PROJECT FINAL REPORT

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4.1 Final publishable summary report

4.1.1 Executive summary

The overall aim of the emBRACE project was to build resilience to disasters amongst communities in Europe. To achieve this, it was vital to merge "forces into research knowledge, networking and practices" as "a prerequisite for more coherent scientific approaches". The consortium involved 11 committed and reputable expert partners from Europe.

#	Partner	Code	Country
1	Université catholique de Louvain	UCL	Belgium
2	Northumbria University	UoN	United Kingdom
3	King's College London	KCL	United Kingdom
4	United Nations University	UNU	Japan
5	Accademia Europea per la Ricerca Applicataed il Perfezionamento Professionale Bolzano (Accademia Europea Bolzano)	EURAC	Italy
6	Helmholtz-Zentrum fuer Umweltforschung GMBH – UFZ	UFZ	Germany
7	University of York	SEI-Y	United Kingdom
8	SEI Oxford Office Limited * Stockholm Environment Institute Oxford Office SEI Ltd	SEI-O	United Kingdom
9	Eidgenoessische Forschungsanstalt WSL	WSL	Switzerland
10	Middle East Technical University	METU	Turkey
11	University of Reading	UoR	United Kingdom

Table 1. emBRACE Consortium

The development of the empirical foundations upon which to build an emBRACE methodology, required intense interdisciplinary collaboration. This process started with the initial identification of framework elements through a focussed, systematic literature review, which incorporated searches of both academic and grey literature. The elements were then integrated into a series of domain-based schematics whish served to provide a structured understanding of how the process of community disaster resilience operates. The initial framework was then used to guide the project's initial case-study based fieldwork. Repeated feedback cycles involving inputs from the on-going multi-site fieldwork and from the project's External Advisory Group did lead to an understanding that this would not be the framework's final iteration. In order to make best use of this finding, additional meeting were held. This process reached its conclusion in March 2015 with the delivery of the final emBRACE framework for Community Disaster Resilience (Figure 1). Once finalised, the framework was integrated into all remaining outputs and formed a key focus of discussion at the project conference in London. At its most basic level the conceptual trinity of resources and capacities, learning and actions, operating within a disaster-risk governance context, were identified as being useful lenses through which explore, interpret and assess different communities' latent or expressed resilience against a range of hazard and disturbances.

Figure 1. The emBRACE framework for Community Disaster Resilience

More information on the project can be found on: www.embrace-eu.org

4.1.2 Project context and objectives

The overall aim of the emBRACE project was to build resilience to disasters amongst communities in Europe. To achieve this, it was vital to merge "forces into research knowledge, networking and practices" as "a prerequisite for more coherent scientific approaches". This we aimed to do in the most collaborative way possible.

Research and practice in hazards and disasters is eclectic. The field comprises many specialisms and much 'silo' working, with major divisions both between and within the natural and social sciences. The relatively recent study of disaster resilience has already produced many definitions and conceptualisations but they often betray their disciplinary origins or only bridge disciplinary boundaries in limited ways. The major contribution of emBRACE is to build on the considerable range of backgrounds within the Consortium, to extend this by means of a large external consultative group, and attempt to cross disciplinary frontiers to produce a functional framework that is flexible and ultimately unidentifiable with respect to discipline. The aim was to truly embrace interdisciplinary and in doing so communicate to the widest user group. This is a necessity if we are to confront the complexity of the task to build societal resilience to disasters in Europe. Resilience is a highly dynamic process and not a static status; we aimed to develop a framework which allows us to capture this dynamic in a way that is grounded in real communities, and yet is firmly based in academic practice.

To do so, our specific objectives were to:

- Identify the key dimensions of resilience across a range of disciplines and domains
- Develop indicators and indicator systems to measure resilience concerning natural disaster events
- Model societal resilience through simulation experiments
- Provide a general conceptual framework of resilience, 'tested' and grounded in cross-cultural contexts
- Build networks and share knowledge across a range of stakeholders
- Tailor communication products and project outputs and outcomes effectively to multiple collaborators, stakeholders and user groups

To achieve these objectives and aims, the embrace project involved an international consortium of 11 committed and reputable expert partners from Europe (Table 1).

The research process began with a systematic review and synthesis across a broad spectrum of the literature, which led to an initial framing of resilience for subsequent application.

The emBRACE project was set in the context of increasing, but unequal and discontinuous, disaster risk and impacts. A key stage in assessing resilience is to estimate the impact of past and future hazards, disasters, contingencies and crises in a multidisciplinary way. A 'disaster footprint' for selected European countries and a local 'disaster footprint' focusing on landslide in South Tyrol were produced using EMDAT data and others sources. While CRED data (EMDAT) may be the current 'industry standard', the project aimed to critically analyse data provision and moved this work 'beyond the state of the art' through informed interaction with data providers and users. While considerable effort has gone into measuring and mapping impacts and vulnerability in recent years relatively less attention has been given to understanding the links to resilience. We still know little, in a systematic, scientifically robust way, about who is resilient, where, why and how. This is partly due to the extreme complexity of the concept and thus the difficulties deciding on measurement parameters. We addressed the measurement issue, not only with a focus on quantitative disaster data, but by modelling resilience with a combined quantitative-qualitative approach, using a range of

techniques and methods, innovative in their combination (e.g. archetypes of resilience, agent-based modelling).

The planned case studies allowed us to examine hazards of slow and fast onset (i.e. days to seconds) with a range of scales and durations; and in contrasting socio-economic-cultural and governance contexts. With these we aimed to provide a requisite variety with which to articulate a resilience framework that has general utility. But it is not simply the selection of locations that set apart our approach to case study research. The overall objective of the project was to develop methods and knowledge for understanding resilience by transforming the many and varied disciplinary interpretations of resilience into a holistic concept; one, moreover, that has an operational (i.e. practical) basis, and one that has been co-produced and refined with users and stakeholders.

The project has been carefully designed to contain within it an almost continuous external verification and validation (over and above the satisfactory completion of the agreed tasks and deliverables). We aimed to move beyond mere tokenism in stakeholder involvement to a real partnership of ideas production. Consortium members were under no illusion about the challenge of working in this manner. However, the project has been designed to build on many previous projects; not to simply re-use existing data but to build on the networks that all have developed, sometimes over periods of many years. Thus, we built on previous research and research networks to start the empirical process much further along the learning trajectory than is normally the case. Working within this integrated, collaborative and participatory frame, emBRACE produced new products and methodologies for building societal resilience to disasters in Europe.

Figure 2. emBRACE Consortium and Expert Advisors, Northumbria, UK, October 2011 and September 2015

4.1.3 Main scientific and technical results/foregrounds

Introduction

In order to achieve the project aim of building resilience amongst communities in Europe, the emBRACE project consortium developed a set of objectives:

- Identify the key dimensions of resilience across a range of disciplines and domains
- Develop indicators and indicator systems to measure resilience concerning natural disaster events
- Model societal resilience through simulation experiments
- Provide a general conceptual framework of resilience, _tested‘ and grounded in cross-cultural contexts
- Build networks and share knowledge across a range of stakeholders

- Tailor communication products and project outputs and outcomes effectively to multiple collaborators, stakeholders and user groups

In order to meet these objectives the research was split into a series of work-packages (WP), which over the course of the four years each fed the iterative research process. Key outputs of the project were always regarded as 1) the emBRACE Framework for Community Disaster Resilience (originally attributed as D6.6) and 2) the Guidelines for Indicators and Indicator Systems (D3.5). All other deliverables were designed to form the empirical foundations upon which these two deliverables would stand. As one of the consortium members stated during the project's final meeting in London, "These outputs have emerged from the engine room of our case studies".

The development of the empirical foundations, however, required intense interdisciplinary collaboration between the projects' eleven partner institutions. An example of this is the iterative process that underpinned the development of the emBRACE Framework (henceforth, the Framework). This process started with the initial identification of framework elements through a focussed, systematic literature review (WP1), which incorporated searches of both academic and grey literature (NB. the concept of assessing community resilience was found to have been most practically elaborated in the grey literature, rather than the academic). The elements were then integrated into a series of domain-based schematics (WP2), which served to provide a structured understanding (or testable hypothesis) of how the process of community disaster resilience operates. This initial rendition was then used to guide the project's initial case-study based fieldwork (WP5, supported by methods developed in WP4). This 'agreed' framework was delivered, part way through the fieldwork (D2.2), so it was able to integrate provisional findings from this work, which continued to support the frameworks' basic composition. However, as projected in the DoW, repeated feedback cycles involving inputs from the on-going multi-site fieldwork and from the project's External Advisory Groups (WP7), did lead to a clear understanding that this would not be the framework's final iteration. In order to make best use of this finding, an additional (to the DoW) meeting was held by a cadre of partners in Zurich in Jul 2014 to discuss the framework specifically. Into this discussion's outcome agreements were then integrated the recommendations from the project's three stakeholder group meetings in the UK, Turkey and Germany (WP6), with all this process synthesised into what had originally been envisaged as a final framework (D6.6). However, due to reflection on the timeframe apportioned in the DoW to the fieldwork analyses it was realised by the consortium that the delivery of a final framework concurrently with the delivery of the case-study reports had made it impossible to create a synthesis that integrated all the case studies' useful, empirically derived, knowledge into the D6.6 output. Accordingly, the consortium re-entered deliberations in relation to the framework's final format. This process reached its conclusion in March 2015, with the delivery of the final emBRACE framework for Community Disaster Resilience (Figure 1) and with the closing negotiations and deliberations that underpinned this output reported in D7.2; which had been purposefully delayed for the task. Once finalised, the framework was integrated into all remaining outputs and formed a key focus of discussion at the project conference in London.

Figure 3: The emBRACE framework for Community Disaster Resilience

Scientific and technical results by Work Package

Having used the process that underpinned the development of the emBRACE framework to illustrate the tightly inter-related nature of the project's WPs the next section will discuss scientific and technical results, which emerged from the individual WPs, before summarising the project's outputs in relation to its generation of new knowledge in synthesis.

WP1: Systematic evaluation of literature on resilience in the context of natural hazards and disasters

D1.1: Working paper 1.1 on early discussion and gap analysis

WP1 comprised tasks to deliver the project's series of literature review and gap analyses. These commenced with **D1.1**, which provided an early assessment of the multiple framings that had been applied to the resilience concept. This output provided analyses that discussed resilience thinking that had been applied to disciplines as diverse as psychology, critical infrastructure, organisations and institutions and social-ecological systems. It also discussed how the concept had been integrated into civil protection practices in the UK and USA (NB. as was pointed out to the consortium by a partner at an early stage, there is no direct translation for resilience in the German language). This output also incorporated a discussion of the equally contested concept of 'community'. This initial deliverable, therefore, set the parameters for a project that was envisaged to make useful sense of the community disaster resilience concept.

D1.2: Working paper 1.2 on systematization of different concepts, quality criteria and indicators

D1.2 built on the first deliverable, by using the WP's systematic review methodology to identify components of and to isolate an initial set of resilience indicators for community resilience from the literature. This task resulted in the identification of 15 main components of resilience across the range of disciplines discussed in D1.1 and the further pinpointing of 86 sub-components that others had proposed as potential indicators for community resilience in either academic or grey literature and across a number of resilience assessment frameworks.

D1.3: Interim update of the literature

Following these early reviews, it was important for emBRACE to reappraise knowledge in relation to resilience. This was particularly important because, as it transpired during the course of the project's progress, community resilience had become a concept receiving considerable interest in academic, practice and policy environments. **D1.3**, therefore, provided an update of this emerging literature and discussed its implications for the still on-going emBRACE research. Rather than repeating the systematic review, this deliverable took the form of an annotated bibliography, which was developed by a team of collaborating partners. The output provided clear précis of papers and other documents, which these partners found particularly important in their own work or in helping to define their own research approaches.

