CapHaz-Net

Social Capacity Building
for Natural Hazards
Toward More Resilient
Societies

Lessons learnt and challenges with regard to social capacity building:

Heat-related hazards – droughts, forest fires and heat waves in Southern Europe

Meera Supramaniam, Marina Di Masso and Almudena García Sastre
(Institute for Environmental Sciences and Technology (ICTA), Autonomous University of Barcelona, Spain)

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Lead Author	Meera Supramaniam and Marina Di Masso
Contributors	Almudena García Sastre
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Preamble

This document is based on the CapHaz-Net Southern Europe Regional Hazard Workshop on Heat-related Hazards: Droughts, Forest Fires and Heat Waves which took place at Casa de Convalescència, Barcelona, Spain, on 7-8 October 2010. It forms the second half of two part documentation from Work Package 7 (WP7) on heat-related hazards (the Minutes of the Workshop are the first one). This WP downscales the previous project findings to a Southern European regional context where heat-related hazards are widespread. This has been done, firstly, by scrutinizing the regional institutional context (existing practices, legal tools, and policy approaches to social capacity building) as well as by preparing and conducting a Regional Hazard Workshop in Southern Europe about droughts, heat waves and forest fires.

Following this, the outcomes of the Regional Workshop are summarised and analysed in this document in view of the previous theoretical work within the CapHaz-Net project. The deliverable begins with a section that provides an overview of the institutional situation and policy context in the region. It then continues with a summary of the main discussion points of the workshop. These points emerged from insights, provided by invited practitioners, regarding the current situation and on-ground practices for the three heat-related hazards of droughts, forest fires and heat waves. This deliverable then connects the workshop with the previous six thematic work packages, and concludes by triangulating the three main pillars of institutional overview, workshop and previous work packages. The analysis identifies some strengths/weaknesses, gaps of knowledge, as well as the implementation in the existing initiatives, practices and legal tools in relation to the mitigation of heat-related hazards. It then concludes with recommendations, by assessing the potential for new initiatives, practices, legal tools, decision processes and to identify new opportunities and challenges. The aim of this section of the report is to begin connecting the previous thematic/theoretical work packages with the practical situation in order to provide recommendations which support the final objective of building social resilience that is both theoretically sound and practically relevant.

We would like to thank all who have contributed to the success of the workshop: Mercè Caparrós and Alexandra Garcia, our hosts at Casa de Convalescència; our excellent facilitators: Jordina Belmonte, Laia Domènech and Anna Serra; as well as our minute takers: Jochen Luther, Chiara Bianchizza, Marta Dinarès and Ivana Logar. Special thanks to our speakers for their valuable input to the discussion groups: Donald Wilhite, Xavier Basagaña, John Handmer, John Tesh and Alba Ballester. And of course our hardworking translators which helped bridge the language barriers. We finally would like to thank Eduard Plana from the Forest Sciences Centre of Catalonia for his invaluable knowledge on forest fires.

Contact persons for WP7

Meera Supramaniam: meera.supramaniam@gmail.com
Marina Di Masso: Marina.DiMasso@uab.cat

Structure

Executive summary

The Barcelona Regional Hazard Workshop on social capacity building with regard to heat related hazards is at the start of a turning point within the CapHaz-Net project. It is the doorway to the practice-oriented phase of the project, and it is the first of three regional hazard workshops to be completed within the duration of CapHaz-Net. These workshops represent a shift in our perspective from a theoretical base to a more practical one which aims to complete our picture of CapHaz-Net's goal, *building social resilience towards natural hazards*. Context and scale will be a key factor to consider within this second phase of the project, as each workshop is developed in a certain context, not only geographical but social, institutional and cultural. Particular physical conditions, risk governance frameworks and risk cultures will strongly affect the outcomes of the regional workshops and therefore, the recommendations.

CapHaz-Net has highlighted the need to contextualise hazardous events when analysing the interactions between the different actors involved in risk governance and risk experiences. In keeping with the rational provided in WP1[1] the local and/or community level is the most appropriate setting for appraising social capacity building, while the regional level provides a more macro focus on the specific risk cultures, risk governance structures and institutional performance that strongly shapes the local impact of each natural disaster. This provides us with two somewhat interlocking scales from which to discuss social capacity building and resilience. In addition to hazards-of-place approaches which only account for some aspects of social vulnerabilities to natural hazards, a regional scope can provide for detailed contextualised research. From the perspective of social capacity building, bottom-up processes are increasingly advocated, which means that in the field of natural hazards, capacity building strategies will always need to take into account local management practices and local risk memories.

This document is the first attempt by the CapHaz-Net project to combine the theoretical aspects and the practical contextual aspects of how risks are perceived, communicated, governed and responded to into a coherent analysis. To achieve these goals, in Section 2 there is first an overview of the evolving policy context and the institutional frames that are a key part of the Southern European, Spanish and Catalan context of risk governance. This feeds into Section 3 where the specific issues concerned with heat-related hazards discussed within the workshop are distilled. This proceeds to Sections 4 and 5 which connect the workshop with the thematic work packages and analyse all three aspects of this work package, towards the goal of identifying strengths and weaknesses, gaps of knowledge, initiatives, practices and legal tools related to mitigating heat-related hazards. Finally, the concluding section offers a recap and recommendations from the overall analysis to improve capacity building concerning these hazards in Catalonia.

The Barcelona workshop began with the initial preparation phase of trust building through pre-contact interviews[2]. It was understood that a successful workshop would depend a lot on the experience and knowledge that local participants were willing to share with us. In order to build such confidence we had several interviews with some of them, introducing the issues they would be discussing. The workshop essentially asked four questions: *How does (the hazard) affect us?*

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[1] See CapHaz-Net WP 1 report on Social Capacity Building (Kuhlicke and Steinführer 2010, 30-31).

[2] See also CapHaz-Net WP 3 report (Section 3.9 on trust; Wachinger and Renn 2010).

What is being done? How to improve? How do we work together? These questions may seem simple, but the answers and impressions given are as varied and diverse as our participants, from members of government bodies, NGOs and academics to pensioners. Indeed the workshop gathered people who normally work on separate hazards together in one workshop, an uncommon experience for the practitioners themselves.

During the group sessions participants kept referring to the emotional *effects* of the hazards, with many of the effects discussed being at the individual and community level. However, many of the conflicts surrounding *what is being done* centred on a discussion over information provided and the rights of access to a resource. Although more of the effects pointed at the individual and society levels, participants found *improvement* aspects were better handled at an institutional level. To figure out *how to work together*, the discussion revolved around the division of responsibilities, communication practices and cross-cutting themes among different administrative levels.

In addition to these main aspects of the document, WP7 also contains an Annex where the details of the rational and construction of the workshop is provided. This is provided with the understanding that the information achieved during the workshop will be partly dependent on the structure of the workshop. Therefore being as transparent as possible in regards to the workshop construction process allows not only reproducibility of the workshop and informs us how better to structure a similar workshop, but also allows any possible bias or influence to be properly addressed.

1   Background of the CapHaz-Net project

CapHaz-Net is particularly concerned with people's capacities and how they are influenced by contextual conditions. CapHaz-Net does not focus on the physical conditions of a hazard, but acknowledges its relevance. However, we maintain that by focusing on the physical aspects we neglect the social aspects of a hazard, a factor that the CapHaz-Net project focuses on redressing. Specifically, we regard the occurrence of a disaster as a result of an inability to anticipate, cope with and recover from the impact of a natural hazard. It is these conditions which transform a natural hazard in a social disaster. The central question CapHaz-Net is dealing with is therefore: How can we enhance the social capacities of European societies to prepare for, cope with and recover from the negative impacts of natural hazards?

Obviously one should not expect a simple answer to this question (otherwise it would have been provided in the past). Therefore CapHaz-Net asks further: What should be the goals of social capacity building efforts? Should these goals be the same for each individual, for each organisation, for each community? What is the appropriate level of social capacity building? Who defines who is lacking social capacities (and who not, respectively)?

However, there are also other questions we are concerned with: How do people perceive, interpret and communicate natural hazards? How are they affected by them and how do they cope with and recover from them?

To achieve this goal, CapHaz-Net is divided into two main phases. The first phase consists of a thematic section which reviews the theoretical literature available on six main themes thought to be relevant to uncovering the components of social resilience as defined within the project documents of CapHaz-Net (Figure 1.1). The second phase consists of three regional workshops each focusing on different types of hazards and areas of Europe. Of the six work packages, social capacity building and risk governance are seen as overarching themes that interconnect risk perception, social vulnerability, risk communication and risk education. These last four, while divided as independent themes for structural purposes, are viewed as interdependent (note the double edged arrows). The interlinkages of all these 6 themes will feed into the final work package on social resilience.
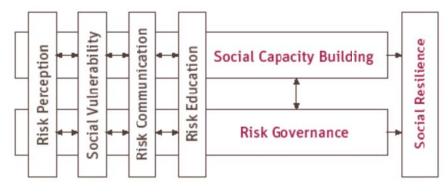

Figure 1.1: CapHaz-Net Thematic Structure

How does the Regional Workshop function within the CapHaz-Net project?

As described above, the first half of the CapHaz-Net project involved a review and documentation process of the six themes that the project has found pertinent to achieve the goal of enhanced social resilience. This review process through the six themes identified was designed to inform the project consortium sufficiently as to provide a solid foundation to handle the more practical section and second half of the project, the so-called Regional Hazard Workshops (RHWs). During three such regional workshops – each of them focusing on specific types of (regional) hazards – the theoretical concepts developed in the first half of the CapHaz-Net project were intended to provide a foundation to understand the practices encountered in the workshops. Thus, the Regional Hazard Workshops function as a bridge between the more theoretical component of the CapHaz-Net project and the more practical aspects.

The first Regional Hazard Workshop was held in Barcelona from 7-8 October 2010. The workshop's focus was on heat-related hazards, specifically droughts, forest fires and heat waves. Two more regional workshops, one on Alpine hazards and the other on river floods, will be held in the course of 2011 before the CapHaz-Net project finishes in 2012.

As an introduction to delimit the discussion, in the following paragraphs we provide a first approach to the three heat-related hazards which this report deals with.

Large areas of Europe are affected by *droughts* and water scarcity (WSD) and pressures on European water resources have increased. In Europe, over the past 30 years many countries were hit hard by WSD, particularly the European Mediterranean countries. But WSD is not exclusive to drier areas and in recent years, several regions in Europe have been affected by severe and extensive events. For instance, the 2003 drought, which was one of the most prominent events in the period analysed, affected an area extending from Portugal and Spain to the Czech Republic, Romania and Bulgaria (EEA, 2010). In this report we will understand droughts as "socio-environmental phenomena, produced by admixtures of climatic, hydrological, environmental, socioeconomic, and cultural forces" (Kallis 2008: 85).

Forest fires are a recurrent phenomenon in Europe and on other continents. Fires are a natural disturbance, which are essential for the regeneration of certain tree species and ecosystem dynamics. In addition, fire has been used in the environmental context for many purposes, including shrub removal in the forest and straw burning in agriculture. In the Mediterranean Region, for instance, the abandonment of traditional forest management practices and the suppression of fires for decades led to an accumulation of fuels in the forests, leading to more intense fires. Once these fires are ignited under high fire danger conditions that facilitate fire spread, they cannot be stopped. Despite the significant number of fire fighting resources used to extinguish them, large fire episodes that lasted several days occurred recently in Portugal (2003, 2005), Spain (2006) and Greece (2007) (EEA 2010). According to the CTFC[3], forest fires are the main disturbance affecting Mediterranean forests. The phenomenon has two perspectives not always sufficiently differentiated: fire as a natural ecosystem element and fire with destructive effects in the framework of the emergency management.

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[3] Forest Sciences Center of Catalonia. http://www.ctfc.cat/?page_id=453 (last access June 9th, 2011).

Heat waves have been the most prominent hazard with regard to human fatalities. In total, more than 70 000 excess deaths were reported in Europe during the hot summer of 2003, and heat waves in the summers of 2006 and 2007 together showed an increase in excess deaths of almost 3 000 fatalities. According to EM-DAT (2010), a hot/warm spell or heat wave is a prolonged period of excessively hot, and sometimes also humid, weather relative to normal climate patterns of a certain region. Due to the fact that the term is relative to the usual weather conditions in a given area, there is no universal definition of a heat wave e.g. in terms of a temperature threshold that has to be reached for a number of consecutive days (EEA 2010). In Catalonia a heat wave is usually defined as three or more consecutive days with temperature over a certain threshold[4].

The topics and main issues discussed within the Barcelona RHW group sessions are categorised in this report (see all Tables in section 3) according to levels as presented in Figure 3.1 of CapHaz-Net WP1. This categorization system refers to four levels of social capacity building, from the individual, community, organizational and institutional arrange, in an overlapping manner. The definitions and separation of the levels we have used in the aforementioned tables are as defined in WP1 (21-24) and will be those used throughout this document.

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[4] As stated by Xavier Basagaña in his speech during the RHW.

2 Exploring forms of governance for heat-related hazards based upon existing practices and policy approaches

In this section we aim to shed light on the practices, policy approaches and legal tools used to understand how natural risks are handled. Firstly we examine how institutions have been evolving in Europe in the field of environmental regulation, particularly focusing on Southern regions. We intend to provide a picture of the main features of the institutional framework at the supranational, national and regional levels which will shape risk governance in the future. Secondly, and considering national and regional levels of analysis, we identify the problems within the institutional framework towards natural hazards taking heat-related risks (forest fires, droughts and heat waves) as examples to elaborate policy recommendations to help enhance the capacities of European societies to prepare for, cope with and recover from the negative social impacts of natural hazards.

2.1 The European legislation is shaping new forms of governance in its Member States

European Union membership demands national political adaptations to fulfil EU regulations standards. The main drivers of change rely on the distribution of both financial and cognitive resources and the pressure of sanctions applied by the European Commission and the European Court of Justice (ECJ).

