net risk work

Funded by
European Union
Humanitarian Aid
and Civil Protection

Networking for the European Forest Risk Facility initiative
"NET RISK WORK"

2nd NATURAL HAZARDS RISK MANAGEMENT WORKSHOP
Emergency Management and Risk Governance towards resilience societies

Deliverable nº 9 - Proceeds of the Discussions Sessions

Cagliari - June 2018

CTFC EFI FVA Forest Research Institute Baden-Württemberg PAU COSTA FOUNDATION REGIONE SARDEGNA VALABRE

net risk work

Funded by
European Union
Humanitarian Aid
and Civil Protection

Project name: Networking for the European Forest Risk Facility Initiative (NetRiskWork)

Financed by: DG ECHO 2016 Call for projects on prevention and preparedness in civil protection and marine pollution

Website: http://netriskwork.ctfc.cat/

Partnership: Forest Science and Technology Centre of Catalonia - CTFC (Coord.), European Forest Institute - Central European Regional Office and the Observatory for European Forests - EFICENT, Pau Costa Foundation - PCF, Forest Research Institute Baden-Württemberg - FVA, Entente pour la forêt Méditerranénne - EPLFM, Civil Protection General Directorate of Autonomous Region of Sardinia - DGPC RAS

Duration: 2017-2018

Contact: netriskwork@ctfc.cat

Document reference suggested: NET RISK WORK, 2018. Proceedings of 2nd Natural hazards risk management workshop: Emergency Management and Risk Governance towards resilience societies (2018/04/11-13). Deliverable 9. Networking for the European Forest Risk Facility initiative. ECHO/SUB/2016/740171/PREV10 Project. 28 pp.

CTFC E F I FVA Forest Research Institute Baden-Württemberg PAU COSTA FOUNDATION REGIONE SARDEGNA VALABRE ANTICIPER VOTRE PRÉSENT

Contents

I. NET RISK WORK Project

Networking for the European Forest Risk Facility Initiative is a two-year Project (2017-2018) funded by the EU Civil Protection Mechanism, promoting the knowledge exchange and networking around four major European forest risks and their interactions; wildfires, storms, floods and avalanches.

NET RISK WORK wants to perform a best practices capitalization and knowledge exchange process on risk planning and management for a better comprehension on how these hazards are interacting in a changing climate context across Europe, and what can be used from lessons learned between regions and other risk experiences.

The Project is also giving continuity to the Risk Facility Initiative started in 2014 (*www.friksgo.org*) encouraging networking under informal and permanent multi-actor platforms seeking for a better transfer of knowledge into practices and policy making.

Further information of the project is available at the website: http://netriskwork.ctfc.cat/

II. Workshop objective and agenda

During last decades, natural risks knowledge has reach a high level of maturity and development. However, into the actual and future climate change scenario new challenges and gaps appears as the most relevant challenges to deal with risks and social wellbeing. While on one hand national and international scientific debate has developed a good theoretical framework with respect to the concepts of risk and disaster cycle, public policies and local practices presents limits that affects institutions but also the capacity and awareness of the local communities to respond effectively, efficiently and promptly to events.
The workshop wants to provide a meeting and discussion space on expert knowledge about wildfires, floods, storms and avalanches risks, with particular emphasis on emergency management, community involvement, risk communication and policy development, with the following specific objectives:

- Identify main risks' emergency management and reduction strategies challenges in a climate change context;
- Explore how different risks are interacting and what can be used from lessons learned between regions and others risks' best practices and operational tools;
- Highlight the fundamentals for facing an inclusive risk cycle management under the Civil Protection objectives, enhancing preparedness and response of local governance systems and the community;
- Promote networking and knowledge exchange on different natural hazards at European level.

Workshop agenda includes sessions with key note conferences as well as 3 discussion group sessions conducted by moderators to promote the exchange of knowledge among the audience.

Final fieldtrips will serve to analyse the case of floods and wildfires risks in the region.

Tuesday, 10th April 2018 - Arrival and project partnership meeting

17.30 Only for NET RISK WORK partners: Project meeting in DGPC RAS headquarter

19:00 Visit to the Headquarter of Civil Protection General Directorate of Autonomous Region of Sardinia - DGPC RAS (all guests)

Visit to the Regional Operational Room and of the Regional Decentralized Functional Center

20.30 Welcome workshop dinner at "La Mola Sarda" Restaurant, Cagliari

Wednesday, 11th April 2018 - Workshop Day 1
Response and emergency management; Community involvement and risk communication towards efficient civil protection. Lessons learned and achievements

08:45 **Welcome address**. Massimo Zedda, President of the Metropolitan City of Cagliari; Donatella Spano, Assessor for Environment and Civil Protection, Sardinia Region; Graziano Nudda, General Director, Regional Directorate for Civil Protection - Sardinia Region; Mr. Eduard Plana, NET RISK WORK Project coordinator - CTFC

09:15 **Agenda presentation** (logistic issues, etc.) - NET RISK WORK team (DGPC Sardinia)

09:30 **Opening session: Interactions and feedback mechanisms between risks and social processes relevant for risk management** - Andrea Duro, Emilio D. Iannarelli, Italian National Department of Civil Protection

09:50 **1st workshop results presentation** - NET RISK WORK team (CTFC)

10:10 Short questions and debate

10:20 *Coffee break*

10:50 Short conferences related to Discussion Group 1 topic

- **Sharing an overview perspective of civil protection and emergency management from a multi risk approach** - Rafael Prades, Catalan Civil Protection
- **Enhancing emergency management and response to weather and climate events in Northern Europe** - Kim Lintrup, Executive Director - Chief Fire Officer, Frederiksborg Fire & Rescue Service, Denmark
- **Managing fire suppression operations into the Mediterranean wildland urban interfaces** - Vincent Pastor, SDIS13 - Bouches-du-Rhone fire and rescue department

11:40 **Discussion group session 1: Response and emergency management; lessons learned and achievements** (audience is split in parallel 3 groups)

Exchange of knowledge, tools and best practices about different emergency management and response strategies for different risks will be considered, also for risk interaction from multi risk approach perspective.

12:45 Report to the plenary

13:30 *Lunch*

15:00 Short conferences related to Discussion Group 2 topic

- **Resilient cities and participated processes. The Municipality of Quiliano** - Alberto Ferrando, Mayor of Quiliano, Paolo Fiorucci, Fondazione CIMA/Proterina project
- **Human factor and community involvement. The case of wildfires in NW Spain** - Mr. Juan Picos, ESP - Forestry University
- **Engaging communities into risks management. The wildfire groups in UK** - Mr. Rob Gazzard, Forestry Commission
- **Building community disaster resilience. Good practices from civil protection associations** - AVPC San Pantaleo, Associazione Soccorso S. Andrea, Gonnesa

16:10 **Discussion group session 2: Community involvement and risk communication towards efficient civil protection; lessons learned and achievements** (audience is split in parallel 3 groups)

From the point of view of emergency: exchange of knowledge, tools and best practices about risk perception, communication and participatory processes will be considered.