D1.4: Final update of the literature

D1.4 added a final layer of analysis by reporting a final review process. This process was slightly different from the earlier, encompassing, reviews because its specific focus was put on identifying resilience research that focussed on the domains which had by now (July 2015) been substantively integrated, as domains, into the emBRACE framework, and on community resources/capacities, community actions, and community learning, in particular. The aim of the deliverable was, therefore, to review how these components of the framework were reflected in the wider emerging literature on resilience in order that the final framework could be situated to be most relevant across as broad and multi-disciplinary a range of understandings and practices as possible.

WP2: Development of a conceptual framework of frameworks

D2.1: First draft theoretical framework

WP2 ran concurrently to the initial WP1 reviews and was designed to build on the WP1 outputs, by using the components and processes, which the review identified as being potentially important in defining the resilience process, into a preliminary framework. This framework was delivered in Sept 2012 (**D2.1**). In accordance with the DoW, this delivery allowed the consortium to deliberate the framework's structure at the 1st project meeting in Bonn. These deliberations, which were informed by early-stage case-study work as well as by the framework's exposure to external review by the External Advisory Group (WP7), led directly to the significant illustrative changes that were to be encompassed in the 'agreed' framework (**D2.2**).

D2.2: 'Agreed' Framework

D2.2 was delivered as the final output from WP2 in Sept 2013. The framework elaborated now contained all the elements that had been identified in the literature reviews and which had been supported for inclusion by the case-study teams and wider consortium. The structure of the framework was, however, to undergo considerable modification over the next year, as the iterative research processes adopted by the case-study and 'methods' (WP4) teams revealed a need to move

away from designs that intimated the capacity for using the output as an operationalisable framework for quantitative resilience *measurement*, toward an image that represented community resilience in heuristic terms.

WP3: Disaster Data Review and Needs Assessment

Activity undertaken in WP3 revolved around the issue of how to assess resilience with indicators. Early deliverables, therefore, described the current start of the art in terms of identifying databases that were, or which could potentially, store resilience data for analysis. Later deliverables applied methodologies to use existing data to analyse their potential as components in a resilience assessment.

D3.1: Review of Human Impacts of Disasters Databases in Europe

D3.1 provided an overview of existing disaster databases in Europe, which were identified by literature review and survey. This survey provided insights into the contents, accessibility and applied methodologies of 23 national disaster / human impact databases covering 13 European countries.

D3.2.1/3.2.2: Disaster impact and land use data analysis in the context of a resilience relevant footprint

This deliverable was originally envisaged in the DoW as an investigation of resilience 'footprinting' at a national scale across Europe. What transpired, however, was slightly different. Work was indeed carried out to understand how resilience could be defined by a national-scale footprint. However, a significant challenge emerged when it came to identifying datasets that had coherence across national boundaries. What resulted was a mapping methodology of extremely coarse resolution. In a context of natural hazards (which can often bear distinct extent-related attributes, e.g. a floodplain), the value of such outputs is obviously limited. Using national data to create a relationship between disasters, socio-economic data and land cover was, therefore found to be insufficiently reliable because of the too-coarse scale of the data that was available. This method did, however, lead to the development of a hazard-territory index (HTI), which was seen as being possibly transferrable to the local scale. Accordingly, with the science officer's permission, a second foot-printing methodology was developed. However, given that the resolution and inter-dataset coherence of disaster data were so poor at a national scale, this analysis focussed on the development of a method to footprint landslide risk in Italy alone. Using HTI at the local scale and analysing it against CORINE and the Italy-specific Reakart Land-use Land-cover (LULC) datasets led to the conclusion that LULC is a relatively useful instrument for analysing the landslide-resilience of place at the local scale.

D3.3: Developing indicators and indicators systems of societal resilience to disasters: benefits of systematic reviews

D3.3 was originally intended as a mechanism through which to identify challenges and opportunities in terms of collecting resilience-relevant data from existing database owners. This deliverable, therefore, fed directly from D3.1's analysis of disaster databases. Fortunately, the systematic approach taken in the identification of disaster databases, had already found that there were few or no databases that actually collected data relevant to resilience assessment at national scale and lower. Accordingly, the focus of this work was shifted to add value to the project by developing a review of the benefits of using a systematic approach in the development of resilience indicators. With collaboration from METU, UCL used the literature review method to identify a substantive set of potential indictors for psychological resilience (e.g. gender and the un/availability of social support). This deliverable was adapted to become the project's first peer-reviewed journal article.

D3.4: Recommendations for database improvements

This deliverable lays out a series of data-related challenges and opportunities that will be faced by individuals or institutions intent on assessing communities' resilience. The analysis was performed through a collaborative investigation that enabled EURAC and UCL to analyse the resilience indicators, which had been identified by the case-study partners (WP5), in order to identify where the most appropriate place for such data to be collected would be. The analysis found that data related to only 5% of the indicators would be likely stored in dedicated disaster databases, whereas, data for 44% of the indicators would be compiled at governmental or lower resolution. This finding highlighted the importance of collating higher-resolution (community level) data in a standardised format at European level.

D3.5 Guidelines for development of indicators and indicator systems, and data provider challenges

This deliverable constituted a principle project output. Accordingly, considerable cross-consortium collaboration occurred in its development. This included an iterative process of indicator development, which required the five WP5 case-study teams and WP4 'methods' teams to analyse their data and to identify phenomena that could act as potential indicators for resilience. Although creating a universally applicable indicator set was never considered a realistic proposition, a framework was produced, within which higher level indicators can be understood in local contexts and vice versa. A list of 128 emBRACE indicators were also identified, which include certain indicators of community resilience that contain *unique* components that do not appear centrally in the existing literature (Table 2).

Table 2: Unique elements integrated into emBRACE Indicators.

- Trust (e.g. mutual (social) trust between community members, and the 'trust in authorities' involved in disaster risk management).
- Integration in social networks (e.g. the type of persons people go to for support in case of an event, modularity of the response network, time needed to activate the local response network).
- Community capacity to experiment and innovate.
- Spaces within the organisational structure for critical reflection.
- Past learning experience and implementation.
- Calibration of risk to organisational mandate.
- Community engagement in renewal and transformation processes.
- Local governance aspects (e.g. presence of a formal process through which locally-affected communities can draw on government support, existence of a legal foundation and specific legislation for disaster risk management).
- Individual/psychological aspects (e.g. belief in being prepared for hazards. Satisfaction with external support &, adaptive coping strategies of the individual).

Each of these components is outlined by individual emBRACE case studies according to: how the indicator might be parameterised; its scale of application; and level of assessment; and by a separate analysis according to the respective Pre-/Post- hazard event phase. This allowed the guidelines to address practitioners/users who need to carry out a resilience assessment for decision making. From the master indicator list of 128, further analysis identified 14 'key indicators' (Table 3), whose utility was corroborated by the findings of at least two separate case studies.

The emBRACE key indicators are relevant at both a higher policy level and community level and combine not only different perspectives of community resilience but also of 'communities' *and* resilience. Through the provision of supplementary information related to the level of assessment, scale of application and possibilities of generalisation, the list offers a valuable toolbox for applying community resilience indicators at different scales and contexts. Further, it allowed the derivation of emBRACE key-indicators that we maintain should be considered when assessing community resilience by means of indicators and supplemented with other local context-specific indicators.

Table 3: emBRACE Key Indicators of Community Resilience Presence of a (active) third sector emergency coordination body
Social/Mutual trust
Type of physical/infrastructural connection of community (e.g. roads, utilities, IT)
Sense of belonging in community
Existence of local tested community emergency plan
% of households in the community subscribed to an early-warning system
Belief in being well prepared for hazards & able to control the impacts
% of persons with mandatory hazard insurance
Collaboration and information exchange among involved actors in risk management
Presence of cross-departmental municipality staff training programs related to emergency management
Integration in social networks
Social support
Belief in effectiveness of self in coping with disaster-related adversities
Satisfaction with external financial support received

WP4: Modelling Societal Resilience

D4.1: Archetypes of personal attributes & cognition for psycho-social resilience from narratives

The goal of this deliverable was to provide information on the assessment of individuals' perception of resilience. The document reflects on various methods of assessment with a focus on their applications in the different emBRACE case studies. The report exemplified that the assessment of individuals' perception of resilience can be carried out by both quantitative (with empirically validated psychological instruments) and qualitative (with in-depth interviews and focus groups) methods of assessment. The utility of using different assessment methods for understanding resilience also implies that individual resilience is multifactorial, which means that it can be assessed with multiple methods of data collection and analysis. This lends support to the view that multifactorial models, which include factors and mechanisms translating these factors into effective adaptation are required to understand resilience comprehensively.

D4.2: Mapping of social networks as a measure of social resilience of agents

This report explored the application of social network visualisation and mapping as a measure of community resilience following natural disasters. The core of this deliverable is the two emBRACE case studies where SNM inspired methods were applied. These are Alpine Hazards in South Tyrol, Italy (D5.4) and Floods in Northern England (D5.6). Two methods were used in these case-studies. These were the traditional method of structuring the data management protocols for SNM analysis prior to its collection (South Tyrol) and a more *post-hoc* method, of analysing data for social connections from data already collected (N. England). Overall the studies illustrated that the density and diversity of bonding, bridging and linking social relationships enabled the provision of a range of resources, including, emotional, physical and financial support, which were crucial to building and maintaining resilience. The analysis identified that horizontal and vertical ties helped the communities with the acquisition of local support and national resources from higher level government circles. Thus the 'strength of weak ties' that Granovetter (1973) suggested as having the potential to generate far more positive outcomes and inclusive benefits across and between different communities was once again validated.

This work task revealed that network maps and visualisations, particularly when co-created by the users themselves, can be used as a way to understand mechanisms through which the indicators of community resilience can be portrayed. Most important among the indicators, as surfaced from our case studies, are density and diversity of nodes, dynamism and modularity of network structure, and redundancy of ties. The identification and quantification (in maps) of these variables has been found to allow analysis of the nature and level of community resilience. These maps can also be an important channel in linking local communities to policy makers and knowledge brokers at multiple levels.

Figure 4 is one example of how network maps can be used to illustrate social connectivity in a way that can be useful for explaining processes, as well as for examining ways in which risk communication works in practise. The map, from the South Tyrol case study, shows how the three most prominent actors - the fire brigade, the municipality, and civil protection can be seen as being central actors within their communities' communications. This was regarded by practitioners as a positive affirmation of the levels of trust felt toward them locally.

