TYNE AND WEAR FIRE AND RESCUE AUTHORITY
EMERGENCY PLANNING UNIT

Committee Report

Meeting : CIVIL CONTINGENCIES COMMITTEE : 05 JULY 2010

Subject : UNIVERSITY RESEARCH PROJECTS and OPPORTUNITIES

Report of the Chief Emergency Planning Officer

1. Purpose of the Report

1.1 The purpose of this report is to inform Members of current and developing links between Tyne and Wear Emergency Planning Unit (TW EPU) and the Institute of Hazard, Risk and Resilience (IHRR) within Durham University (www.dur.ac.uk/ihrr).

2. Description of Decision

2.1 Members are asked to note the contents of this report and to support the development of proactive practice and research linkages between TW EPU and IHRR. An example of this would be the development of evidence based professional development relating to the role of Members within the emerging Community Resilience work stream.

3 Introduction

3.1 TW EPU is currently supporting a number of work areas within IHRR through the provision of practitioner representatives and as supporters for research proposals and this has been formalised through the invitation received by Kate Cochrane, TW EPU, to sit on the following groups. From the perspective of Tyne and Wear, the role is to support the development of research outcomes that develop professional practice within the resilience community. The groups are:

i) IHRR Advisory Council – group meets twice a year to provide advice and support to the research activities within the Institute (see Annex A for further information);

ii) Emergency Response to Rapidly Evolving Large-Scale Unprecedented Events (REScUE):- sitting on project management board (total project grant £350,788 (see Annex B for further information).

iii) Built Infrastructure for Older People's Care in Conditions of Climate Change (BIOPICCC), sitting on project management board: total project grant £713,942 (see Annex C for further information)

3.2 The Unit has also been invited to support the following research projects during the bidding phase of the grant process:

i) Staging and Performing Emergencies: The Role of Exercises in UK Preparedness: project grant £80,046.74 (see Annex D for further information);

ii) IDEAS Factory - Resilient Futures: project grant £1,429,319 (see Annex E for further information). Support for this project was also provided by Newcastle City Council.

3.3 Support has been provided to the Tyne and Wear resilience community from IHRR in the following ways:

- Professor Dominelli spoke and facilitated a workshop on community resilience and engagement at the 2010 Spring Study for the Core Cities group;

- IHRR and Coventry University worked with TW EPU and Newcastle City resilience officers to develop a funding proposal to enhance community engagement during Exercise Watermark in 2011;

- Professor Dominelli acted as Principal Investigator for a funding application developed and submitted to the National Institute for Health Research in December 2009 (approx value £400,000) to explore issues of emergency preparedness in social care contexts. Unfortunately, the bid was unsuccessful, but IHRR have offered further support to develop the project for submission to other funding bodies;

- The BIOPICCC project has offered the services of their Post Doctoral Research Assistant to be used within the Gateshead area to explore how older people view risks that are related to climate change. These findings will be used to support the work currently being undertaken within their Community Resilience Strategy.

4 Current Position

4.1 At present, TW EPU is engaging with IHRR on a reactive basis; however it would be useful for members to consider how these links could be used to develop a more proactive approach to resilience development within Tyne and Wear.

4.2 A number of different research funding routes are available to non-academic bodies with the most appropriate being a CASE studentship provided through the Economic and Social Research Council (ESRC). This scheme jointly funds three years of supervised research at a PhD level within an area agreed between the non-academic agency and university. During the previous funding rounds the costs have been as follows

4.2.1 ESRC pays an enhanced maintenance grant and fees for the student, (approx £15,000 for institutions outside London) with the non-academic partner making a minimum contribution of £2000 to the student and £2000 to their collaborating academic department commencing from the first year of the PhD studentship.

