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UK emergency preparedness: a holistic response?

Geoff O'Brien, *Disaster and Development Centre, School of Applied Sciences, Northumbria University, Newcastle upon Tyne, UK*

Abstract

Purpose – This paper aims to argue that to address the consequences of climate change and variability a greater focus on pre-emergency planning that engages a wider stakeholder group must be adopted.

Design/methodology/approach – The paper discusses UK emergency management and approaches to climate change and climate variability risk.

Findings – The internal focus of UK emergency management inhibits the contribution that it can make to societal resilience and public preparedness. Effective risk reduction requires that all actors, including the public, are engaged in the social learning process. From a UK emergency management perspective this requires a culture shift to an outward proactive focus.

Originality/value – This paper offers insights into emergency preparedness in the UK.

Introduction

The reform of UK emergency management[1], started in 2000, has seen radical changes. A new approach to emergency preparedness and response in the UK was much needed to reform and modernise emergency systems inherited from the Cold War era. The UK Civil Contingency Act 2004 is the legal framework underpinning UK Resilience. The Act introduced a broader definition of emergency, new structures and a duty for emergency planning at the local level that were intended to provide a more comprehensive and streamlined response system. But the reform process, prior to the introduction of the Act, was overshadowed by the terrorist attacks of September 11 2001, resulting in a greater focus on institutional resilience and responses to terrorist attacks ([O'Brien and Read, 2005](#)). Terrorism is a real threat as evidenced by the July 2005 bomb attacks and the 2007 failed attack on Glasgow airport and thwarted car bomb attempts in London. It is the duty of government to protect the public. But too great an emphasis on one source of threat can divert attention, both of government and the wider public, from other pressing problems. The current focus and emphasis needs to change to reflect the wider agenda of preparedness.

UK emergency management

Emergency management in the UK is predicated on an all-hazards or comprehensive approach that incorporates response, recovery, mitigation and preparedness ([McEntire et al., 2003](#)). The all-hazards approach aims to reduce risk from civil, natural, technological, biological and instrumental disruptions. Acceptable levels of risk are embedded in norms and standards and are part of the governance structure that regulates societal activities. General acceptance by the public of the regulatory framework governing risk management is a necessary component of effective civil protection along with an emergency management function that meets societal expectations. This approach can be characterised as legally based,

professionally staffed, well funded and organised. Training and exercising is aimed at improving the response function of emergency management professionals, evaluating communications systems, standardising procedures, testing and evaluating equipment and investigating stress on the responders. Alerting the public to potentially hazardous events is done through a variety of warning and informing systems. The aim is for a return to normality, that is, to re-establish conditions as they were prior to the event ([Perry and Peterson, 1999](#); [Alexander, 2000, 2003](#); [Schassfstaal et al., 2001](#); [Paton and Jackson, 2002](#); [Cassidy, 2002](#); [Perry and Lindell, 2003](#)).

The focus of UK emergency management is the Civil Contingencies Secretariat (CCS). The CCS sits at the centre of Regional Resilience Forums for the English regions with similar arrangements for the devolved administrations of Scotland, Wales and Northern Ireland. Forums at the sub regional and local level bring together the planning and response functions. For further detail on UK Resilience see [www.ukresilience.info/](#)

The reforms to UK emergency management were needed and welcome. They have, for example, by replacing discretion with a duty to prepare plans, introducing standardised procedures for risk assessment and procedures for continuity of function ensured an integrated approach. However, the reforms feature the hierarchical top-down structure that typify a command and control approach. Its focus is on institutional resilience and organisational preparedness. [Table I](#) provides a useful way of considering the overly centralised nature of UK emergency management ([O'Brien, 2006](#)).

Emergencies range from routine, for example road traffic accidents, through to events that can require a national, or even international, response ([Alexander, 2002](#)). The hierarchical top-down approach characterised in [Table I](#) is an effective approach for events that do not exceed societal expectations and norms. For those rare events that may exceed societal expectations, for example, the Buncefield oil storage fuel depot explosion in 2005, the emergency management response function is able to respond effectively. Though the public may be surprised by such events, the reality is that though Buncefield could not be predicted, previous events such as Seveso envisaged that such catastrophic events were likely to occur in the future. Experience suggests that increasingly complex and tightly coupled technological systems are prone to accidents ([Perrow, 1999](#)). The subsequent legislative and regulatory framework governing hazardous facilities cannot prevent accidents but can ensure the readiness of the emergency response function. Response systems should be designed as self-adaptive socio-technical systems to aid learning and adaptation ([Comfort and Sungu, 2001](#)). And this is a characteristic of UK emergency management as outlined in [Table I](#). Learning acts to enhance organisational resilience.