When countries in Southern Europe – Spain, Portugal and Greece – entered the EU, they had to incorporate horizontal and cooperative approaches which defied the prior reactive and interventionist political framework inherited from authoritarian regimes (Börzel 2002). The named countries showed multiple deficiencies: institutional underperformance, administrative fragmentation, lack of technical expertise, weak investment potential, scarce civil involvement and administrative reluctance to cooperate with private actors. These countries had to strengthen democratic institutions, readjust political instruments and achieve socio-economic modernisation to gain international recognition.

Environmental policy has been one of the challenging domains for Southern Member States (Börzel 2003). Environmental governance in these countries has been shaped throughout the last two decades according to the domestic institutional scope in which environmental policy has been evolving. On one hand, the distribution of competencies in the political framework within a territory permits the decentralisation of the decision-making processes from the national to the local level. In Spain, for instance, regions have autonomy of governance, which triggered the development of intergovernmental cooperation channels between central and regional administrations. This situation gave rise to a diverse network of stakeholders which operate at different government levels, such as bureaucrats and industrial and environmental groups (Fernández, Font, and Koutalakis 2010). On the other hand, the autonomy and leading capacities of a particular policy determines its prominence in the political agenda. Hence, the institutional structure behind environmental policy enables the organisation of policy communities, the coordination of networks and the involvement of non-state actors in resource exchange processes.

2.2 Institutional framework and policy context at the regional level: Environmental governance in Spain in response to EU environmental regulations

Spain's entry into the European Economic Community (EEC) in 1986 and the subsequent adoption of EU environmental policies represented a huge economic challenge for the country. Spanish GDP was much below the European average, and economic and social priorities partly excluded environmental concerns from the national budget. Furthermore, the hierarchical structure inherited from 39 years of dictatorship hindered the involvement of stakeholders which was demanded by the EU directives. Hence, Spain failed in the implementation of environmental regulation in the subsequent years after its incorporation to the EEC (Börzel 2009). Nevertheless, the economic growth and the steady establishment of the welfare-state allowed for an enhanced implementation of environmental governance mechanisms since the mid-1990s.

The Spanish government has gradually created incentives to encourage participatory processes for environmental decision-making. It has decentralised decision-making towards the regions and has allocated political and technical resources to a broader range of stakeholders. Additionally, it has endorsed the creation of intergovernmental coordination mechanisms, the adoption of multi-level management and the activation of interconnected networks. Spain is among the aforementioned Southern EU members eager to implement environmental governance mechanisms.

Due to the decentralised structure of the Spanish administration and its autonomous functioning, it is necessary to take into account two different levels (national and regional) when analysing the institutional scope for heat-related hazards.

2.3 Definition and characterisation of the hazards

2.3.1 Droughts

The rainfall pattern in Spain is irregular and shows steep variability throughout the year, which is one of the characteristics of the Mediterranean climate. This Southern country is therefore particularly vulnerable to droughts.

In Catalonia there have been different episodes of drought and, as already explained in the CapHaz-Net WP2 report (Walker et al. 2010), adverse meteorological events have a great impact in the region. The strong regional and seasonal differences in precipitation and soil moisture, which are characteristic of the Mediterranean climate, have important implications for water supply, notably the need for the transfer and storage of water within the different regions to match supply and demand (GenCat 2009).

2.3.2 Forest fires

In Spain, and particularly in Catalonia, the repeated large forest fires show that land use change is one of the main causes which triggers uncontrolled forest fires. Since the 1980s, forest fires which could not be controlled with the existing extinction strategies burnt large areas. Hence, the "fight against fire" concept has evolved to new paradigms and assessment tools. Forest fire risk

management strategies integrate land-use patterns into the common policies of prevention and extinction.

2.3.3   Heat waves

Heat waves are underestimated hazards despite an increase in mortality rates associated with these events (Robine 2007). It is estimated that climate change will accentuate these kinds of disturbances by enhancing their intensity, frequency and duration (Meehl et al. 2004; Schar et al. 2004).

The heat wave that hit Europe in summer 2003 caused 50,000 deaths, which was above the normal yearly average. In Catalonia, mortality rates were twice those registered for the same period in the previous year.

2.4   Political and institutional approaches for heat-related hazards

2.4.1   Droughts

Water shortages attract more popular and political attention than any other environmental issue in Catalonia and even in Spain more generally (Kent, Newnham, and Essex 2002). Nevertheless, historically, droughts in Spain, as well as in Catalonia, were managed as an emergency situation. Thus, drought management policies usually used a crisis management approach by declaring a national and regional drought program to alleviate drought impacts (the Drought Decree of Catalonia), or by transporting water from different rivers or water basins to another location, such as from the Ebro river (Karen 2007).

The EU Water Framework Directive encouraged Spain to rebalance its priorities and ensure water supply to all economic users. In 2001 the Hydrological National Plan established the basis for the planned management of droughts and the development in each river basin of a special drought action plan. The main objective of this draft entitled "Guidelines for the development of drought emergency plans in urban water supply systems" is to ensure that all plans meet unified and homogeneous criteria so that the identification of risk situations responds to the same principles. It was developed by the Spanish Association of Water Supply and Sanitation, in collaboration with the Spanish Federation of Municipalities and Provinces and the Ministry of Environment.

Nevertheless, the State Water Authorities at the regional and local level can establish different types of management measures to mitigate the consequences of drought, these measures are mainly related to the management of demand and not only those measures designed to restrict it. Certain actions, such as the preservation and improvement of public water, can mitigate the effects of drought and are measures to be implemented in long-term planning.

In Catalonia the Catalan Water Agency (ACA) is the public authority with full competence over the entire water cycle – planning, administration, control, promotion, regulation and management – for the internal watersheds. It is therefore the water authority or watershed body for this public water area. For watersheds shared among more than one region, the regional water agency shares competence with the correspondent national river basin confederations regarding treat-

ment and intervention in the public water domain. Nowadays the governing policies and management concerning water in Catalonia are based on the principles of the Water Framework Directive. The areas, institutions in charge and plans related to the drought management in Catalonia are further detailed in the Table 2.3.1.

Table 2.3.1: Areas, institutions in charge and plans related to the drought management in Catalonia (source: self-elaborated)

Area	Institutions	Plans and Organisations
Water management Water consumption restrictions Recovery of aquifers	Catalan Water Agency	Water conservations campaigns: • To inform about the daily progress of drinkable water availability, • To explain about measures taken to reduce water demand and • To provide advice to citizens in order to collaborate in reducing water consumption Coordination of the different authorities from local to regional scale Administration, control, promotion, regulation and management
Drought management	Catalan Water Agency Inter-institutional commission[1]: Coordinators for the Emergency Management Units (UGE).	Drought Decree Permanent Drought Committee (CPS) Drought Management Committee (CGS) Working groups with suppliers (ATLL, ASAC, AAA, EMSHTR) Actions and additional economic provisions aimed at defraying the costs resulting from the Decree corresponding to services or interventions provided by the different ministries of the Catalan Government. In an emergency scenario, their function is: • To assess the level of available resources and demands. • To ensure the fair administration of water resources. • To advise and make proposals to the holders of the supply/high management authorities. • To regulate the joint management of local resources.
Drought observatory for awareness raising	National Drought Board in Catalonia	Compile information about the consequences of actions approved or planned, and at the same time to understand and address the perceptions of these actions in the territory and in the main sectors

[1] It comprises: Department of Governance and Public Administration; Department of Agriculture, Food and Rural Action; Department of Health; Department of Innovation, Universities and Enterprise; the Department of Economy and Finance; Department of Home Affairs, Institutional Relations and Participation; Catalan Water Agency; Catalan Association of Municipalities and Regions; Federation of Catalan Municipalities and Metropolitan Agency for Hydraulic Services and Waste Treatment (EMSHTR).
AAA: Water Supply Association / ASAC: Water Service Group of Catalonia / ATLL: Ter-Llobregat Waters

The persistent lack of rainfall in Catalonia led to the Drought Decree being issued in 2007. This document compiles different interests from ministries of the Catalan Government, water suppliers' associations, affected farms, the Metropolitan Agency for Hydraulic Services and Waste

Treatment, and other members of the spill-over committees, which are the bodies responsible for managing the regulated systems of the inland basins in Catalonia (http://aca-web.gencat.cat)5. The institutions that monitor compliance with Drought Decree are the ACA as the main institution and the management bodies of the upstream supply or local authorities responsible for domestic supply.

The Catalan Water Agency (ACA) implemented a series of instruments and management plans that included a variety of measures aimed at reducing water consumption, the recovery of aquifers and the application of the new Drought Decree. The latest relies upon different scenarios and progressive selective restrictions in all areas aimed at conserving water reserves in order to prevent an emergency situation in which restrictions would be applied to domestic water use. Restrictions on non-priority uses and savings in the supply based on the obligations established in the Decree represented a reduction in consumption from the supply network of around 6%, according to figures for 2005 (ACA 2009).

The main instruments and management plans implemented were:

i.   At the end of January 2007, the Permanent Drought Committee (CPS) was set up within the ACA as the executive body for monitoring periods of scarce resources and for planning actions to be taken.

ii. The Drought Management Committee (CGS) was also set up and was given the two-fold task of drawing up the new Decree on exceptional and emergency measures for the management of probable future periods of drought, along with the writing and processing of the Drought Management Plan.

iii. A campaign to encourage water conservation was also launched. ACA opened a web site to provide the daily progress of drinkable water availability, to explain about measures taken to reduce water demand and to provide advice to citizens in order to collaborate in reducing water consumption. Furthermore, the website also allowed people to follow the water levels of the Catalan reservoirs through graphs and real images, as well as rain forecasts for the next days and graphs of the evolution of the rains in the last decades. Moreover, some pedagogical resources to raise awareness about sound water practices and uses were also available.

iv. In order to carry out its functions, the CGS created the working groups necessary for ensuring that the results were operational and attained with the agreement of the different users, amongst which the Working Group with Suppliers (ATLL, ASAC, AAA, EMSHTR) should be highlighted, so as to coordinate drought management measures with the emergency supply plans.

Measures to conserve water were laid down in the Decree and were complementary to the actions that could be taken by all citizens in terms of household consumption. They included municipal actions such as reducing garden watering, closing ornamental fountains, reducing the cleaning of streets with drinkable water, controlling the filling of private swimming pools, the use of private springs, the production of municipal emergency plans for municipalities of more than

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[5] See also CapHaz-Net WP 2 report, Section 7.4 (Walker et al. 2010).

20,000 inhabitants and those covered by the river basin of Ter-Llobregat (ATLL), the publication of edicts and the application of measures on a municipal level, etc. (http://acaweb. gencat.cat).6

Furthermore, there are transversal institutions for drought management: the Inter-institutional commission and the Coordinators for the Emergency Management Units (UGE).

i.   The Inter-institutional Committee comprises members of the Department of Governance and Public Administration; the Department of Agriculture, Food and Rural Action; the Department of Health; the Department of Innovation, Universities and Enterprise; the Department of Economy and Finance; the Department of Home Affairs, Institutional Relations and Participation; the Catalan Water Agency; the Catalan Association of Municipalities and Regions; the Federation of Catalan Municipalities and the Metropolitan Agency for Hydraulic Services and Waste Treatment. The aim of this Inter-institutional Committee is to make proposals to the Government in terms of actions and additional economic provisions aimed at defraying the costs resulting from the Decree corresponding to services or interventions provided by the different ministries of the Catalan Government.

ii. The Coordinators for the Emergency Management Units are appointed by the director of the ACA. They enter into action when the emergency scenario is stated. Their functions are:

   • To assess the level of available resources and demands.
   • To ensure the fair administration of water resources.
   • To advise and make proposals to the holders of the supply/high management authorities.
   • To regulate the joint management of local resources.
   • To issue resolutions (by delegation from the director of the ACA).

Simultaneously, other platforms have been created both at the regional and at the national level: the National Drought Board in Catalonia and the National Observatory of Drought, respectively. Both organisations are integrated by a wide range of stakeholders: government representatives, parliamentary representatives, social actors, resource users, representatives from academia and ecologists.

The main objective of the National Drought Board in Catalonia is focused on getting as much information as possible about the consequences of actions approved or planned, and at the same time to understand and address the perceptions of these actions in the territory and in the main sectors. Therefore, this board monitors exceptional proposals to deal with drought and their feasibility, implementation and effectiveness. Among these measures is the requirement that approved actions do not involve the permanent transfer of water between basins, and to avoid negative impacts on the environment.

The Ministry of Environment and the Ministry of Agriculture, Fisheries and Food which aims to bring all Spanish water administrations which hold responsibility for water-related issues into a centre of knowledge exchange, anticipation, mitigation and monitoring of the effects of drought in the country. The organisations that can be part of this Observatory are:

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[6] See also CapHaz-Net WP 2 report, Section 7.4 (Walker et al. 2010).

- The eight inter-basin organizations dependent on the General State Administration
- The seven intra-basins (Costa Galicia, Basque, Catalan Basins, Mediterranean Andalusia, Andalusian Atlantic basin, Islas Baleares and Canary Islands)
- The autonomous cities of Ceuta and Melilla
- The seventeen Autonomous Communities and Local Corporations.

The main objective of the National Observatory of Drought in Spain is to promote participatory processes in the political decision-making process not just among the relevant water administrations, but to include all citizens who want and demand information, transparency and quality of information. Hence, a new water culture is emerging as an alternative to water management and therefore an alternative way to cope with water scarcity as result of periodic droughts.

The 'new water culture' is a socially constructed concept which appears in Spain and Catalonia as an alternative to the current water management. It emerged in 2004 within the social movements of resistance to the Ebro river transfers and as a result of water scarcity awareness. It embraces an ideology of water saving, protection of ecosystems and quality improvement of water sources. It represents a new water management adjusted to the needs of the territory and based on a cross-institutional framework which endorses public participation.

It seeks to adjust to the Water Directive Framework, satisfying not only human demands but also improving water ecosystems to guarantee water quality. The new water culture aims to achieve an efficient use of water sources, involving stakeholders in participatory processes and within inter-institutional collaboration, and encouraging the administration to focus on a more sustainable territorial policy model.