See Annex F for further information on the programme

5 Recommendation

5.1 Members are asked to consider this report and identify:

i) their appetite to be involved in developing a research proposal to be submitted during the next round of ESRC CASE Studentship applications

ii) potential research areas covering the role of members within the community resilience work area

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Background Papers

Relevant background papers are appended to this report

Annex A

Membership and Terms of Reference for the Advisory Council

Membership:

Ex officio

Independent Chair appointed by the PVC (Research): John Cuthbert

The Executive Director: Stuart Lane

The Dean of Internationalisation: Anoush Ehteshami (Government and International Affairs)

A representative from each of the Faculties:

Brian Huntley (Biological and Biomedical Sciences)
Ranald Michie (Arts and Humanities)
Catherine Panter-Brick (Social Sciences and Health)
Jonathan Rigg (Head of the Department of Geography)

Appointed

A Director of an Interdisciplinary Research Institute: Ash Amin (Institute of Advanced Study)

Alumni representatives:

Rowan Douglas (Willis Analytics)
Charles Wilson (Booker plc)
Vacancy

Three external academic representatives:

Melissa Leach (Sussex University)
Brian Wynne (Lancaster University)
Vacancy

Three representatives of the NGO/policy community:

Sam Bickerseth (Oxfam)
Kate Cochrane (Tyne and Wear Emergency Planning Unit)
Tricia Henton (Environment Agency)

Co-opted members

Jon Davidson (Earth Science)
Ray Hudson (PVC-Region)

In attendance

Pro Vice-Chancellor for Research: Tom McLeish

The Directors and Wilson Chair

Alex Densmore (Hazards)

Lena Dominelli (Vulnerabilities and Resilience)
Sarah Curtis (Frontier Knowledge)
David Petley (Wilson Professor of Hazard and Risk)

Servicing

The Administrator of the Institute: Krysia Johnson

Service:

Appointed members will serve for three years, with the exception of members appointed *ex officio*.

Appointed members may serve for a further three years to take the normal maximum length of service to 6 years.

Roles and responsibilities:

Advisory Council members have four principal functions:

1. to act as Ambassadors for the Institute, raising the profile of the Institute proactively with policymakers, businesses, regulators, academics and NGOs at international, national and regional levels;

2. to identify opportunities for the Institute to expand and to develop its programmes of work;

3. to comment on the five yearly strategic plan of the Institute, and the activities that are being undertaken to deliver this

4. strategic plan;

5. to provide a sounding board for testing of ideas and initiatives of the Institute.

Meetings:

The Advisory Council will meet once per year in the Institute of Hazard, Risk and Resilience. The Director's PA will arrange meetings, normally on the first Monday of November, from 3pm to 7pm, with dinner afterwards. The Advisory Council will be consulted electronically in May of each year, in relation to any issues raised by the Executive Director.

Adaptive Co-ordinated Emergency Response to Rapidly Evolving Large-Scale Unprecedented Events (REScUE)

Undertaken within Engineering and Computing Sciences Department – Durham University

Research summary:

Recent major events have exposed the susceptibility of the UK's emergency response capability. For example, after the terrorist attacks in London on 7 July 2005, the UK government acknowledged that weaknesses existed in its preparation and response on the day. It is reported that in terms of the response, the geographical proximity of the explosions led to uncertainty over roles and responsibilities.

Consequently, the UK government has indicated that improvements must be made in developing the plans, capabilities and structures to be put in place to respond to future major emergencies, whatever the cause. Similarly, in the USA, the events of 11 September 2001 have provided the drive for broad changes in emergency response procedures and technologies aimed at improving readiness for high consequence events.

Pre-planned fixed response solutions for major emergencies are totally inappropriate for rapidly evolving large-scale unprecedented events (REScUE). It is inconceivable to pre-plan responses for all possible major manmade and natural events. The proposed research will provide multi-agency co-ordinated emergency response solutions for any situation.

Significantly, a feature of our research is the intimate involvement of practitioners from government resilience teams, emergency planning units and the emergency services to assure validity, acceptance and relevance of our solutions. As well as theoretical results, we shall deliver a highly visual computational tool by which we can simulate a co-ordinated emergency response for evaluation in command and control centres

The intended research offers a novel solution to coping with fast changing, major events through the co-ordination of the collective efforts and actions of the multiple agencies (emergency planning units, ambulance service, fire brigade, police force) involved in emergency response. This research will investigate and develop decision making methods to construct in real time a near-optimal response team consisting of units composed of individuals from different emergency organisations together with equipment and vehicles.

Further, these methods will specify coherent response operations for these units. Given the critical time constraints in an emergency situation, the decision making methods will determine within minutes, how a team should be formed, how individuals should be formed into team units, how roles and

responsibilities are allocated within these units, and how tasks should be assigned to personnel thus defining the response operations of these units.