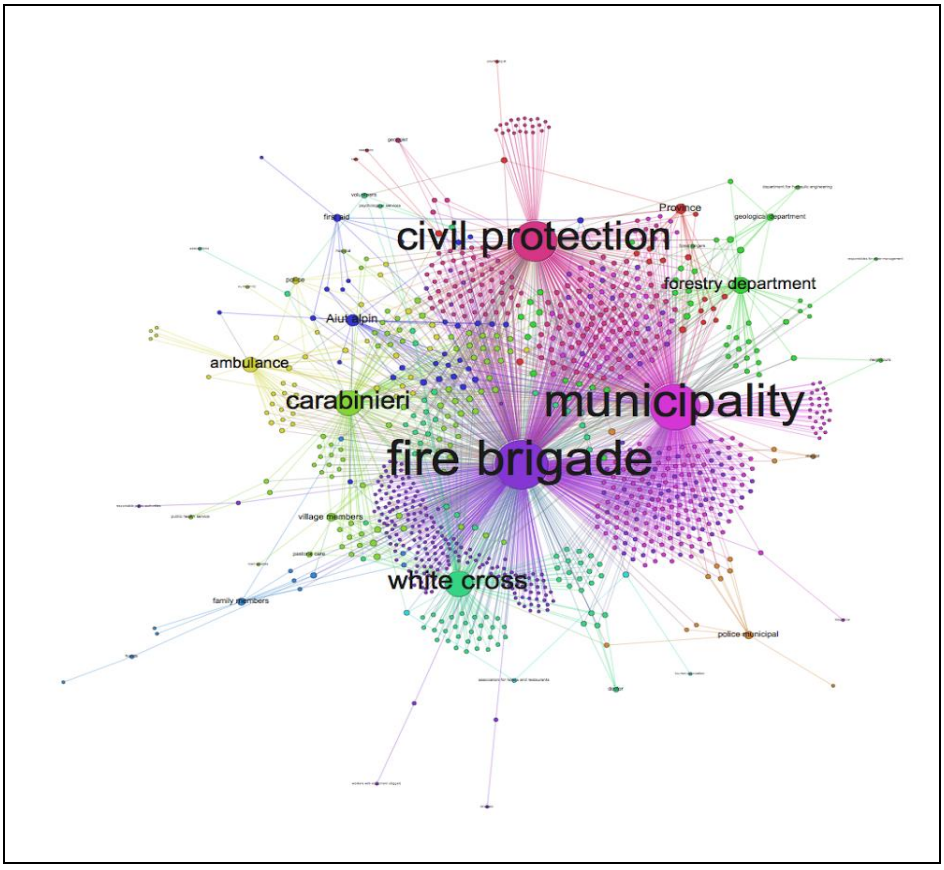

Figure 4: The bipartite network showing all connections between respondents and institutional actors in response to the question "which institutional actors do you connect to in case of an event?" (D5.4)

D4.3: Critical review of social learning

This report explored the challenges faced by communities at risk from environmental hazards and how they might be tackled via the application of social learning practices. By outlining the theoretical framework for social learning a better understanding of its application for developing resilient communities was proposed. The mechanisms for triggering social learning were then

outlined, with examples from flood and heatwave risk in the UK employed to highlight how this might be achieved. Gaps and further opportunities for learning and research were outlined, again supported with examples from the UK and Turkey. This provided context for enhancing understandings of the utility of social learning. Most notably, as a way of evolving resilience discourse and practice in order to mitigate the potential and manifest consequences of the disaster risks posed by environmental hazards, by proactively adapting to changes, understanding the wider context and bouncing forwards.

D4.4/.5: Developing agent-based models for community resilience: Connecting indicators and interventions

Following considerable deliberation between the partners it was realised that the original D4.4 and D4.5 that were described in the DoW, actually contained a considerable degree of duplication. Accordingly and with the Science Officer's permission, these two deliverables were amalgamated into a single output.

The modelling case examples presented in the combined report demonstrated that a range of phenomena are readily amenable to study through the use of Agent-Based Models (ABM), from disaster preparedness measures to disaster response situations, whilst the review of history of simulation studies revealed that this work is still only beginning. Moreover, this literature review – and other empirical experience by the authors – has suggested that, whilst they can initially be difficult to understand, ABMs can also be very appealing to those that are engaged with resource management.

Models presented here were used to test different 'intervention' scenarios which objectively seem feasible, the models themselves could not, yet, be considered reliable. The models have not been validated, and some of the results still seem difficult to explain. However, one lesson we can take is that when applying such "what if" scenarios and unexpected or counter-common sense findings appear – the likelihood is that these novelties would then be extremely useful for planners to discuss.

D4.6: Handbook: data-collection protocols & statistical analysis plan for emBRACE HSS component

The main objective of the Health and Social Service (HSS) component of the emBRACE case studies was to identify appropriate indicators of HSS functioning in disasters, which can then be fed into the emBRACE framework. The task systematically reviewed the current state of the art in relation to the resilience assessment of hospitals and found only one tool (HDR) that had been expressly developed to measure hospital resilience, rather than simply preparedness and response (i.e. resilience indicators include elements such as mitigation measures or vulnerability reduction, systems redundancy and importantly learning processes).

In the first test of the emBRACE Framework a comparative analysis between the HDR questionnaire items and framework elements revealed that the current HDR instrument is unbalanced towards measuring hospital resources to deal with a manifesting disaster situation, rather than actions conducted throughout the disaster cycle or active learning processes, which are critical factors in terms of avoiding future catastrophes. From this analysis it was clear that the HDR tool will need refinement, including through consideration of recent community disaster resilience frameworks, further testing, adaptation, validation, and extensive piloting in Europe. One key point raised is the need to clearly communicate the message to stakeholders that resilience is different from preparedness or readiness and may impact positively on their daily practices. At the same time, support and coordination from high-level institutions will be key to convincing hospitals of the need to systematically complete surveys to monitor hospital resilience, given their already important bureaucratic burden.

WP5: Contextualising Resilience: Case studies across Europe

D5.1: Characterising case studies of the emBRACE project

The five emBRACE case studies focussed on different hazards, namely floods, earthquakes, alpine hazards (i.e. landslides) and heat-waves, engaged with different management and governance settings across Europe and are situated in different economic, social and cultural settings. They also followed, to certain extent, different methodological approaches and, thus, different data and methods were developed, which were shaped by different epistemological emphases (not to mention disciplinary differences). Regardless of these complexities, however, this report drew together a series of common themes:

Community resilience – a multi-faceted context specific construct

The results of the extensive case work in the different case-studies underlines that community resilience is a construct shaped through a complex mix of resource and capacity sets, based on a multitude of actions, all of them linked to learning processes and embedded in wider governance frameworks that interact within specific localities. In all case studies, at least implicitly, the relevance of socio-political context conditions was highlighted. This underlined the relevance of good governance, specific disaster legislation, supervision of the implementation of legislation, coordination and cooperation, involvement of the civic society, building mutual trust and trust in authority.

Yet, there are also clearly context-specific emphases that have been identified. The Turkish case study revealed that the majority of the indicators selected were related to resources and capacities elements of the framework, and appeared to be applicable to all the elements of actions and to a lesser extent to learning. *In Turkey the relevance of "political peace, equality, and a culture of no corruption" emerged as a context defining resource and capacity* and was thus identified as a robust indicator of community resilience in the case sites. The North England case study emphasizes that while civil protection dimensions remain key facilitators, they need to be accompanied with the broader formal social protection objectives and alongside a cohort of engaged community members.

Hazard experience and learning: incremental, fundamental or limited?

All case studies report that learning processes had occurred on various levels, mostly in the direct context of actual disastrous events. The experience of hazard events was usually accompanied by increased risk awareness among residents and organisations alike. In the German case study households that were heavily affected by the flood also report more often to have implemented private mitigation and also more often to have purchased an insurance against natural hazards. They also feel better prepared with each flood event. Learning also occurred on the level of organisations and institutions with the adoption of new measures, implementation of new legislation and new forms of how hazard and risk management is institutionalised and with changing attitudes. However, case study results also underline that learning processes may be limited. First, since they are not sustainable and significant, forgetting may occur in relatively short time spans after the actual hazard experience. Second, learning processes may be rather incremental with a focus on increasing the effectiveness and efficiency within existing structures. In this sense learning rather consolidated existing plans at the local level, and hence reinforced the status-quo.

The London case study highlights how social learning was constrained by the interaction between formal and informal institutions. Shadow institutions such as trust relationships and

networks supported formal risk planning arrangements in functioning. In the short-term, this added flexibility to disaster risk planning because it provided opportunities to deliver risk management even if formal strategies were dysfunctional or failed. However, support from trust relationships and informal networks seemed to consolidate existing heat-wave planning strategies in the long-term and thus stabilised, rather than challenged them. Informal institutions of the shadow system were not used to innovate local risk planning, explore alternatives to existing strategies or to propose paradigm shifts in heat-wave risk management.

The case study on floods in Central Europe, however, highlights that more fundamental learning processes can be observed, although mostly on the local level and hardly accompanied by state efforts. The 2013 flood shattered some of established ideas about flood management quite substantially. From this, reflection and learning processes in consequence of the 2013 flood are more fundamental and questioned, to a certain extent, not only the dominant, institutionalized way of how floods are managed, it also questioned the very relation between settled/urbanized areas, the way such areas are protected and the role and prospective "behaviour" of the river and its surrounding floodplain. As a result, new socio-spatial formations of community development are thought about. Also the London case study illustrates that more fundamental learning processes occur. The report understands the shift towards preventive risk management strategies that acknowledge social, environmental and technical dimensions of heat-wave risk as an opportunity for deep social learning. Yet, more research is necessary to better understand to what extent incremental learning processes may help of increase the resilience of communities, where they reach their limits and what helps to initiate more fundamental learning processes in a sustainable manner.

Resilience and the idea of protection

The idea of protection has come under critique in recent discourses on risk management and resilience. It is stated that the idea of protection is either misleading ("100% is not possible") or even reinforcing the problem (e.g. the levee-effect). However, the case study work underlines the relevance of feeling and actually being protected, at least from the point of view of those exposed to various flood hazards. Whilst in all the flood case studies a range of management techniques and technologies have been deployed, principal amongst all measures adopted by town residents was the focus on the protective role of concrete, with most of it forming components of structural defence measures. The German case study highlights that with regard to resilience the feeling of protection is a decisive driver of being resilient. Respondents with lower impacts also reported more often to feel well protected. The level of protection and the *perceived* level of protection correlates directly with the actual technical protection and shows a strong correlation with the impact/ability to bounce back: The lower the perceived level of protection the higher the economic damages, the more severe the perceived overall, physical and psychological consequences, the longer it takes a household to return to normality and the more often its household situation was similar or worse than before the flood event. The report on Floods in North England comes to similar conclusions, but makes an additional direct connection between the presence of structural measures and the availability of insurance, which is also perceived as a key resilience indicator.

These findings have some relevance, as through the establishment of risk-based prioritisation measures in many areas across Europe, which are quite often accompanied with intense competition for the financial resources, the socio-spatial inequality with regard to protection schemes will further increase. Quite often, the less protected households are left with the only

option being to protect themselves. As the result of our study the effectiveness of such individualized approaches should be critically examined as they may be quite limited with regard to mitigating the immediate consequences and the long-term impacts on a household. The fact that physical defence structures formed such a focus of attention cannot, however, be ignored from a resilience perspective. In terms of resilience it is quite often the presence or lack of engineered solutions that went furthest toward underpinning people's ability to manage the risks to which they remain exposed.

Cooperation and the question of responsibility

The case study report highlights the relevance of cooperation and participation and started to engage with what resilience-building implies with regard to shared responsibilities.

Particularly for the idea of community resilience, social support and cooperation appeared as key variables at the intersection of individual psychological resilience and the resilience of the wider community. While social resources and capacities may support individual level resilience, individual resources such as having a spirit of volunteerism can feed into community resilience. This is highlighted both in the Turkish case study as well as in the London case study. Also the South Tyrolean case study reveals that being part of the community and having a strong family network, as well as bridging links with the other members of the community resulted to be very important in forming community identity. The feeling of community belonging and the strong presence of social networks proved to be very important as a crucial support to deal with the impacts of natural hazard events and to contribute positively to community resilience.

Also the close interaction between formal and informal networks is highly relevant to community resilience. Results from the social network mapping and analysis conducted in South Tyrol show that there is a high connectivity between the geographical community of Badia and the community of supporters. As the two most important actors the volunteer fire brigade and the municipality of Badia were identified; both of them are locally based and people working for them are not only members of the community of supporters but also members of the community they support. Similarly, in Northern England, the engaged Community of Resilience Practice (CoRP), comprising statutory agencies and representatives of the hazard-exposed populations, offers significant potential in working collaboratively toward disaster-risk reduction outcomes. In terms of resilience, this confirms the importance of the local presence on the territory and the interconnection between the geographical community and the community of supporters: knowing people working in the organization increases trust, and being part of the community people support leads to a better understanding of their needs and perceptions. These two elements are crucial for crisis situations.

Yet, the northern England case study also underlines that network and cooperation structures are quite often dependent on single individuals, which might weaken the stability and the resilience of the network under other circumstances. The fact for example that the network is "highly personalized" and actors know and trust each other could become critical for the network if one or more of the actors is not available or has to change.