2.4.2 *Forest fires*[7]

Fire risk management in Europe is integrated into the forest policy context. Each Member State develops its own planning processes according to their socio-economic, cultural, political and environmental features. To this end, the Spanish National Forest Programme (NFP) emerged in 1996 as a crucial tool in creating a framework for achieving sustainable forest management and as a basis for international cooperation in forestry (Solano 2006)

In Spain, forest management policy relies upon two ruling systems: the Spanish Forestry Strategy (1999) and the Spanish Forestry Plan (2002), which follows the NFP guidelines (1996). However, most of the tasks for the management natural forest areas rely on institutions of the Autonomous Communities. The Central Government has the authority to set up the law-making framework of forest policy in which each Autonomous Community develops its competences (Alcanda 2004). The transfer of powers to the Autonomous Communities occurred gradually over the 1980s. For this reason, the different Spanish regions are currently in various stages of its Regional Forestry Programme.

Within this context, forest fires are managed at two levels: national and regional. At the national scale Central Government has five functions: a) it provides support to the Autonomous Commu-

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[7] We very much acknowledge Eduard Plana from the Forest Sciences Center of Catalonia (CTFC) for his contribution to this section.

nities for the logistics during extinction, b) it is responsible for the overall coordination for forest-fire management in Spain, c) it is in charge of setting up a statistical database of forest fires at the national level, d) it has authority on Civil Protection through the Home Office when fires affect property outside forest sector and threaten people's lives and public services, and e) it provides basic guidelines to meet international commitments.

At the regional scale, legal tools for forest-fire risk management are the Forestry Plans and the Emergency Plans. The first concerns the protection of forestry in the different regions while the second embraces required actions when a forest fire actually takes place, including risk analysis, zoning, and organisation of the extinction and coordination protocols. Additionally, some regions have developed Defence Plans which have a broader scope and include prevention measures, detection systems, participatory processes and burnt area recovery. For a more exhaustive description we will tackle the institutional analysis at the regional level in Catalonia, one of the Spanish Autonomous Communities which has developed broader authority on the management of forest-fires.

Table 2.3.2: Areas, institutions in charge and plans related to the forest fires management in Catalonia (source: self-elaborated)

Area	Institutions	Plans and organisations
Landscape management		
Planning of environmental services provided by forests	SGF-DGMN-DMAH	General Plan of Forest Policy in Catalonia, Forest Resources Planning Project and Forest Management Plans
Husbandry	CPF-DMAH	Technical Plans of Forest Management at farm level
	DAR	Rural Development Plan, Land Use Contract
Restoration of burnt areas	SGF-DGMN-DMAH	Zones of Urgent Action (ZAU)
Forest fires prevention		Controlled burns in grasslands
Preventive agro forestry and infrastructure of prevention	SPIF, SGAR, SGF -DGMN-DMAH	Prevention Plans of Forest fires Burns to control vegetal combustible
	Cos de bombers-DIRIP ADF	
Surveillance	SPIF, SGAR –DGMN-DMAH DGPC-DIRIP	Organisation of rural actors. Forest fire statistics
Research into the causes	DMAH, DIRIP	
Awareness raising		
Extinction	DGPEIS-DIRIP ADF	INFOCAT Plan. Fire-fighters
Civil defence	DGPC-DIRIP	INFOCAT Plan Action plan
Territory planning	DPTOP	General plan of territory in Catalonia. Urbanisation plans

ADF: Forest Defence Groups / CPF: Centre for Forest Property / DAR: Department of Agriculture, Food and Rural Action / DGMN Environmental Management Department / DGPEIS: General Department of Fires Extinction and Rescue / DGPC: General Department of Civil Defence./ DMAH: Department of Environment / DPTOP: Department of land use policies and public infrastructures / GRAF: Supporting Group for Forestry Actions / SGAR: Bureau of Rural Agents / SGF: Forest Management Services

In Catalonia, forest fire management consists of three plans – prevention, extinction and restoration:

i. The prevention plan encompasses direct and indirect strategies. Indirectly prevention refers to the promotion of agriculture and husbandry activities in order to reduce the combustible material that is naturally accumulated in forests. The direct prevention includes, on the one hand, intervention on the causes which produce forest fires through education, surveillance and law-making to regulate risk activities (electric grids, agriculture burns, dumping sites, etc.); and, on the other hand, interventions to prevent fire expansion, by putting in place risk analysis of the territory. This will decrease combustible material and will allow the generation of security zones such as firebreaks and water spots.

ii. The extinction plan is defined by the 'Pla INFOCAT' (Special Plan for Forest Fire Emergencies in Catalonia). It establishes how and when to give notice of a forest fire, as well as the organisation and the procedures that those different institutions of the regional government and other private organisations should follow.

iii. The restoration plan for burnt areas consists of studying and analysing the territory before and after the forest fire, removing burnt vegetation and reforesting. Zones of Urgent Action are defined by law, which comprise those areas where natural reforestation cannot happen spontaneously as they are threatened by erosion.

In Catalonia prevention and fire fighting authorities are allocated in different departments. The administrative responsibility for forest fires risk management corresponds to a complicated structure that we explain in the following paragraph and which is pictured in Table 2.3.1[8]

Direct prevention (prevention plans, fire causation and statistics, etc.) is the responsibility of the Forest Fire Prevention Unit (SPIF) which depends on the Department of Environment and Housing (DMAH).[9] Forest management is tackled by the General Directorate of the Environment (DGMN) and the Forest Ownership Centre (CPF, which promotes forestry planning in privately owned estates) of DMAH. Both agencies do not have any organic relationship with the SPIF. Agricultural and livestock policies relate to the Department of Agriculture, Livestock and Fisheries (DARP). Land use, infrastructure planning and urban settlements are under the authority of the Department of Territorial Policy and Public Works (DPTOP). There is no form of coordination among these departments regarding land use and fire risk. Finally, authority for extinction relies on the fire brigade, which belongs to the General Directorate of Emergency and Public Safety of the Department of the Interior (DI). Also relevant is the role of the GRAF (Support Group for Forestry Activities), a department which is specialized in forest fires. Here again there is no formal collaboration with the departments aforementioned except during the period of forest fire risk. Forest Defence Groups (ADF) and the Municipal Technical Office for the Prevention of Forest Fires (OTMPIF) should be added to all the already described institutions. The ADF are supra-municipal associations of forest owners and volunteers who work in prevention and extinction, and currently cover more than 80% of the territory. The OTMPIF program develops fire prevention and the restoration of burnt areas of the Diputació de Barcelona[10].

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[8] In Catalonia there are professional and voluntary firemen. Professional firemen make up the Catalan government Fire Department, and voluntary firemen are trained by the Catalan Public Safety Institute. Both professional and voluntary firemen are supervised by the Catalan Department of Interior.

[9] The names of these institutions correspond to the period previous to the elections celebrated in Catalonia in November 2010.

[10] Institution which operates at both regional and local level and works as a link between municipalities and regional government.

The complexity of the forest fires institutional framework in Catalonia is evident and requires a transversal organisation in order to avoid the overlapping of functions within the regions and at the national level.

2.4.3 Heat waves

In Catalonia, the raise of mortality rates during the summer time on 2003 triggered alarm and the Catalan government put in place the first Action Plan to prevent the effects of a heat wave on health (POCS), which was subsequently implemented in the following years during summer time. This plan responds to the recommendations that the Spanish Ministry of Health Care and Consumption provided to the different Autonomous Communities. This plan observes an inter-sector cooperation which embraces the Catalan health care system, the Meteorological Service of Catalonia and the General Directorate for Civil Defence.

Table 2.3.3: Areas, institutions in charge and plans to mitigate heat waves effects in Catalonia (source: self-elaborated)

Area	Institutions	Plans and Organisations
Heat-waves forecast	Meteorological Service of Catalonia Operative Coordination Centre of Catalonia (CECAT)	Plan PROCICAT
Human health	CAP (Primary Health Attention Centres)	Action Plan (POCS)
Civil defence	General Directorate for Civil Defence	Plan PROCICAT Emergency Committee

PROCICAT: Plan for civil protection. The civil protection plans are planning tools that establish the functioning and organization of human and material resources to improve emergency response or serious risk in Catalonia.
POCS: Action Plan to prevent the effects of a heat wave on health implemented by the Catalan government

The warning and communication system is set up by the Department of Health with the collaboration of different agencies, which broadcast recommendations through some brochures available in CAP (Primary Health Attention Centres), pharmacies and hospitals. In addition, people can call a 24-hour telephone number for consultations and also receive advice and recommendations from the health care system on different topics. Also notices are sent to specific groups such as nursing homes and to certain groups in the workplace. The city council can strengthen these channels of information and dissemination by using local media.

The structure and the organisation of the plan are achieved by a function distribution. This description of the local level is based on the case study of Hospitalet de Llobregat, a city in the outskirts of Barcelona which has elaborated a protocol according to the Action Plan POCS and PROCICAT. The municipal council takes care of:
- Predicting the possible consequences of a heat wave in the city
- Encouraging prevention and self-protection in advance of a heat wave
- Identifying vulnerable sectors of the population and ensuring the monitoring of social and health care during a heat wave episode
- Strengthening the broadcasting of risk predictions and disseminating the alert to the population in advance
- Defining action procedures associated with thresholds and following the principles of proportionality, effectiveness and efficiency

The functions of the Catalan government rely on the activation of the civil defence plan (PRO-CICAT), providing extra resources to support municipalities.

The Meteorological Service forecasts monitor and track meteorological risk situations in coordination with the Operative Coordination Centre of Catalonia (CECAT) which, according to protocols, broadcasts warnings to the respective institutions in there as affected by the risk (Table 2.3.3).

The Emergency Committee is made up of different people with defined roles and it operates at the local level.

- Municipal Emergency Manager: This function is usually held by the mayor, who is the highest authority of the municipal civil protection body. This person needs to be aware of the situation in the municipality and, after evaluating and assessing the situation, decides to implement the most appropriate measures.
- Municipal Emergency Coordinator: CECAT monitors the situation in different at risk areas and informs the respective affected agencies. The municipal emergency coordinator acts as a coordinator of the different areas and should be in contact with CECAT. He has to inform and give advice to the Municipal Emergency Manager.
- Communication Manager: This person is in charge of disseminating risk information to the population and informing about the recommended measures to prevent negative effects.
- Responsible person for reception/interpretation of the meteorological risk warning – In an emergency situation CECAT tracks the evolution of the weather conditions through the Meteorological Service of Catalonia and monitors the situation of the area at risk. CECAT predictions are sent to the Alarm Receiving Centre of the affected place.
- Manager for the coordination of vulnerable people: The identification of vulnerable people is a key factor in the successful management of the emergency situation. It is necessary to continuously evaluate the welfare of people at risk and to bring them to hospital if necessary. For that purpose it is necessary to appoint a person who coordinates the health care system, social services and civil defence, and who is in permanent contact with the municipal emergency manager.
- Head of Transportation: manages the transport of vulnerable people in case of heat wave and works in permanent contact with the local coordinator of the emergency and particularly with the manager for the coordination of vulnerable people.

As described, POCS is a plan involving various departments of the Catalan government and other organizations and is coordinated by the Department of Health. The objective of this plan is to minimise the effects of heat waves through the coordination of preventive actions in several different areas with the help of weather forecasts. It consists of three phases, two of which are preparation and information and phase three is only activated in case of a Meteorological Risk Situation. However, there still exists a deficit of knowledge of this hazard which hinders efficient preventive actions.

2.5 Strengths and weaknesses in the political and institutional approaches in relation to the mitigation of heat-related hazards

In the previous section we have highlighted the practices, policy and institutional approaches needed to understand how natural risks are handled, and stress the strengths and weaknesses identified in order to provide some answers for the questions stated in the CapHaz-Net WP2 report (Walker et al. 2010).

> **Questions:**
> To what extent can shifts towards the new governance be seen across Europe, and what variation is there? Have some EU member states seen stronger and more significant processes of change than others?
>
> How might wider patterns of 'rolling back' and 'hollowing out' of the state, privatization, devolving and sharing of power have positive or negative implications for processes producing vulnerability and shaping the intensity of disaster experiences?

European Union membership demands national political adaptations to fulfil EU regulation standards. In order to do so the EU establishes incentives and sanctions. As a result, new schemes of governance have emerged also in the Southern Member States. Domestic institutional pathways encompassing territorial structure, political prominence and trust between state and non-state actors are essential to integrate the required standards.

The scientific literature argues that the distribution of competencies in the political framework within a territory allows the decentralisation of the decision-making processes. In Spain, for instance, regions have autonomy of governance in a variety of domains, which has triggered the development of intergovernmental cooperation channels between central and regional administrations. This situation has given rise to a diverse network of stakeholders which operate at different government levels. The identified features match up with the reviewed scientific literature stated in the previous work packages of the CapHaz-Net project. As indicated in the WP2 report (Walker et al. 2010), a key characteristic of new ways of governing is the diverse and interdependent set of actors organised as part of a network. This shapes a complex structure of multi-scaled partnerships, ranging from local governments to voluntary sector which can communicate directly with supranational organisations such as the European Union and vice versa. Hence, as stressed in the literature review, nation states are no longer the main players in the system due to a "hollowing out of the state" which refers, as we have seen in the case of Spain, to the relying of functions "upwards to the European Union, downwards to special-purpose bodies and outwards to agencies" (Rhodes 1997).

Furthermore, the autonomy and leading capacities of a particular policy determines its prominence in the political agenda. Hence, an established institutional structure enables the organisation of policy communities, the coordination of networks and the involvement of non-state actors in resource exchange processes.

The institutional framework is different for each of the identified heat-related hazards and the scope ranges from a supra-national scale, as it is the case of forest fires integrated into forest policies at the EU level, to regional or local level in the case of heat waves in Catalonia.

Table 2.4.1: Overall assessment of the heat-related hazards institutional framework in Catalonia.