To explore the effectiveness of alternative response teams, and their co-ordinated response to REScUE, the research will devise a computational agent-based simulation environment. This environment will model a major event as it rapidly unfolds during which the operations of some units within the response team may become sub-optimal in terms of them no longer being appropriate in time, and thus the overall co-ordinated emergency response being degraded.

As the situation develops, it would be disruptive to the overall response, and time-consuming, to redefine repeatedly an entirely new response team and the detailed operations of its units. Thus within the existing response team, units exhibiting a sub-optimal response will be identified and the necessary adjustments will be made to their composition and operations.

Annex C

BIOPICCC Built Infrastructure for Older People in Conditions of Climate Change

Aim

To develop a methodology for selecting locally sensitive, efficient adaptation strategies during the period up to 2050 to ensure that the infrastructures and health and social care systems supporting well-being of older people (i.e. those aged 65 and over) will be sufficiently resilient to withstand harmful impacts of climate change.

Researchers:

Principal Investigators: Prof. Sarah Curtis, Durham University, Dr Dimitry Val, Heriot-Watt University

Co-Investigators: Durham University: Dr Christine Dunn; Prof Lena Dominelli; Dr Mylène Riva, Dr Sim Reaney; Dr Ralf Ohlemüller; Mr Jonathan Erskine; Heriot-Watt: Dr Roland Burkhard

Expert Advisors: King's College London: Dr Karen Bickerstaff; University of Newcastle, Australia: Prof. Mark Stewart

Objectives

- Identify locations within the UK that are most at risk from relevant aspects of climate change and the nature of the changes.
- Within the zones at greatest risk from climate change, identify 'case study' communities (neighbourhoods or small settlements) in urban and rural settings with high concentrations of older people and with a range of socio-economic conditions.
- Engage stakeholders within the selected 'case study' communities and also at national and international levels. With their help, we will determine crucial aspects of living conditions, which sustain wellbeing of older people, and identify the key elements of health and social care systems and related infrastructures, which are important for maintaining these conditions in the case of weather hazards.
- Identify different design and management solutions, including a probabilistic evaluation of their life-cycle costs, to improve resilience of health/social care systems and related infrastructures with emphasis on the previously identified key elements.
- In collaboration with providers and users of services and other expert informants, develop strategies to integrate these design options into wider procedures and policies and disseminate knowledge about how

to adapt built infrastructure to support older people's health and wellbeing under changing climatic conditions.

Structure, phases or work packages

- Stage 1: Identification of areas most at risk from climate change related hazards (Reaney, Ohlemüller, DUR; Val, HWU).
- Stage 2: Identification of study communities with high concentrations of older people (Curtis, Riva, Dunn, DUR).
- Stage 3: Identification of key elements of health and social care systems and built infrastructures in selected study sites (Curtis, Dominelli, Riva, ErskineDUR; Val, Burkhard, HWU; Bickerstaff, Kings; Stewart NCL-AU).
- Stage 4: Identify design and management solutions including a probabilistic evaluation of their life-cycle costs to improve resilience of health/social care systems and related infrastructures (Val, Burkhard, HWU; Stewart, NCL-AU; Dominelli, DUR).
- Stage 5: Dissemination: knowledge exchange on adaptation strategies, building local capacity and establishing risk mitigation strategies (Curtis, Dominelli, Bickerstaff, Erskine, DUR; Val, Burkhard, HWU).

Research themes

The functioning of health and social care systems and infrastructures supporting them is likely to be influenced by climate change, especially by increasing frequency and severity of weather-related hazards such as floods, heat waves and storms. Recent experience of extreme climatic events had significant repercussions for the health of older people, who comprise a growing proportion of the total population in the UK. Thus we face a major challenge concerning how to adapt infrastructures, essential for health and social systems serving older people, to impacts of a changing climate. To address this challenge, our project will actively involve key stakeholders and use demonstration case studies. The problem is complex involving climate change, socio-demographic trends, infrastructure performance, so the research will be conducted by a multidisciplinary team from Durham University and Heriot-Watt University, combining expertise in engineering, climate modelling, and health and health care research and expertise from University of Newcastle, Australia and King's College London.

