.

Uncertainty in future projections and model outputs

19. River flow projections used in climate change impact assessment studies are the outputs of a long and complex modelling chains. Global and regional climate models, forced with different emissions scenarios, provide output for use within hydrological models. Each of these models in the chain introduce uncertainty into the modelling process. Hydrological models (which translate climate inputs to river flow) have previously been identified as a large source of uncertainty. In Visser-Quinn et al. (2019), the relative contribution of each source of uncertainty (climate model, hydrological model and residuals) is determined. Hydrological models were identified as the largest source of variability, in some instances exceeding 80% of the total variance. Critically, in Visser-Quinn et al. (2019; in review) and Ellis et al. (2021), there is clear spatial variability in the sources of modelling uncertainty, highlighting the need to consider a range of models and

modelling approaches. Visser-Quinn et al. (in review) further compared the two types of climate ensemble. With large variations in uncertainty across Scotland, these results highlight the limitations of focusing on one ensemble type.

Deterministic vs probabilistic methods

20. Rapid urban development has led to an increase in flood exposure as populations become increasingly concentrated in floodplains (Domenghetti et al, 2015; Faccini et al, 2015). The delineation of the floodplain boundary is therefore an area of importance in risk assessment. Current practice requires numerical modelling of complex flood processes to produce hazard maps for a range of return periods (factored for climate change) that enable practitioners and decision-makers alike to examine the interaction between exposure, hazard and impacts, thus characterising risk. However, traditional characterisation of risk is derived by representing climatic and riverine process deterministically, using single optimum parameter sets in numerical models (Bates et al., 2004). This approach does not account for uncertainty within stochastic natural processes, governing mathematical equations, model parameters or input data (VanVuren, 2005; Beevers et al., 2020). In turn, deterministic hazard outputs are of a dichotomous nature (i.e. 'hard edge') as flood extents are not expressed in terms of likelihood of flooding relative to the distance of the river (Jafarzadegan and Merwade, 2019). A deterministic approach potentially misrepresents the hazard, resulting in under/over-estimation of exposure and impacts, and thus misjudgement when designing policy and engineering interventions.

21. A move towards probabilistic approaches has the potential to increase confidence in outputs as different permutations of model inputs and parameters quantify uncertainty. This therefore acts as a more reliable method of conveying risk as an ensemble of results facilitates understanding of the interactions between hazard, uncertainty and exposure likelihood (Stephens & Bledsoe, 2020). However, unlike deterministic flood maps, no consistent framework for probabilistic flood maps (PFM) exists in practice (Beven et al., 2015). PFMs should be used in future as they provide a more realistic depiction of the flood hazard (Beevers et al., 2020). By covering the full range of possible flood extents, PFMs facilitate a more rigorous and comprehensive assessment of properties at risk of flooding as uncertainty is explicitly factored into the risk assessment process (Aitken et al., in review).

22. Probabilistic flood maps are created from the results of multiple hydraulic model simulations, using climate model outputs as hydrograph inputs. The large climate model uncertainty identified by Visser-Quinn et al. (2019) and Ellis et al. (2021) must be assessed using uncertainty quantification methods. Current flood hazard uncertainty quantification methods are typically simplistic in design relying on computationally expensive large sample sizes. More advanced probabilistic methods have been practiced in financial and oil reservoir modelling for some years [Giles et al. (2009), Elsakout et al. (2015)] but these have only recently been applied to flood assessments (Aitken et al. (2021 – in review)). This research (Aitken et al. in review) has used a range of traditional and novel multi-level and multi-fidelity modelling techniques to improve the accuracy,

efficiency and computation burden of high-resolution probabilistic flood modelling.

Developing resilience capability

23. True resilience-building is a continuing struggle, partly due to a lack of understanding around how hazards translate into impacts within complex systems that have interacting natural, social, and technical parts (Bedinger et al., 2020). Future approaches to developing resilience must move beyond dealing with one sector or hazard at a time, or risks may be assessed and prioritized in a way that neglects interdependent impacts. Future approaches to risk assessment must recognize and account for systemic risks; and be able to determine impacts across interconnected systems. They must also take into account local factors, rather than adopting a one-size-fits-all national approach. Finally, future approaches must acknowledge that technical fixes aimed at “bouncing back” to the status quo are not always the optimal or complete way forward (McClymont et al., 2020). This requires a method of risk assessment which is multi-sectoral, location-specific, allows for identification of non-technical impacts and interventions, and gives diverse stakeholders an opportunity to reflect on longer-term implications of any intervention.