Hazard	Characteristics	Strengths	Weaknesses
Droughts	▪ Multiple actors, networks and partnerships. ▪ Public participation processes. ▪ Multi-scale governance.	▪ Decentralised management at the different. ▪ Overall institutional structure: Catalan Agency of Water. ▪ Inter-institutional commission. ▪ Risk communication and risk education.	▪ Inter-sector collaboration. ▪ Reinforcement of participatory processes. ▪ Emergency management. ▪ Connection of stakeholders.
Forest fires	▪ Guided by EU directive. ▪ Multiple actors, networks and partnerships. ▪ Multi-scale governance.	▪ Decentralised management. ▪ Transition towards a risk management.	▪ Complex institutional structure. ▪ Lack of an overall coordination. ▪ Overlapping of functions. ▪ Emergency management. ▪ Connection of stakeholders.
Heat waves	▪ Local scale governance.	▪ Inter-sectorial collaboration.	▪ Allocation of institutional responsibilities. ▪ Awareness raising. ▪ Emergency management. ▪ Connection of stakeholders.

Fire risk management in Europe is integrated into the forest policy context. Each Member State develops its own planning processes according to its socio-economic, cultural, political and environmental features. In Catalonia, forest fires management consists of three plans: prevention, extinction and restoration of the burnt areas. However, the administrative responsibility for forest fires risk management corresponds to a complicated network structure that is poorly interconnected. The complexity of the institutional framework requires transversal organisation, which would avoid the overlapping of functions within the regions and at the national level.

Droughts are the second but no less important natural hazard to which Southern European regions are exposed to[11]. In Spain State Water Authorities at the regional and local level can establish different types of management measures to mitigate the consequences of drought. The Catalan Water Agency is the public institution with authority over the entire water cycle for the internal watersheds. This Agency has implemented a series of instruments and management plans which include a variety of measures aimed at reducing water consumption, the recovery of aquifers and the application of the new Drought Decree. Furthermore, there are transversal institutions for drought management. Simultaneously, other platforms have been created both at the regional and at the national level: the National Drought Board in Catalonia and the National Observatory of Drought at the state level. Both organisations are integrated by a wide range of stakeholders: government representatives, parliamentary representatives, social actors, resource users, representatives from academia and ecologists.

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[11] See EC Communication on the challenge of water scarcity and droughts in the EU (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0414:FIN:EN:PDF) (last access July 25th, 2011).

A new water culture is emerging as an alternative to traditional water management and therefore to cope with water scarcity as result of periodic droughts. It focuses on an efficient use of the water sources, involving stakeholders in participatory processes and within inter-sector collaboration, and encouraging the administration to focus on a more sustainable territorial policy model. This again provides a clear example of the governance shifts discussed in WP2 towards collaborative, partnership working and of lessons learnt.

Focusing on heat waves as the third heat related hazard it is understood that, despite the negative effects generated by temperature rise on people's health, an institutional gap exists. After the 2003 heat wave the Catalan government put in place the first Action Plan to prevent the effects of a heat wave on health (POCS). This Plan considers an inter-sector cooperation which embraces the Catalan health care system, the Meteorological Service of Catalonia and the General Directorate for Civil Defence. Nevertheless a more thorough definition of responsibilities and functions is needed.

It is relevant to stress that, from a political perspective; the three phenomena are approached as situations of emergency and therefore as sporadic events. Nevertheless, the increases in frequency and intensity which are predicted for these kinds of events in the future will make it essential to review the perspective from which they are regarded. It is necessary to incorporate uncertainty and readiness for unexpected events and multi-hazard situations through institutional learning in order to build resilience and social adaptive capacity – another key theme of the risk governance literature. This will require the design of policies and institutional infrastructure able to respond and reorganise after the natural hazard. It is necessary to endorse the creation of intergovernmental coordination mechanisms which connect multiple actors, networks and partnerships and the adoption of multi-level governance.

3   Existing practices for heat-related hazards in Catalonia: Main outcomes of the RHW

After having described and understood the hazard-related national and regional institutional contexts, the Heat-Related Hazard Regional Workshop (RHW) aimed at identifying existing practices for dealing with droughts, forest fires and heat waves at a regional scale. The RHW was intended to provide a space for the practitioners in Catalonia to discuss current practices, main problems and possible solutions when dealing with these hazards.

In this section we provide the main outcomes of this discussion space, which began to be developed prior to the workshop, during what we called the pre-contacts phase[12]. During June and July 2010 we carried out 12 face-to-face interviews in Barcelona with the main aim of creating a sense of familiarity and interest in the workshop, and this is why we dismissed the option of having interviews by phone or designing some kind of questionnaire and agreed to have face-to-face meetings. During these pre-workshop meetings a version of the RHW discussion questions that would be used to guide the break-out group sessions during the workshop was introduced to participants. But the analyses of the interviews also provided some interesting outcomes[13]. These results proved to be a kind of introduction for the issues which were later brought up during the RHW group sessions[14].

Overall, the Heat-Related Hazards Regional Workshop served to improve our understanding about how different social actors in Catalonia perceive their own vulnerabilities and capacities, and how they act. The final purpose was to identify various forms of social capacity[15] at different levels (individual, community, institutional) for each of the three heat-related hazards and to raise awareness at the local and regional level.

A result worth mentioning of the interviews was that power was an issue to be addressed somehow, particularly in the drought context[16]. As discussed in the WP2 report, imbalances and asymmetries of power are recognised as an important challenge to simplistic notions that collaborative risk governance will always lead to effective and equitable outcomes. Power was referred to several times[17], ranging from discussions of the interactions between actors (between organisations and communities, as well as between individuals and within organisations), to the way information is provided (or not) by the media (how and by whom public opinion is built) as well as to the content of the message provided, and to issues of agenda setting and problem definition (mainly risk definition and vulnerability definition). This can be noted within the group dynamics even, as during the first group session for droughts, there seem to be a power struggle over the agenda setting within the group. Various institutional actors tried to provide their arguments to move the frame of the discussion into their own perspective. In the later group discussions how-

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[12] See the Annex of the Deliverable for detailed information on the aims and usefulness of the interviews, as well as on practical procedural issues.

[13] See Appendix 4 in this report for detailed information on the results of the pre-contacts round informal analysis.

[14] See the Annex for detailed information on the organization and development of the group sessions.

[15] Social capacities, as defined in WP1, encompass all the available resources in a multi-scale level (individual, community and institutions) which are invested to anticipate, respond to, cope with, recover from and adapt to external disturbances. These resources include skills, knowledge, social networks as well as institutions, structures and knowledge of how to elicit and use them (Kuhlicke and Steinführer 2010, 16).

[16] As a result of recurrent references in the interviews with ACA and XNCA representatives.

[17] Power and legitimacy issues are dealt with in pages 40-41 of the report.

ever, the actors within the group change, discussion also changed and became more conceptual. Yet, what we saw within the group is a microcosm of the reality of the public sphere, with various actors debating along their institutional agenda trying to promote their ideas. Setting the agenda and defining the problem are linked, whether through the media or through discussion. "The public does not appreciate the cost of providing water, who is to pay for it" vs. "water is a basic right and need of the public" are quotes that frame the problem and therefore the agenda.

3.1 Discussion groups' analyses

During the RHW, each of the group discussions provided several outcomes on current practices and improvable aspects when dealing with droughts, forest fires and heat waves.

3.1.1 Droughts

With reference to the etiological characteristic of the hazards (Table 3.2, Tapsell et al. 2010, 15), droughts do not differentiate between the source and receptor of the hazard, have a slow rate of onset, with slow systematic flow out characteristics, persist over a long period and affect a diffuse area. However, within the droughts group, the discussion focused more on the use of water as a resource (Figure 7) than on the physical aspects of the hazard. In discussing 'how to deal with the hazard?' and 'how it affects us?' the debate consistently revolved around water management and use rights, rather than drought management per se. It was understood that droughts are not just a physical phenomenon but moreover there are social and economic aspects in the management/mismanagement of water resources[18] that lead to the current problem of droughts in Catalonia. This reality is in line with the definition of droughts as defined by Kallis: "droughts as socio-environmental phenomena, produced by admixtures of climatic, hydrological, environmental, socioeconomic, and cultural forces" (Kallis 2008, 85). Although precise definitions remained unspoken, this was the meaning adopted within the drought group, as opposed to other commonly used definitions which regard droughts as a more meteorological phenomenon. Hence, the creation of a drought was seen as dependent on institutions, usage, and management. Discussions therefore revolved around the question of use rights, how they should be defined, and if (and how) they should be paid for. Questions surrounding the transparency of the administration and the role of citizens in terms of participation were offered as solutions. The new imaginary for dealing with drought seems to involve a more inclusive form of participation from civil society in water management. Ideas of managing the risk of drought, or around the privatisation of risk were not the questions that were asked within the group. Rather, 'do we agree with the current management of the resource?' and 'how can we be more involved to manage the resource in a fairer manner?', were the questions that were considered relevant not just in terms of reducing drought occurrence but also for our overall autonomy with water use as well as current inequalities in water distribution and consumption within communities.

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[18] Within the group sessions water was referred to as a resource – 'the resource of water' – and discussions revolved around the use of it as a resource. For practical reasons we will write water but it needs to be born in mind that water as a resource is a different concept rather than water as an element that is lacking during droughts. This concept also brings a specific approach to dealing with the institutions surrounding the hazard.

Figure 5.1: Visual summary [19] of the minutes in the drought discussion

In Table 3.1.1 the main outcomes of the group session are organised by levels[20] on the Y axis and discussion questions in the X axis. Participants highlighted that droughts affect mainly the individual and social level. It has immediate economic impacts (industry and agriculture) and subsequently raises conflicts between sectors and the debate over rights and use efficiency. As stated by a participant in the drought group, individually there is a steadily increasing awareness of the risk which has triggered a cultural shift towards water consumption and demands for alternative water management policies[21]. For their part, institutions are making an effort to promote self-responsibility among citizenship through risk communication and education through water use campaigns, access to information and weather forecasting[22]. Overall, the impact, and therefore the vulnerability to the hazard, depends on many different factors: water uses, the degree of urbanisation, water management policies in the area, etc.

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[19] Words of bigger font size refer to words used more often within the minutes (as in M7.1) of the discussion.

[20] Adapted from CapHaz-Net WP1.

[21] Referred to previously in this report as a 'new water culture'.

[22] See the Barcelona drought case study in the CapHaz-Net WP 2 report (Walker et al. 2010).

Table 3.1.1: Group session's synthesis and lessons learnt for droughts

Level	How does it affect us?	What is being done?	How to improve?
Individual	▪ **Emotional, conscious-ness, attitude, cultural shift**		
Social/ Communi-ty[23]	▪ **Conflicts between sec-tors**; debate over **rights** (and use efficiency); **transparency** requirement increase. ▪ **Economically**: agriculture and industry; tariffs	▪ **Social movements**: participation of differ-ent groups developing proactive proposals.	▪ **Public participation** in water planning (writing, following up, application); social networks as information and good prac-tices transmission vehicle; "to learn by participating" (participation training).
Institutional		▪ **Awareness raising** campaigns. ▪ **Available infor-mation** improvement (access and following up). ▪ **Weather prediction** improvements. ▪ **Water planning**: drought factor consid-ered, but not at cross-section level.	▪ **Hydrological measures**: precautionary principle; concession system revision; sector use flexibility; improvement in drought prevision; improvement under-ground water strategic role manage-ment. ▪ **Cross-section** measures: introduction of **vulnerability reduction** measures within other policy areas; government agreement on water management is-sues; raise awareness in need to **adapt consumption practices** to climatic-environmental conditions; **inside admin-istration** participation; **ethical commit-ment of media** in risk messages trans-mission. ▪ **Prevention** measures: risk awareness rising in school curriculum. ▪ **Legal: binding reports** on risk; con-struction legislation. ▪ **Economic**: **tariff structures revision; public money traceability** (transparen-cy).
Ecosystem	▪ **Losses**: environmental services.		
Others/ General reflections	▪ **Droughts effects depend on** urban-rural, available information, social sector, water uses, life level, politi-cal management, intensi-ty/frequency and type of urbanisation.		

Simultaneously, several weaknesses were raised during the workshop and relate mainly at the social and institutional level. The importance of promoting public participation in water planning and endorsing social networks was emphasised as the means to convey information and social practices. Risk education and communication were stressed as crucial for addressing efficient water use and awareness rising. At the institutional level, participants pointed out the need to

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[23] 'Community' category as CapHaz-Net defines it was referred to as 'social' during group sessions.

take hydrological measures based upon the precautionary principle (e.g. concession system revision, sector use flexibility, improvement in drought forecasting), the suitability of a cross-sector coordination (not only water management) focused on the territorial policy model and the adoption of economic and legal measures. Participants emphasised that binding reports on the one hand and adapted tariff structures considering the vulnerability and water demands of the population on the other would be crucial to improve the situation. These outputs from the droughts group session correspond with the conclusion raised in the Xerochore project[24] regarding the European Water Framework Directive. In this project it was argued that due to demand management strategies not being promoted as obligatory measures, economic instruments might be considered as a means to influence water consumption patterns. However this does come at odds with the debate within the drought group on the inherent right of the population for access to water. Similarly, it was recommended to aim towards an integrative water management, which considers different sectors (agriculture, energy) in a policy territorial model. Finally, the drought group stated that there is a need to move from emergency management to preparedness planning.

The discussion devoted to *forest fires* heavily stressed the multi-dimension effect this hazard has, such as: social, ecological and economic; direct and indirect; short, medium and long term; positive and negative. Risks borne from forest fires are perceived as a complex and uncontrollable phenomenon by both society and institutions. Such a perception generates an emotional effect expressed through the feelings of insecurity and frustration.

