Managing Extraordinary Risks: Proactive and Reactive Strategies[i]

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Planning for the Unknown

Risk management techniques have contributed greatly to improving reliability and safety in society. But they have been less effective in dealing with some complex risks with substantial consequences for social, economic and physical systems.

Paradoxically, for some of the most critical societal risks they can do more harm than good unless applied carefully. In the case of challenges to national security or natural disasters, for example, classical structured methodologies can engender false confidence around matters that are inherently unknowable. Analytical methodologies with proven value in managing recurring risks, even in complex environments, have been less effective with multi-dimensional risks or societal systems that have been stressed beyond normal.

There is a wide-spread perception that the risk landscape is changing rapidly. To the extent that this is true it is only partly because of new and ill-defined threats, hazards, accidents, and other sources of harm. A bigger factor by far is the ever-growing complexity in society that makes it nearly impossible to anticipate and contain their potential consequences. Unusual circumstances have been triggering disproportionate, wide-ranging, and unexpected effects, largely because ever more complex systems fail to cope with increasing concentrations of people and wealth.

New vulnerabilities are arising for many well-known reasons: global interconnectedness, demographic changes, modern business practices, new systemic risks, and reliance on closely-coupled infrastructure systems among others. These can create conditions that allow problems to spread rapidly, cascade unpredictably, and manifest in novel ways. Such situations inevitably damage the foundations of social planning, such as assumptions about order, cause and effect, rational choice, and intentional capability.

This escalating uncertainty in the propagation of harm obliges risk practitioners to adopt more comprehensive methods of limiting the effects in their policies, strategies, and practices.

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Risk management has traditionally been oriented to pre-emptive control. Over time it has evolved from mitigation at source to addressing vulnerabilities, managing adverse consequences, and transferring potential costs. But, while effective for familiar risks, the widening concepts of risk and its management have been carrying increasing baggage; limitations have been exposed for growing classes of risk, especially those involving complex dynamic systems.

For one thing, such approaches require prior knowledge that the risks exist – through analysis, historical experience, or evidence of specific threats and hazards. Successful management requires understanding not just of the risk sources (nature, scale, likelihood, potential effects, etc.), but of the pathways by which harm might propagate. The potential combined consequences are largely shaped by many unpredictable 'system' factors such as societal vulnerabilities, community culture, and the dynamics of social and organisational networks.

Integrating Proaction and Reaction

Because they are, by definition, least familiar, critical issues need greater allowances for uncertainty, ambiguity, and complexity. Probabilistic assessments on their own cannot be expected to contribute meaningfully; major events usually occur too infrequently to be of much influence in normal planning timescales for businesses and governments.

Such situations need to be managed with a different balance of reactive and proactive strategies. Comprehensive planning that is based on a mix of specific risk controls (where justified on cost-benefit grounds) and that also fosters strong resilience in sub-systems and throughout organisational processes usually provides a more pragmatic means of addressing unfamiliar threats or hazards. Having such an orientation to resilience and adaptation will usually be more effective for extraordinary multifarious risks, large-scale societal issues, emerging problems, or threats with high uncertainty.

Resilience has some way to evolve as both a formal discipline and an operational paradigm. Despite its conceptual simplicity, there is no universally accepted definition and there are semantic differences to be resolved. It is usually characterised as a behavioural property of a system as it responds to and recovers from shock. It differs from risk management in its focus on inter-relationships between system elements. It depends on the functioning of physical systems, the availability and quality of information, and the way that the different elements operate individually and collectively.

In the context of governance arrangements, risk management and resilience can have a degree of overlap or complementarity in both concept and definition. The two, however, are fundamentally and distinctively separate, notwithstanding views held in some quarters about one being a subset or outcome of the other.

To the greatest extent possible the governance arrangements for both risk management and resilience building should be established within a single integrated framework. While the detail will depend on how responsibilities are shared, this is an important principle at all levels of government and business. A single integrated framework can have a number of advantages by:

- encouraging systems planning and holistic management;
- improving the chances of exposing rogue conditions;

- identifying effective control measures;
- strengthening coordination and balanced management;
- revealing trade-offs and management efficiencies;
- providing a knowledge base for potential adaptive management.