17:10 Report to the plenary

17:30 *Coffee break*

17:45 **Regional node conference: Connect-collect-exchange, promoting networking towards risk management at EU level** - Alex Held, EFI Resilience Programme/SURE project

18:00 **European Fire Risk Node updates presentation** - Núria Prat-Guitart, Pau Costa Fundation/NET RISK WORK team

18:15 Short questions and debate

Thursday, 12th April 2018 - Workshop Day 2
Risk management and policy development; Field visit

09:00 **Risk assessment matrix presentation and results** - Net Risk Work team (FVA - CTFC)

09:45 **Questions, debate and suggestions about the risk assessment matrix**

10:15 *Coffee break*

10:45 Short conferences related to Discussion Group 3 topic

- **Challenges/constrains integrating wildfire risk into spatial planning in Catalonia (study case)** - Eduard Plana, Marta Serra, Marc Font, Forest Science and Technology Centre of Catalonia
- **Dutch policies and programs for flood protection** - Michaël van Buuren, Landscape planner
- **Drought Risk Reduction. Framework and practices in Sardinia** - Paolo Botti, Regional Hydrographic Agency of Sardinia
- **Cost-effectiveness analysis for identifying flood risk mitigation measures in Sardinia** - Giovanni Maria Sechi, University of Cagliari

11:45 **Discussion group session 3: Risk management and policy development** (audience is split in parallel 3 groups)

Exchange of knowledge, tools and best practices about risk management from cost-effective, institutional and recovery perspective will be considered.

12:45 Report to the plenary

13:30 *Lunch*

15:00 **Field trip: flood risk**

Visit to a case - study in Capoterra, near the city of Cagliari, area hit by a major flood resulting from prolonged heavy rain in October 2008. Examples of hydraulic and hydrogeological risk mitigation through structural and non-structural/civil protection measures, mediation and conflict management tools.

Interventions: Municipality Mayor, University of Cagliari, DGPC RAS and representative of Regional Department for Public Works.

15:30 Arrival in Capoterra - City Hall

15:45 **Welcome -** F. Dessi, Major of Capoterra

October 22th 2008: case study analysis

16:00 **Meteo description of the event -** P. Cao, Arpas - Regional Meteo Department

16:15 **Description of the flooding hystogram** - G. Sechi, University of Cagliari

16:30 **Civil Protection Plan. What did we learn from the flooding? Post emergency actions for hydrogeological and hydro risks** - E. Concas, Capoterra Municipality

17:00 **Exposed areas during the flooding: description of mitigation manmade constructions along the river mouth** - R. Mulas, Regional Department for Public Works

Field survey: Mitigation manmade construction 1th and 2th phase: kindergarden school area and municipality civil protection plan; i.e. Poggio dei Pini bridge and dump areas in Frutti d'Oro

18:00 End of field trip and transfer to Cagliari

Friday, 13th April 2018
Workshop Day 3 - Field trip: wildfire risk

Visit of coastal wildland-urban interfaces - WUI hit by wildfires in the municipality of Pula. Interventions: Municipality Mayor, Forest Ranger Service and Environmental Surveillance - Sardinia Region, representative of Forestas - the Regional Forestry Agency.

8:00 Departure from Cagliari

8:40 Arrival in Pula at Forestal Command Station

8:45 **Welcome -** C. Medau, Major of Pula

Territory description, Municipality Civil Protection Plan, great natural hazard risk: list and type. Interface fire risk - prevention and emergency response to the risk, developed by the Municipality

9:00 **Forestas - Sardinia Forest Agency. Duties and organization, with foremost attention to civil protection activities, public properties, regional planning of public ownership, i.e. fire risk mitigation actions** - M. Francesco Cappai, Forestas

9:15 **CFVA, Forestal and Environmental Monitoring Corp of Sardinia - Description of the Corp: regional organization of fire risk protection plan; classification of fires with fire interface attention** - Carlo Masnata, Stefania Murranca, CFVA, Cagliari Department

9:35 **Cases study analysis**

First case study: Capo Blu, Eden Rock, fire 2006; second case study: Burranca, Villaggio dei Gigli, 2014 - G. Delogu, CFVA

10:30 *Coffee break*

11:00 **Field Survey**

First case of study: **Capo Blu. Interface fire. Occurred Problems: fire putting out operations**

12:30 **Polaris Centre** - Science and Technology Park of Sardinia. Presentation of the Centre and ongoing projects list

13:00 *Lunch at Polaris Cafeteria*

14:30 Departure to Villaggio delle Mimose

Field Survey

Second case study: Villaggio delle Mimose. Fire description from panoramic viewpoint; intervention suggestions to mitigate fire risk

17:00 End of field trip and transfer to Cagliari

III. Presentations

This chapter summarize the oral presentations of the workshop. Titles are linked with the complete content of the presentations hosted on the NET RISK WORK website.

Workshop Day 1

Opening session. Interactions and feedback mechanisms between risks and social processes relevant for risk management. *Andrea Duro, Emilio D. Iannarelli - Italian National Department of Civil Protection*.

Hydrogeological and hydraulic risk is not only a natural one, but also a «human-induced risk». Social processes are not negligible in risk hydrogeological assessment: increase of exposure caused by urban sprawl and inappropriate territorial and urban managements are key causes of hydrogeological and hydraulic risks; human behaviour is a key factor in the degree of vulnerability and the likelihood of disasters taking place. Combination of structural and non-structural measures, in particular risk awareness, are needed to substantially reduce the risk. Within the recent Decree legislative n. 1/2018, the National Service of Civil Protection promotes initiatives in order to increase communities' resilience, fostering citizen's participations to civil protection planning, knowledge and civil protection culture dissemination. In order to develop the new CP code's provisions, is still needed a better understanding of the leverage points for each kind of community (municipalities, schools, workplaces, etc.); to define a very simple system of proxy indicators in order to measure the resilience processes at community level; to find at local level actors (resilient citizen champions and/or groups) capable to activate and sustain resilient processes; to implement and refine the right governance interface between empowered citizens/groups and local administrations; to empower local civil servants and different civil protection agencies and operators with a brand new set of skills, more focused on social dynamics and on a "anticipation" mind-set.

1st workshop results. *Eduard Plana, Forest Science and Technology Centre of Catalonia/NET RISK WORK team.*

The 1st natural hazards risk management workshop, "Managing forest risks towards disaster reduction: the case of wildfires, storms, floods and avalanches" held in Solsona (Catalonia, Spain) from 4-6th October 2017 brought together fourteen experts on different forest risks and risk management domains from research to practitioners from 11 countries. The workshop last three days with key notes conferences on each risks, on risk theory and multi-risks R+D projects, discussion session on how are risks affecting society and how are they interacting in a CC context; how to be effective in mitigating risks, achievements towards risk assessment, mapping, cost-effectiveness, risk planning, governance and communication to build up a resilient society. The Deliverable #8, available on the project's website (http://netriskwork.ctfc.cat/results) provide an overall overview of workshop's results.

Risks' key note conferences
Response and emergency management

Sharing and overview persective of civil protection and emergency management from a multi risk approach. *Rafael Prades, Logistics and Land Operations Service, Catalonia Civil Protection Directorate.*

An overview of the Catalonia's Civil Protection Mechanisms, complemented by a detailed description of the system and tools for flood risk/emergency management (in particular, tools of warning) is provided. In Catalonia the civil protection structure coincides with the administrative structure and is organized in 3 level according to the three administrations: municipalities, Catalonia Region and Spanish central government. Mayors in their communities, Catalan Regional Minister of Interior as the highest authority in the region or the Spanish Government whether the emergency exceeds the Catalonian territory (when "national interest" is declared) are responsible for the risk and emergency management. Catalonian system has their own structure for the protection of citizens and goods, composed by Public services, Emergency services from companies and activities (self-protection services), Civil Protection Volunteers depending on municipalities. There are no variations in the civil protection structure across types of disasters. The CECAT - Emergency management centre of Catalonia is the strategic coordination level, with a global vision, dealing with centres of different agencies. The general PROCICAT - Regional plan determines municipalities obligated to prepare the municipal plan (PAM). Municipalities are responsible for integrated civil protection planning including risk assessment plans and for operational units.