24. The Urban Systems Abstraction Hierarchy (USAH) supports systems thinking and meets these needs (Bedinger et al., 2020). Rather than scoring hazards and their likely impacts in general, the USAH takes a geospatial, functional approach to understanding how different hazards can impact different aspects of specific places. The USAH is a network consisting of five levels of increasing abstraction. OpenStreetMap data is used to detect which physical objects (e.g. ‘Hospitals’) are present in a specific city boundary (e.g. Edinburgh), and these object types are linked to the processes they support (‘Provide life-threatening healthcare’), then to tasks achieved (‘Public health’), then to outcomes (‘Effective safeguards to human health and life’), and finally to system purposes (‘Social opportunity and care’). These system parts are interconnected through their functionality. The complete USAH network consists of 481 nodes and 4463 links, and highly interdependent parts of the urban system can be identified through network analysis. Hazards can be introduced to different parts of the network through adjusting link weights (e.g. reducing strength of links which have experienced flooding (McClymont et al., 2021)).

25. Abstraction Hierarchies are effective in integrating “*partial view[s] of the design problem*” (Burns & Vicente, 2000, p. 79), by acting as a single point of reference to explore multiple perspectives across different disciplines and stakeholders (Patorniti et al., 2018). Because the USAH is actor- and event-independent, the urban system can also be understood outside of typical operation, even for unanticipated events (Naikar et al., 2005). The USAH is “hazard-agnostic”, allowing multiple hazards to be assessed in one tool. To date this has been applied to understand the complex impacts of flood hazards (McClymont et al., 2021) and the COVID-19 pandemic (Morrison et al., 2021).

26. Probabilistic methods mentioned in previous sections allow for improved understandings of interactions between hazard and exposure. Using probabilistic outputs as input for the USAH can lead to a more nuanced understanding of

system exposure, particularly how tangible impacts cascade through the system and interact with city outcomes. Through network analysis, the USAH provides a tractable way to identify risk that might be embedded in the system as a result of these interdependencies, which can lead stakeholders to a more informed discussion around systemic risk and resilience capability.

Terminology

27. The following definitions have been adopted from UNDRR (2019) for the purpose of this document.

- **Hazard** - a process, or phenomenon which may cause health impacts, or economic, social or environmental damage. This proposal focuses on floods and droughts, heatwaves, bushfires and landslides, as they represent the most significant hazards in the case study locations;
- **Event** - a specific occurrence of a hazard (with/without impact);
- **Cascading impacts** - how events cascade through a risk chain;
- **Vulnerability** - conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards;
- **Exposure** - people, infrastructure, housing, production capacities and other tangible human assets located in hazard-prone areas;
- **Systemic risk** - risk that is embedded in a system that is not itself considered to be a risk and is therefore not generally tracked or managed, but which is understood to potentially negatively impact overall system performance.

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Evidence from: Aberdeenshire Council (author)

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1. What are the most significant extreme risks that the UK faces? Are these kinds of risks discrete, linked or systemic? What do you understand the term 'extreme risk' to mean?

28. Natural Events, Major Accidents, Malicious Attacks = Terrorism, Pandemic (human or animal disease outbreak), Severe Weather, Cyber Attack, Climate Change, Interruption to utilities.

29. Most extreme risks are to be interconnected and therefore require a holistic approach to reduce the likelihood of occurrence. For example, climate change effects political instability which creates the likelihood of terrorism etc. Any event which impacts on how vulnerable a community feels also has the potential to have knock on impacts such as public disorder etc.

30. The term 'extreme risk' could be described as a risk which should it occur it will cause disruption which will be felt for over 5 days, it will make international media, result in huge financial cost either by the impact its self or in the response generated to mitigate the risk, it could result in the loss of life and/or damage to places and property. It is a risk that should it occur the ramifications will be catastrophic and potentially it will not be possible to recover fully from. These are also risks that are leave the public feeling vulnerable with widespread impacts felt across multiple communities.

2. Are there types of risks to which the UK is particularly vulnerable or for which it is poorly prepared? What are the reasons for this?

31. It is arguable that as an island nation we should be in a stronger position to impose measures to protect our borders in effort to reduce the impact of pandemic transfer, however this has not been the case and is an area that would benefit from development for future health protection.

32. The UK because of where it is situated can experience extreme weather which cannot be prevented from taking place. The climate change aspects on

coastal and inland flooding cannot be underestimated, along with the impact of severe weather on domestic and industrial properties, businesses, infrastructure and food supply. A more holistic response plan is required to look at not only isolated extreme weather events but the long-term impacts societal impacts on soils, wildlife, food supplies, our economy and health and wellbeing.

33. We are also extremely vulnerable to attacks or disruption to our power supply. This could range from a short-term power outage to a large scale EMP event. Our vulnerability comes for our dependency on power and technology to not only manage but support life. At a local and individual level people are not prepared for a long-term power outage.

34. As the UK includes London as its capital which is renowned worldwide as the financial capital of the world and a business hub this makes it a target for cyber attacks and terrorism. The same can be said for mega events in which the UK hosts a number of which are all potentially lucrative terrorism targets.