But where events exceed expectations, such as the unprecedented floods in the UK of 2007, the 2003 heat wave in Europe and hurricane Katrina in 2005 then there is danger that this institutional focus may be an insufficient response, particularly for extreme events. The Intergovernmental Panel on Climate Change (IPCC) predicts that extreme weather events will occur with increasing frequency ([IPCC, 2007](#)). The UK is already suffering more extreme storms, heat waves and floods and this is illustrated best through the insurance companies who have seen insurance claims soar in the past 20 years ([Environment Agency, 2007](#)). Since 1990, weather-related insurance claims have averaged £825 million per year ([ABI, 2007a](#)). There is a risk that if UK emergency management remains reactive, then in times of multiple concurrent events it could be severely disrupted and possibly, stretched to the point of collapse. This was almost the case in the flood events of 2007 ([BBC News,](#)

[2007](#)). To manage in such conditions requires both a resilient response function and a resilient society. This requires a shift in the characteristics of emergency management from an internal focus to one that promotes both societal resilience and public preparedness.

Approaches to climate change and climate variability risk

Climate change is recognised as having potentially disastrous consequences. Reducing climate change risk is approached through the United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol in two ways. The first is to mitigate or reduce greenhouse gas emissions and stabilise their concentration at a safe level – a focus on reducing future risks. The second is adaptation to the current and ongoing consequences of a changing climate – a focus on reducing current risks. Though adaptation is referred to in the Convention, though not defined, the main focus of effort has been on greenhouse gas reduction with the aim of stabilising atmospheric concentration of those gases at a level that would prevent dangerous anthropogenic interference with the climate system ([UNFCCC, 1992](#)). Dangerous implies the possibility of unpredictable shifts in climatic conditions that could have potentially catastrophic consequences ([NERC, 2006; Met Office, 2004; Jenkins et al., 2005](#)). For European and UK populations and livelihood systems an abrupt shift in climatic conditions could result in three different outcomes; cooling due to an interruption of the thermohaline current resulting in a shift south, accelerated warming resulting in a shift north and sea level rise resulting in a shift inland ([Adger et al., 2005a](#)). The 2007 flood events in the UK serve as a reminder that we must also deal with the consequences of a changing climate.

Climatic extremes, driven by changing climate conditions, threaten both human life and livelihood systems. [Table II](#) lists some of the effects that IPCC has identified that climate change is already having and is likely to have on European and UK society and economy.

Adjusting to the consequences of climate change now, by minimising threats and making human support systems more resilient, is more cost-effective than doing so in the future ([Stern Review, 2007](#)). Adaptation is an urgent risk reduction strategy. Adaptation is defined by IPCC in its Third Assessment Report as:

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation ([IPCC, 2001](#)).

The above definition highlights the multi-dimensioned nature of adaptation. Risk is a function of the frequency and severity of hazards and of vulnerability. Like risk and adaptation vulnerability is multi-dimensioned. People, either individuals or groups, and human systems can be threatened, exposed to, or at risk from, a threat, or series of threats, that can be natural, technological, economic or political in origin. Vulnerability is a function of proximity, socio-economic status, susceptibility and coping capacity and is modified over time by technological, geopolitical, socio-economic trends and changes to the resource base and environmental conditions, either natural or anthropogenic in origin ([McEntire, 2005](#)). Vulnerability has its focus on needs in stressful situations. Those most disadvantaged in stressful situations are unlikely to be able to respond and adjust as effectively as those that have both the resources and adaptive capacity. For example those with mobility difficulties are less able to evacuate an area than the able-bodied. Those with the appropriate home

insurance will be able to cope better in the aftermath of a flood than those that are not insured.

Though the aim of adaptation is to reduce or mitigate vulnerability its focus is on adaptive capacity. Adaptive capacity refers to the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change ([Smit and Wandell, 2006](#)). IPCC describes adaptive capacity as the ability of a system to adjust to actual or expected climate stresses, or to cope with the consequences and defines adaptive capacity as being a function of determinants such as wealth, technology, education, information, skills, infrastructure, access to resources, and stability and management capabilities ([IPCC, 2001](#)). In a UK context [Table III](#) summarises these determinants in terms of adaptive capacity.