Enhancing emergency management and response to weather and climate events in Northern Europe. Kim Lintrup, Executive Director - Chief Fire Officer, Frederiksborg Fire & Rescue Service, Denmark.

Extreme weather events are expected to increase in likelihood and intensity in Denmark as a result of climate change: more rain in winter and less in summer; summer season with both periods of drought and heavier downpours; milder and more humid winters; growing season of plants prolonged; warmer summers with a risk of more and longer heath waves; higher water levels for the seas around Denmark; more powerful storms can be expected. Project and operational tools designed to increase resilience include the HEIMDALL and the beAWARE projects. The HEIMDALL project - Multi-Hazard Cooperative Management Tool for Data Exchange, Response Planning and Scenario Building (http://heimdall-h2020.eu), aims at improving preparedness of societies to cope with complex crisis situations by providing a flexible platform for multi-hazard emergency planning and management, which makes use of innovative technologies for the definition of multi-disciplinary scenarios and response plans, providing integrated assets to support emergency management, such as monitoring, modelling, situation and risk assessment, decision support and communication tools. The beAWARE project (http://beaware-project.eu/) proposes an integrated solution to support forecasting, early warnings, transmission and routing of the emergency data, aggregated analysis of multimodal data and management the coordination between the first responders and the authorities.

Managing fire suppression operations into the Mediterranean wildland urban interfaces. *Vincent Pastor, SDIS13 - Bouches-du-Rhone fire and rescue department.*

Starting from an overview of the Bouches-du-Rhône territory, in the Southern part of France, the state of the art on wild fire risk and emergency management and assessment on the wildland urban interface of South France is illustrated. The territory is characterized by a Mediterranean climate, with strong wind condition and a surface most covered by forest, a growing population and a dense road network. Forestry work are realized in compliance with management plans; in particular, the public authorities use the fire as an example of the effectiveness of such measures with the comparison between preserved building in areas where the implementation was correct and destroyed houses

where the obligations were not respected. lLessons learned during the last decades of forest fire history. Improvements on prevention policies implementation and challenge to face during the lasts extreme events are provided.

Community involvement and risk communication towards efficient civil protection

Resilient cities and participated processes. The Municipality of Quiliano. *Alberto Ferrando - Mayor of Quiliano.*

In 1992, there was a dramatic flood in Quiliano: two people were killed, the city was in ruins. The event taught the Municipality and the inhabitants to respond and be ready as of today, thanks to the participative process of drafting of a new Civil Protection Plan (hydro-meteo section). The results of the process were improved operational capacities, increased community awareness, collaborative synergy of all involved stakeholders, effective dissemination of Civil Protection culture, diffusion of adequate behaviour and self-protective skills among the population, strengthened awareness raising procedures. The new approach to the civil protection planning, more based on real skills and resources of the territory, together with an increased awareness of the community, produced as a result self-protection and resilience.

Human factor and community involvement. The case of wildfires in NW Spain. *Juan Picos, ESP - Forestry University.*

A detailed review and analysis of the human factor behind the wildfire risk in the NW regions of Spain. How human have been relating with landscapes and fire as a natural element of management, can help to understand the roots of present problems beyond simplistic trends and preconized behaviours.

Engaging communities into risks management. The wildfire groups in UK. *Mr. Rob Gazzard - Forestry Commission.*

Starting from a definition of communities, a review of the status of wildfire policy in England is provided. The wildfire coordination in UK has two level: national/government and local fire operation groups, where stakeholders such as fire services, land owners and local groups shared knowledge and equipment to tackle the problem; a variety of structures between groups and informal management solutions emerged in response to local needs. Knowledge of wildfire was accumulated within regional and national wildfire forums and academic networks. Only later did the need for central emergency planning and the response to climate change produce a national policy response, with a first definition of wildfire as risk in the National Risk Register (2013). Stakeholders such as the Forestry Commission pioneered good practice in adaptive land management to build fire resilience into UK forests. Regarding risk manage for future communities, the National Planning Policy Framework states that Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change, through suitable adaptation measures, including through the planning of green infrastructure.

Building community disaster resilience. Good practices from civil protection associations. *AVPC San Pantaleo, Olbia and Associazione Soccorso S. Andrea, Gonnesa.*

Civil Protection Association's voluntary work plays a crucial role on the Italian Civil Protection system. Speakers from two Sardinian voluntary association talked about their work and their achievements. The G.I.A.N.O. (General Information on Natural and not natural Bed beds in Olbia) project, promoted by the Civil Protection Volunteering Association San Pantaleo, arises from the need to protect vulnerable groups - especially children - within the population, after the experience of "Cleopatra", the flooding event that hit Sardinia and particularly Olbia during November 2013. In this serious flooding

event, six people died, four of these part of vulnerable groups (two children and two elders). Using the resources raised by the Italian Foundation Media Friends through public donations (€ 270,000) and an additional € 30,000 from the Municipality of Olbia, the Association was able to establish a network of weather stations placed in key points in the Municipal territory, which transmit data to hubs located in flood-prone schools, disseminating warnings and information concerning the status of water channels, height of water levels, weather conditions in Olbia and in the surroundings to the local population. The data were transmitted to the Municipal Operational Centre (C.O.C.) at the municipal level via wi-fi bridges; in order to take full advantage of the system potential, training courses have been provided for school managers, teachers, voluntary associations and COC operators. It is also expected that information and data may be published on social networks in real time. The future prospects are interesting, with the extension of the functionality of the stations to monitor other type of risks, and the collaboration with others municipalities.

The Soccorso S. Andrea Gonnesa - SOSAGO is a volunteering association dealing with medical emergencies, rescue at sea and support activities related to citizen's security. Trying to optimize the way to respond to emergencies and the communication with citizens, inspired by the research on urban planning in the Gonnesa territory, the Association developed in 2015 the NISE - Emergency Informatic Support Centre, to deal with emergencies management as well as facilitating the sharing of information via web portal https://sosago.maps.arcgis.com. The NISE research and experiments new effective data gathering methods regarding terrain structure and local hydrogeology, to be more time-effective when dealing with emergencies. With the SITSE (IT Emergency System for Monitoring the Territory) the Association support municipalities, authorities and the civil forces managing data and volunteers in monitoring and preventing emergencies, improving time effectiveness thanks to the application of mobile technology.

NET RISK WORK project tools and ongoing actions

Regional node conference: Connect-collect-exchange, promoting networking towards risk management at EU level. *Alex Held, EFI Resilience Programme/SURE project/NET RISK WORK team.*

Following the 'connect-collect-exchange' principle, the Forest Risk Facility European initiative implemented a number of Regional Risk Facility Network Nodes, together with case studies, expert exchanges, training events, workshops, and delivered mutual support. Exemplary Regional Nodes are in Ireland, Bulgaria, Germany, Spain / Catalunya, France, Switzerland and Czech Republic. The tasks for the further development and formation of regional and thematic network nodes and focal points is apply the Communication Framework; strengthen operational strategy for cooperation and shared objectives; ensure operational budget / finance scheme for the Secretariat and the Nodes.