In overall effect this brings about a shift of focus from problems to resolution – improving the situation, not eliminating the problem. At the same time, investments in resilience, including adaptive capacity, can have wider long-term utility for governments and businesses. Generic resilience-building that concentrates on core needs can be especially cost-effective for the innumerable rare risks that are possible or plausible, but that cannot individually be foreseen and mitigated.

Layered Risk Governance

Methods of resilience and risk management have to be employed with care to avoid wasted effort. The framework is especially important. Governance needs to be framed in the context of social objectives, such as public safety, community functioning, organisational stability, or business continuity, rather than through the lens of individual events, hazards, threats, or vectors of harm.

In a community, for instance, resilience will only be effective if there is clarity about the ways that various elements in social systems might interact, and, in particular, an agreed view on what might accelerate recovery and what might retard it. Any interventions must take into account not only questions of feasibility, efficacy and cost-benefit utility, but societal expectations such as public acceptability, trust, accountability, legality, and long-term sustainability.

Thus, a comprehensive system for risk governance will be one in which there is layered effort on several fronts such that:

- known sources of peril are assessed, repelled, attenuated, avoided, or deflected in ways that are practical and cost-effective, and appropriate for those potentially at risk;
- exposure and susceptibility are reduced in vulnerable elements, including stakeholders, organisations, infrastructure, and assets;
- generic resilience is enhanced to attenuate unexpected forms of harm and absorb disturbances so that those threatened can respond quickly, improvise and adapt as appropriate, and evolve to a stronger state following a disruption.

Because complex failure routes are intrinsically unpredictable, the effects must be brought under control as quickly as possible. Much will depend on the governance arrangements in place, including provisions for helpful features such as: early detection, fast sense-making, speed of response, quick control of evolving problems, generic preparations, availability of resources, pre-planned decision-making, devolved and flexible management, adaptive capacity, rapid experimentation with ‘safe-to-fail’ interventions, real-time modelling of the effects of multiple interventions, rapid learning, and heuristic decision-making.

Implementation

Because it is oriented to outcomes rather than inputs, and tends to be an emergent feature of a system in action, resilience is not easily quantified *a priori*. It represents the overall reaction to shocks rather than any pre-determinable metric in static terms. It is not just a measure of the controls in place, but a characterisation of how the whole system behaves and adapts to internal or external stresses. Ultimately it is a reflection of the success of the risk governance in place for the combined 'Source-&-Society system' in dynamic mode.

To a limited extent it is possible to develop measures of effectiveness in respect of managing familiar risks such as in personal safety, medicine, agriculture, manufacturing, and emergency management. More complex situations or large-scale events need to be approached through modelling and predictive simulation. Good practice usually involves the use of proxies and indirect indicators of governance such as situational awareness, quality of planning, capacity for adaptation, ability to learn from experience, and so forth.

The experience of systems thinking in the engineering world has much to offer for resilience governance. Engineering systems have evolved over centuries to maximise their overall fitness to handle disruption from accidents, natural hazards, human failings, deliberate attacks, technical weaknesses, and other sources of harm. Achieving those ends requires deep knowledge of the system in a suitably wide context, an understanding of the environment in which the system sits, and confidence that all control elements are fit for purpose. The essential attributes of a 'healthy' system have been described in the following terms:

- *Completeness* - all necessary elements are present
- *Balance* – weight given to each element is appropriate for purpose
- *Cohesion* – connections and interactions are present and suitable
- *Consistency* – elements consistent with each other and overall purpose
- *Clarity* – no ambiguity about elements or connections.

The arguments set out here suggest that a general management strategy for extraordinary risks of all kinds should be based on four integrated phases of governance:

1. **System**: manage the system coherently
   Analyse the system continuously to try to understand its main features – i.e. investigate essential elements of the organisation, business, network, or nation to identify the parts and relationships, roles and responsibilities, strengths and weaknesses, and other factors;

2. **Risks**: mitigate discrete risks
   Undertake risk analysis and management for distinct hazards and threats, potential vectors of harm, and system vulnerabilities, in order to examine options for mitigation or for modification of potential consequences on the basis of cost-benefit analysis;

3. **Resilience**: enhance generic resilience
   Build generic resilience throughout the system for diverse scenarios on the assumption that there could be significant unknowns in both the sources of harm and the pathways, and in the reactions of those threatened;

4. **Adaptation**: pre-plan flexible management in response
   Put in place arrangements and capacity for high-level governance and adaptive management to enable a rapid and flexible response if exceptional shocks should occur or systems are overwhelmed.