While cooperation seems intuitively a good thing, it is closely interlinked with the normative question of how responsibilities should be distributed and hence accountability of decisions made ensured that a 'sufficient' diversity and number of actors are involved in hazard management. Some of the case studies therefore started to explore attitudes towards responsibility. The South Tyrolean case study shows that people do not perceive themselves,

as individuals, being responsible for the mitigation and protection against natural hazards. Indeed, people have a high trust in authorities and civil protection actors. Similarly, the German case study underlines that attitudes towards responsibilities are closely interlined with the actual flood experience. Whilst households with multiple flood experiences tend to agree with the statements that the idea of private mitigation overwhelms people and that flood protection is perceived as a public and not a private duty. What it shows is that many people believe that private actions make sense and should be undertaken. However, it also shows that such a responsibility overwhelms people. Not everyone is convinced that private actions can make a difference when it comes to the formation and build-up of individual resilience.

D5.2: Case study report on "Resilience and River floods in Central Europe"

This report summarises the main findings of the case study focusing on floods in Central Europe and how the experience of flood event is interlinked with the concept of resilience. While initially the case study was focussed on various global change processes and how they might affect the resilience of households and communities (an investigation supported by a large dataset collected following the 2002 floods), the occurrence of the 2013 flood made us rethink our research approach and central research questions. So the focus changed from understanding the consequences of global transformation processes such as demographic, institutional and climate change and what consequences they might have for the cities of Saxony, to how resilient households and communities are to multiple, quite disastrous flood events occurring in a relatively short time span.

Findings include the fact that after the 2002 the perception dominated that through the improvement of the existing flood management systems (e.g. new and better dikes, improved warning systems, improve emergency management) the risk of flooding would be reduced considerably. The 2013 flood shattered this idea quite substantially, at least on the local level. Many communities now, quite openly, admit that they are at the risk of flooding and that flood events such as the ones in 2002 or 2013 can happen on a quite regular basis and not just once per generation (or even less), as it was assumed before the 2002 flood. As a result the so called "residual risks" are now more openly admitted and communicated. However, it is not just the residual risks; also the very promise of safety, quite often associated with levees and other technical measures, is now more openly and critically reflected. As a result more responsibility is attributed to exposed citizens and businesses, a more adapted way of constructing in flood prone areas is demanded and even relocations are considered as an appropriate way of handling future flood risks, at least on the local level.

D5.3: Case study report on "Resilience and Earthquake in Turkey"

In the Turkish case study, community resilience pertinent to different phases of the disaster risk management cycle was evaluated with field work in two case sites, one with a recent quake experience (in Van, 2011) and the other having a more remote experience (in Adapazari/Sakarya, 1999). The focus was on evaluating how community and individual psychological resilience was perceived by individuals from the community, members of non-governmental organizations, local governmental institutions, and municipalities. Furthermore, the long-term recovery processes and how resilience of the systems changes over time were evaluated in the context of earthquakes experienced in different geographical regions of Turkey and in different time periods.

The results of the qualitative and quantitative analyses provided a rich variety of indicators which mainly fitted the resources and capacities elements of the emBRACE framework. Socio-political and human resources and capacities appeared to be more pronounced indicators. However, indicators related to financial, physical, and natural resources and capacities were also obtained. The issue of political peace, having equality amongst citizens and NGOs, and lack of corruption, which all seem to affect trust, appeared as a robust indicator of community resilience in both case sites. The

emphasis on political peace and equality seemed to penetrate all areas of disaster risk management, ranging from the aid distribution (e.g., fair distribution of aid, absence of nepotism) to the accreditation of NGOs (e.g., not making distinctions based on political affiliations), to recovery activities (e.g., damage assessment procedures, provision of permanent housing), and to building inspections. Therefore, this contextual characteristic seems to be a prerequisite for ensuring resilience in terms of good governance, risk mitigation, and preparedness activities.

D5.4: Case study report on "Resilience and Multiple Hazards in South Tyrol, Italy & Grisons, Switzerland"

This dual-aspect case study was conducted autonomously in South Tyrolean (Italy) and in Grisons (Switzerland).

Focussing on the investigation of the role of social networks (see D4.2 above), the South Tyrolean case study's finding included the fact that being part of the community and having a strong family network, as well as connections with the other members of the community, and therefore having access to information coming from "real faces", resulted to be very important for forming community identity. The feeling of community belonging and the strong presence of social networks proved to be very important as a crucial support to deal with the impacts of natural hazard events and to contribute positively to community resilience. Results showed that people were satisfied with the way authorities and supporters dealt with the event, particularly with the coordination of action forces (i.e. incident responders). However, the results also revealed that 16 months after the event the satisfaction with provided information and recovery actions decreased. In terms of resilience, out of the findings we can say that it is important to look not only at the short term after a disaster, but also to the mid and long term (a finding with a direct correlation to the N. England and other case study findings).

The results of the mapping and analysis of the organizational network carried out with key actors within the community of supporters revealed a highly interlinked core network involving actors from different organizational scales (local, provincial and national). The individually drafted maps show a high level of coherence, revealing that the actors have a similar view of the network, which is very important in a crisis or disaster situation (Figure 5). Additional key factors for resilience turned out to be the existence of a local civil protection plan and regular emergency exercises, the fact that the core network needs little time to become active and fully operative, as well as the personal knowledge and trust in the other members of the network. Thanks to these characteristics, the network resulted to be very resilient with no missing links or marginalized members.

The principal aim of the Grisons case study part of the report was the investigation of how resilience indicators can be developed at the local level. The emphasis here was, therefore, on methodological issues. This work was built on data generated during a series of expert interviews, wherein key stakeholders were asked a set of questions, whose answers were then analysed thematically to identify potential indicators of resilience. The indicators that emerged from this process were: Residence time and experience of natural hazards, both as indicators of risk/loss perception (a framework 'learning' element). Warning services were also identified as a civil protection (preparedness/response) indicator.

It was found that the use of a structured approach that was adopted to develop these indicators appeared to provide real potential in defining local level resilience. This method also complemented the systematic-literature review method of indicator development discussed in D3.3 (above).

From this analysis it could be conferred that quantitative indicators are to be seen as the best possible quantitative operationalization of present qualitative knowledge about resilience in the study region.

However, quantified indicators are never all encompassing for all time and all regions. When indicators are transferred from one region or country to another, the indicators have to be revalidated carefully to ensure that the indicators actually measure the intended concept. These findings obviously resonate clearly with and serve to act as validation for the guidelines outlined in D3.5 above.

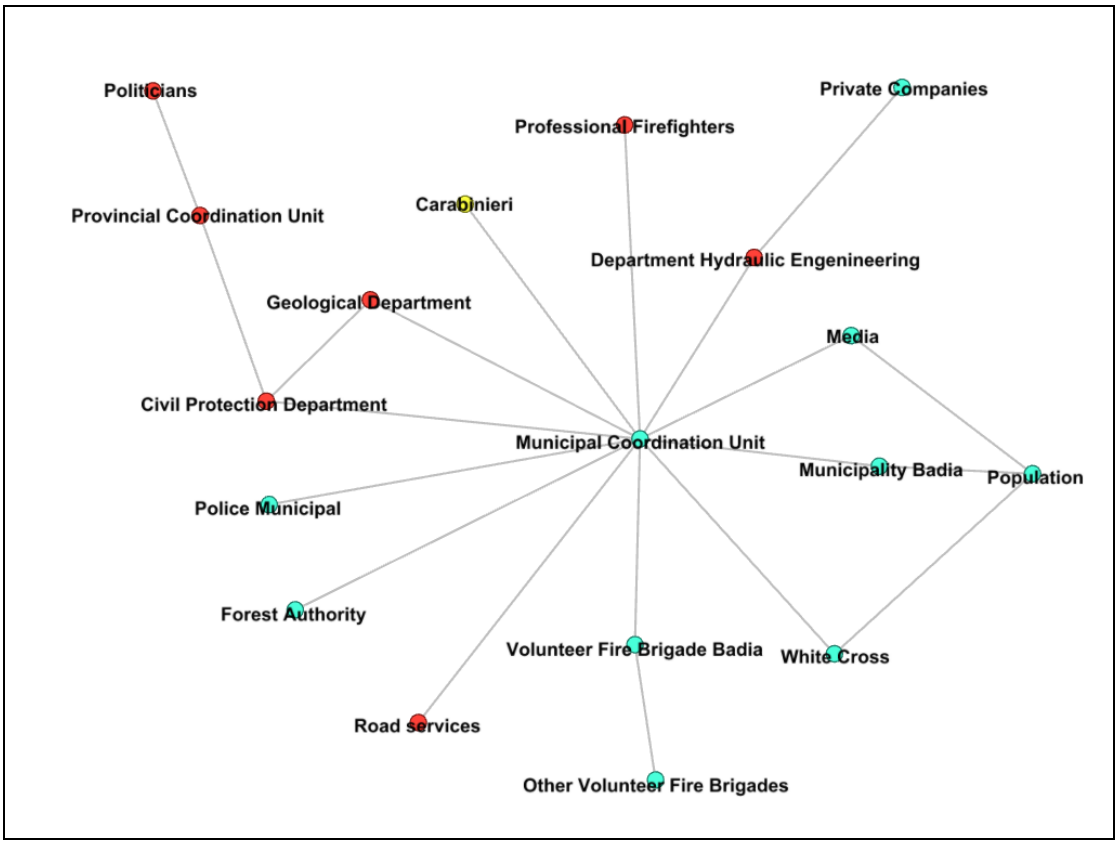

Figure 5: Visualisation of an organisational network

D5.5: Case study report on "Resilience and Heat-waves in London"

This study has pushed forward our understanding of the biophysical and social determinants of resilience to heat-wave in a large metropolitan area: London. By enabling and demonstrating the utility of a borough level modelling of biophysical drivers for temperature the study has succeeded in providing a link from the low resolution studies that have so far dominated heat-wave risk assessment to the finer scale resolutions that becomes more useful to policy makers in the city. By enabling a borough level assessment the research reported here opens scope for a much more integrated assessment of resilience, and also of risk. At the same time the social research completed in this case study has demonstrated the value of a borough level lens for articulating the structural (and interpersonal) relations that drive community resilience and risk.

The work has succeeded in making advances in our knowledge base through original studies that have made observations of, for example, the social behaviour inside organisations that frames community level resilience, and of the power of individual social networks for positioning and enabling independent decision-making and behaviour to reduce and respond to exposure form heat-wave risk. The study provides a strong argument for the need to approach heat-wave risk from a

more integrated policy perspective, one that continues to support health care but can couple this with social policy led risk management. Social care has a more distributed regulatory and delivery structure than medical care in London and the UK, and this might explain the reluctance of government to frame heat-wave risk in this way, but the gains in addressing the drivers of resilience building are clear.

The work was not able to fully integrate across the biophysical and social science elements, which while associated through scale and hazard focus, remain working in parallel. However, the achievement of a common scale of analysis for both approaches opens significant scope for more integrated analysis in the future.

D5.6: Case study report on "Resilience and combined fluvial and pluvial floods in north-west England"

This study was carried out with the participation and assistance of members of a complex amalgamation of geographical, interest and practice communities situated along the catchment of the River Derwent in the county of Cumbria, north England. In terms of meeting the principal emBRACE aim of 'Building resilience to disasters amongst communities in Europe', this case study offered particular value, because it presented an opportunity to investigate the concept as it is operationalised across a range of hydrologically-linked topographical and social contexts i.e. from hill farms in the Lake District fells to the post-industrial port town of Workington that lies at the mouth of the river. The focus of the research was on understanding community resilience to hi-magnitude floods, because parts of this catchment have experienced at least two such events since 2005.