European Fire Risk Node updates presentation. *Núria Prat-Guitart, Pau Costa Fundation/NET RISK WORK team.*

The presentation contains the main ideas of the development of the new European node on wildfire risk: objectives, participation, functionalities and management of the node were explained. In the present climate change context and the subsequent threats of shifting the fire regimes, there is the need to bring together the current knowledge of the wildfire communities and continue to face the present and forthcoming challenges together within Europe. The initiative of the European Wildfire Risk Node has the purpose to establish links between the existing formal and informal networks, individual practitioners and communities that own the expert knowledge on wildfire risk. The development of a wildfire risk node is an action of NetRiskWork project. The node aims at acting pro-actively to shift the paradigm from response and reaction to proactive risk management across the networks, and provide services and experiences that benefit the communities.

Risk assessment matrix presentation and results. *Yvonne Hengst - Forest Research Institute of Baden-Württemberg.*

The risk assessment matrix developed in the course of the project, is a tool that helps to capitalize existing knowledge and to reveal influencing factors in terms of risk interaction and single risks (storms, flood, avalanche and wildfire). It focusses on the risk formula (vulnerability, exposure and hazard) and potential natural and human influences. Starting from these elements, the tool is a new exercise for thinking about natural risks and their interactions in a climate change context. The objective of the Risk Assessment Matrix is the analysis of different forest risks. The harmonized risk assessment methodology and abstract level of analysis, ensures risk comparability and allows the detection of present and potential interactions between these hazards. Further, it identifies factors and measures, which influence vulnerability and exposure. Additionally, it incorporates a goal-oriented risk management approach. Systematic single risk assessments have been conducted for each forest risk. Subsequently risk interaction assessments, based on the results of the single risk assessments have been conducted. Furthermore, new types of risk could be identified, while better understanding interlinked risk relations. However, it remains an abstract exercise to compare risks, identify new types of risks, and better understand risk interactions. To address this challenge, guidelines were created that show how to fill the assessment sheet, as well as an annotated example for Single Risk Assessment. General comments on main challenges with filling the matrix were discussed and several sections of the risk assessment matrix updated. Overall, 30 single risk assessments and risk interaction sheets were prepared.

Workshop Day 2

Risk management and policy development

Challenges/constrains integrating wildfire risk into spatial planning in Catalonia (study case). *Eduard Plana, Marta Serra, Marc Font, Forest Science and Technology Centre of Catalonia.*

The presentation defends the importance of an effective integration of forest risk into spatial/urban planning (land-use and urban planning). The complexity of the landscape requires the adoption of an updated approach for integrating wildfire risk into spatial planning, involving urban planners and managing the territory through its classification and qualification. In order to put the focus on the risk prevention complementing and connected with the risk response, as it is already done in other risks such as floods or avalanches, main challenges and constrains are required: it is necessary to adapt the risk assessment information to the requirements of land planners, including the expertise on forest risks in the initial stages of the planning phases; provide a quality of risk assessment information, a strong legal framework; having measures and tools for putting the needs of risk management before private (even other public departments) interests; a strong institutional coordination for being able to assume the transverse dimension of factors affecting the phases of the risk cycle and its domains, and also the several risks' interactions; to adopt of a participatory processes for promoting the corresponding awareness and own risk mitigation responsibility and dealing with the uncertainties.

Dutch policies and programs for flood protection. *Michaël van Buuren, Landscape planner.*

The Netherlands is well known for its long history and tradition of water management and flood defence, with strict safety standards, dedicated forms of governance, regular safety assessments and engineering. The presentation exposes a review of the flood risk management story of the Netherlands, with a chronology of the main flood risk protection policies that have been adopted, from the dam constructions to the social involvement to increase resilience. Between new developments and trends, is presented the flood policy adopted after the river flooding in 1995, when the national Room for the River programme was initiated to give back more space to the rivers in order to reduce the risk of flooding. The goal of the government programme (34 projects, 2,2 billion euro, realised

2008-2017) is to create more room for the rivers to address flood protection, master landscaping and be able to safely process higher water levels. At more than 30 locations, measures are taken to give the river space to reduce flood risks (new high water gully, river city-park, dike relocation, floodplain with agricultural use, removing obstacles, new bridge that replaces dikes …). The "Room for the river" has also be a good example of measures designed with the population, local actors and experts, that participated to the improving of the quality of their surroundings identifying problems, opportunities, possible solutions and policies, effects and means for realization ... and do it together.

Drought Risk Reduction. Framework and practices in Sardinia. *Paolo Botti - Regional Hydrographic Agency of Sardinia.*

Floods and drought are the two sides of the same coin. The analysis of the hydrological series for the last 94 years (1922/23 - 2016/17) in Sardinia shows that both the rainfall and the runoff are not stationary, as is clearly shown by the statistical tests. Rainfall decreases on average by about 1.66 mm/year. In Sardinia, the water supply system is mainly based on reservoirs due to the lack of significant underground resources; the system is characterized by: low reliability, high vulnerability and low resilience. The Island has been divided in seven hydrographic zones called "Sistemi". The application of the methodology for the Sardinia Multi-Sector Water System has given good results over the last decade; through this tool it has been possible to identify, from time to time, the areas of crisis and the mitigation measures to apply. Main conclusions result that is preferable to anticipate resource deficits, especially where costs are not a linear function of the deficit; therefore, it is preferable to have several years with a moderate shortage rather than a single year with a high deficit. The duration of the water crisis may be in the order of months or even years. At the time of planning, in such circumstances, it is always very difficult to assess the volumes for the different uses and thanks to hydrological studies and forecasting models it is possible to identify the most suitable choices. The measures to tackle a water crisis are typically a combination of structural and non-structural interventions, including, for example: use of alternative resources; construction of emergency infrastructures; implementation of the levels of supply established in the Crisis Management Plan (restrictions, reductions); combined use of superficial and underground resources; integration of the emergency plan with other mitigation measures (eg. socio-economic measures); measures of Civil Protection in situations of particular emergency.

Cost-effectiveness analysis for identifying flood risk mitigation measures in Sardinia. *Giovanni Maria Sechi, University of Cagliari.*

Mediterranean regions have experienced severe flood damage caused by flash floods, which are characterised by a short duration and concentrated rainfall intensity in small river basins and steep slope areas. Recent flood events in Sardinia (Capoterra 2008, Cleopatra 2013) have been in such way characterized.

Flood damage and loss estimation forms an integral part of flood risk assessment and it is useful for planning flood mitigation structural works. Specifically, the Flood Risk Management Plan (FRMP) of Sardinia Region - Article 7 of Chapter IV - states that the "Flood Risk Management Plans shall take into account relevant aspects such as costs and benefits", and the Chapter III requires the preliminary preparation of flood hazard and risk maps. Frequently, in Sardinia region, upstream reservoir management policies for flood wave lamination interact with downstream flood mitigation works. Studies of flood impact on the territory have been conducted to determine regional water depth-damage curves using the database of claimed refunds after floods registered in October 2008 and November 2013. This aiming to obtain regional representative water depth-damage functions and allowing a comparison with the European JRC water depth-damage function for residential land-use territories. The work, an example of application in the Mediterranean that could be useful for comparing with other EU contexts, is focused on the evaluation of the direct component of the tangible flood damage by applying the water-depth damage functions. The need of deeper local analysis arose

planning mitigation measures for specific zones. Obtained water depth-damage functions for flooded zones in Sardinia have been compared with the JRC curve and differences mainly due to the structural dwelling typologies have been highlighted.