[Table III](#) does identify that the UK has the financial and human resources to adapt to climate change threats. But estimating the economic impact and the subsequent costs of both mitigating climate change and adapting to its consequences is problematic. The *Stern Review* estimates that with an average global temperature increase of three to four degrees Celsius, the additional costs of adapting infrastructure and buildings could range from 1-10 per cent of the total costs invested in construction in OECD (Organisation for Economic Co-operation and Development) countries. Making new infrastructure and buildings more resilient to climate change in OECD countries could range from \$15-150 billion each year in additional costs (0.05–0.5 percent of GDP). The impact on global economy could amount to a 3 percent drop in output ([Stern Review, 2007](#)). Estimates of the likely economic impact by IPCC suggest that in 2010 the effect on the GDP of OECD countries in Europe could range from 0.13 to 1.5 percent ([IPCC, 2001](#)). In 2005 the GDP of the UK economy was around £1.2 trillion. Stern estimates that the cost of stabilizing greenhouse gases at a manageable level would cost around 1 percent of GDP, some £12 billion for the UK. Though the aggregate figure, including mitigation, adaptation and damage costs, of up to £18 billion (author estimate), may seem large it should be noted that the Association of British Insurers (ABI) estimates that the total cost to insurers of the June and July floods in 2007 will exceed £3 billion ([ABI, 2007b](#)). Research undertaken on behalf of the EU Commission points out that climate change studies often pay little attention to the costs of adaptation and further work is needed to produce realistic adaptation costs, to differentiate between autonomous and anticipatory adaptation and to understand the distribution of costs and benefits ([Watkiss et al., 2005](#)). Adaptation measures are likely to be costly but the process will be more cost-effective if planning is timely as anticipatory and precautionary adaptation is more effective and less costly than forced, last minute, emergency adaptation or retrofitting ([EEA, 2004](#)).

Adaptation as a risk reduction strategy

Adaptation to climate change is needed to prevent or limit severe damage to the environment, society and the economy and to help ensure sustainable development in the face of climate change. Adaptation as a risk reduction response to the disruptive climate events implies purposeful actions aimed at enabling communities to withstand and cope with adverse events. This process embeds resilience. Resilience has its focus on resources and adaptive capacity and acts as a counter, or antidote, to vulnerability ([O'Brien et al., 2006](#)). The resilience perspective as a response to disruptive challenges or contextual change has emerged as a characteristic of complex and dynamic systems in a number of disciplines including ecology ([Holling, 1973](#)), economics ([Arthur, 1999](#)), sociology ([Adger, 2000](#)) and psychology ([Bonnano, 2004](#)). Resilience as a concept is increasingly used within the emergency management community as a metaphor both to describe responses of those affected as well as

responding systems ([Manyena, 2006](#)). A resilient system responds and adjusts in ways that does not harm or jeopardise function. Underpinning the approach to UK emergency management is the concept of resilience which is defined as:

The ability at every level to detect, prevent, prepare for and if necessary handle and recover from disruptive challenges ([Cabinet Office Civil Contingencies Secretariat, 2004](#), p. 1).

Emergency events, whether large or small, rapid or gradual, are deleterious for both the affected and the responders. Adaptation as a risk reduction response to the disruptive challenges of climate change means that resilience should be a societal characteristic, not just of the emergency management function. Adaptation is not a new concept. People and societies have been adapting and adjusting since the beginning of human history and is an intrinsic part of societal development. Climate change, accelerated by human activities, is a potentially catastrophic threat to both life and livelihoods and it is unlikely that autonomous adaptations alone will be sufficient to reduce risks to acceptable levels ([Stern Review, 2007](#)). A degree of planning and anticipation is needed. As a counter to vulnerability resilience will have to be considered at different scales and in the different phases of emergency events.

The degree of risk to a hazard is a function of vulnerability. Developed world nations such as the UK are vulnerable in many ways to climate driven events. Not only are individuals, households and settlements vulnerable, for example, the 2007 flood events in the UK, also much of the infrastructure that supports modern lifestyles is vulnerable. Transportation infrastructure was severely disrupted during the 2007 floods, along with water, sewage and electrical systems. Conceptually, resilience is important in terms of responses to emergency events as well societal preparedness to cope with and respond to disruptive events and to the systems and infrastructure that support modern lifestyles. Broadly resilience has to be realised in two areas. The first is the infrastructure and systems that underpin modern lifestyles. The second is societal preparedness.

Development patterns can have a profound influence on the vulnerability of both people and systems ([Abramovitz, 2001](#)). Political perspectives can have significant impacts on resilience. Lack of investment and a focus on foreign policy by the US central government, for example, has diverted attention from the need to embed resilience in national infrastructure and social support systems, heightening vulnerability to a range of hazards such as an avian flu outbreak in New York; an earthquake in San Francisco that compromises levees and leads to massive flooding; flash flood events in Arizona that would impact developments on flood plains and disruptions to an aging electrical supply system, particularly during a heat wave event ([Flynn, 2007](#)). Decisions to allow development in hazardous areas such as the Thames Gateway and prevarication on compliance with Environment Agency recommendations erode resilience ([Environment Agency, 2003](#)).