This layered strategy can be applied to the management of most forms of risk. The balance of investments in each of the four steps depends critically on factors such as the nature of the risk, its potential significance for the organisation or business, and the quality of knowledge.

Three broad categories may be described:

- It is not usually cost effective to mitigate for very rare threats or hazards (e.g. meteorites) given that there can be so many that are plausible but individually unlikely; any occurrences are best covered by response services and fast flexible management.
- With regularly occurring risks, experience helps to define the range of uncertainties and put adequate arrangements in place as part of normal professional practices. Examples include urban fires, storms, individual medical interventions, industrial failures, hazardous materials spills, supply chain interruptions, criminal activities, and highway accidents, among many.
- High-end risks, such as major natural disasters, warfare, para-military operations, global warming, challenges to sovereignty, financial crises, and trans-national threats, where there is little relevant experience and high stakes, require more comprehensive strategies based on appropriate risk governance, scenario testing, generic resilience, and adaptation.

Notes on operationalising the four steps in this strategy are provided at Annex.

Conclusions

The future of governance for dealing with extraordinary risks will increasingly need to be based on community attributes such as social capital, informal communication networks, and organisational culture. It will inevitably require a different balance of proactive and reactive management, and changes to risk governance. Above all, it will require a re-orientation of purpose: with the prime focus being on achieving stability, safety, and security, rather than managing threats and hazards.

In particular, experience of major disasters suggests that the changes will need to concentrate on a better balance of proactive and reactive practice. Such an approach must involve some or all of the following: better decision-making under uncertainty; less reliance on risk avoidance and simple precautionary policies; greater use of probabilistic techniques where relevant; recognition that many risks have deep uncertainties or are inherently stochastic in nature; planning based on principles and guidelines, rather than rules or standard operating procedures; decentralisation, subsidiarity, and devolution of responsibilities; more openness to ideas when confronting unfamiliar crises; instinctual decision-making rather than simple deductive logic; empowerment to encourage bottom-up as well as top-down management; frameworks that facilitate action rather than prescriptive plans; acceptance of self-organising-structures and evolving behaviour in dealing with crises; and trial-and-error experimentation to investigate options for response and recovery.

Annotated Bibliography

The approach outlined here is based on observations of risk management in various sectors over a number of years. It is not intended to represent official policy but reflects a mix of theory and practice applicable at different levels. Of many publications that have helped to shape these views, the following have been particularly valuable.

Brown, C.B., & Elms, D.G. (2015). Engineering Decisions: Information, Knowledge and Understanding. *Structural Safety, 52,* 66-77. http://dx.doi.org/10.1016/j.strusafe.2014.09.001

The authors offer insightful comment on decision-making and the roles of information, knowledge, and processes. The track record for decisions involving risk is far from impressive, notwithstanding the availability of high-quality information and well-defined methodologies. This is true even in long-established disciplines such as engineering, where, for example, the observed failure rates in structures are thousands of time worse than predicted. While this paper deals with structural engineering, its many practical suggestions have considerable relevance for decisions about complex risks in other fields.

CAE. (1997). *Risks & Realities: A Multi-disciplinary Approach to the Vulnerability of Lifelines to Natural Hazards.* Report of the Christchurch Engineering Lifelines Group. New Zealand Centre for Advanced Engineering.

This was an outcome of the Christchurch Engineering Lifelines Project undertaken in the early/mid-1990s to investigate the vulnerability of the city's lifelines to natural hazards. It engaged a wide range of technical specialists, businesses, and local government officials for assessing the risks and developing strategies for mitigation. Published 13 years before the major earthquakes there, the document prompted many upgrades to infrastructure in the city that meant critical services were undamaged or were able to be rapidly reinstated.

CCS. (2004). *Dealing with Disasters.* (Revised 3rd edition). Cabinet Office, Civil Contingencies Secretariat. London, UK: The Stationery Office.

This guide was prepared at the time when the UK planning for civil protection was undergoing considerable reform. It provided an omnibus framework for local authorities, government agencies, emergency services, and other statutory, commercial, and voluntary organisations. Although it tended to reinforce many traditional ideas on command, control and co-ordination, it established standard national practices. Its main significance lay in the fact that it was one of the first national plans to incorporate concepts of resilience for civil contingencies.