IV. Results from the Discussion groups

IV.1 Introduction

In addition to the plenary presentations, the workshop featured small-group sessions and following reporting back session, in which the results of the small-group discussions were reported. For each discussion session, experts were split in three different groups distributed according to the individual fields of expertise and regional contexts.

The group discussion sessions were conducted in order to promote the exchange of knowledge and information across the main four risks, avalanches, forest fires, storms and floods. Specifically, the sessions focused on: (i) Response and emergency management; (ii) Community involvement and risk communication towards efficient civil protection and (iii) Risk management and policy development. Discussion sessions seek to capitalize the updated knowledge regarding each risk across Europe, and to promote the exchange of lessons learned from different EU contexts and expertise.

Participants were provided with questions that encouraged them to consider the most significant recent and predicted future developments, according to the session's focus. Participants were also asked to consider how developments could affect emerging concerns.

The diversity of nationalities and expertise backgrounds participating ensures a wide variety and representativeness of cases and needs from multiple European contexts, meanwhile strengthening the professional network consolidations. In this sense a total of 40 experts representing 10 different EU countries - Germany, the Netherlands, Switzerland, France, Italy, Denmark, United Kingdom, Catalonia and Spain, Portugal - participated in the discussions sessions.

This chapter summarizes the inputs provided by workshop participants during the discussion group, and highlights the main conclusions of each session.

The content of each discussion group is divided in different sections according to the thematic topic. In that sense, the discussion group 1 is divided in three sections: current challenges in emergency and response; most significant advance in response and emergency management; future scenarios. At the end, some key points emerging from the three-workshop discussion are underlined. The discussion group 2 is divided in cross-sectoral topics: is the individual the problem or the solution?; efficient risk communication: tools and ingredients; information quality/standards). Finally, the discussion 3 on risk management and policy development took place as a plenary discussion on the final day, the content, general remarks on key topics discussed.

IV.2. Discussion session 1: Response and emergency management; lessons learned and achievements

This discussion group wanted to identify past and future scenarios for emergency management. In this session the participants exchange knowledge, tools and best practices about different emergency management and response strategies for different risks, also for risk interaction from multi risk approach perspective. Moderators followed a storyline that answered these and other questions: what challenges do the response and emergency management present in case of risk interaction? What are the current problems/challenges of response and emergency management? What have been the most significant advances in response and emergency management? Does this evolution help to think about possible solutions to the new challenges?

Current challenges emergency management & response

Policy / procedures

- Most municipalities don't have plans, or have plans that are not regularly updated. **Local Authorities make plans as requested by the law,** but they don't really own the procedures that they have to apply in case an event occur. They are not well trained on the practical application of the plan.
- **Management is based on administrative levels**, but natural risks are not. Therefore, action teams and responder crews needs to be prepared in a pro-active way before the event, and agree on common protocols and languages.
- There are more and more agencies involved in Civil Protection, all with their own dynamic, and they are very reactive; but crosslinks between agencies is not easy.
- It is necessary to take into account the "voice/opinion" of agencies and organisations working for Civil Protection not only in the "emergency periods" but also in "peace periods".
- The **lack of homogeneous procedures and operational standards** make it difficult the mobility across EU emergency agencies during an event/hazard management. **What is missed is a standardised view.**
- It will be very interested to understand **how emergency services and planning departments work together** and identify if this relation is effective.
- The issue of **insurance must be taken into account**, with flood risk characteristic that influence the different flood loss compensation schemes in place in the European countries.

Technology / tools

- There are a lot of tools but not all are used; there is a **low adoption of modern technology.**
- Technology can make things worse on the long run, because it can decouple people from reality. We construct against natural hazards, rather than work with it. People need to have a relationship with the land, need to identify with it, and technology should help on it, rather than destroying this relationship.

New and emerging risks

- Challenge of tackling new risks.
- Climate change effects on new hazards: **agencies react to new challenge with "old mentality"**. In some cases, egos and hierarchy are a constrain for collaboration. Competition for resources between agencies or feeling of competition of agencies towards researchers arise. There is not a clear feel of collaborative and be together to face the problem.
- The **cascade effect** is affecting risk interactions in a climate change context and also the damages of risks; new damages are appearing.
- A response and emergency new challenge in case of new risks or risk interactions is **to change the legislation according news scenarios**: the rhythm of risk appearance and development is different than political/legislative rhythm. This legislative changes are very necessary to adapt the response and emergency capacity to real situation/scenarios.

Most significant advance in response and emergency management

- **Networking is a good "response/solution"** to face the policy challenges related with risk management.
- Regarding the risk interactions, they have always existed (excluding new risks). In that sense, emergency services are getting prepared to face more than one risk in a short temporary scale.

- There are large advances in **technology, not only for response** (drones, helicopters), **also as a new communicative tool** that is effective, fast, direct and functional (new media, smartphones, etc.). They can be used complementary and to support emergency management and communication with citizens. These tools are also good to collect information.
- Technology advances have led to an increase of people and responder's safety, however is not enough to face new risk trends and intensities.
- Wildfire risk is the only hazard that emergency responders try to combat during the emergency; we cannot imagine responders trying to stop an avalanche during its runout, or a hurricane, or a flash flood. This is a clear difference between natural risks and how we manage the emergency, try to minimize the intensity of the event.

Future scenarios

Risk perception / Trust

- We need to **increase trust and credibility** of society on the institutions and agencies managing risk.
- We need **to educate responsible citizen**. People are not proactive anymore, we expect "others" to fix problems. How to install a spirit into a society to create responsible citizens? Some indications from the audience:
  - **Work with the schools**: inspiring new generations, then their parents will learn it too. Build on move towards more attention for skills in teaching.
  - Not just to focus on awareness, but to **give opportunity for action**, transferring knowledge to skills. Example of activities: Work with a fire beater; be aware of risk in environment; self-protection measures; creating defensible space together with fire and forest service; work with scouting groups; remind past events; show the correct behaviour to adopt (example for floods: go upstairs rather than take car and do horizontal evacuation), and so on.

Policy / procedures

- **Administration should be more explicit**: People can not be protected at 100%. Risk zero does not exist. In some days and some places, the emergency services just cannot do anything.
- Be clear about when and where to expect what kind of help.

New risks

- One successful methodology to increase and to improve the response should be the **exchange of experts**, across Europe and in the world. New risks in non-traditional areas (e.g. wildfire in Northern Europe) can be faced through the exchange of experts and professionals from the South of Europe that are used to work on the emerging risk.
- Problem is not part of the economy. We should give products real prices, with all costs involved. Prevention should be "attractive" again, assessed as an ecosystem service.
- Firefighter safety may be more effective tool for politicians than prevention. In avalanche search, the focus is on the search and rescue team. Storms: quick and fast and cleaning up all the trees. Most accidents happen after the storm because people go quick and fast after the storm. Set priorities for after storm management. The approach for flood risk is a bit different and based on flood defence and flood warning, with particular attention to vulnerable groups, strategic buildings, hospitals.
- **Cost benefit analysis** can be used to communicate with the citizens. Additionally to money, **other numerical indicators may be used, more significant** (the number of jobs preserved in relation to prevention and fire suppression operations in the case of wildfire threatening an industrial area).