3.1.2 Forest fires

As stated previously, the etiology[25] of forest fires is of mixed generation, with rapid onset, chaotic and rapid flow out characteristics affecting a diffuse area over a short time period. The institutional management of forest fires is also different as it involves many agencies working together in a short term emergency situation. It is therefore not surprising that the issues discussed and the focus on the problem were conceptualised very differently from the other two hazards. The forest fires discussion kept rotating around the idea of learning (social learning, learning from/between organisations) as well as education and communication, and within that the idea of self-responsibility for that learning. There was a huge focus on the sharing of knowledge within this group, probably in part because the institutions involved usually create problems through their lack of knowledge sharing and coordination. The group did, however, see the need for research to be done particularly on the social construction of risk but in a manner that responds to the social agents – again an indication of the lack of current research in that area. They also felt that, while society would like to work more on the 'living with fire' idea, the institutions are slow on the uptake.

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[24] (FP7), European Commission. 2010. XEROCHORE SA (An Exercise to Assess Research Needs and Policy Choices in Areas of Drought) Science Policy Brief. Implementing a programme of measures.

[25] See Table 3.2 of the CapHaz-Net WP 4 report (Tapsell et al. 2010, 15).

Figure 5.2: Visual summary of the Minutes in the forest fires discussion

An interesting comment which relates to the learning practices was mentioned as a positive im-
pact of forest fires. Community and the institutions would be involved in this learning dynamics.
However, the transition from (current) 'zero-risk' paradigm to (desirable) 'living with fire' para-
digm[26] is still a very slow process. An on-going learning process from past experiences should
help complete the transition to a co-existence paradigm in which citizens' self-responsibility and
experience sharing would play an important role, as well as the identification of implementable
rather than possible (but not realistic) solutions. The paradigm shift implies a discourse evolution
which is indicative of the social construction of risk idea, which didn't emerge in the other groups.

As shown in the main outcomes of the group session (Table 3.1.2), one of the weak spots identi-
fied point out the need of risk education, both at the individual and institutional level. In the first
case referring to self-responsibility, and in the second stressing the need to provide people with
a coherent message. This last observation is consistent with the need of cross-scale coordina-
tion, without which the current complexity of institutions involved in forest fire management re-
sults in a confusing, incomplete and even contradictory message. Participants particularly em-
phasised the need for an overarching institution which is able to group and coordinate all the
current actors involved in the management of this hazard.

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[26] The traditional institutional paradigm, centered in the extinction phase, seeks to eliminate all fires (e.g. zero-risk paradigm). Alternatively, we are
currently in transition from this strategy to an acceptance that some fires are necessary as part of the ecology of Mediterranean forest, as well as the
impossibility of eliminating all fires (e.g. living with fire paradigm).

Table 3.1.2: Group session's synthesis and lessons learnt for forest fires

Level	How does it affect us?	What is being done?	How to improve?
Individual	▪ **Emotional**: insecurity, frustration (uncontrolled and complex phenomenon); status loss.		
Social/ Community[27]	▪ **Emotional**: insecurity, frustration (uncontrolled and complex phenomenon). ▪ Due to social impact forest fires generate **learning practices.**		▪ **Educating citizens in self-responsibility** when facing hazards: **understandable massages adapted to** addressees; **coherence** from administration.
Institutional	▪ **Emotional**: confusion (uncontrolled and complex phenomenon). ▪ Due to social impact forest fires generate learning practices and **reactive policies.**	▪ Immediate and simple effects **mitigation measures.** ▪ **Slow evolution from 'zero risk' paradigm to 'living with fire' paradigm.** ▪ **On-going learning from experience**: positive aspect (knowledge globalization allows faster learning)/negative (catastrophe needed to begin learning).	▪ **Unification effort** (integrated/cross-sectioned management of risk; Catalan Fire Agency?). ▪ **Educating citizens in self-responsibility** when facing hazards: **understandable massages adapted to** addressees; **coherence** from administration.
Others/ General reflections	▪ **Multi-dimension effect:** social, economic, ecological, emotional **level**; short, medium, long term (**temporal scale**); **direct, indirect** affectation; **positive, negative** impacts; **domino effect** (with other hazards). ▪ Effects can't be understood and interpreted without considering **social construction of risk** (education, communication, and media factors). ▪ Due to social impact forest fires generate **discourse evolution.**	▪ **Research**: applicable and transferable, in response to social agent's demands **(bringing together social and technical realities).**	▪ (Just) **Possible or realistic solutions?** ▪ **Results transfer**: communication **alliances** (science, society, politicians, and technicians); multidisciplinary approach to improve channels and ways of **experience sharing.**

When thinking of how to deal with hazards a very specific suggestion was the need to consider possibilistic solutions, meaning solutions than can really be implemented, as opposed to ideal (but maybe not applicable) solutions.

[27] 'Community' category as CapHaz-Net defines it was referred to as 'social' during group sessions.

3.1.3 Heat waves

The etiology[28] of heat waves is such that they are undifferentiated between the source and receptor of the hazard, with a slow rate of onset. They are also geographically and temporarily diffuse and slow, affecting a diffuse area and persisting for a short time. The major point of concern for this group was risk perception issues and vulnerability, with some concern on risk communication and social learning issues. This is understandable since, of the three hazards discussed, heat waves were seen to be the one with the widest impact – they don't just affect the region of Catalonia but the whole of Europe. They also have their cause in a longer timeline (considering climate change), which makes them a hazard where determining cause and responsibility is less evident[29]. Hence much of the discussion centred around whether hazards are perceived by people as hazards as such or are ignored. The discussion focused also on people's vulnerability, though this was less about defining categories[30] and more about the position of people within their social networks and the relation of this position to their own (increased or decreased) vulnerability. Of note, and this bodes well for the idea of resilience, is that the city structure and its design was held in question considering the risk posed to people in urban areas. Cities could be designed to protect people from heat waves, and changes could be made in this direction. In addition, changes in cultural behaviour (e.g. reinstitutionalising the 'siesta') were suggested to reduce vulnerability to heat waves.

Figure 5.3: Visual summary of the minutes in the heat waves discussion

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[28] See Table 3.2 of the CapHaz-Net WP 4 report (Tapsell et al. 2010, 15).

[29] In comparison with the forest fires and droughts groups, there seems to be an understanding that some of the causes of the hazards were due to the mismanagement on the part of the institution involved. That is not as obviously brought up in heat waves, though some of the effects of the heat waves could be related to mismanagement of institution, but never in a direct manner.

[30] An emphasis made in the CapHaz-Net WP4 report (Tapsell et al. 2010).

An interesting but not surprising result in the *heat waves* group was that the ecosystem was never mentioned as a relevant scale, as it was in the droughts and forest fires groups. In terms of risk perception, participants clearly thought of heat waves as mainly affecting humans, and specifically human health. This was the characteristic focus of heat waves groups[31].

Individual and community levels where mostly referred to when discussing vulnerability issues. As a general comment on the hazard perception, participants agreed that heat waves are a usually underestimated risk. This underestimation is explained by different factors, such as age, health state or being local. Socio-demographics were brought up as a key factor to identify most vulnerable groups (children, the elderly). Another recurrently mentioned relevant factor when discussing vulnerability at the community level was social networks. The more integrated in social networks, the less vulnerable a person is. According to this reasoning and in addition to the socio-demographic factor, old people living alone were identified as highly vulnerable. It is worth mentioning that social networks were not mentioned in the other groups, as they are not so clearly understood as health-affecting hazards.

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[31] It needs to be mentioned that the speaker invited focused on the health effects of heat waves and the system associated in controlling this. Additionally, heat waves bear the brand of the European wide heat wave episode of 2003. Both these situation do inevitable bias the groups somewhat towards a health related discussion.

Table 3.1.3: Summary of the outcomes of the heat waves group sessions and lessons learnt.

Level	How does it affect us?	What is being done?	How to improve?
Individual	▪ Risk perception factor: **underestimation of risk.** ▪ Risk perception factor: **credibility and trust** in other agents involved in risk management. ▪ Social vulnerability impact factor: **socio-demographics.**	▪ **Cultural strategies**: 'siesta' as a traditional adaptation strategy	▪ Give **clear - more coordinated - information** on individual behaviour. ▪ Increasing citizens' **trust** towards governments.
Social/ Community[32]	▪ Risk perception factor: to **which audience** the message has been directed to (content, audience, channels). ▪ Risk perception factor: **credibility and trust** in other agents involved in risk management. ▪ Social vulnerability impact factor: **social network** and transmission of knowledge.		▪ **Formal and informal networks** improvement. ▪ **Media**: less catastrophic, more pragmatic message. ▪ **Research community**: monitoring data, monitoring campaign effectiveness.
Institutional	▪ Risk perception factor: **credibility and trust** in other agents involved in risk management.	▪ Direct measures: **Special preventive plan** for heat waves. ▪ Indirect measures: **building regulations, spatial planning, research community involvement**	▪ **Social risk maps design** (reducing vulnerability). ▪ Tailoring information to different audiences. ▪ Environmental education.
Ecosystem			
Others/ General reflections	▪ Risk perception impact factor: **big events** such as 2003 heat wave can be a window of **opportunity.** ▪ Social vulnerability impact factor: **knowledge of the environment.**		▪ **Structural**: resilient and efficient cities with areas that allow improving social networks (e.g. green areas).

Although referring mainly to the individual and community levels when discussing how heat waves affect people, participants transferred the responsibility to government and administration

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[32] 'Community' category as CapHaz-Net defines it was referred to as 'social' during group sessions.

when discussing what is being done. Indeed, participants didn't think of changes in their own individual behaviour when discussing measures to be taken when facing a heat wave, but spontaneously referred to prevention plans and spatial planning and building regulations as direct and indirect measures (to be) implemented at the institutional level.

Access to information was highlighted as a field to be improved at all levels. Clearer and more coordinated information from the administration was demanded on measures concerning individual behaviour. Media were mentioned as a relevant medium for the spreading of information, which should be made through more pragmatic (what to do in case of heat wave) and less catastrophist messages. Moreover, at the community level, more research was demanded in order to provide data not only to monitor the hazard itself and its impacts but also to monitor the effectiveness of the information campaigns. These campaigns and the information provided should be tailored by the responsible institutions according to different audiences. These different targeted audiences could be identified by elaborating a "social risk" map, which could help to reduce vulnerability. Environmental education was highlighted as a risk reducing tool to be considered and improved by the administration.

Credibility and trust were commonly referred to as relevant topics having an influence on risk perception, as also stressed in general terms in the WP3 report (Wachinger and Renn 2010). Improving the credibility of the agents involved in heat wave risk management could help reducing vulnerability – if people trust the speaker more probably they will accept the message.

3.2 Common findings

As common findings *for the three hazards*[33] several comments were raised when discussing the possibility of an integrated governance of the heat-related hazards. Participants widely agree on the need of improving risk communication by elaborating clear and coordinated messages. The need to incorporate risk in everyday life was highlighted as a key shift to be made in all three heat-related hazards. Concerning the political sphere participants clearly demanded cross-cutting policy making and increasing the levels of credibility, transparency, legitimacy and trust. Last but not least, responsibility definition was referred to as a most relevant field to work upon. Generally, the institutions level was referred to when participants discussed the responsibility issue, although there was also a certain agreement around the idea that individuals and community should assume some of the responsibility. However, specific mechanisms to do so were not discussed.

To sum up, existing practices in Catalonia for heat-related hazards as described in this section can be summarised according to their strengths and weaknesses (Table 3.1.4).

[33] As explained in the Annex, the 'how to work together' question was addressed in a plenary session.

Table 3.1.4: Strengths and weaknesses identified in the RHW outcomes analysis.

Hazard	Strengths	Weaknesses
Droughts	▪ Increasing risk awareness ▪ Cultural shift ('new water culture') ▪ Public participation.	▪ Emergency management. ▪ Public participation. ▪ Risk education and communication. ▪ Cross-sector coordination.
Forest fires	▪ Learning process from past experiences. ▪ Discourse evolution ▪ Research (bridging social and technical realities).	▪ Zero-risk paradigm. ▪ Risk education. ▪ Cross-scale coordination.
Heat waves	▪ Social networks.	▪ Risk underestimation ▪ Information. ▪ Monitoring research ▪ Credibility and trust.

These strengths and weaknesses are just part of the findings during the workshop. A note of caution needs to be provided here as these are the strengths and weaknesses of the heat-related hazards situation in the context of Catalonia. They can offer guidance in considering the context of hazards in other countries but by no means are they easily transferable ideas. Of interest to our discussion aside from context are some of the main concepts that could be heard repeatedly within the discussion sessions.

The emotional factor was constantly discussed. In answer to the first question on 'how does the hazard affect us?', another issue to be addressed is the rights, responsibility and power concept. This trinity is a curious concept that while frequently discussed separately is probably best explained together. Part of the underlying issues of governance is the social contract of democracy that provides the government the right and power to govern for the common interest. The change of this social contract is rightly questioned in the current debates over right of use and privatisations. This change of mandate is also to be considered in the dispersal of responsibility that government creates in the privatisation of risk as well as through participatory processes that do not bring transference of power. This leaves people with all the burdens/responsibility but no power/capacities to influence the hazard situation. These issues have been discussed not just within the workshop but also with the previous work packages. Connecting these dots is the goal of the next section.

4 Analysis: Linking theory and practice – connecting previous work packages with the RHW

In this section we will frame the RHW main outcome within the CapHaz-Net theoretical work packages. Intentionally we leave Social Capacity Building (WP1) and Risk Governance (WP2) to be discussed last as they are overarching/connecting concepts, and so will be better understood by first discussing the more restricted work packages.