Davies, T. (2015). Developing Resilience to Naturally Triggered Disasters. *Environmental Systems and Decisions, 35,* 237-251. DOI 10.1007/s10669-015-9545-6

In considering the role that conventional processes of risk management play in natural disaster management, the author concludes that their infrequency means that *"there are fundamental and irremediable limitations to the reliability of these processes for reducing the impacts of disasters on communities".* He advocates a strategy for strengthening community resilience through local planning involving greater scientific input to explore disaster possibilities, and the use of scenarios to plan how their worst effects might be reduced.

Edwards, C. (2009). *Resilient Nation.* London: Demos.

Issued in 2009 when ideas on resilience were evolving, this little book called for a radical rethink of the concept. Using a wide range of examples of disaster responses, it reasoned that resilience is built not by government and institutions of state but by individuals and communities. It provided convincing evidence that the growth of specialised emergency and response services, coupled with increasing centralisation of authority, was contributing to brittleness in modern society and weakening its ability for learning and adaptation.

Elms, D.G., & Brown, C.B. (2013). Professional Decisions: the Central Role of Models. *Civil Engineering and Environmental Systems, 29 (3),* 165-175. DOI:10.1080/10286608.2011.640752

Another thoughtful paper on risk decision-making from these authors; see remarks above.

GOS. (2012). *Blackett Review of High Impact Low Probability Risks.* BIS/12/519 London, UK: Government Office for Science. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/278526/12-519-blackett-review-high-impact-low-probability-risks.pdf

Another in a series of comprehensive reviews by UK government agencies that have synthesised contemporary thinking on risk management at various stages over the past three decades. The focus is on low-probability high-impact events – those at the most difficult end of the risk spectrum! Drawing on advice from academia and industry, this report highlights the importance of exploring and providing for rare situations even where there are deep uncertainties. While a useful primer on the topic, the risk-centric focus and lack of consideration of resilience rather limit its usefulness for practitioners.

Helm, P.O. (1996). Integrated Risk Management for Natural and Technological Disasters. *Tephra New Zealand, 15(1),* 4-13.

This paper proposed the use of risk assessment for the management of emergencies and natural disasters. Until the mid-1990s, formal risk methodologies had tended to be applied mainly to quantifiable fields such as engineering and insurance. The integrated risk management strategy outlined became the basis for subsequent reforms in New Zealand's arrangements for emergency management and civil defence.

Helm, P.O. (2015). Risk and Resilience: Strategies for Security. *Civil Engineering and Environmental Systems, 32:1-2,* 100-118. DOI: 10.1080/10286608.2015.1023793

This paper offers guidance for practitioners responsible for critical poorly-defined risks. It recommends greater allowance for uncertainty and a different balance of proactive and reactive management, noting that *"traditional approaches to security and safety are being challenged by ever-increasing complexity in today's socio-economic systems"*. As a general strategy for managing complex risks, it proposes a multi-layered approach involving systems planning, risk management, resilience building, and adaptive responses. It was published as part of a special issue of the CEES journal on the topic of resilience.

IRGC. (2015). *Guidelines for Emerging Risk Governance.* Lausanne: International Risk Governance Council (IRGC).

This publication builds on the IRGC's extensive record of research aimed at bridging the gap between theory and practice in risk management. With its focus on 'emerging risks' it provides an excellent introduction to the difficulties of interpreting rare risks associated with complex

systems or conditions that are poorly understood. While anchored in concepts of risk management, it contains guidelines for resilience that will underpin future work by this organisation. It includes many well-considered pointers for the early identification and management of emerging risks that will be invaluable for public and private organisations.

ISO 31000. (2009). *Risk Management – Principles and Guidelines.* Geneva: International Organisation for Standardization).

This international standard evolved from the joint Australian/New Zealand generic standard AS/NZS4360 published first in 1995. It sets out principles, a framework, and a well-proven process for assessing risks and guiding organisations at any level towards achieving their objectives. It provides users with an internationally recognised benchmark against which to assess their management and governance arrangements. The standard, which in its present form is focussed on risk management, is currently under routine review.

Kurtz, C.F. & Snowden, D.G. (2003). The New Dynamics of Strategy: Sense-making in a Complex and Complicated World. *IBM Systems Journal, 42(3),* 462–483.