Key points emerging from the discussion

- We need **to strengthen the relationship between landscape and urban planning**.

- **Review and update the preventing measures implemented and adapt this measures to new risks/new hazards and the climate change challenge**.
- It is necessary to define all the measures using a **collective-community approach**, not only individually.
- In particular, we have **to make a change in the model in communication**, **shifting from an authority-model to a more responsible model**; from a top down culture to a bottom-up approach. In particular, agencies need to find a common understanding and harmonize the language used.
- **Cultivate a culture of risk through education and awareness**, starting from a new ownership of the places where people live (people are not aware of the risk in the territory in which they are living).
- For education and awareness purposes we can **introduce the information about the costs**. This information can be seen in a very dangerous way - the response depends on the population awareness - to be discuss.
- As for the use of technology, during the last 15 years, the technology under response and crisis management has increased a lot. This save a lot of life and losses. But there are new trends and technology solutions improvement are not enough. **For community's safety, technology is a solution but not the only one; is always needed social involvement**.
- We need to include/involve new actors in the search for new solutions**. Community involvement is always a good solution to solve the crisis**.
- **Successful measures can be cross-border and other international cooperative or collaborative actions, in particular the exchange of experts**.
- Climate change is a big issue. Responders and crisis manager have a lot of work to do for increase the resilience.
- **It is important to take into account also public health issues and pandemic risk**, that can be characterised by economic, environmental and human (migration) impacts.
- **We need to accept the "something we cannot stop"**, for does emergency situations that are over the capacity of the emergency services.
- Regarding the communication flows: sometimes we have to much information and we simplify to much the concepts. **We need to find the way to provide a correct analysis of all the information**.
- We have to use **existing networks to spread the message in a timely manner**.

IV.3 Discussion session 2: Community involvement and risk communication towards efficient civil protection; lessons learned and achievements

This session took specific emphasis in the exchange of knowledge, tools and best practices about risk perception, communication and participatory processes. Moderators followed a storyline that answered these and other questions: the individual is the solution or is the problem? How to achieve the first and avoid the second? What kind of tools can we use to communicate the risk? And for community involvement? Who is in charge and responsible for the communication of risk? Who is the receiver of the information? If there's no good information, where is the problem? Why there's no good?

<u>Is the individual the solution or the problem?</u>

- The **ban-prohibition vs. the explanation of the risk attitude policy**. In the Catalan and Southern France experiences of denied access to specific areas in high risk periods, it seems that people after some time (often years) get used to the mechanism. This actually help citizens better understand the risk and adapt their behaviour.

- A big issue is the involvement of the **tourism sector professionals** and how they should be involved in the risk communication approach as **intermediaries between the tourists and the Local authorities**. They might be reluctant to "spread the word" as this might impact the frequentation of their area and therefore their income as well.
- In some cases, individuals or groups are at the origin of the hazard (or having an impact on its frequency or intensity), while other individuals are suffering the damages. There is therefore an issue of **solidarity**, which is made more complex in the case when those groups do not know each other's (large areas). This is illustrated in the example of the actions carried out by the municipality of Quiliano where people upstream and downstream the flood impacts are convened together into a **participatory process**. **It is necessary to explain the risk evoking people solidarity value**, explaining through participatory processes how our actions can affect the rest of the population.
- That lead us to the cross-sectoral topic of **participation**: we cannot solve the problem if we don't involve the community. Involving people is the solution and also an added value, because can address the gap between people and nature. Empowering the people to take part in the risk management can be a solution. This empowerment can be solved by participative processes? Individual is the solution - if the individual is informed and aware**.**
- **There are differences between cultures** (e. g. North vs South of Europe). In some cultures, people are used to respect the risks because risks are severe; in other cultures, they respect the risk that they're used to (that they can remember: a particularly important aspect of risk is its cumulative nature when exposure to a hazard occurs repeatedly over time) but not the new risks or the very old ones.
- This doesn't mean we have to discuss different cultures, but rather different messages. There is the need to investigate people's values and backgrounds and then adapt the message to that, address the feeling of the people that have, for example, forest as cultural heritage versus forest production, general public background vs forester background.
- For new and emerging risks, it is not realistic to expect individuals to be the solution: **public support is essential for new risks**. Governments and agencies can provide knowledge, skills and then they can transfer that to the citizens.

Efficient risk communication - tools, ingredients

- There is a need to **standardize the alert messages** in terms of colours, symbols, visual codes, and link them to the expected behaviour, so that people develop a memory of the messages after repeating events, but also **across risks**.
- **Communication skills and expertise** are necessary in defining and implementing an alert strategy. The **inputs from social sciences** are deemed very valuable and complementary. Participants also emphasise the experience and know-how of **journalists** that can be used as well especially when it comes to processes related to interesting and catching an audience, even though they may have a tendency to amplify the information to increase their sells. Communication is a discipline itself, social science in risk management expertise and knowledge should be integrated in this process.
- **Real time** is a key aspect. Sometimes, it is useful to communicate even though there is no fresh information just to tell people that things are being managed and that they are kept informed as time goes by.
- Regarding **communication content**, there is also a lot of possible improvements. Indeed, communicating about the **authority's response actions** is not the most important message, even though in later stages, society will hold the authorities accountable. The key information for the public is to **understand the level of risk, and to infer the behaviour that is expected from them**.

- How can we get people to join? After an event, we can capitalize on catastrophes to sensibilize people. That doesn't mean that no awareness effort should be taken before catastrophes: we don't have to wait for the catastrophe, but be prepared to make use of the opportunity once the risk happens. **We may find measures to create awareness that they feel identified with the risk around them**, using international examples like the wildfire in Portugal during 2017: the accident and the victims probably saved many other lives because all that has been done after the accident.
- If the danger level is put too high and then nothing (e. g, an avalanche) happens, people lose the trust and start ignoring it. This is similar to fire warning in the Netherlands where they used red alert like red weather alert but people didn't understand because there was only a probability of fire and not an actual fire.
- A Catalonia specific case: risk for flood is not well known/communicated to the potential affected society, and neither one person has participated on a flood emergency drill. Every city and municipality has their own flood plan and knows their risk according to the law, but none has involved directly the affected population to train how to react in case of flood and be ready and prepared. In opposition, the same population is also exposed and vulnerable to chemical risks, but in this case as some incidents can occur in short time (1 each 5-10 years) people knows the procedure of response and self-protection. With all, communities are less prepared to face infrequent risks, therefore an extra communication effort has to be put on these risks.
- Communicate to the people that risk occurrence estimation is based on probability, and therefore we cannot eliminate uncertainty. The new Italian Law on Civil Protection use the word 'probabilistic', to indicate that the risk has uncertainty. **A big question is: how to communicate uncertainty**?
- Economic loss of tourist areas because day tourists check the forecast and they don't come when weather is bad. The example of Switzerland lawsuit in which companies used the weather forecast organization because of economic loss is provided.
- Avalanches are started usually by skiers - for fun. Fire can also start for fun, or accidentally by fun activities. Prevention of that is another user group.

<u>Risk perception / Trust</u>

- **Risk perception** - how people understand risks and safety - is a central issue.
- From a psychological and sociological point of view, there is often a **denial, a negation of the risk**. In this sense, it is much difficult to work with social vulnerability than physical vulnerability.
- People's trust in emergency management is challenging, now and in the future, but there is the need to build more trust.
- **Practitioner's trust in research is low**; often they are sceptical. They use different technical terminology and approach (both necessary and complementary), but until now we haven't succeeded to find the key liaisons between them.