Adaptation as a risk reduction strategy should be seen as an integral part of governance in the same way as risk. Adaptation, like risk, is complex. The severity of the impacts will vary from region to region, depending on physical vulnerability, the degree of socio-economic development, natural and human adaptive capacity, health services, and disaster surveillance mechanisms. Though the UK is a developed country, levels of socio-economic development vary from region to region and community to community. Knowledge of physical and social vulnerabilities is a key aspect of implementing adaptation measures. Adaptation requires a comprehensive long-term view and multi-dimensioned responses with actions and measures at a range of societal and spatial scales. Adaptation incurs costs and can generate benefits, for

example, new employment opportunities ([EU Commission, 2007](#)). In terms of scale adaptation requires decisions from individuals, firms and civil society, to public bodies and governments at local, regional and national scales. Building adaptive capacity may include communicating climate change information, building awareness of potential impacts, maintaining well-being, protecting property or land, maintaining economic growth, or exploiting new opportunities ([Adger et al., 2005b](#)).

Linking adaptation and emergency management in the UK

In the UK DEFRA (Department for Environment, Food and Rural Affairs) is the lead government department on adapting to climate change. Other stakeholders such as the Environment Agency with responsibility for flood risk, UKCIP (United Kingdom Climate Impact Programme) which provides the most commonly used scenarios for future UK climate and advises organisations on adaptation, local authorities with responsibility for many services that are vulnerable to the climate and Regional Climate Impacts Partnerships that assess impacts and build adaptive capacity, are all part of the adaptation regime. Other stakeholders such as business like insurers bear some of the financial risks of climate and actively press for adaptation. In common with many developed countries adaptation studies in the UK, until recently, have been dominated by assessment of future climatic changes and impacts with the discussion on adaptation limited to a few generic options with little attention paid to vulnerability ([Gagnon-Lebrun and Agrawala, 2006](#); [Whitelaw et al., 2004](#)).

Adaptation requires a multi-level approach with both top-down and bottom up approaches ([EU Commission, 2007](#)). In the UK local authorities are the vehicle most appropriate for developing local level adaptation responses. Local government has many responsibilities, including emergency management, but is strongly influenced by central government with much of its funding earmarked and, as a consequence, local discretion is limited. Its response to climate change, unsurprisingly, has been to follow the government and focus attention on the mitigation of greenhouses gases. The local authority planning function has a key role in anticipatory adaptation. However, there are two areas of concern. First, effectiveness could be compromised because of the mismatch in the relatively short planning horizon compared to the long-term implications of climate change ([Wilson, 2006](#)). Second, the key role of the spatial planning at the local level could be hampered if draft guidance, currently under consultation, on planning and climate is adopted. It reflects a weak approach to acknowledging the need for a robust engagement at the local level, for example, by stating that spatial planning should “take into account the unavoidable consequences (adaptation)” ([UK Government, 2006](#), p. 2). A stronger approach would better reflect the need for greater local empowerment. Local authorities have intimate knowledge of their areas. This, coupled with the knowledge of the emergency management function of local vulnerabilities, evidenced through the Community Risk Registers, provides a starting point for a broad based approach to developing anticipatory adaptation strategies. In terms of planning the vulnerability perspective should contribute to evaluating proposals from a climate risk perspective. Similar approaches to programme and project evaluation in terms of financial risk, sustainability aspects, environmental impacts and health and safety are well established in local governance structures.

Broader preparedness is realised through public education and warning systems ([McEntire and Myers, 2004](#)). Developing and enhancing societal resilience requires the active involvement of the emergency services to assimilate and co-ordinate perspectives and needs derived from community consultation and providing the information and resources to sustain

empowerment, self-help and resilience (Paton [Paton and Johnston, 2001](#)). This is not simply about awareness raising, an approach that is not generally ineffective, but an active and outward process ([Ballantyne et al., 2000](#)). In terms of public trust the response function of emergency management is an obvious lead agency. To do so, requires a shift in the social learning processes within UK emergency management. Learning within UK Resilience is aimed at promoting institutional resilience. Learning helps to prevent a repetition of mistakes, updates procedures and enhances preparedness and this should be broadened to include the wider public.