In respect to the first project aim, the research confirmed a complex mix of resource and capacity sets that comprise the core of community disaster resilience and identified that, while civil protection dimensions remain key facilitators, they cannot effect fully resilient outcomes unless developed in concert with the broader formal social protection objectives and alongside a cohort of engaged community members.

In relation to the second project aim, it was found that to build trust in FRM bureaucratic processes and civil protection procedures at a catchment scale, which inevitably encompasses a range of communities with varying access to resources and capacities, requires a dynamic appreciation of balance and social equity. Without this there is a risk that isolated and vulnerable communities will be left to spectate as those with louder voices, greater savvy and more political linkage receive more investment (e.g. financial, emotional, temporal), simply because they are more able to manipulate the 'rules of the game' in their own favour. Such challenges lie at the heart of the social equity concerns that underpin the Sustainable Livelihoods Approach, which underpinned the emBRACE framework's development.

This report has corroborated the understanding that, even in the close spatial confines of a short river catchment, different geographical communities need to access and utilise different resource sets and capacities to maintain their resilience to hazards. However, it has also identified that engaged Communities of Resilience Practice (CoRP), comprising statutory agencies and representatives of the hazard-exposed populations, offer significant potential in working collaboratively toward disaster-risk reduction outcomes at these catchment scales.

WP6: Refinement of the framework: bridging theory, methods and practice

D6.1: Report on the systematisation of the emBRACE framework to the consortium

This output systematised the first findings on the conceptual and theoretical framework, the proposed methods and research concepts for the case study work. In other words, it provided an initial overview of the puzzle pieces that have been exposed during the projects first twelve months of work. More importantly, it summarized gaps, and open questions that could be discussed prior to the commencement of the case study work. It served to contribute toward and to support the following work in the other work packages, as an object for reflection over their adopted concepts and proposed assessment tools and in supporting further revisions of the framework.

D6.2 Minutes of project workshop on the systematisation of the framework to the consortium and experts

In December 2012 the emBRACE consortium circulated its First Systematization of Framework Report (D6.1) to the project's External Advisory Group (EAG). Additionally, and in keeping with the project's ethos of participation, the report was also circulated to the membership of the Jiscmail Disaster-Resilience List1 (Approx. 290 members). The intention was to seek helpful critique of the project's progress to date and to gain valuable insights from this collection of 'experts', as to how they thought the consortium could make best progress. In all, seven individuals (4 x EAG, 3 x D-R List), returned substantive comments in response to the call. This report discussed these comments in detail and reflected on how they might be used most effectively to inform the project's on-going work.

Given the early-stage (i.e. prior to fieldwork) nature of the framework and systematisation process, the feedback received from the EAG undoubtedly provided the consortium with high-value critique, which was integrated into the framework's development cycle.

D6.3, 6.4, 6.5 Documentation of the three stakeholder workshops in Cumbria, UK, Van, Turkey and Dresden, Germany

These three documents described the proceedings of the three emBRACE stakeholder group meetings. These meeting were conceived as important for a though which to gain locally specific insights into the process of the framework development, as well as to develop a community resilience assessment methodology:

> D6.3: Ullswater Cumbria. During the workshop it was found that the characteristics perceived, by the workshop participants, to underpin the resilience of this community where predominantly associated with the social structure and social resources available to community members – rather than being associated with (e.g.) physical measures, such as flood walls. That being said, discussion of factors such as gravel/sediment management in river channels and the sustainability of local Fire and Rescue Service manning levels, provided an important depth to the deliberation and illustrated the complexity of the participants perceptions of what makes them resilient (or not). Whilst it was 'surprising' to the research team that these social issues provided the principal backdrop for the discussion, it should be remembered that relatively few households in the valley have been directly affected by flood water and, to our knowledge, none of the participants had suffered direct impacts to their *property* (notwithstanding that one participant had suffered direct impacts to his *livelihood* as a hill farmer).
>
> D6.4: Van Turkey. The workshop provided rich and useful material for informing the refinement of the framework for community resilience, for obtaining feedback for the ongoing fieldwork in the selected case sites in Turkey, and finally for systematization. Therefore, it is considered to have contributed to the relevant work packages in the emBRACE project and helped it to move closer to its principal aim.

D6.5: Dresden. Most of the participants considered a Community Resilience Assessment (CRA) as useful for the community, the emergency planning and the individual residents. In their point of view a CRA would provide evidence for changing flood prevention and protection practices and can draw attention to areas that have been neglected so far. For the design of a CRA the participants emphasised that it is important that the CRA is scientifically sound and long-term oriented. Thus, half of the participants see a research institute as being in charge of assessing community resilience or alternatively the city authority. In a clear vote, the participants stated that a CRA would need additional funding or personnel and cannot be funded through the current community budget. In relation to indicators, the participants listed a broad set of possible indicators related to different fields of action and learning. These were integrated into the then on-going indicator-development cycle.

Overall, the third participatory assessment workshop and the post-workshop survey provided rich material for the evaluation of the case study results as well as for the potential design of a resilience assessment.

D6.6 Synthesis report on the revised framework and assessment methods/tools

In this report the process of refining the emBRACE framework was outlined (up to Dec 2014). The outcome is the presentation of three emBRACE frameworks, the refined main framework for scientific purposes, the operationalised version, and the version for stakeholder communication.

At time of delivery of this report, the emBRACE project was still due to run for another 9 months until end of September 2015. For this reason the frameworks presented were still subject to further changes to reflect forthcoming outputs and deliberations (See D7.2).

WP7: Knowledge Exchange

D7.1-7.3: Three External Advisory Group Session briefs

These reports represented the additional substantive outputs describing the consortium's interaction with external expert members of the project's three key advisory groups: The External Advisory Group (EAG), the External Consultative Group (ECG) and the Local Stakeholder Groups (LSG)

D7.1: Laid out the detail of the consortium's proposed expert review process.

D7.2: This output was delayed, specifically in order that it could be used as a vehicle through which to deliver the final emBRACE Framework once it had been agreed by the consortium. This report, therefore, gives details of the framework's development from Dec 2014 to June 2015, i.e. following the delivery of D6.6. It incorporates summary detail of final framework's structure and conceptual underpinning and how the discussions within the consortium and suggestions offered by the external advisory groups contributed to this output. The full elaboration of the framework will be reported in a peer-reviewed article and chapter in the project's Wiley-published book *"Framing Community Disaster Resilience: resources, capacities, learning and action"* (forthcoming). A detailed description of the framework has, however, been prepared following a request from the Environment Agency (England). This can be downloaded from the project website (www.embrace-eu.org/outputs)

D7.3: This final session brief reported the feedback and comments that were received from the invited delegates who attended the emBRACE project conference in September 2015. Most satisfying, for the consortium, and most importantly, in terms of project impact, the general response of the delegation to the project findings was undoubtedly positive. The

delegates were impressed with the work undertaken and appreciative of the gift of a new framework for understanding community disaster resilience in which they all saw value. As in all scientific endeavours, however, these findings also crystallised new questions about how to progress this research usefully 'in the field' (NB. a field that encompasses multiple practices). At its most basic level the conceptual trinity of resources and capacities, learning and actions, operating within a disaster-risk governance context, were identified as being useful lenses through which to explore, interpret and assess different communities' latent or expressed resilience against a range of hazards and disturbances. Challenges do, however, remain and if the emBRACE framework is to progress from heuristic to operationalised model, it behoves the project consortium members to continue to use and to share emBRACE knowledge and outputs (such as the framework) to frame the concept in ways that, as the conference demonstrated, actively and mentally engage stakeholders, from across the spectrum, with the utility of socially-inclusive resilience-based approaches to reducing disaster risk.

D7.4-7.5: All Local Stakeholder Group (LSG) meetings organised and conferences attended

These two outputs simply listed the various interactions consortium members had with their LSGs during the course of the project (36) and reported the main conference that each partner had chosen to attend to disseminate emBRACE outputs.

Summary

This section has used the summation of the content of protect outputs as an illustration of the temporal and methodological progression of the project consortium's progress, from its initial development of clear aims and objectives, to the point at the final project conference, when others (i.e. the conference delegation of practitioners, academics, policy advisors and community members) made it apparent that in their opinion those objectives had been met. The project consortium has delivered a unified heuristic framework for understanding community disaster resilience, which has been positively received by a diverse audience of stakeholders. It has also delivered set of key indicators and guidelines for the development of indicators and indicator systems for assessing community disaster resilience. These outputs have been created by a consortium working in close collaboration, using a mixed-method and interdisciplinary approach to feed an iterative process of review, empirical research and synthesis. The consortium is, therefore, confident of the high quality of these deliverables.

4.1.4 Potential impact and main dissemination activities and exploitation of results

This section of the report will detail the deliverables and activities that have been developed or carried out in order to disseminate new knowledge created by the project and to create *impact.*

From the initiation of the project, the tasks undertaken within Work Package 8 (WP8) formed the basis of these dissemination activities. The DoW lists 11 discrete deliverables that were required to be created and publicly shared by the end of the project. Accordingly the consortium worked hard to deliver science that was useful to and easily translatable into policy, practice and community relevant formats. The regular circulation of project ideas and thoughts to the various external advisory groups (e.g. the ≤460 Jiscmail list subscribers) meant that critique and ideas were always feeding into the iterative development process from outside the confines of the consortium. As discussed above in

relation to WP7, this inclusive process undoubtedly led to additional levels of grounding, validation and impact for the final outputs.

Throughout the project, partners also subjected their work to the crucible of review at a number of academic conferences and workshops, with two presentations winning awards:

- Thomas Abeling (UNU-EHS) 'Young researcher' award at the Deutsches Komitee Katastrophenvorsorge (DKKV) conference, Leipzig 2014;
- Sylvia Kruse and Sebastian Jűlich (WSL), poster prize, "*Resilience of buildings and settlements in climate change*", Stuttgart 2015.

Partners also involved themselves in media presentations of their work, with METU and UFZ engaging in numerous radio and televised interviews where they discussed their fieldwork and their findings as well as the emBRACE project more generally.

Given the 'tail-loading' of the project (i.e. the planned delivery of its major outputs at the end of the project) the majority of the impact is likely to be achieved in the future, as the project outputs become familiar to a wider audience and are disseminated more broadly. Accordingly, the fact that the consortium ensured, from an early stage, that all deliverables likely to attract wider interest were always made available for download from the project website, has laid the ground for continued use of those resources. The fact that the website is based on the Googlesites™ platform is important from this perspective. This is because, unlike many other platforms, there is no subscription cost for web presence. Accordingly, even though emBRACE funding has now ceased, the main website and two linked websites (D8.1 & D8.10) will remain live for the foreseeable future, with updates and maintenance being continued by the project science coordinators (UoN).

As discussed briefly above, the project conference in London (9th Sept 2015) attracted a diverse delegation, including key policy advisors and practitioners from the UK civil protection community, as well as academics interested in hearing about emBRACE from across Europe. This conference had two early impacts:

1) The science coordinators were asked to liaise with the Nordic Centre of Excellence on Resilience and Societal Security (NORDRESS) consortium, in order to assess the feasibility of emBRACE partners running a workshop in Iceland, directly in order to share project findings with this nascent group.
2) The Environment Agency (England) made an express request that a policy brief was developed that was purely focussed on elaborating the detail of the emBRACE framework. This was requested, because the EA were in the process of reviewing their use of the resilience concept and the emBRACE framework (and its framing of resilience) had attracted significant interest from various departments. The EA's sibling organisation, Natural Resources Wales, had also expressed an interest in learning more about the framework. The project's science technical officer (Hugh Deeming, UoN) was also invited to present emBRACE at the Cabinet Office facilitated 'Communities Prepared National Group' (CPNG) Conference in Jan 2016.

These latter developments led directly to the creation of two additional documents, a policy brief and a briefing note, which were each focussed directly on explaining the components and domain inter-relations in the framework. Both of these documents were sent directly to the EA and were also added to the outputs available for download from the project website (www.embrace-eu.org).