<u>Involvement</u>

- People don't know enough about risk and need to be trained regarding self-protection measures and self -protection assistance. They have to trust in the action they can do by themselves.
- One of the big issues is how to engage people in emergency management. It's difficult to manage a crisis situation if citizens don't know what to do; **it is necessary to work on awareness and avoiding top-down processes**. People have to be part of the process to feel acknowledged.
- Prevention actions and communication about risks are not deemed sufficient and the objective is not to convince. The priority should rather be on **education and collective learning** instead of an only-one-direction communication. There should be a paradigm shift from **a top-down to a bottom-up approach** and **from authority to responsibility.**

- The **risk knowledge** (understanding the risk) and the **risk culture** (knowing how to live with the risk, how to adapt its behaviour, and therefore be resilient) are the two sides of the coin and the engagement with the public should accommodate both aspects.
- There is **both an individual and a community dimension in coping with risks**. For instance, the brushing obligations are an individual responsibility, but they protect the whole community. First responders explain that population preparedness is crucial for the response efficiency.
- In France there is a legal obligation for the owners, responsible for clearing around their property. There, **regulatory provisions are presented and shared with the citizens**. A lot of **public meetings** (with Municipality team, the firefighters, the foresters, the prefect authorities) are organised and **material from previous fires is collected to show the impact** of a brushing that is compliant with the regulation in preserving the houses. In Sardinia, regulations (from 1960) are not adapted to stop the fire from threatening the interfaces and new rules are needed. However, the interaction with the other actors is a barrier in that process.

Communication quality/standards

- There is a big **gap in the communication between the emergency services and the citizens**. People don't understand the processes behind hazards, one-week flood risk, next week fire risk. People don't understand how this works; so the quality of communication is very important. An intermediary levels of communication (territorial: national, regional, local) would probably be more effective.
- An issue across Europe is the language barrier, that does not simplify a common understanding. It is also needed to create technological platforms and **harmonise the language to enhance the communication between agencies, in particular weather and forest agencies**. It also important to differentiate the message according to the user groups.
- We deal with the quality of being convincing or believable: Trump on Twitter, no credibility; GRAF unit about fire, high credibility, because the sender of the message is accepted. Journalists only worked with program because EFI had credibility.
- How does that work for new risks? For community: old agencies handling new risks have credibility based on their past activities in other risks. For government or other expert agencies: exchange of experts and visibility of the training done is essential for building credibility about your new risks.
- In Catalonia, nobody wants to miss the daily TV weather alert. During all year, the weather guy includes information about fire risk, flood risk and give practical solutions and advices to be aware of our exposure and vulnerability and self-protection measures! In Portugal the level and detail of information is quite poor and simplistic: it is often assumed that everything should be as simple as possible, avoiding some important concepts, but people are intelligent so more information can be given than is done now.
- **Risk mappings: it is important to have uniform colours between regions and at national/international level of each risk level/degree/alert**. Like this a better comprehension of risk alert system could be achieved. A good example is the specific case of resident people versus tourists (both are exposed by only one is familiar with the national risk alerts and colours.
- Risk maps are important but they are not everything. They need to be accompanied by explanations and real examples to reach people awareness.
- In Portugal after October fires alert code stayed Red while it rained. This need to be make clear and explained.
- A solution can be try to establish **new media partnerships**, like for instance EFI and The Guardian. Training program of EFI for journalists in which journalists are trained by EFI, very good model for other organizations and agencies.
- Integrate journalists with the team, physically involve them in the activity (sandbags, fire beater, etc.).

VI.4 Discussion session 3: Risk management and policy development

This discussion group considered the exchange of knowledge on lessons learned, tools and best practices managing risks across common cross-sectoral topics of disaster reduction strategies, in consonance with the Sendai Framework for Disaster Risk Reduction 2015-2030. This session took specific emphasis in the exchange of knowledge, tools and best practices about risk management from cost-effective, institutional and recovery perspective. Moderators followed a storyline that answered these and other questions: what challenges do different risks present? What is the "state of the art" of policy development in the different risks? Is it possible to integrate the risk management in urban and land planning/development? What challenges do the risk management and policy development present in case of single risks (wildfire, flood, avalanche and storm) and risk interaction?

General remarks

- A big issue is the competition between **resources and needs of different users**. The example of the drought risk in Sardinia is provided: the use of the water stored in the reservoirs set against short term agriculture use versus medium to long term potable water availability. Lobbying activities are mobilized by specific interest groups (farmers) to modify the management plan of the dawns. Approving measures when risk is low will result in one plan, but approving measures when the risk is high will lead into another result. A collaborative approach integrating all actors is needed, in order to look for the common good and avoid conflict.
- **Civil protection approach (citizen's security) versus economic & revenue drivers**. Despite a great political willingness in doing a risk protection plan, there is always the issue of «who has to pay»? Local municipalities don't often have enough resources and they expect that the National government « pays the bill ». A good plan can prevent but it can also end for economic reasons.
- In general, to face up to the potential conflicts is needed a step beyond and the value of solidarity is evoked: not only solidarity between neighbours, or farmers and Civil protection, but also between farmers and tourists, and between neighbour countries: examples are transboundary water management across borders and the case of the Netherlands investing in dams in Germany.
- It has to be taken into account that **decision making is, as demonstrated, much more based on psychological processes than on technical information**. Taking decision is therefore not exclusively a technical thing, but it is also the result of the complex interaction between psychological elements, different feeling and thoughts.
- Modification and adaptation of indicators to increase their significance: the example of Australia changing the fire risk indicators or Galicia adding new extreme risk levels. The question is raised with regards to how should this modification be linked to the related behavioural advices. In particular, the big project run in Australia to change risks indicators has involved scientists, forest agents, land users, all the stakeholders implied in the decisions/discussion; «everybody is getting on board», not only the experts in managing the forest, but everybody implied in the discussion is protagonist and responsible.
- **A participatory approach to the risk planning process** builds ownership and trust between institutions, the community and among the individuals involved and can lead to solidarity; but it is also a demanding process really time consuming. In the described experience of Quiliano Municipality, the local Mayor found very hard to explain to the population dangers and risks and, in the case of schools in overflowing areas, to make parents understand that, for their pupils, the safest place was the school (is reported that one mother has a sudden illness).
- In some context **the participatory approach need in any case to be led by some kind of authority**: if you share the problems, and the solution have costs some conflicts arise, there are

winners/losers. An authority can drive the discussion mediating conflicts between stakeholders and assuring the more rational decision, using an appropriate pedagogical approach to explain the problem and the uncertainty. This would also be a way to manage some personal sensitive issues (e.g. kindergarten in an exposed area to a certain risk, such as a flooding area).