3. How could the Government's approach to risk assessment be strengthened to ensure that it is rigorous, wide-ranging and consistent? Your answer could refer to any aspect of the risk assessment process including, for example, its governance, the evidence base, or the degree to which it is open to scrutiny and the input of experts.

35. Review of local Risk & Impact assessment with enhanced input from Regional Resilience Partnerships could assist in informing the National Risks, as this would highlight where there are local individual issues requiring local focus only, but also collectively identify any repeating issues from across geographic or thematic areas which collectively weight towards inclusion in the National Risk Assessment – this supports the recognised concept of understanding the risks and determining their relative significance in terms of potential impact is the starting point for emergency planning. This allows for a bottom-up (community-based start point) informing upwards to the local, regional and national assessments, as opposed to singularly a top-down approach. A blend of both could arguably be the strongest methodology to apply.

4. Given the range of possible national risks, and the need to achieve a balance between efficiency and resilience, what level of assurance should the Government be seeking on the UK's resilience to hazards? What would effective national risk management achieve, and how could its success be measured?

36. The UK Government should identify where risks require a localised response plan or when a coordinated national approach should be adopted. For example, the UK would benefit for a coordinated, top-down response to a "black start" event.

37. The Government should be ensuring there are plans in place for every identified hazard, that plans are accessible by the individuals who will need to adopt them, plans are exercised and reviewed as a minimum on an annual basis. Depending on the impact and likelihood of the hazard materialising it may be that the plan to react to this hazard requires more detail and resource in order

to provide reassurance that should the hazard take place the response is appropriate.

38. The Government should be looking for assurance that plans are in place which; are communicated (internally/externally), appropriate, reviewed, exercised, owned by a named individual, plans join up with partner agencies.

39. National risk management could achieve a joined up approach allowing for all resources and skills/services to be consulted in order to mitigate a risk, this ensures different points of view and industry experts are consulted allowing for the most effective response possible.

40. Its success could be reviewed by looking at past incidents and responses, lessons learned after an incident takes places, feedback from those involved in the process.

5. How can the Government ensure that it identifies and considers as wide a range of risks as possible? What risks does the inclusion criteria for the National Security Risk Assessment exclude and what effect does this have on long-term resilience?

41. Ensure there is wide scale consultation on the process including feedback from a local perspective. The government needs to liaise with as many different organisations/individuals/services from diverse sectors and geographic locations in order to consider as many risks as possible.

6. How effectively do current ways of characterising risks (for example, the use of a five-point scoring system of a 'reasonable worst case scenario') support evidence-based policy decisions? What other information would be useful?

42. Support the current characterisation model which makes prioritisation of resources easier to identify. There is a clear explanation to the model with a quantifiable justification for the rankings provided.

43. The use of a risk matrix is a good tool to use to score risks however risk is perspective so score's need to have clear concise criteria along with discussions and justifications given to ensure the score provided is as accurate as possible. Lessons learned, near misses, past events, similar events in other countries/sectors are all important to consider when looking at risks.

7. How effectively do Departments mitigate risks? Does the Risk Assessment process and the Civil Contingencies Secretariat adequately support Government departments to address risks within their remits? Is further oversight or accountability required, and if so, what form should that take?

44. In a general context LAs, working collectively with partners seek to mitigate risks however this could be more effective and a governance structure with defined lines of accountability. As demonstrated by the pandemic there is a lot of good co-ordination and governance and accountability has been demonstrated through Scot Govt direction, however a considerable amount of this has had to be delivered at a local level, which has seen disparate processes being introduced and subsequently reviewed and revised.

45. In general some departments within organisations are very good at managing risks and others do not manage risk effectively or efficiently. Risk management is an evolving discipline which is constantly improving the methodologies and techniques used for the best processes. Risk management is not adopted and utilised to its full potential, more needs to be done to impress upon individuals and departments the benefits and importance of good risk management. Further oversight and accountability is required which comes down to more training, learning and consequences for not adhering to and upholding good risk management processes.

8. How well are national contingency plans communicated to and understood by those at a local level, including emergency responders? What could be changed to increase the capability of local responders to effectively plan for and respond to emergencies?

46. Would benefit from a more structured approach to the sharing of national plans and relevant information with local responders ensuring, where relevant, local plans compliment national procedures. Assurance can be provided through national guidance on training and exercising relevant national plans at a local level with compliance auditable.

47. Clear lines of communication and access to relevant and necessary information are fundamental. As opposed to passive information sharing, support through regular network updates could bring benefits.

48. This comes down to training, communications and reviewing of plans in place potentially by external parties (governance and assurance).