Products and dissemination

Based on our experience in producing Health Impact Assessment ‘tools’, the process we have followed in our research will be presented as the ‘BIOPICCC toolkit’ to inform similar consultations in other settings. The BIOPICCC toolkit will include practical information on process and appropriate objectives, as well as nationally mapped data which would be relevant for similar consultations elsewhere in the UK. Possible dissemination strategies include publications for professional groups and in professional and academic journals; materials for mass consumption (TV and radio appearances and newspaper materials; video/DVD for use in social care settings, e.g. day centres, hospitals with older people and health and social care professionals; web-based materials). We also plan publication in professional and academic journals and presentation at international conferences relating to the methods used and our findings. Participation in the ARCC network activities is another important route for dissemination.

Inputs

- Projected climate change data from UKCP09
- UKCP09 stochastic weather generator (on 5 x 5 km grid)
- Small-area statistics on age distribution, population projections, population turnover rates, age-selective migration, socioeconomic characteristics, and rurality, obtained from various official data sources (e.g. Office of National Statistics, 2001 Population Census, Indices of Multiple Deprivation) for GIS mapping.
- Key informant interview/ discussion group/survey questionnaire information from a range of relevant stakeholders within our case study areas, and more widely through expert networks.
- Data for generation of design and management solutions including data for probabilistic evaluation of their life-cycle costs.

Annex D

Staging and Performing Emergencies: The Role of Exercises in UK Preparedness

Research Aim, Objectives, and Questions:

The 24 month research project is being undertaken by Durham University and Keele University, and is funded by the Economic and Social Research Council to the value of approximately £98, 000. The overall aim of the research is to understand the role that exercises play in the development and maintenance of resilience in the context of a range of hazards, risks and threats. To realise this aim the research has three objectives.

1. To understand differences in how exercises are planned, designed, used and learnt from across the UK post the 2004 Civil Contingencies Act.

2. To analyse how exercises enable the development of resilience, whether through the testing of plans, the development of capabilities, the rehearsal of collaboration between emergency services, or more informal functions such as the development of confidence in response roles.

3. To identify examples of best practice that will enable practitioners to improve the practical planning, design, delivery and dissemination of exercises.

   The Tyne and Wear Emergency Planning Unit is involved in the research in two ways.

   - Advising the project team on the focus of the research, in particular on how the outcomes of the research can be useful for emergency planning practitioners

   - Being involved in the data collection for the research, specifically by being interviewed and by allowing the project team to observe a number of exercises

Methods:

The project has three phases of data collection. First, UK wide interviews (approximately 50) with emergency planners, focusing on the issues involved in planning, designing, and learning from exercises. Second, observation of a small number of case study exercises. The research will follow different types of exercises – seminar, live and table-top - through the stages of planning, the actual doing of exercises, and the development of outcomes. Third, a series of interviews with central and regional government focusing on strategic issues involved in the use of exercises in the context of changes in Civil Contingencies legislation. We are currently in month 6 of a 24 month project, so are just beginning the first research phase. Thirteen interviews and two exercises observations have taken place. These have raised a number of initial issues about what makes a successful exercise, the different tools used to design exercises, how the different functions

exercises can have relate to one another, and how to design exercises at Gold, Silver and Bronze levels.

Outcomes

The research will result in a series of outputs that will be designed with participants to ensure that they are useful and can feed into practice.

They will include; a ‘how to’ report on ‘*Best Practice in Exercise Dynamics’* sent to LRF exercise subgroups*;* a wider report on *Exercises and UK Resilience post the 2004 Civil Contingencies Act* sent to central and regional government departments and stakeholders; and a practitioner workshop on best practice in exercise design. This may be supplemented by one to one policy maker briefings depending on the level of interest.

The project will also involve a series of academic research papers, including papers placed in emergency planning publications.

All of the above outputs will be made available on a dedicated project website hosted by the Department of Geography, Durham University (some content may be password protected).

Annex E

IDEAS Factory -

Resilient Futures

Project Summary

What will the UK's critical infrastructure look like in 2030? In 2050? How resilient will it be? Decisions taken now by policy makers, NGOs, industrialists, and user communities will influence the answers to these questions.

How can this decision making be best informed by considerations of infrastructural resilience? This project will consider future developments in the UK's energy and transport infrastructure and the resilience of these systems to natural and malicious threats and hazards, delivering

a) fresh perspectives on how the inter-relations amongst our critical infrastructure sectors impact on current and future UK resilience,

b) a state-of-the-art integrated social science/engineering methodology that can be generalised to address different sectors and scenarios, and

c) an interactive demonstrator simulation that operationalises the otherwise nebulous concept of resilience for a wide range of decision makers and stakeholders.