4.1 Risk perception (WP3)

4.1.1 Emotions

In discussing how the hazards affected people, the drought and forest fire groups brought up the emotional effects, the insecurity felt, and the sense of loss and the lack of control. In the Hull case study (WP2 report; Walker et al. 2010) we see this same issue, where people talk about the emotional effects of the hazard. Yet within the work packages, there has yet to be a thorough discussion of the emotional perceptions and emotional impacts of the hazards[34], even though, during the workshop, in many cases it was one of the first issues mentioned in terms of how it affects people. It is clear that emotional reactions to hazards are also products of perception and the values a culture holds towards the life and relationship it is supposed to have with its environment (for example, some participants felt that the public had the rather unrealistic expectation that hazards should not have the capacity to affect their current life in any drastic fashion). This can be related to ideas on the social construction of risk, in terms of what is considered to be a risk and what are considered to be acceptable risks (a debate brought up in WP3). However, it is clear that both emotional responses and affects are issues to take into consideration when thinking about how the hazards will be perceived and how to learn new ways of living with natural hazards. What is clear is that hazards cannot be seen from single viewpoints; to the person perceiving the hazard, it is multidimensional both in its affect and effects. This is in line with some of what was discussed in the risk perception work package:

What human beings perceive as threats to their well-being and how they evaluate probabilities and magnitudes of unwanted consequences is less a question of predicted physical outcomes than of values, attitudes, social influences, and cultural identity (Douglas and Wildavsky 1982: 38; Breakwell 2007). (Reproduced from WP3 report; Wachinger and Renn 2010)

It appears that the conclusion of the WP3 report with regard to the current research on risk perception is in accordance with the opinions voiced by the participants, that risk is not just confined to probability and magnitude. Yet there does seem to be a shift of the participants in support of the fact that institutions are perceived as part of the problem of natural hazards and part of the risk to be evaluated.

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[34] The emotional aspects may have been touched on in passing. In the Hull case study it was a recurrent issue for the Hull residents, while in risk perception there were touched on. However there wasn't the emphasis in the work packages that the participants gave in discussing the issues surrounding heat-related hazards.

4.1.2 Trust and credibility

The trust and credibility of the agencies involved in dealing with the hazards in question was a major issue among the discussion groups. This can also be related to the issue of transparency (commented in next sections) of funds and decisions made of these funds. There does seem to be a general lack of trust in the institutions charged with managing these hazards. Part of the reason also relates to the fact that services are farmed out by elected bodies to private bodies that have a different mandate (see risk governance section). This issue does seem to reduce the trust of the public in the government, as well as the lack of transparency private companies may use in providing their services. Clearly the issue is that the expectations of the public are not being met by this situation.

4.2 Social vulnerability (WP4)

Vulnerability was heavily discussed within the heat waves group, though sparingly discussed in other groups. Part of this could simply be that practitioners many not want to define themselves as vulnerable, as pointed out in the WP4 report (Tapsell et al. 2010). However, this could also be due to the type of hazard; drought and forest fires can be related to the local social environment. Heat waves do not seem to have that direct link, despite the fact that, as has been previously stated, within the heat wave group (see the heat wave case study; Tapsell et al. 2010, Section 5.3), inequalities and the social structure of the city can be seen to increase the vulnerability of certain groups. However, the heat wave group did call for the creation of risk maps to better understand vulnerable populations. In addition, as discussed by WP4, there is a need to identify whether individual, community, or systematic vulnerability is being referred to. However, vulnerability, as discussed within the RHW group, referred to individual and sometimes group vulnerability, with community vulnerability not being mentioned at all[35]. Furthermore, it was interesting to note that although the systematic vulnerability of the institutions involved in the hazards appeared to be a consistent theme of the group discussions, it was never labelled as such.

Themes linked directly to the discussion in WP4 report on *vulnerability*, emphasising the complexity and contextuality of the concept, also featured in the discussion. The need for a common definition of vulnerability was highlighted as a key idea in risk management. Indeed, who contributes to this definition was highlighted as determining risk management policies. Context was another recurrent idea brought up when trying to identify those social groups mostly affected by hazards. Most interviewees during the pre-contact phase pointed to the need of contextualising hazards before identifying vulnerable groups. The territorial scale, the precise moment in a person's life cycle, and socioeconomic conditions were core elements highlighted to contextualise vulnerability. Some participants also mentioned environmental vulnerability within a holistic perspective that considers both (all) humans and nature vulnerable to natural hazards.

4.3 Risk communication (WP5)

Risk communication was heavily discussed particularly concerning heat waves and forest fires. An issue brought up by the discussions that had not been covered in the WP5 report (Höppner et al. 2010) was the ethical commitment of the media in its transmission of risk messages. Part

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[35] Community was referred to as a wider social collective in which the (vulnerable) individual is inserted but 'community vulnerability' was not mentioned as such.

of this has to do with the media's role in sensationalizing reports and, at times, under and over reporting information. Indeed, part of the ethical debate around the role of the media really centred on the issue of who the media answers to and who it speaks for. In relation to this, the participants cited asymmetries of information as a worrying factor, and this brings us back to the lack of trust in institutions discussed within the section on risk perception. In terms of the lack of transparency of the available information, the underlying issue is the lack of trust between the institutions that provide information and those that make decisions about the hazard. This does not bode well for attempts to foster participatory decision-making to mitigate the hazard. If communication from these institutions is perceived as not revealing the whole truth, how can the public respond to such information which is provided to deal with the hazard? One suggestion for improvement is that creating better connections to the audience is crucial, which means the purpose and objective of the communication needs to be clear, and that roles and responsibilities must be clearly defined. This is also a recommendation in terms of risk governance, and perhaps we can view bad risk communication as one of the effects of a lack of clear roles, responsibilities and structure, as when many agencies are involved in a hazard without clearly defined roles.

4.4 Risk education (WP6)

Whereas the WP6 report (Komac et al. 2010) focused on formal education mechanisms, the discussions in the RHW seemed to focus more on informal learning and the use of social networks. Overall, the discussion was very general, and did not get to specific forms of risk education that could be better used. It is however interesting to note that discussions regarding the need for more or better risk education came mostly from the heat waves group, though the forest fires group discussed social learning in reference more to organisations, as this is one of the hazards where the bulk of the problems were not seen to lie in institutional arrangements per se, but in the ability of the public to be provided with the information and to be more aware of the real risk of heat waves.

4.5 Social capacity building (WP1)

Social Capacity Building, as defined within CapHaz-Net WP1 report[36], refers to an "emphasis on a social process that involves different actors and takes place at various levels, it is defined as an umbrella term comprising efforts to build individual, organisational and communal as well as institutional capacities. It is considered an ambiguous multi-level concept which contains both a normative-prescriptive dimension as well as a more conceptual analytical one." Despite its broad overarching definition, neither the terms social capacity nor capacity building were ever mentioned during group discussions – more importantly, the idea that communities might have a capacity to be improved was never really on the table. In contrast, participants discussed risk perception, vulnerability, risk education, risk communication and governance in similar terms to those in the work package thus presented.

Also they frequently discussed the institutions and organisations involved in managing the hazard and the rights to use a particular resource, most of this part of the discussion was in refer-

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[36] WP1 has gone through many evolutions and as such we refer to Version 4, the latest version of WP1 report, for comparisons (Kuhlicke and Steinführer 2010).

ence to the current problems with the system. This part of the discussion we can relate more directly with governance. However, considering that Social Capacity Building has been defined within the CapHaz-Net as a multi-levelled effort, we can relate some of the discussion to this idea. What is clear is that participants had very different ideas of who was lacking in capacity; chiefly, it was not considered to be the communities themselves but the *institutions and organisations* that govern them. This is in line with the criticism highlighted in the WP1 report (Kuhlicke and Steinführer 2010, 27) from Beazley (2004). It could be seen that the institutional background of the participants seemed to condition their view. Participants discussing more on institutional change typically were from civil society, who had been working to question the current situation, while people from private companies argued along the lines that services should be paid for.

4.5.1 Power[37] and legitimacy

During the pre-contact phase, the idea of power kept being brought up by some interviewees, hence we considered to look into the possibility of bringing up the issue again during the RHW group sessions, whether explicitly or implicitly. For a detailed discussion in the various ways power may manifest in a governance context, Zografos and Howarth (2010) are a good reference.

The power issue was particularly considered within the droughts group, and revolved around the questions of who has the right to use the resource and how the institutions extracted payments from society. In light of the definition of power provided by Hornborg as quoted in Zografos and Howarth (2010: 3410), that it is "a social relation built on the asymmetrical distribution of resources and risk", we realise that the most pertinent issue to the drought group was how power was structured in the current institutional and organisational environment. What is interesting here for social capacity building is the understanding that the practitioners' discussion about building the abilities of communities to deal with a hazard involved making changes at the institutional and organisational level (including the power that these institutions hold in defining and legitimising decisions involving the communities). There was a tendency to question corporate interests in regards to rights, while the corporations participating in the discussion questioned the rights of people to overuse a resource they had/hadn't paid for. The lack of transparency in the decision making process was a core issue within the discussion, which is in many way a criticism on the procedural power practiced by the current institutions.

Additionally, given the institutional background of all participants, it is clear why certain lines of discussion were championed by certain groups and not by others. Linking these ideas to the vulnerability section, if the general public are not involved the debate it can always be conditioned by profitable sectors with very particular interests. Without inclusion and empowerment of the public through access to all the information, the discussion becomes reduced to a conflict of interests.

Following also on the 'hollowing out of the state' concept, it can be noted that the discussion is not so much a matter of reduction of state involvement but rather where and how this involvement takes place.

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[37] Power is discussed in more detail in Section 3 of this report.

These are some of the initial ideas concerning the connection between power and the Barcelona RHW but it is clear that more work needs to be done on the relevance of power concerning building community resilience within the CapHaz-Net project.

4.5.2   Social vulnerability, social capital and resilience

With the exception of vulnerability (see above, Section 4.4), these key concepts did not seem to appear in the discussion. In particular, the goal of building resilience was not mentioned. More important within the discussion was the idea that building resilience or adaptive communities does not seem to be a priority. The problems and solutions seem to rest in the reconstruction of the institutions. This involves a great deal of third loop learning[38], and within the discussion groups there did not seem to be a lot of hope for a complete change, much less to create resilient societies.

4.6   Risk governance (WP2)

Risk governance as discussed within WP2 is a theme that concerns the administration of the organisations relevant to each hazard along with the broader societal processes and norms. However within the workshop participants mainly referred to governance and risk governance as the administration organisational aspects involved rather than societal processes, especially when discussing the problems. The exception would be in the discussion of rights and responsibilities, which does bring into question the issue of current norms. In discussing solutions, participants did question how to change society's concept of risk, or to create a new risk culture. It is an interesting division of where participants see the problem and solutions. Yet as with social capacity building, context was the key.

The drought group for instance particularly focused on risk governance, considering issues of the privatisation of water[39], access, usage, and the right of civil society to it. These were themes that were constantly reworked during the discussions. The issue of the accountability of the private entities that manage water[40] was frequently mentioned, more so in terms of the lack of transparency in setting the price of the resource. Questions about the right of access to the resource and who has more right to access it, and how the current situation is set up was a fundamental debate. This is very much akin to the question about who has the right to define who is capable or not (Kuhlicke and Steinführer 2010, Section 5.1), but turned on its head. It is not about who has the right to define if the communities are vulnerable or capable, rather it is about questioning the current governance which seems to be unacceptable for the participants. This highlights the question of perspective and from which section of society should this debate be discussed – top down or bottom up?

The classical approach in risk management ignores the individual's potential for evaluating the risk and taking measures, "it considers adults as children with paternalistic measures being used

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[38] With reference to the CapHaz-Net WP1 report (Kuhlicke and Steinführer 2010, 28), and Ramalingam (2008), who refer to social capacity building as learning, third loop learning, that involves a change in the overall organizational rational and context.

[39] Within the group sessions water was referred to as a resource –'the resource of water'- and discussions revolved around the use of it as a resource. For practical reasons we will write water but it needs to be born in mind that water as a resource is a different concept, rather than water as a lacking element during droughts, for instance. This concept brings a specific approach to dealing with institutions surrounding the hazard.

[40] Also discussed in CapHaz-Net WP2 report, Section 3.2 (Walker et al. 2010).

to give the impression that something is being done"[41]. Thus, *involving citizens* in risk management[42] was highlighted as a key aspect to improve, in order to empower people and collaboratively build social capacities.

S*trategic management*, understood as management during the pre-risk phase, was an important idea brought up when discussing actions helpful when facing the hazard, fitting with the concept of the risk governance cycle (Walker et al. 2010). The pre-risk phase is the right time to manage risk as opposed to emergency situations where capacity of reaction is more limited. This is a difficult shift in risk management because "you don't want to feel unsafe when you are feeling safe, which is the only moment you can manage risk"[43]. Education and communication were mentioned as necessary elements (and needing further improvement) when dealing with the hazards, both before and during an emergency situation. During the pre-risk phase communication is more difficult – (currently visible) impacts mitigation measures are easier to explain than (future possible) impacts adaptation measures. Participation was highlighted as being essential when dealing with the hazard, an informed participation to empower people – a key theme of the WP5 discussion. In this empowerment effort, transparent decision making processes are needed.

4.6.1   Institutional coordination

Changes were also claimed to be made in the *political sphere*. The need of better coordination between the relevant authorities dealing with each hazard was a clear demand. As it has been described previously in this report, complexity characterises the institutional framework at least for two of the three heat-related hazards (this is droughts and forest fires) in Catalonia. In relation with the need to consider the interlinkages between current crises in a context of uncertainty, the need of a cross sectional perspective within the administration was repeatedly highlighted. Governance problems, of the form discussed in WP2, were highlighted in relation to the inability of the administration to deal with complex phenomena. A practical suggestion in this coordination effort was the creation of a Catalan Fire Agency (as there is a Catalan Water Agency) in order to avoid splitting all kinds of resources in different institutions dealing with forest fires. In order to confront the social reality with the technical reality, adopting long term structural measures and creating better linkage between diagnosis and measures were changes (current limitations) suggested to improve the governance of natural hazards.

4.6.2   Transparency & economic issues

The economic aspects of hazard governance, a subject not broadly covered within WP2, were of major importance to the participants, along with the transparency of these economic aspects. There was a demand for accountability in defining the responsibilities of the agencies and providing more transparency around why and how decisions and costs were passed on to the public. This ties in clearly with many of the questions posed in the WP2 report (Walker et al. 2010). The idea raised within WP2 was that the government wants to steer but wants more people to row in the direction they dictate. In line with this is the drive to privatisation of risk which

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[41] Quote from participant in the forest fires group.

[42] This is participants' wording. We understand risk management within the risk governance cycle (Walker et al. 2010).