9. What is the role of the individual in relation to national crises? Are there potential benefits in increasing public involvement and transparency in emergency planning? What limitations are there to this? What lessons have been learnt or should have been learnt about the approach taken to risk assessment and risk planning in this country from the COVID-19 pandemic?

49. The role of an individual in a national crisis is to understand and follow instructions as they are communicated, it would be beneficial if they could help where possible in providing support or care depending on skill set and suitability this would be communicated.

50. As Covid-19 has highlighted the actions of the public have been hugely influential in success or failure of the pandemic response. That is not to put the entire responsibility onto the actions of the individual but public by in is crucial to ensure success of emergency response effects. Through encouraging a level of personal responsibility and ensuring communities and households are well prepared this reduces the burden on Emergency Responders for already limited resources. This can be achieved through greater national transparency on plans available and through relevant comms campaigns. The value of volunteers throughout the COVID-19 pandemic, there is unquestionably a resource base to be tapped into and mobilised in such crises. Recognising and rewarding this appropriately and developing robust volunteer mechanisms should be a fundamental strand moving forward. However, it also requires a grassroots

approach with local responders educating communities on local risks and how to best prepare.

51. It could be beneficial for the public to receive some communications surrounding emergency plans which could provide assurance and allow for early adoption of emergency plans.

52. There are limitations: Plans may have security elements which cannot be shared, plans may be sensitive or upsetting and in reality not required as wide spread information (body storage etc), people may misuse the information for their own gain, it may hinder the emergency plan if it is activated and individuals have decided upon doing something else in advance as they will have had time to make alternative arrangement without understanding consequences and external factors for why the plan implemented is required to take place.

53. Lessons which should have been learned from Covid-19 is the importance of business continuity, emergency plans, risk registers and that these are not just theoretical that these work in practice and have been communicated and joined up with the areas who will be required in these plans. Exercising of plans and keeping plans up to date is crucial. Time and resource needs to be implemented in these areas as they are crucial and any form of emergency could occur in the future. These areas cannot be after thoughts they require to be recognised and respected as crucial in all government departments.

10. What challenges are there in developing resilience capability? Your answer could refer to critical infrastructure, but also to systems and networks beyond those elements. What is the role of exercising to test risk preparedness, and are these methods utilised effectively in risk assessment and risk planning in this country?

54. One challenge is planning for the event you hope never to happen, and with this comes the challenge of securing the necessary resources within and across organisations to fully plan and prepare for such events – securing human resources, funding, valuable time against competing 'here and now' demands to plan for and deliver processes and plans for a situation that may not occur, is always challenging.

55. Challenges included a limited number of individuals who have the correct training and experiences. Confidence is required in these roles which is not possible by individuals who have not received appropriate training. Adoption by organisations and Senior Managers in understanding and implementing resilience, this is a cultural change which is required.

56. Funding is also a significant challenge. With budget restraints widely felt across the public sector it is harder to secure commitment to adequate funding for, what many feel are, unlikely events. Robust exercising is often deemed a nice to have rather than an essential activity. This is due to both budget and resource pressures.

57. Exercises are often carried out in isolation without considering the interdependencies beyond a local approach.

58. There are also significant challenges at present with testing plans due Covid restrictions. Remote testing is useful to a point, but many plans require a live element that are currently very challenging to run.

59. Resilience Direct is not as intuitive and easy to use as it should be in order to provide the best resource. The introduction of risk management software universally is necessary as risks are not being identified, managed, mitigated or report as they should be.

11. What can be learnt from local or corporate risk management processes, or those of other countries? Are there any specific examples of practices, processes or considerations which could improve the UK's national risk resilience? How could businesses and civil society more effectively support national resilience preparation?

60. Some kind of regulatory measure that imposes requirements on businesses to actively engage and support national resilience preparation would be beneficial.

61. It may be that highlighting some of the risks and how they would impact on businesses (such as the impact of major Cyber and/Communications attack or energy supply failure). Clearly size and scale of businesses would influence their ability to actively contribute and would require scaling as appropriate

12. What individual or economic behaviours would strengthen national resilience against hazards, and what mechanisms are open to the Government or society to incentivise these behaviours? How should we prioritise any changes required in approach, process or policy needed to improve risk mitigation and strengthen the UK's resilience to extreme risks and emergencies?

62. This holistic approach would need to consider what are the incentives that would attract involvement and contribution from individuals, communities and business.

63. There needs to be greater awareness within the public of potential risks and personal levels of responsibility to prepare for these. People need to be well informed but empowered to respond effectively as individuals or communities.

64. A campaign to raise awareness of the extreme risks and the way in which the public can help to mitigate these risks are required. There are already anti-terrorism campaigns which are trying to give individuals confidence in reporting anything they do not think is right. There may need to be a cultural change which comes from leadership, training and common language explaining to the public what is required from them and why it is important. The public need to be confident before they will help/react.

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