Having discussed some of the project's initial impacts, the next section goes into further detail about the development and expectations underpinning the consortium's delivery of specific, DoW-defined, dissemination focussed outputs.

WP8: Policy and practice communication outputs to improve resilience building in European societies

D8.1: Building Resilience Amongst Communities in Europe (emBRACE) Handbook

In accordance with the project DoW, **t**he emBRACE on-line Handbook brings together in one place, and for a general readership, the knowledge gained throughout the project. Building on the synthesis and participatory tasks conducted in WP6, this product presents the final emBRACE Conceptual and Operational Framework in synthesis (Figure 6).

In its online form the Handbook contains the collected key outputs of the emBRACE Project. These reflect the development of ideas over the four-year course of the project and have not been edited *post hoc*. The Handbook is an interim (yet enduring) collection, which has been presented so as to reach the widest possible audience, prior to the publication by Wiley of a fully revised and reviewed, edited book of the emBRACE scientific outputs: *Framing Community Disaster Resilience: resources, capacities, learning and action* (Deeming, Fordham, Kuhlicke and Kunath, expected publication 2016).

The emBRACE handbook is accessible at: https://sites.google.com/site/embracehandbook/

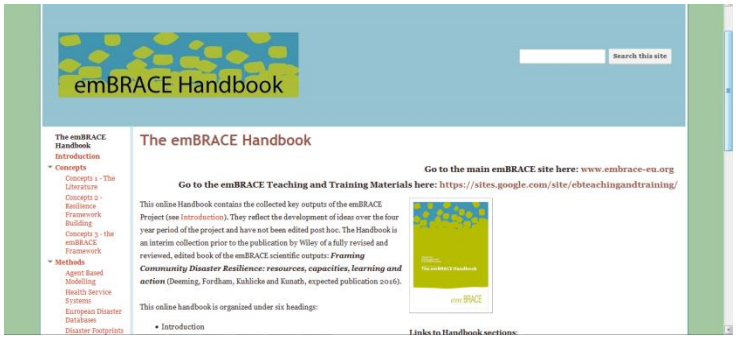

Figure 6

D8.2 – 8.6: Policy briefs focussed at key community resilience stakeholders

In accordance with the DoW, all the scientific and technical knowledge generated by emBRACE was formatted into a series of Policy Briefs and additional hazard-specific briefing notes for a range of audiences, from international to community and 3rd sector. These briefs were well received at the project conference and as described above, this resulted in a further two framework specific briefs being developed in addition to the formally agreed outputs. All these briefs are available for download from the emBRACE website (D8.7).

D8.7: Project Website and evolving add-ons

The emBRACE website was launched on the 1st day of the project kick-off meeting (3rd Oct 2011) and has been maintained and updated throughout the course of the project by the scientific coordination team (UoN) and other partners (Figure 7). Having been transferred (in 2013) to the Google Sites™ platform, the website has acted as an important medium through which to provide

project partners, stakeholders and the public with open access to emBRACE reports, deliverables and news, whilst attracting no subscription fees for upkeep. This arrangement allows for the site to continue to act as a low-maintenance medium for project output dissemination and outreach, for the foreseeable future, thus ensuring an important degree of project legacy.

Visitors to the site are also provided a direct link to the D8.1 emBRACE Project Handbook (on-line).

Project website: www.embrace-eu.org

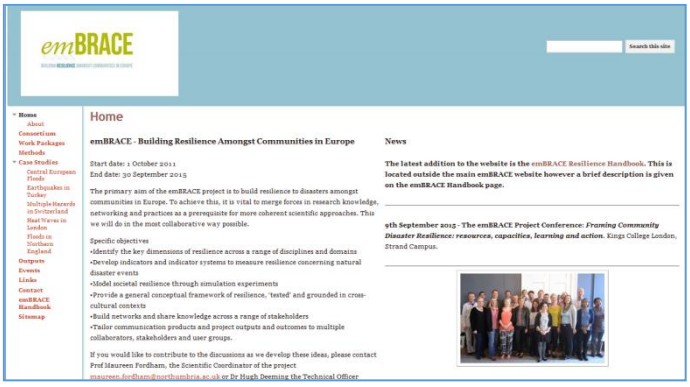

Figure 7

D8.8: Common glossary of terms for emBRACE

The common glossary of terms was originally submitted in month 10 where it provided a benchmark of definitions for use by the consortium partners during the development of their methodological approaches. During the 2nd project meeting (Bolzano, May 2014), this document was reviewed. In review it was agreed that the analyses undertaken during the project had realigned the consortium's thinking about which was the most appropriate definition of resilience to associate with emBRACE. Accordingly, 2nd version of the glossary was produced, in which the preferred definition of resilience was updated from the UNISDR (2009) definition, to that of the IPCC (2014):

> The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation. (IPCC, 2014: p.5)

This document was then added to the online resources available for download from the project website.

D8.9: Building Resilience Film

This deliverable presented the web address for the emBRACE Building Resilience film.

This animated film was produced (following a process of competitive tendering), by the animation company *Studio Moo*™ (Newcastle-upon-Tyne, UK). Following extensive drafting and collaboration between the animators and project coordinators, the first draft of the film was presented to the consortium at the final project meeting on 8th Sept 2015. During the following discussion, some partners identified areas in which the presented film could be improved to better communicate emBRACE findings. Accordingly, Studio Moo™ has been asked to edit the film accordingly. Unfortunately, this means that the final delivery of the film will be slightly delayed beyond the closure of the project. Whilst this is not ideal, it was agreed by the consortium as a whole that, with

the agreed amendments, the film will prove to be an invaluable resource through which to disseminate emBRACE findings to interested publics.

Ultimately, the final-draft film will be embedded into the project website (D8.7) and made available on platforms such as YouTube™ and Vimeo™

Although the potential for the development of a 'participatory film' was mentioned in the DoW, all case study teams agreed that such a product would prove much more useful if developed using the emBRACE framework concept. Given that the final Framework was not delivered until 2015 (once all fieldwork had been completed), such filming with research participants was effectively no longer practicable. Accordingly, the decision was made to progress using professional services.

The first draft film, delivered to consortium on 8th September 2015

https://drive.google.com/file/d/0B9RBeBGSyVgFd3A0Sm5XZ3BhTm8/view?usp=sharing

The final draft will be embedded in project website (D8.7) as soon as it is complete:

www.embrace-eu.org

D8.10: emBRACE teaching/training resources

In accordance with the project DoW the consortium has collated a range of teaching and training resources, which are potentially of use within a variety of educational and practitioner-training environments (Figure 8). Collated and offered for use and/or adaptation under creative commons conditions these resources reflect useful knowledge generated across all emBRACE work packages. They include materials, prepared by consortium members, which offer users ways in which to introduce, frame and discuss the resilience concept, as well as those which are designed to educate about specific methodological approaches to resilience assessment (e.g. SEI-O's YouTube™ tutorial on GEPHI Social Network Mapping software)

Linked dynamically from both the emBRACE on-line Handbook (D8.1) and project website (D8.7) this resource archive is intended to provide those with a wish and/or need to instil critical and practical thinking about community disaster resilience, with teaching and training resources that have been prepared and used by emBRACE researchers, but which are also easily adaptable to specific student contexts (the importance of any resilience-related intervention's adaptability to 'local' context, being a key finding of the emBRACE project).

As discussed above, the sustainability of the resource is ensured through the use of Google Sites for the platform as this requires no hosting subscription and will continue indefinitely or as long as Google offers the service.

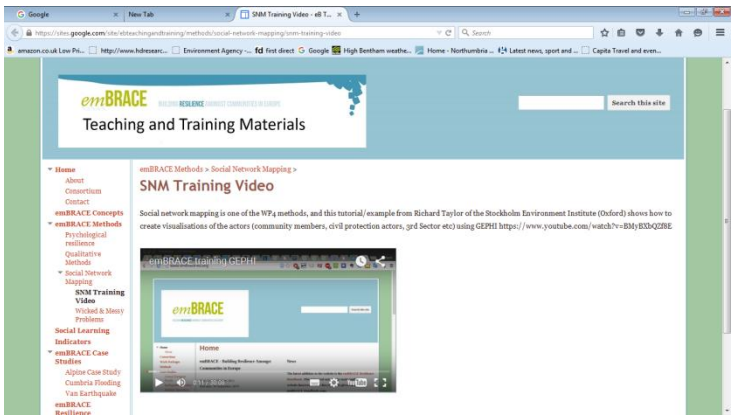

Figure 8
https://sites.google.com/site/ebteachingandtraining/home

The teaching and training resources website has an embedded Youtube™ app, which has provided a window for a Social-Network Mapping (SNM) software training presentation prepared by Richard Taylor: SEI-O (see Figure 8 above).

D8.11: Package of additional online dissemination services

In addition to the project website (see emBRACE Deliverable 8.7) and in accordance with the project DoW, the web has been utilised in a variety of ways throughout the project as a medium through which to promote: outreach and stakeholder engagement with the project's progress; active 'community of practice' discussion of resilience issues (through the Jiscmail Disaster-Resilience listserver); dissemination of outputs (e.g. WeAdapt, Researchgate) and sharing of good-practice (e.g. teaching materials).

Here, screen grabs and short descriptions are used to highlight the six key mechanisms through which web-based outreach and dissemination has been achieved and will continue to be achieved with updates and as on-line legacy (e.g. on subscription-free GoogleSites™) following project end.

Although a 'blog' was mentioned in the DoW it was found that the Jiscmail Listserver (1 below) provided a more straightforward and popular on-line 'venue' through which the wider resilience 'community' could engage with the project, and each other.

Jiscmail™ Disaster-Resilience Listserver was activated on 3rd Oct 2011, on the first day of the project kick-off meeting (Figure 9). During the course of the project membership has risen to a point where there are now 454 registered subscribers. The list has now become a valued medium through which this community of practice can circulate and discuss resilience-related issues (screen capture 29/09/15)

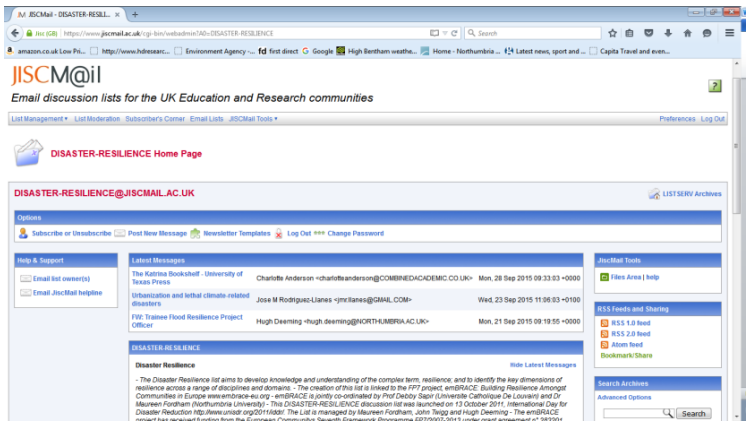

Figure 9

https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=DISASTER-RESILIENCE

WeAdapt© is a platform that is owned and operated by project partner SEI (Figure 10). In order to bring emBRACE to the attention of SEI's global audience of adaptation practitioners and researchers project outputs have been uploaded onto the website's 'Adaptation Layer', e.g. this screen capture (29/09/15) illustrates a geo-referenced emBRACE WP5 case-study report:

https://www.weadapt.org/

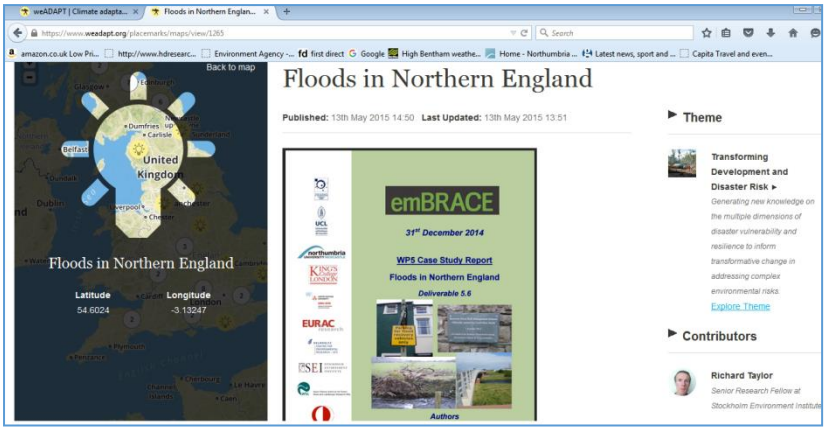

Figure 10

Google Flyovers: North England and South Tyrol (Figure 11). To be situated in the WeAdapt platform (see 3 above) these flyovers have been developed (on-going 29/09/15) by SEI-O to provide a detailed browser-based overview of two of the project case-study sites. Using custom scripts and geo-referenced images the flyovers take viewers on a trip around the case-study sites, whilst explaining the research process and key findings.