[43] Quote from a participant in the drought group.

can create problems as it dilutes institutional accountability. Key services which are under the privy of elected bodies are farmed out to private bodies without these private bodies being bound by the same rules to demand transparency. In addition, the participatory nature of including many hands in the pot leads to the question of who exactly is doing this cooking, or rather who is responsible for what[44]. Many of the problems brought up by the participants themselves relate to these very questions. Additionally, the participants cited citizen participation ("real participation"[45]) in defining the management of resource use (this is particular to the drought group) as a possible improvement of the situation. In the drought group, the discussions were less about risk from the hazard and more about faulty management and how to improve it. The heat waves group though was more concerned about risk perception than management. Meanwhile, the forest fires group was focused more on the integration of the various agencies rather than transparency. This brings us back not only to the discussion of who is responsible for what, but also the coordination between and within the agencies[46] and the conflict between sectors on rights of use.

4.6.3 Context

Context is discussed extensively in the WP2 report – particularly the different contexts within the European countries. However, the issue we see here is not just the context of the country but also the context of the hazard. Each hazard has a different etiology[47], the institutions within the country that deal with them are different, they may be within the same government but that doesn't mean the problem nor the solution can always be generalisable. It is clear that the context of both the hazards and the institutions involved in it has to be specifically considered before a solution can be found.

4.7   Summary

During the workshop, as can be noted from this section, most of the discussions during the first two sessions ('how does the hazard affect us?' and 'what is being done?') were better connected to the first four work packages (WP1, WP2, WP3, WP4), while the 'how to improve?' session provided more connection with risk communication (WP5) and risk education (WP6). It is somewhat strange that while problems of communication were not really discussed in terms of what is being done, communication was discussed extensively in terms of how to improve. There seems to be a belief that better communication can solve a lot of problems. Or is it simply the most accessible change? Clearly the nature of some of the problems calls for a change in the structure of institutions, yet perhaps that is not a solution that many see as plausible. This probably can be related to the way the discussions were focused as well as to the ways in which the participants saw the problems. It is clear that, with drought and forest fires, many of the current problems were seen at an institutional level, and it was more in relation to heat waves that the basic problems were seen to be focused on communication and education. Of interest is where the categories of blame lie. Generally, communities are not perceived to be at fault, yet we had attendance from a fair amount of government administrative personal, as well as NGOs. It would be very

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[44] More detailed discussion in the CapHaz-Net WP2 report (Walker et al. 2010).

[45] Figure 6.1 of the CapHaz-Net WP 3 report (Wachinger and Renn 2010, 69) provides a good description of the various levels of participation and actors involved.

[46]See section 2.3 above forest fires.

[47] Table 3.2 of the CapHaz-Net WP 4 report (Tapsell et al. 2010, 15) provides a brief description of the etiology parameters of a variety of hazards.

interesting to conduct more group discussions with other groups within Catalonia, as well as throughout Europe, to see if there is a pattern where the problem is seen to lie in comparison to the institutional background of the participants. Is it simply that community groups would not choose to change themselves and take personal responsibility to deal with the risk? Or that they expect the government and institutions to take care of them? Or have the institutions been shirking their responsibilities in terms of the current social contract?

5   Final reflections

Looking at the entirety of WP7, concepts such as *adaptation, flexibility and dynamism* appear as important factors to better deal with natural hazards. A change to be introduced would be to consider the current crises of resource scarcity, energy predicament and climate change as interlinked rather than separated, as they are commonly dealt with. This fragmented vision should change in order to consider the whole picture when dealing with natural hazards. Within this renewed vision, for instance, we can consider there is no scarcity but a structural overexploitation of all resources. Such an improved (integral) vision describes an uncertainty scenario within which whatever brings more dynamism provides more capacities to cope with and recover from natural hazards. Increasing flexibility and improving adaptation capacities are solutions to improve resilience. The need of working on the adaptation message was pointed out, but in Catalonia there is very little done on communication and education, and what is done is very insubstantial. This is clearly a weakness to be improved, as communication and education are crucial to build social awareness and social capacity. Furthermore, *communication* is also a big challenge because information must be given in a transparent way. This means that there shouldn't be hidden interests conditioning the debate. Particularly economic interests should be considered when talking about general interest and welfare. Overall communication was seen by the participants as a trust-building tool.

Part of connecting the hazards involved in WP7 consisted of understanding that while we are dealing with three heat-related hazards – hence all of which will most likely converge during the warmer months of the year in Catalonia– the geographical and temporal *contexts* are very different. Each hazard also has disproportionate effects on certain community groups and areas. In addition, institutionally each hazard has its specific management bodies, each with their specific problems. It is clear that these hazards cannot be dealt with through a one-size-fits-all approach to creating resilience, but from the discussions during the workshop we hope to shed some light on the specific examples of these hazards within Catalonia and offer some ways forward that can be applicable at various levels.

Climate-related catastrophes such as the 2002 floods and 2003 heat wave in Europe show the continued exposure to natural hazards that human beings are confronted with. It is necessary to review the deep-seated patterns which lie behind social vulnerability and the limited coping capacity that makes these natural hazards so devastating (Vogel et al. 2007). These natural hazards have potentially destructive effects and pose new challenges due to evolving patterns of vulnerability, the limitations of predictive models and the shortcomings of management approaches.

Environmental risks are inherent to development processes (Pelling 2003). The evolution pattern of these processes implies the interaction of humans and the environment according to co-evolutionary theory (Norgaard 1994). Current approaches of ecosystem management often fail to relate social and ecological structures and processes at different spatial and temporal scales (Gunderson, Holling, and Light 1995; Berkes, Folke, and Colding 2000; Berkes, Colding, and Folke 2003). *The conceptualisation of risk should be considered as part of socio-ecosystem dynamics.* And understanding how a socio-ecological system will react to the advent of natural

hazards is only possible by considering the interactions between humans and the environmental/ecological systems facing risks (Norgaard 1988; Pelling 2003). For this purpose the resilience concept embraces a dynamic and proactive perspective towards risk and sheds light on how a system reacts and adapts to changes.

In light of this, one of the first weaknesses identified in the analysis of both the Barcelona RHW and the institutional framework for each heat-related hazard in Catalonia (sections 2 and 3 in this report) is a failure to understand disturbances and risks as part of the natural processes and dynamics of socio-ecological systems. This trend has already been recognised by the scientific literature (Berkes, Folke, and Colding 2000), which points out that Western resource management tends to disconnect feedback between periods of gradual change and rapid transformation which complement one another. Rapid transformations are perceived as disturbances which should be eliminated. This strategy forms the basis of modern industrial societies. Alternatively, many traditional communities have recognised the necessity of *coexisting with change*. They have developed social mechanisms to interpret environmental feedbacks and understand signals of destruction and renewal. Their institutions incorporate traditional knowledge to know how to respond to these disturbances and enhance their resilience. Given this comparison, there is a loss of resilience in industrial societies as opposed to traditional communities. An example from the workshop was the discussion around the need to move from a 'zero-risk' paradigm to a 'living with fire' paradigm[48].

Berkes, Folke and Colding (2000) identified a set of social mechanisms within the structure and dynamics of institutions which are suitable for *resilience building* in contemporary societies: a) community assessments, b) cross-scale institutions, c) short-term responses to surprises, d) social sanctions, e) an ability to re-organise under changing circumstances, and f) the emergence of incipient institutions. The appropriateness of adopting some of the aforementioned measures in Catalonia was emphasised during the workshop within the drought group by (b) drawing attention to the introduction of vulnerability reduction within different policy areas, (c) the awareness raising needed to adapt consumption practices to climatic-environmental conditions, and (d) the revision of binding reports or tariff structures. The suitability of creating a Catalan Fire Agency which could coordinate actions (b, e, and f) was highlighted during the forest fires group. The need for community assessment and environmental education was pointed out by all groups, the last as a mechanism for cultural internalisation.

The disconnectedness of social and ecological systems within the contemporary concept of resource management means that neither economic nor social pressures are considered within the hazard. Plana et al. (2001) studied forest fire risk management scenarios based on a model of relationships between causality and forest fire management. They highlight that conventional management focuses only on the natural causes producing the fire and ignores other drivers. This conventional approach centres on the intervention involved in the extinction phase and therefore on the final stage of the causality chain which are the consequences of the risk. Nevertheless, they argue that consideration of the social forces which interact in the forest ecosystem to cause forest fires is gaining attention among experts and the scientific community. This emer-

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[48] See forest fires group discussion in Minutes M7.1

gent approach puts the emphasis on the initial stages of the causality chain, a risk management approach which entails better institutional coordination and the involvement of stakeholders.

Hence, another shortcoming of the current way of handling hazards is to focus solely upon natural causes and separate these from the social factors which may lead to devastating effects. This reasoning centres *political intervention on the consequences rather than the causes*, which are considered to be out of human control. In this way, we have discerned that, from a political perspective, *the three heat-related hazards studied here are treated as emergency situations* and, as such, any intervention is purely reactionary.

Established models of coping with natural hazards fail in their effectiveness and it is necessary to move from ideas of risk mitigation, risk prevention or risk management towards ideas of risk governance. This evolution implies redesigning the relationships between government institutions and civil society.

The first step would be to enhance the fit between governance systems and ecosystems (Gunderson, Holling, and Light 1995). The challenge centres on *how to combine multilevel governance with ecosystem complexity.* Governance systems often appear as fragmented organisational and institutional structures with sectorial decision-making, as we have seen in the institutional frameworks in which forest fires and drought management are embedded. According to co-evolutionary theories, there is a relationship between local institutions and the ecosystem where they are located (Norgaard 1994). Therefore, self-organisation and institutional learning via integrating environmental feedback should be promoted for resilience building (Berkes, Folke, and Colding 2000).

Secondly, governance in multi-scale systems requires deliberative processes among stakeholders and a mixture of institutional structures (Dietz, Ostrom, and Stern 2003; Armitage et al. 2008). Thirdly, the connection of social actors in a reciprocal and shared learning environment requires the creation of the right linkages to guarantee the circulation of information across scales with shared understanding and problem articulation. These channels generate opportunities for stakeholders to better collaborate and respond to change (Diduck et al. 2005; Ostrom 2005). Taking into account stakeholder analysis and power relations, *researchers have a key-role to play in the task of bridging organisations and supporting cross-scale institutions through participatory action research methods*. In this direction the October 2010 Barcelona workshop aimed at creating platforms of discussion which provide opportunities to stakeholders to communicate and to raise issues of concern which should be further investigated.

Summing up, several weak points have been identified in the way natural heat-related hazards are handled in Catalonia, which suggest some recommendations:

- There is a need to view disturbances and risks as part of the natural processes and dynamics of socio-ecological systems. *A culture of coexistence needs to be built and a holistic approach* looking at the interactions between human and environmental/ecological systems facing risks must be adopted.
- Current policies to handle natural hazards are mostly reactionary. *Alternative risk management should put the emphasis on the initial stages of the causality chain*, which entails better institutional coordination and the involvement of stakeholders.

- Finally, *it is necessary to move from ideas of risk mitigation, prevention or management to a philosophy of risk governance.* Collaboration and sharing amongst institutions and stake-holders are at the core of this different relationship between government and civil society.

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7 Appendix 1: Workshop agenda

CapHaz-Net Southern Europe Regional Hazard Workshop

"Heat-related hazards: Droughts, forest fires and heat waves"

Barcelona, 7-8 October 2010

OCTOBER, 7th

08h45	Registration
09h00	**Welcome by Louis Lemkow** (ICTA, Director)
09h10	**Welcome by Christian Kuhlicke and Annett Steinführer** (UFZ and vTI, CapHaz-Net Coordinators)
09h20	Agenda
09h30	**Speech 1**: **Droughts**. By **Donald A. Wilhite** (School of Natural Resources, University of Nebraska)
09h55	**Speech 2**: **Heat waves**. By **Xavier Basagaña** (Environmental Epidemiology Research Centre, Barcelona)
10h20	**Speech 3**: **Forest Fires**. By **John Handmer** (Centre for Risk and Community Safety, RMIT University, Melbourne)
10h45	*Coffee break*
11h15	**Plenary session** – Questions & Answers
12h45	Description of Work plan & Agenda for the afternoon
13h00	*Lunch*
15h00	**Break-out groups discussion 1**: How does [the hazard] affect us?
16h15	**Group report to plenary**
16h45	*Coffee break*
17h15	**Break-out groups discussion 2**: What is being done?
18h30	**Group report to plenary**
19h00	Description of Work plan for the next day & Closing
20h30	*Dinner at El Salón*

CapHaz-Net Southern Europe Regional Hazard Workshop

"Heat-related hazards: Droughts, forest fires and heat waves"

Barcelona, 7-8 October 2010

08h45	Agenda
09h00	**Speech 4**: **Governance**. By **John Tesh** (Deputy Director, Capabilities Civil Contingencies Secretariat, Cabinet Office, UK)
09h30	**Speech 5**: **New Modes of Governance and Environmental Management**. By **Alba Ballester** (University of Zaragoza)
10h00	**Plenary session** – Questions & Answers
11h00	*Coffee break*
11h30	**Break-out groups discussion 3**: Dealing with the hazards: How to improve?
12h45	**Group report to plenary**
13h15	*Lunch*
15h00	**Break-out groups discussion 4**: Dealing with the hazards: How can we work together?
16h15	**Group report to plenary**
16h45	*Coffee break*
17h15	**Plenary session – Conclusions**: Lessons learnt & Gaps of knowledge
18h45	End of Workshop
20h30	*Dinner at Divinus*