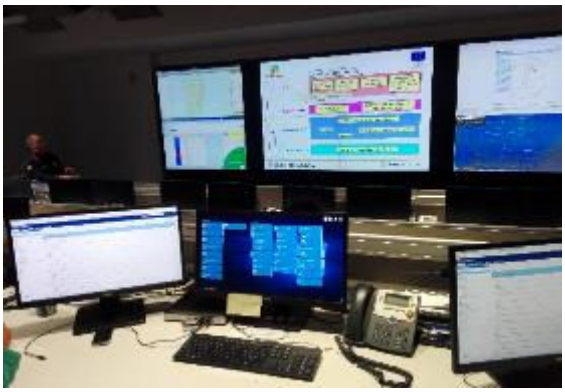
- **Decision makers and general public have to deal with the uncertainty related to hazards and risk**. It has to be clear that we must get used to uncertainty. Dealing with uncertainty is to accept that we can't control everything: forecasts are not prediction, and even the most careful prevention can completely reduce the risk. Although the aspect of security is taken into consideration, is not possible to prevent the risk at 100% and to predict what happens in a particular place and in a particular instant.
- This uncertainty is underlined in particular for flood risk. Flooding risk can never be dropped to zero: we can retain the water with banks, but we could be never sure that the flat risk rate will be 0%. Many examples show that even if you adequately constraint banks on the basis of a correct prevision, you may have damages worst that the previous situation. **We always have to deal with a residual risk**.
- It is important to be open about the **consequences of uncertainty for risk planning.** Forecasts are one thing; the operational aspects of the plan are another thing. If there is an alert and nothing happens, decision makers can be the object of many protests. This requires effective and honest communication between decision makers and the general public where the nature of the decisions and the strengths (and weaknesses) of the risk information are transparent and understood by all. There is no single simple recipe for communication and a collaboration and alliance with the media has to be found. Journalists should participate in workshops about the communication of risk.
- A latest discussion point concerns the **reactivation of memory** and how to pass the hazard memory from generation to generation, cultivating memories to manage risks. It is the case of the commemoration of the century anniversary (picture books, activities at school, municipal civil protection exercise, etc.) of an earthquake in Northern France.
- **Cost-benefit assessments** can be tools to show there is the need of planning and raising awareness and preparedness.
- People awareness **can be raised through the history of their own places.** In Switzerland the **names of geographical localities have been studied to check whether there is an indication about a specific hazard** (especially avalanches and floods) contained in the name and whether specific events already occurred in this locality. One of the special characteristics of geographic and local names concerns the fact that very often they refer to events occurred in that place. This survey can be done easily (place names are already on Google maps) in all Europe and can activate great knowledge, formulating relationship with the local places names, using the references to build dataset of danger zones. This can also be an attractive ("sexy") argument, that can be interesting and easily understood at local level.

V. Annex

V.1. List of participants and representatives

	Surname	Name	Institution	Representative
Miss	Yvonne	Hengst-Ehrhart	Forest Research Institute Baden-Württemberg - FVA	Germany
Mr	Christophe	Hartebrodt	Forest Research Institute Baden-Württemberg - FVA	Germany
Mr	Alexander	Held	European Forest Institute - EFI	Germany
Miss	Alice	Clemenceau	VALABRE	France
Mr	Vincent	Pastor	SDIS13 - Bouches-du-Rhone fire and rescue department	France
Miss	Nuria	Prat Guitar	Pau Costa Foundation	Catalonia - Spain
Miss	Mariona	Borràs	Pau Costa Foundation	Catalonia - Spain
Mr	Kim	Lintrup	Frederiksborg Fire & Rescue Service	Denmark
Mr	Fábio	Silva	Special Force of Firefighters (FEB), National Authority of Civil Protection	Portugal
Mr	Sebastien	Lahaye	SDIS13 - Bouches-du-Rhone fire and rescue department	France
Mr	Andreu	Palacios Megías	GRAF Unit, Catalan Fire and Rescue Service	Catalonia - Spain
Mr	Joaquín Miguel	Boigues Firth	Operations Unit, Catalan Fire and Rescue Service	Catalonia - Spain
Mr	Frank	Krumm	Swiss Federal Institute for Forest, Snow and Landscape Research - WSL	Switzerland
Mr	Marc	Font	Forest Science and Technology Centre of Catalonia - CTFC Catalonia	Catalonia - Spain
Mr	Eduard	Plana	Forest Science and Technology Centre of Catalonia - CTFC Catalonia	Catalonia - Spain
Miss	Marta	Serra	Forest Science and Technology Centre of Catalonia - CTFC Catalonia	Catalonia - Spain
Mr	Rafael	Prades	Civil Protection General Directorate, Government of Catalonia	Catalonia - Spain
Mrs	Anna	Casamitjana	Catalan Water Agency	Catalonia - Spain
Mr	Rob	Gazard	Forestry Commission	United Kingdom
Mr	Juan	Picos	Forestry Faculty of Pontevedra University	Spain
Mrs	Cristina	Montiel	Complutense University, Madrid	Spain
Miss	Cathelijne	Stoof	Wageningen University	Netherlands
Mr	Michaël	van Buuren	Wageningen Environmental Research (Alterra)	Netherlands
Mr	Giuseppe	Delogu	Former Commander of Forestry Corp of Sardinia	Italy
Mr	Paolo	Botti	Regional Hydrographic Agency of Sardinia	Italy
Mr	Andrea	Duro	Italian National Department of Civil Protection	Italy
Mr	Paolo	Fiorucci	CIMA Foundation	Italy
Miss	Marta	Giambelli	CIMA Foundation	Italy
Mr	Alberto	Ferrando	Mayor of Quiliano	Italy
Mr	Giovanni	Sechi	University of Cagliari	Italy
Mr	Sergio	De Benedictis	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mrs	Teresa	Capula	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mr	Francesco	Tola	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mr	Salvatore	Cinus	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mrs	Caterina	Visani	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mrs	Fabrizia	Soi	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mrs	Germana	Manca	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy
Mrs	Daniela	Pani	Civil Protection General Directorate of Regione Sardegna - DGPC RAS	Italy

V.2. The workshop in pictures



Visit to the DG PC RAS Headquarter

The theory session was developed in this main hall, where all the speakers made their presentations. The workshop was held in this room Wednesday 11th April and Thursday morning 12th April of 2018.

Participants were divided in 3 different discussions groups, spaces to discuss and reflect on the specific workshops thematic.

The report-out by the workgroups to the plenary session

Field trip, Thursday 12th April 2018.
The first field trip took place in Capoterra, near the city of Cagliari, area hit by a major flood resulting from prolonged heavy rain in October 2008. The event caused damages in structures of residential and touristic area for millions of Euros, and 4 victims.
Thanks to the Municipality, to the Municipality Mayor, to Arpas, the Regional Meteo Department the University of Cagliari and to the representative of the Regione Sardegna Department for Public Works for their collaboration and support!

Attendance family picture in Capoterra

The second stop of the field trip was in Poggio dei Pini and in dump areas in Frutti d'Oro, near the municipality of Capoterra.

Field trip, Friday 13th April 2018
The second field trip was a visit of coastal WUI - wildland-urban interfaces hit by wildfires in the municipality of Pula.
Thanks for contributing to the Municipality Mayor, Forest Ranger Service and Environmental Surveillance - Sardinia Region, representative of Forestas - the Regional Forestry Agency!

By the hand of an expert forestry technician, was illustrated the wildfire case studies of Capo Blu, Eden Rock (2016) and Burranca, Villaggio dei Gigli (2014)

The last stop was in a wildland urban interface at Villaggio delle Mimose, in the territory of the Municipality of Sìnnai, where intervention strategies to mitigate fire risk were illustrated.
Thanks to the rappresentative of the Sinnai Municipality for their partecipation!

Attendance family picture in Villaggio delle Mimose, Sìnnai

Funded by
European Union
Humanitarian Aid
and Civil Protection

Personal notes, comments, remarks