Current reports from the Institute for Public Policy Research, the Institution of Civil Engineers, the Council for Science and Technology, and the Cabinet Office are united in their assessment that achieving and sustaining resilience is the key challenge facing the UK's critical infrastructure.

They are also unanimous in their assessment of the main issues.

First, there is agreement on the main threats to national infrastructure: i) climate change; ii) terrorist attacks; iii) systemic failure.

Second, the complex, disparate and interconnected nature of the UK's infrastructure systems is highlighted as a key concern by all. Our critical infrastructure is highly fragmented both in terms of its governance and in terms of the number of agencies charged with achieving and maintaining resilience, which range from national government to local services and even community groups such as local resilience forums.

Moreover, the cross-sector interactions amongst different technological systems within the national critical infrastructure are not well understood, with key inter-dependencies potentially overlooked. Initiatives such as the Cabinet Office's new Natural Hazards Team are working to address this. The establishment of such

bodies with responsibility for oversight and improving joined up resilience is a key recommendation in all four reports.

However, such bodies currently lack two critical resources:

(1) a full understanding of the resilience implications of our current and future infrastructural organisation; and

(2) vehicles for effectively conveying this understanding to the full range of relevant stakeholders for whom the term resilience is currently difficult to understand in anything other than an abstract sense.

The Resilient Futures project will engage directly with this context by working with relevant stakeholders from many sectors and governance levels to achieve a step change in both (1) and (2).

To achieve this, we will focus on future rather than present UK infrastructure.

This is for a two reasons.

First, we intend to engender a paradigm shift in resilience thinking - from a fragmented short-termism that encourages agencies to focus on protecting their own current assets from presently perceived threats to a longer-term inter-dependent perspective recognising that the nature of both disruptive events and the systems that are disrupted is constantly evolving and that our efforts towards achieving resilience now must not compromise our future resilience.

Second, focussing on a 2030/2050 time-frame lifts discussion out of the politically charged here and now to a context in which there is more room for discussion, learning and organisational change. A focus on *current resilience* must overcome a natural tendency for the agencies involved to defend their current processes and practices, explain their past record of disruption management, etc., before the conversation can move to engaging with potential for improvement, learning and change.

Benefits of Collaborative Research between Academic and Public/Voluntary Sector Partners

Using academic research

Academic research has much to offer the public/voluntary sector, but collaboration does not always happen as much as it could. Whilst key questions are often widely recognised, it is not always easy for universities and organisations to link up effectively and many may be put off by the costs involved, perhaps for an uncertain outcome.

The ESRC funds academic research in the social sciences and actively promotes the widest use of this research in the public/voluntary sector and they are trying to ensure that future social scientists are not only highly trained researchers but also have the skills to work in both academic and non-academic environments.

To this end over the last five years a collaborative awards scheme linking academic and non-academic partners in the training of PhD students has been developed.

What are collaborative awards?

Collaborative or CASE studentships provide funding for some of the most able students to undertake up to four years of study for a masters plus a PhD degree or five years for part time awards.

These projects are jointly designed and supervised by an ESRC recognised university department and a non-academic organisation.

They can be from the public, private or voluntary sectors, ranging from multi-nationals, SME's, local authorities and registered charities.

Listed below are examples of project titles are being/have been funded by the ESRC:

- The role of Buddhist religious culture in biodiversity conservation under changing environmental and social conditions in Western Sichuan, China.
- Delivering Climate Change Policy in the English Regions: Reducing Greenhouse Gas emissions in the East Midlands.
- UK Migrant Policy in practice: The role of Public and Civic organisations.
- New Value-added models in Education: latent-variable multilevel to solve longstanding biases.

What are the benefits of collaboration for the public/voluntary sector?

Organisations who have previously participated in the scheme have identified the following benefits from undertaking collaborative projects:

- The opportunity to access key expertise that may not exist within the company or which may not be cost effective to develop in-house
- An opportunity to test the value of collaborative research for a relatively modest outlay
- The ability to fund valuable but not necessarily the highest priority research, for which an economic case for doing the work in house would be difficult
- Providing future researchers/potential employees with 'real life' experience of situations outside academia whereby academics have a better understanding of the public/voluntary sector and employees have improved research skills.
- Developing the skills and careers of staff