Learning takes place in many ways and forms and in many contexts. Learning is a dynamic and ongoing process. Social learning theory focuses on the learning that occurs within a social context. It considers that people learn from one another, including such concepts as observational learning, imitation, and modelling. Social learning is seen as a cognitive process ([Bandura, 1989](#); [Ormrod, 1999](#); [Rotter, 1982](#)). Learning has its focus on the management of change rather than strategy. Two types of learning are distinguished; single-loop learning on how to do things better, the current mode of UK emergency management, and double-loop on testing assumptions and re-thinking strategies or learning how to learn, the mode that UK emergency management should adopt. Such a change would result in a shift of the characteristics of UK emergency management, which is shown in [Table IV](#).

Conclusion

Managing climate change and climate variability risk is a challenge. Assessing and prioritising risk, though requiring expertise, should not be a closed process. Distancing an actor, the public in the case of the UK, from the risk management chain is potentially disruptive ([Jasanoff, 1997](#)). Involving the public in identifying risks is an important aspect of embedding resilience. Emergency management should be about strengthening the links between responders and the public to enhance emergency planning. Preparedness is addressed in UK Resilience but its focus is the continuity of emergency services and commercial activities. There is no doubting the importance of developing plans to ensure the continuity of both functions, but effective emergency planning should be more encompassing and should include the wider public.

Can the emergency management community in the UK incorporate these principles? One of the positive aspects of the changes to UK emergency management is the change in the definition of an emergency in the Civil Contingencies Act. It is much broader than previous definitions and incorporates an environmental aspect. This provides a basis for broadening the role of the emergency management community. There is considerable evidence of proactive work by the emergency management community in the UK and a willingness to work in partnership with a range of stakeholders at the local level. This forms a strong base for the shift needed to develop societal resilience and to focus that on responding and adapting to climate change and climate variability. To support this, institutional development that recognises the value of bottom-up collaborative working is required. It is not clear at this time if the UK institutionally is ready to develop in this way.

Characteristic	Comment
Isolated event	Emergencies usually regarded as unusual or unique events
Risk not normal	Risk is socially constructed and risk management aims to reduce risk to within proscribed levels realised through governance structures
Techno-legal	The legislative framework and the technologies used to reduce risk and for emergency response
Centralized	Operated through formalised systems – The Civil Contingencies Secretariat at the centre
Low accountability	Kept internal to the Emergency Management Community
Post event planning	Internal procedure for updating and validating plans
Status Quo restored	The overall aim – a return to normal

Source: O'Brien (2006)

Table I.
Characterising the UK approach to emergency management

Table I Characterising the UK approach to emergency management

Changes already underway	More heat wave deaths and allergenic pollen reactions Rising damage from coastal and inland flooding Warming of lakes and rivers resulting in loss of water quality Changes in agricultural planting dates and higher incidence of pests and forest fires Loss of mountain sports and tourism potential
Changes likely in the future	More frequent heavy rainfall leading to flash flooding Increased coastal erosion and flooding due to more storms and rising sea levels Increased drought in Southern, Central and Eastern Europe

Source: IPCC (2007)

Table II.
Climate change impacts

Table II Climate change impacts

Determinant	Comment
Economic resources	Wealthy nation able to provide financial resources to support a wide range of adaptation measures
Technology	Technologically advanced society with access to manufacturing capability and technological capacity that can help adaptation
Education and skills	In general a well educated and skilled population that enhances adaptive capacity
Information	A sophisticated information communications infrastructure. However some concerns as to whether or not sufficient timely information is available in terms of adaptation
Infrastructure	A developed country with extensive infrastructure. Concerns in some areas such as flood defense. Also much infrastructure vulnerable and aging
Access to resources	Access to resources such as health care, education and social support systems is good but there are concerns around inequitable distributions of wealth both within communities as well as nationally. Some areas are recognized as being resource poor and suffer high levels of deprivation
Stability	Stable multi-party democracy with established institutions

Table III.

Determinants of adaptive capacity

Table III Determinants of adaptive capacity

Current characteristic	New characteristic	Comment
Isolated event	Increasing common events and extremes	Climate driven events increasingly common or “normal”
Risk not normal	Risk assessment with the public	Risk reduction is realised through governance hence not normal
Techno-legal	More comprehensive framework to empower locally	Combination of hard measures such a flood defences and soft measures such as increased awareness
Centralized	Distributed	Operated throughout communities
Low accountability	Open and accountable	Ongoing dialogues
Post event planning	Pre and post planning	Open processes
Status quo restored	Adjusting to new realities	Recognition that shifts and changes are unavoidable

Table IV.
Contrasting characteristics of UK emergency management

Table IV Contrasting characteristics of UK emergency management

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