8 Appendix 2: List of participants

Project Members

SURNAME	NAME	INSTITUTION	e-mail
Walker	Gordon	Lancaster University (LU) Lancaster Environment Centre (LEC)	g.p.walker@lancaster.ac.uk
Whittle	Rebecca	Lancaster University (LU) Lancaster Environment Centre (LEC)	r.whittle@lancaster.ac.uk
Luther	Jochen	Helmholtz Centre for Environmental Research (UFZ)	jochen.luther@ufz.de
Steinführer	Annett	Johann Heinrich von Thünen Institute (vTI)	annett.steinfuehrer@vti.bund.de
Schmidt	Annett	Liaison Officer (EU) Helmholtz Centre for Environmental Research (UFZ)	Annette.schmidt@ufz.de
Kuhlicke	Christian	Helmholtz Centre for Environmental Research (UFZ)	christian.kuhlicke@ufz.de
Wachinger	Gisela	DIALOGIK Non-Profit Institute for Communication and Cooperative Research (DIA)	wachinger@dialogik-expert.de
Komac	Blaž	Scientific Research Centre of the Slovenian Academy of Sciences and Art (ZRC SAZU) Anton Melik Geographical Institute (GIAM)	blaz.komac@zrc-sazu.si
Zorn	Matija	Scientific Research Centre of the Slovenian Academy of Sciences and Art (ZRC SAZU) Anton Melik Geographical Institute (GIAM)	matija.zorn@zrc-sazu.si
Hoeppner	Corina	Swiss Federal Institute for Forest, Snow and Landscape Research (WSL)	corina.hoeppner@wsl.ch
Nussbaum	Roland	French Association for the Prevention of Natural Disasters (AFPCN)	roland.nussbaum@mrn.asso.fr
Bianchizza	Chiara	Institute of International Sociology of Gorizia (ISIG)	bianchizza@isig.it
Tetzlaff	Gerd	Universität Leipzig Institut für Meteorologie	tetzlaff@rz.uni-leipzig.de
McCarthy	Simon	Middlesex University (MU) Flood Hazard Research Centre (FRHC)	s.mccarthy@mdx.ac.uk
Patek	Maria	Federal Ministry of Agriculture, Forestry, Environment and Water Management (Austria) Division IV / 5 Torrent and avalanche control	Maria.PATEK@lebensministerium.at
Supramaniam	Meera	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	Meera.supramaniam@gmail.com
Di Masso	Marina	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	Marina.dimasso@uab.cat
Lemkow	Louis	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	Louis.lemkow@uab.cat

Saurí	David	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	David.sauri@uab.cat
Dinarès	Marta	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	marta3dsfz@yahoo.es

Facilitators

Domènech	Laia	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	Laia.domenech@uab.cat
Belmonte	Jordina	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	Jordina.belmonte@uab.cat
Serra	Anna	Autonomous University of Barcelona (UAB)	annaserrallobet@gmail.com

Local Participants

Zografos	Christos	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	czografos@gmail.com
Logar	Ivana	Autonomous University of Barcelona (UAB) Institute of Environmental Science and Technology (ICTA)	ivanalogar@yahoo.com
Tusell	Josep Mª	Forest Consortium of Catalonia (CFC)	Josep.tusell@forestal.cat
Arola	Josep	Fire Services	joseparolasierra@gmail.com
Delclòs	Jaume	Catalan Water Agency (ACA)	jdelclos@gencat.cat
Grau	Arantxa	Civil Protection	marantzazu@gencat.cat
Artazcoz	Lucía	Public Health Agency of Barcelona (ASPB)	lartazco@aspb.cat
Espluga	Josep LLuís	Autonomous University of Barcelona (UAB) Department of Sociology	Joseplluis.espluga@uab.cat
Plana	Eduard	Forest Sciences Centre of Catalonia (CTFC)	Eduard.plana@ctfc.es
Sorribas	Antonio	Pensionists Federation (CCOO)	asorribas@ccoo.cat
Cánovas	Luis	Pensionists Federation (CCOO)	
Broekman	Annelies	Water New Culture Network (XNCA)	Anneliesbroekman@gmail.com
Queralt	Arnau	Environmental Sciences Professional Association (COAMB)	Arnau.queralt@gmail.com
Gili	Iñaki	Catalan Climate Change Office (OCCC)	igilij@gencat.cat
Samitier	Salvador	Catalan Climate Change Office (OCCC)	wsamitier@gencat.cat
Ambatlle	Fina	Catalan Climate Change Office (OCCC)	Fina.ambatlle@gencat.cat
Oltra	Christian	Research Centre for Energy, Environment and Technology (CIEMAT)	Christian.oltra@ciemat.es
García	Antonio	Red Cross	jagp@creuroja.org
Pineda	Meritxell	Security Studies Institute (IDES)	tpineda@fundacio-ides.org
Escaler	Isabel	AGBAR Group Water Technology Centre (Cet-Aqua)	iescaler@cetaqua.com
Toldrà	Lluís	Defense of Natural Patrimony (DEPANA)	lltoldra@depana.org
Wilkinson	Emily	University College London (UCL)	ucfaewi@ucl.ac.uk

		Hazards Research Centre (HRC)	
Llasat Botija	Carmen	Universitat de Barcelona (UB)	carmell@am.ub.es

Keynote Speakers

Basagaña	Xavier	Centre for Research in Environmental Epidemiology (CREAL)	xbasagana@creal.cat
Tesh	John	Cabinet Office UK Civil Contingencies Secretariat	john.tesh@cabinet-office.x.gsi.gov.uk
Handmer	John	RMIT University Centre for Risk and Community Safety	john.handmer@rmit.edu.au
Wilhite	Donald	University of Nebraska School of Natural Resources	dwilhite@unlnotes.unl.edu
Ballester	Alba	University of Zaragoza	abc@unizar.es

9   Appendix 3: Facilitator notes

Organisational:

Internal Meetings: First day groups will be according to hazard for both sessions, and will change for the next day. Do make note of your suggestion for combining people in groups or making sure they're in separate groups. Also take note of difficult individuals. Quick 10 minute meeting during the coffee breaks between group sessions facilitators, Marina and me, so we can check in and make changes where necessary. End of the first day, we need to discuss a little how to approach tomorrow.

Groups: Make sure you have a **Reporter,** a **Minute Taker,** and a **Voice recorder** (ask us) in each session you chair. If not ask for volunteers to report or take Minutes. Note down their names, so we can communicate with them about obtaining copies of their notes.

At the last 10 minutes, ask your group to decide the 3 main points (or till a max of 7) from your discussion, write them on post it notes and paste them to the chart (example below), provided.

Pointers:

Blame Game Alert! Do be careful on the first day particularly, that the conversation doesn't turn into a blame game, this can easily destroy the discussion at hand and the group. Your first priority is to maintain a flowing conversation among group members. Preferably on the discussion topic with your group, but feel free to take a few steps back from the topic in order to prevent the conflicting issues from getting out of hand, though do expect some conflict. The discussion doesn't need to be all roses and puppies.

Tips: Case studies/ Event (suggestion from Laia). We keep referring to concrete specific examples, so having a case study or event for the group to talk about may help. They may even bring it up themselves, so work with it to drive conversation along.

The first day the main goal is to have an idea of the current situation, hence HOW it affects them? And WHAT is being done?

Breakout groups session 1: How does it affect us?

Focus on getting **concrete examples** of how the hazard affects the people in your group. Take note of **which level** they first refer to and try to get them to **consider other levels. This table** may help in categorising different levels an individual may make reference to. Try to get them considering the 3 different major scales (far left), and as the conversation develops take note of which area your group prefers to maintain the conversation. Our goal is to deal more with the community level and if possible for the discussion to move in this direction, great. But there is no need to force your group to discuss things at a scale that they do not find relevant. So do balance the reality of your group, with the basic idea and goals provided here:

Table 9.1: Levels and actors

Global / Institutional level	Actors	Organization level		
		Public	Private	NGOs
	European			
	National			
	Regional			
Intermediate	District			
Community	Neighbourhood			
	Family			
	Individual			

(Taken and adapted from CapHaz-Net, Draft Knowledge Inventory_ UFZ, 2010)

Breakout groups session 2: What is being done?
Again focus on concrete specific examples, **prevent generalisation**, **try to get the names of departments, persons, etc.** associated with the example, that the participants are aware of who do handle these issues.

The second day's goal is to find solutions. **WHAT** are the solutions and **HOW** can they work together?

Breakout groups session 3: Dealing with the Hazard: How to improve?

Breakout groups session 4: Dealing with the Hazard: How can we work together?
These two sessions work almost **like a funnel**, the first leading into the other, and unfortunately may have a lot of overlap. The group will be mixed from the first day, not according to hazard, because part of the question is about working together across hazards. In the first session try to focus more on what specifically needs to be **done to find a solution**, use the issues brought up on the first day to help (how does it affect us?), also can the improvements be done **across hazards**?

In the second session, focus more on the **specific problem of dealing cross institution and cross hazards** etc.

As with all the sessions, use your own instincts on what you feel will work to get the discussion following towards some common solutions and ideas on dealing with hazards at a community level. These guidelines are here to help, but if they don't, feel free to throw them out. We have faith in you all making the best decision possible on that day.

Other Possible Issues: The similarity of the break-out groups session design with ACA communication campaign and lack of acknowledgement. This is something we recently became aware of, and hence acknowledgement will be made in the official CapHaz-Net documents on the project. However it isn't mentioned here, in part because this is now the space where the design of the workshop is discussed, but also because of worries that it may make us seem biased.

10 Appendix 4: Results of pre-contacts round informal content analysis

- What do you expect from the Workshop?
  - → To learn from other experiences, other perspectives
  - → To become familiar with other methodologies, other approaches
  - → Proposals to work from a more integrated perspective for political actions
  - → To know what is being done at an international level – to know how every country gets ready to cope with extreme events, what are the differences between countries
  - → To build a stakeholders' network
  - → To translate scientific knowledge to practise
  - → To learn!
  - → To know what is the state of the art in risk culture
  - → Interest in methodological approaches to risk perception because the classic tools do not cover subtleties

- How would you like to have the results given to you?
  - → To have a reference document, especially for vulnerability issues
  - → Conclusions that help to make a better diagnosis of risk situations – and subvert the tendency to see risks as an opportunity for administrations to spend money (building infrastructure)

- Which groups are most affected?
  - → The principle of a common definition of vulnerability is a key idea in risk management
  - → Who defines risk? Risk management policies are different from the management of specific risk situations. Risk is defined by others.
  - → It is difficult to reduce vulnerability in the natural hazards field, it depends on the political arena – decisions must be taken in a different way during the pre-risk phase
  - → Vulnerability has to be contextualized
  - → Vulnerability depends on the territorial scale, the precise moment in a person's life cycle and socioeconomic conditions
  - → Dependent people are more vulnerable
  - → Vulnerability depends on the scale (geographic) and the field (urban or rural)
  - → Administration as political system should be also seen as a vulnerable group
  - → Vulnerable sometimes means manipulatable (who has the information to analyse?) As an argument of power and control. I.e. That powerful groups manipulate the data in order to create particular understandings of vulnerability (that make their organizations look good)
  - → Centralized water systems increase vulnerability
  - → We are all affected – from an holistic perspective: (all) humans and nature
  - → Environmental vulnerability is important too

- Which actions are helpful when facing the hazard?
  - → It is important to fight the use of drought as a political tool
  - → Transparent decision making processes are important
  - → To complement and contextualize the information in a crisis situation
  - → The conceptual side in drought management should be more important than the technical

→ Strategic management, not tactic (during the pre-risk phase) – which is difficult, because you don't want to feel unsafe when you are feeling safe, which is the only moment you can manage risk

→ Possibilistic solutions (solutions that can be really implemented)

→ Educating the public

→ Educating people who looks after dependent persons

→ Communication plans

→ Communication is easier when it involves mitigation (visible measures) but it is much more difficult for adaptation (i.e. when you are asking people to take measures to avoid effects which are not yet visible)

→ Empowering people

→ Participation is essential – but it must be informed ("opinions must be from informed people")

→ Adapting – meaning taking action to reduce costs and taking advantage of opportunities, from an environmental, social and economic point of view

→ Flexibility – governance and infrastructure sides

→ Dynamism – especially in terms of reflection (social and physical reality keeps changing)

→ A holistic ecosystem based approach makes prevention more effective

- What changes could be introduced to better deal with the hazard?

→ Economic interests should be considered when talking about general interest and welfare

→ To separate local measures in a particular moment from nation state level vision

→ We should be more mature when talking about vulnerability: national/regional/local level, medium/long term, considering the whole picture (energy crises, climate change, etc.)

→ Currently, very interlinked crises are dealt with as if they had nothing to do with each other – this should change

→ There is no scarcity, but a structural overexploitation of all resources

→ There is an increasing need to professionalize risk management

→ In an uncertainty scenario whatever brings more dynamism gives you more capacities

→ Solutions to improve resilience – for example, increasing flexibility, improving adaptation capacities

→ Anticipation capacity – it does not matter how much money you have if you don't have time to implement measures

→ To work on the adaptation message / discourse

→ (In Catalonia) There is very little done on communication and education, and what is done is very insubstantial

→ Building social awareness – we must explain to society that fire is a typical activity of nature

→ The big challenge is communication; one must give information in a transparent way. Peripheral communication – of the kind that can be carried out by the administration – has no real impact, instead, the mass media are key in communication terms (the media generate the state of opinion). Also what is the message and what is being communicated (only the consequences or the causes)? This is related to a power issue: is there the political will to touch certain interests that condition the debate? There should be a communication Act independent from political will.

→ Citizenship must be involved – if not, the starting point will always be the profitable sectors with very particular interests

→ With no empowerment we are just talking about a conflict of interests – we need to be clear on whether we want to give social capacities

→ The classical approach in risk management ignores the individual's potential for evaluating the risk and taking measures – it considers adults as children, with paternalistic measures being used to give the impression that something is being done

→ To confront the social reality with the technical reality

→ To make a better linkage between diagnosis and measures

→ The adoption of long term structural measures is very limited

→ Changes in the political sphere – the last drought in Catalonia brought individual behavioural changes, organizational changes and technical changes

→ An integrated vision is needed

→ Better coordination

→ CA cross sectional perspective within the administration – we have an inability to deal with complex phenomena (governance problems)

→ There should be a Catalan Fire Agency (as there is a Catalan Water Agency) – we can't split so many resources in different institutions