This thought-provoking paper is about knowledge and its role for sense-making in complex circumstances. It challenges many of the assumptions behind today's 'management science', and highlights fallacies in the simple idealistic approaches to decision-making under uncertainty that underpin so much conventional crisis planning. It introduces the 'Cynefin' Framework – a conceptual model for sense-making to support difficult decisions where information may be unavailable or highly uncertain (a typical situation with extraordinary risks).

McAneney, J. (2014). What is Driving the Rising Cost of Natural Disasters? *Risk Frontiers Quarterly Newsletter, 14(2)*, 3.

The author draws on normalised long term disaster loss histories to demonstrate that the principal factor in the trend to rising economic losses over the past 50 years has been related to population change and concentration of wealth rather than anthropogenic climate change. He references the 2014 report of the Intergovernmental Panel on Climate Change which stated that *"Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather- and climate-related disasters"*.

NAS. (2012). *Disaster Resilience: A National Imperative.* Washington, DC: National Academy of Sciences.

The US was later than others in formally adopting resilience policies but this foundation document represented a major step-change in thinking. It was notable for its wide vision and the fact that it included disruption from all sources: disease, terrorism, social unrest, financial disasters and natural hazards. It also acknowledged the central importance of bottom-up planning, advocating the grounding of responsibilities into the community and *"infusing the principles of resilience into all the routine functions of the government at all levels".*

OECD. (2014). *Recommendation of the Council on the Governance of Critical Risks.* OECD High-Level Risk Forum, Public Governance and Territorial Development Directorate. Paris: OECD Publishing. http://www.slideshare.net/OECD-GOV/oecd-recommendation-on-the-governance-of-critical-risks?related=1

Prepared under the auspices of the OECD High Level Risk Forum, this set of recommendations for country risk management was adopted by OECD ministers on 6 May 2014. It has the effect

of 'soft law' for the 35 member countries, and breaks new ground in both its comprehensive approach to managing large risks and also being the first formal international guidance to governments about whole-of-society risk management. It is based on five core principles: (1) establishing a comprehensive, all-hazard and trans-boundary approach at the national level; (2) anticipating risks and building preparedness; (3) raising awareness to foster whole-of-society investments in prevention; (4) developing adaptive and inter-agency crisis management capacities; (5) including principles of good governance in decision-making.

OECD. (2014). *Boosting Resilience through Innovative Risk Governance.* Paris: OECD Publishing. http://dx.doi.org/10.1787/9789264209114-en

This monograph, also prepared under the auspices of the OECD High Level Risk Forum, brings together ideas on risk management and resilience developed over several years at meetings of the Forum. It draws on the diverse socio-economic experiences and expert analyses of OECD members to identify measures to minimise damage from disasters and help economies recover rapidly. It proposes a fundamental shift in risk governance by encouraging forward investment in measures to strengthen resilience and adaptive capacity.

Park, J., Seager, T.P., Rao, P.S., Convertino, C.M., and Linkov, I. (2013). Integrating Risk and Resilience Approaches to Catastrophe Management in Engineering Systems. *Risk Analysis, 33(3),* 356-367. DOI: 10.1111/j.1539-6924.2012.01885.x

This paper is concerned with failures in complex engineering systems but it breaks new ground of wider relevance with its insightful comments on the concept of resilience and its role in planning for complex risks. While engineering design for hazards tends to be based on risk analysis, resilience demands a different approach for a number of reasons. The authors recommend changes to existing design and management practices where engineering systems interface with natural and social systems.

Renn, O., Burns, W.J., Kasperson, J.X., Kasperson, R.E., and Slovic, P. (1992). The Social Amplification of Risk: Theoretical Foundations and Empirical Applications. *Journal of Social Issues, 48(4),* 137-160

Prepared by some leading researchers in the area of risk and social experience, this article postulated that the overall consequences of adverse events are shaped not just by physical damage but by *"the interaction of psychological, cultural, social, and institutional processes that amplify or attenuate public experience of risk and result in secondary impacts".* Notwithstanding the fact that these insights were developed three decades ago, and deserve greater prominence in community planning, many practitioners still try to control hazards and threats directly using simplistic methods that fail to incorporate over-riding social realities.

Seville, E., Van Opstal, D., Vargo, J. (2015). A Primer in Resiliency: Seven Principles for Managing the Unexpected. *Global Business and Organizational Excellence. March/April 2015*. DOI: 10.1002/joe.21600.