https://www.weadapt.org/knowledge-base/disaster-resilience/embrace-flyover-northern-england

https://www.weadapt.org/knowledge-base/disaster-resilience/embrace-flyover-south-tyrol

Figure 11: Screen capture from draft South Tyrol Flyover
(https://drive.google.com/open?id=0BzQqz5SItu47U2NMbVZYenFfdU0)

An example of output dissemination via partner institution websites (Figure 12). In this case, it is the WP8 Heatwave-Hazard Briefing note, advertised for downloading on the KCL website:

http://www.kcl.ac.uk/sspp/departments/geography/research/epd/newseevents/newsrecords/EUProjectemBraceBriefingNote1.aspx

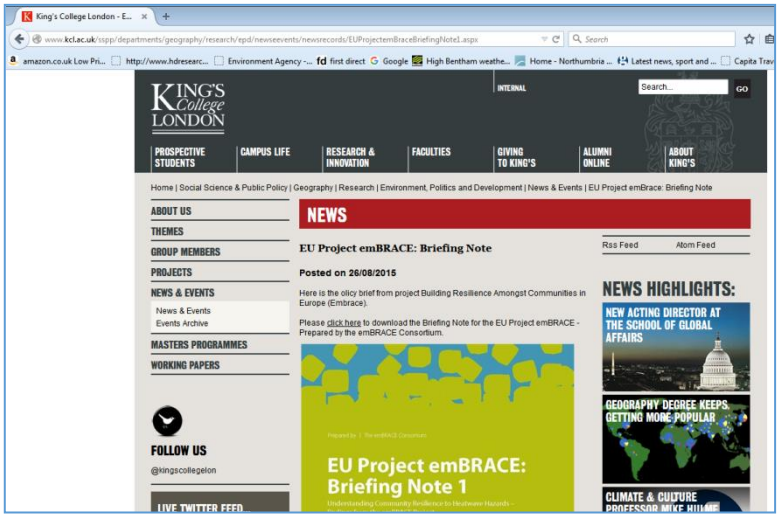

Figure 12

Outreach achieved my individual project partners and writing teams via online academic networks. In this example it can be seen that the emBRACE D4.3: Social Learning report has achieved 113 'reads' since being uploaded onto the Researchgate™ platform in March 2015 (Screen capture: 19/11/15: Figure 13)

https://www.researchgate.net/home

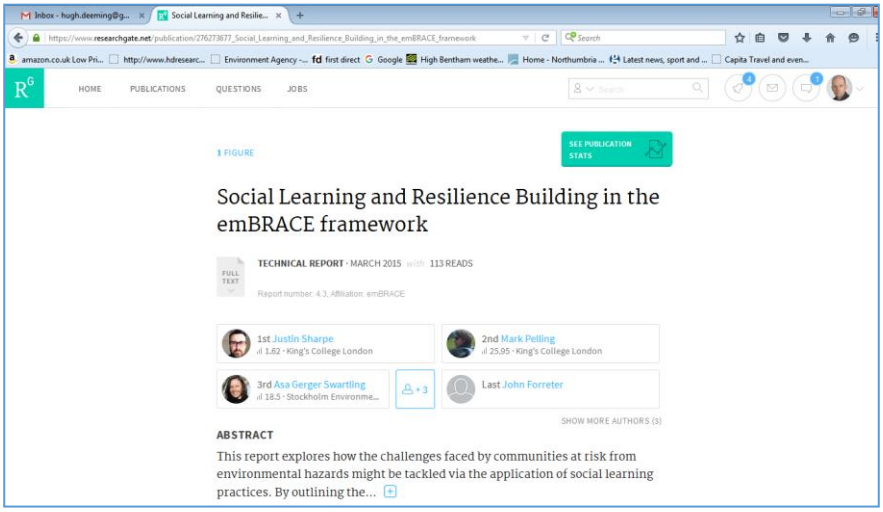

Figure 13

Contact details

www.embrace-eu.org

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4.2 Use and dissemination of foreground

Section A (public) – As it was impossible to introduce online the information please find it below

LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES									
	Title of output	**Author/s**	**Journal name**	**Number, date, Frequency**	**Place of Publication**	**Year of publication**	**Relevant pages**	**Permanent identifiers**	**Is/Will open access provided to this publication?**
1	Measuring psychological resilience to disasters: are evidence-based indicators an achievable goal?	UCL (Rodriguez-Llanes)	Environmental Health	12	Bio-Med	2013	115	http://www.ehjournal.net/content/12/1/115	Y
2	According to Plan? Disaster risk knowledge and organizational responses to heat wave risk in London, UK	UNU-EHS (Abeling)	Ecosystem Health and Sustainability	1, art 9		2015		http://www.esajournals.org/doi/10.1890/EHS14-0022.1	Y
3	Reputational risks and participation in flood risk management and the public debate about the 2013 flood in Germany	UFZ (Kuhlicke)	Environmental Science and Policy	in press		2015		http://www.sciencedirect.com/science/article/pii/S1462901115300150	N

4	Benefits and Challenges of Resilience and Vulnerability for Disaster Risk Management	WSL (Kruse)	International Journal of Disaster Risk Science	5, 1		2014		http://link.springer.com/article/10.1007%2Fs13753-014-0008-3#/page-1	Y
5	Clarifying Resilience: an invited comment	UoN (Deeming)	Natural Hazards Observer	XXXVII, 4	Boulder, CO	2013	1, 14-15	http://www.colorado.edu/hazards/o/archives/2013/mar13_observerweb.pdf	Y
6	Understanding Community Resilience from the perspective of a population experienced in emergencies: some insights from Cumbria	UoN (Deeming)	EPC Occasional Paper Series	Occasional Paper 14	Easingwold, UK	2015	All	http://www.epcresilience.com/EPC/media/Images/Knowledge%20Centre/Occasionals/Occ14-Paper.pdf	Y
7	Surface urban energy balance and wintertime stability simulated using three land-surface models in the high-latitude city Helsinki	UoR (Grimmond)	QJRMS			2015		http://onlinelibrary.wiley.com/doi/10.1002/qj.2659/abstract	N
8	How does impact of objective and subjective disaster exposure relate to the three clusters of posttraumatic stress symptoms?	METU (Ikizer)	Anatolian Journal of Psychiatry			Under review			
9	Exploring factors associated with psychological resilience among earthquake survivors from Turkey	METU (Ikizer)	Journal of Loss and Trauma			In press			
10	Understanding perceptions of community resilience: The case of the 2011 earthquakes in Van, Turkey	METU (Karanci)	American Journal of Community Psychology			Under review			

11	Measuring resilience in natural disaster management - development of quantitative resilience indicators at the local level	WSL (Jülich)	To be specified	Yes (Draft)					
12	The emBRACE community disaster resilience framework	emBRACE Consortium	To be specified	(In Prep)		2016			

LIST OF DISSEMINATION ACTIVITIES

No	Type of Activities	Main Leader	Title	Date/Period	Venue	Type of Audience	Size of Audience	Countries Addressed
1	Conferences	UoN	Researchers already know a lot about flood impacts and vulnerability but what does it take to be resilient?	27/10/2010	Northern Flood Action Group, 3rd Conference, Carlisle, Cumbria	Civil Society	150	UK
2	Conferences	UoN	"Building Resilience Amongst Communities: Research and Practice"	24/10/2011	Northumbria University, "Resilience for Future Energy Systems", Newcastle Civic Centre,	Scientific community	40	UK
3	Conferences	UoN	Building Resilience Amongst Communities in Europe: What Will it Take?	28-nov-11	Presentation for the Dealing With Disasters Conference , Wales	Scientific/practice	150	Int
4	Conferences	UoN	An introduction to the emBRACE project and some preliminary ideas about one resilience approach	17/01/2012	UK Cabinet Office "Community Resilience: research directions" workshop, London	Policy/practice	50	UK
5	Conferences	UoN	What is 'Community Resilience'? Setting the scene from an emBRACE perspective	4/07/2012	RGS-IBG conference, Edinburgh	Scientific/practice	30	Int
6	Conferences	UoN	Community-resilience and IEM: some thoughts on 'capital' resources	28/09/2012	ESRC Workshop on 'Implementing Resilience' Emergency Planning College, York, UK	Practice	30	UK

7	Conferences	UoN	Resilience: A contribution to theoretical and operational issues from the on-going emBRACE project	22/10/2012	EC Scientific Officers workshop in Brussels, CDMA, Brussels	Policy/Scientific	30	EU
8	Conferences	UoN	Resilience: A contribution to theoretical and operational issues from the on-going emBRACE project	15/01/2013	FP7 ENHANCE Kick-Off Meeting, Amsterdam: 15th January 2013	Scientific	25	EU
9	Conferences	UoN	emBRACING the Catchment Scale: an Exploration of Community Resilience from Source to Sea	29/08/2014	RGS-IBG conference, London	Scientific/practice	30	UK
10	Conferences	UoN	emBRACING the catchment scale: an exploration of community resilience from source to sea	31/03/2015	FP7 TACTIC Workshop: Rheged Penrith	Civil Society	12	UK
11	Conferences	UoN	Propagating the aftermath: the Cumbrian experience of using a community development approach to build resilience to flooding	4-5/05/2015	Social Services in Times of Disaster NORDRESS Multidisciplinary Nordic Symposium, Nordic House, Reykjavik, Iceland, May 4-5, 2015	Scientific/practice	150	EU, Scandinavia
12	Conferences	EURAC	Vulnerability and Resilience to Floods - examples from research in South Tyrol -	24/04/2012	EGU 2012 General Assembly, Vienna	Scientific		
13	Conferences	EURAC	Understanding risk perception and risk attitude of an Alpine community to improve risk management procedures. Conference proceedings IDRC Global Risk Forum Davos	26/08/2014	IDRC Global Risk Forum, Davos (Switzerland)	scientific		
14	Conferences	EURAC	In search of a footprint: an investigation about the potentiality of large datasets and territorial analysis in disaster and resilience research. (oral presentation)	29/04/2014	EGU 2014 General Assembly, Vienna	Scientific		
15	Conferences	EURAC, SEI	Co-creation and communication of knowledge as common requirement for climate change adaptation and disaster risk reduction: experiences and lessons learnt	13/05/2015	European Climate Change Adaptation conference (ECCA), Copenhagen	Scientific/practice		
16	Conferences	EURAC, SEI	Hangrutschung Badia 2012- Die Rolle von Risikowahrnehmung und lokalen Netzwerken im Notfallmanagement	6/12/2014	Notfallsymposium, Hall in Tirol, Austria	Scientific		