The principles outlined here are an outcome of ten years of practical development from the Resilient Organisations Research Programme in New Zealand. Because organisations lie at the heart of so much everyday activity, their resilience is a key factor in society's ability to continue through adversity. The seven principles highlight the importance of: adaptive capacity; leadership; organisational learning; social capital; teamwork; operational discipline; and identifying opportunities. These provide sound guidance for businesses and organisations generally to survive and thrive in volatile times.

Stevenson, J.R., Chang-Richards, Y., Conradson, D., Wilkinson, S., Vargo, J., Seville, E., and Brunsden, D. (2014). Organizational Networks and Recovery Following the Canterbury Earthquakes. *Earthquake Spectra, 30(1),* 555–575

This paper has been included here because it provides good source material for researchers interested in findings from the earthquakes that affected Christchurch and its surrounding areas in 2010 and 2011. Undertaken as longitudinal case studies of 47 organisations through the initial years of recovery, the work provides insights into organisational behaviour under stress. As a modern city built to high standards, Christchurch has provided empirical observations with high relevance for metropolitan areas elsewhere.

Taleb, N.N. (2007). *The Black Swan: The Impact of the Highly Improbable.* New York: Random House.

Taleb's well-known book makes the case that randomness plays a larger role in human affairs than we normally acknowledge, leading to rare and improbable events sometimes having major effects. Using many varied examples of large deviations from expectation, he postulates that 'black swan' events lie behind much of what shapes society and individual lives. While the term has been popularised to mean disruptive events, Taleb himself identified three attributes: outliers; extreme impact; and a human inclination to explain them afterwards as less random and more predictable than they were. The last is often overlooked!

ANNEX: Guidelines for Resilience

System : Manage the System as a Whole
• Take a structured approach to managing risks, reducing vulnerabilities, building resilience, and developing adaptive capacity within the same single integrated framework • Have a systems perspective of all parts, including agents of hazard/threat and vectors, and the community (especially factors contributing to social, environmental, and economic consequences) • Ensure that the system has Completeness; Balance; Cohesion; Consistency; and Clarity • Aim to understand interdependencies between the main elements, rules of interactions, causal chains etc. • Analyse linear and non-linear interactions – including under dynamic conditions and over long periods • Frame the issues in social terms, not as events or agents of harm • Orient to outcomes: e.g., security, stability, and safety for the organisation, society or nation • Establish clear governance arrangements across the system, and assign ownership of key risks • Test communication arrangements throughout the system under various conditions

Risks : Mitigate Discrete Risks
• Manage known risks, individually and collectively, where practicable • Develop formal integrated risk management strategies (or prudent use of precautionary approaches) • Embed risk management in organisational behaviours • Pay attention to systemic risks, especially those with low probabilities and high impacts • Analyse initiating agents (threats and hazards) and vectors of harm, pathways, etc. • Undertake sensitivity analysis, and aim for quantitative measures where possible • Mitigate (i.e. treat or control) risks using cost-benefit analysis • Take account of uncertainty, acknowledging the intrinsic limits of risk management

Resilience : Build Generic Resilience
• Assess known vulnerabilities, then ameliorate • Incorporate resilience-building into all organisational processes • Take account of, or reduce, exposure, susceptibility, and sensitivity • Manage through subsidiarity and clear devolution of responsibilities • Examine robustness of all critical elements, and provide redundancy • Enhance resilience within sub-systems and throughout the total system • Explore diverse scenarios and test against extreme conditions • Dampen potential for cascading interactions with ‘crack-stoppers’ and ‘circuit-breakers’ • Consider social context, organisations, infrastructure, environment, and economy • Plan for unknown risks, generic shocks, and long-term adverse trends • Strengthen community networks, support arrangements, and organisational culture • Continually build social capital, and raise awareness

Adaptation : Adaptive Management in Response
• Pre-plan decision-making arrangements for crises or extraordinary situations • Build capacity for fast, well-coordinated, flexible, responses (individual and collective) • Work to principles and guidelines, not rules • Sharpen early warning, anticipatory, and sense-making capabilities • Encourage evidence-based decision-making, rapid experimentation, and creative solutions • Be aware of the limitations of using SOPs or normal command and control management • Facilitate spontaneous self-organising groups of volunteers, and bottom-up decision-making • Continually review and improve, incorporate experience, and strengthen security/safety culture