17	Conferences	EURAC	Presenation of emBRACE case study work in Badia at the European student symposium on the environment and sustainability	7/05/2015	European student symposium on the environment and sustainability, Goteborg, Sweden	Scientific		
18	Conferences	SEI, UoY, EURAC	Methods for Integrative Research on Community Resilience to Multiple Hazards, with Examples from Italy and England	10/09/2014	4Th International Conference on Building Resilience – Salford Quays, UK	Scientific/practice		
19	Conferences	SEI, EURAC	Framing Stakeholder views to clumsy solutions to complex problems	27th May 2015	*Environmental Governance in an Increasingly Complex World: symposium,* Södertörn University, Stockholm, 27th and 28th May.	Scientific		
20	Conferences	UCL	Promoting psychological resilience in disaster and conflict: review of the factors that matter	???	Global Forum on Research and Innovation for Health on 24 to 27 August, 2015	Scientific		
21	Conferences	METU	Community resilience to disasters: emBRACE [Building Resilience Amongst Communities in Europe] Project	11/01/2013	METU DMC (Disaster Management Center) 15th Round Table Meeting, Ankara, Turkey	Scientific/practice		
22	Conferences	METU	Community resilience in the framework of the emBRACE project and presentation of some preliminary findings from Van	26/06/2013	METU DMC Workshop on Natural Disasters: Psycho-social Consequences and Support, Ankara, Turkey	Scientific/practice/policy		
23	Conferences	METU	How do Turkish earthquake survivors perceive psychosocial impacts and psychological resilience?	July 9-12, 2013	13th European Congress of Psychology, Stockholm, Sweden	Scientific		
24	Conferences	METU	Community resilience following the Van Earthquakes: Preliminary findings from the emBRACE project	October 23-27, 2013	2013 International Van Earthquake Symposium, Van, Turkey	Scientific/policy		
25	Conferences	METU	Indicators of community resilience to disasters	10/01/2014	METU DMC 16th Round Table Meeting, Ankara, Turkey	scientific/policy		
26	Conferences	METU	Differential effects of objective and subjective exposure severity on PTSD symptom clusters among earthquake survivors from Turkey.	July 8-13, 2014	28th International Congress of Applied Psychology, Paris, France	Scientific		
27	Conferences	METU	Psychological impacts of earthquakes and psychological resilience	July 8-13, 2014	28th International Congress of Applied Psychology, Paris, France	Scientific		

28	Conferences	METU	Psychological distress and resilience in the aftermath of the Van, 2011 Earthquakes in Turkey	May 20-22, 2015	Integrated Safety & Security Exhibition, Moscow, Russian Federation	Scientific/practice/policy		
29	Conferences	METU	Post-disaster adversity and psychological resilience: does how people cope matter?	July 7-10, 2015	14th European Congress of Psychology, Milan, Italy.	Scientific		
30	Conferences	METU	What affects psychological resilience in earthquake survivors from Van, Turkey?	July 7-10, 2015	14th European Congress of Psychology, Milan, Italy.	Scientific		
31	Conferences	UNU	Presentation: According to Plan? Disaster Risk Knowledge and Organizational Responses to Heatwave Risk in London, UK	7 June 2014	Integrated Research on Disaster Risk (IRDR) Conference, Beijing, China	Scientific/policy		
32	Conferences	UNU	Presentation: Can we learn to be resilient? Constraints for social learning in heatwave risk management in London, UK	27-août-14	International Disaster and Risk Conference (IDRC), Davos, Switzerland	Scientific/policy		
33	Conferences	UNU	Presentation: ""Can we learn to be resilient? The role of social learning in heatwave risk management in London, UK"	4-nov-14	14. Forum Katastrophenvorsorge, Leipzig, Germany	Scientific		
34	Conferences	UFZ	Quantitative Analyse privater Hochwasserschutz- und Vorsorgemaßnahmen in exponierten Wohngebieten der Stadt Leipzig	sept-14	GeoForum Leipzig	Scientific		
35	Conferences	UFZ	Weitermachen oder Wegziehen? Resilienz in Folge wiederholter Hochwassererfahrungen	nov-14	DKKV Forum Leipzig	Scientific		
36	Conferences	UFZ	Hochwassererfahrungen und Resilienz als Lernprozesse Beispiele aus Sachsen	févr-15	BMBF Abschlusskonferenz "Bewältigung des Hochwassers 2013" - Postdam	Scientific/policy		
37	Conferences	UFZ	The Resilience of Shrinking Cities: Shading some light on a neglected urban development path in the disucssion on vulnerability	20-22 Sept. 2012	EURA 2012	Scientific		
38	Conferences	UFZ	The impacts of demographic and climate change on the resilience of shrinking cities	avr-12	City2020 Aachen, Germany	Scientific/policy		

39	Conferences	UFZ	Die Hochwaserkatastrophen 2002 und 2013 in Sachsen - Ein Blick zurück nach vorn	11-12. Dec. 2013	DKKV - Katastrophenvorsorge zwischen alten Struckturen und neuen Herausforderungen, Hamburg	Scientific		
40	Conferences	UFZ	Unrban transformation in the face of climate and demographic change: the case of shrinking cities	19-21. June. 2013	Transformation in a changing climate conference, Oslo	Scientific/policy		
41	Conferences	UFZ	From resilience to transformation: learning from cities that have experienced repetitive flooding in Saxny, Germany	May 2014	Resilience 2014, Montpellier	Scientific/policy		
42	Conferences	UFZ	Citizen Responsibilisation in flood risk management: the creation of new vulnerabilities?	avr-15	AAG, Chicago	Scientific		
43	Conferences	UFZ	Community resilience to natural disasters and the performance of disaster management organizations under change. Results from a modelling study	May 2014	Resilience 2014, Montpellier	Scientific/policy		
44	Conferences	UFZ	Of floods, sandbags and simulations: Urban resilience to natural disasters and the performance of disaster management organisations under change.	avr-15	EGU, Vienna	Scientific		
45	Conferences	WSL	From Vulnerability to Resilience Quantification	15/11/2012	KatNet Conference, Bonn, Germany	Scientific		
46	Conferences	WSL	Resilience and Vulnerability in case of natural hazard and disaster management (Resilienz und Verwundbarkeit – Fallbeispiel Naturgefahren- und Katastrophenmanagement)	19/09/2014	Workshop "Resilienz und Vulnerabilität", Evangelische Akademie Tutzing, Germany	scientific		
47	Conferences	WSL	What is resilience and how to measure it?	26.-27.03.2015	Symposium of the Foundation for Environment and Damage Prevention "Resilience of buildings and settlements in climate change", Stuttgart (D)	Scientific		
48	Conferences	UCL	GLOBAL FORUM FOR RESEARCH AND INNOVATION FOR HEALTH 2015 (DISASTER RISK REDUCTION CLUSTER)	24-27 August 2015	PICC, Metro Manila, Philippines	Scientific/policy		

49	Conferences	EURAC, SEI-Y	IV° CONVEGNO BIENNALE ANUAC "Life Environments and Imagined Environments. New Challenges for Anthropology"	5-8 November 2015	University of Bolzano, Italy	Scientific		
50	Conferences	EURAC	Deutscher Kongress für Geographie	1-6 October 2015	Berlin, Germany	Scientific		
51	Conferences	KCL	Annual Heatwave Seminar	26/03/2014	London, UK	Scientific/practice/policy		
52	Conferences	UFZ	Resilience 2014: "Adaptation, transformation and development", Third International Science and Policy Conference on the resilience of social & ecological systems	04.0.-08.05.2014	Le Corum, Montpellier, France	Scientific		
53	Conferences	UoR	9th International Conference on Urban Climate jointly with 12th Symposium on the Urban Environment	24/09/2015	Toulouse, France, 20th - 24th May	Scientific		
54	Conferences	UNU-EHS	14. Forum Katastrophenvorsorge	4/11/2014	Leipzig, Germany	Scientific		
55	Book Chapter	UoN	Resilience and Adaptation to Hydrometeorological Hazards	13/02/2015	Wiley book: Hydrometeorological Hazards: Interfacing Science and Policy	Scientific/practice/policy	Int	Int
56	Meetings	UoN	36 x Partner facilitated Local Stakeholder Group (LSG) Meetings: see emBRACE Deliverable 7.4 for details	2011-2015	Various	Civil Society/practice/policy	1-100	Case-study specific
57	PhD Thesis	METU	Factors related to psychological resilience among the survivors of the earthquakes in Van, Turkey	14/11/2014	N/A	Scientific	N/A	N/A
58	PhD Thesis	UNU-EHS	Can we learn to be resilient? Institutional Constraints for Social Learning in Heatwave Risk Management in London, UK.	1/04/2015	N/A	Scientific	N/A	N/A
59	Specialist Press	EURAC	Wegstecken, verarbeiten, weitermachen (Article in German language)	March 2015	Science Magazine ACADEMIA	Specialist	on-line	German speaking
60	Specialist Press	SEI-Y	Identifying the pillars of resilience in an Italian Alpine community	07/06/15	http://www.sei-international.org/news-and-media/3116	Specialist	on-line	Int

61	Poster	EURAC	Poster: Resilience - approaches from various disciplines & a framework for community resilience to natural disasters -	March 2015	Presented at the congres: Stiftung Umwelt und Schadenvorsorge der SV SparkassenVersicherung Gebäudeversicherung Stuttgart "Resilienz von Gebäuden und Siedlungen im Klimawandel", 26. + 27.3.2015	Scientific		
62	Poster	EURAC	Poster: Disaster footprint analysis in resilience studies An exploratory approach for a national scale assessment, combining land-use and socio-economic data	17/09/2014	presented at INQUIMUS Workshop - Spatial indicators and assessment of vulnerability and resilience, Salzburg, 17.09.2014	Scientific		
63	Poster	EURAC	Poster: Relationship between landslide processes and land use-land cover changes in mountain regions: footprint identification approach.	15/04/2015	presented at EGU 2015 General Assembly, Vienna, 15.04.2015	Scientific		
64	Radio Interview	EURAC	Participation/Guest speaker in the radio transmission "Zeppelin"	16/04/2015	RAI Radiodue	Civil Society		Italy, Badia
65	Radio Interview	EURAC	interview in German language for the radio transmission "Südtirol forscht" on research in South Tyrol. Presentation of emBRACE and the different project case studies.	15/04/2015	RAI Südtirol	Civil Society		Italy, Badia
66	Discussion Paper	UFZ	Hochwasservorsorge und Schutzgerechtigkeit - Erste Ergebnisse einer Haushaltsbefragung zur Hochwassersituation in Sachsen	May 2014	UFZ - Internal Publication	Scientific		
67	Poster		Die Erosion der Resilienz und die Grenzen der Haushaltsanpassung in Folge wiederholter Hochwassererfahrung	June 2015	IPCC Jahrgang, Potsdam	Scientific		
68	Poster		Untersuchung privater Schutz- und Vorsorgemaßnahmen und Analyse von Einflussfaktoren der Risikowahrnehmung anhand des Juni-Hochwassers 2013 in der Stadt Leipzig	Dec. 2013	DKKV Forum Hamburg	Scientific		

69	Poster		Hochwasserrisikowahrnehmung als Einflussfaktor auf private Schutz- und Vorsorgemaßnahmen am Beispiel des Junihochwassers 2013 in der Stadt Leipzig	Oct. 2013	58. Geographentag Passau	Scientific		
70	Poster		Wegziehen oder Weitermachen? Resilienz in Folge wiederholter Hochwassererfahrungen	May 2015	Forum Zivile Sicherheitsforschung Berlin	Scientific		
71	Poster	WSL	What is resilience and how to measure it?	26.-27.03.2015	Symposium of the Foundation for Environment and Damage Prevention "Resilience of buildings and settlements in climate change", Stuttgart (D)	Scientific		Int

Section B (Confidential2 or public: confidential information to be marked clearly)

N/A

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