Efficient fire risk communication for resilient societies (eFIRECOM)

State of the art on fire risk communication amongst journalists and media

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"Report on the state of the art on the risk communication to journalists and media"

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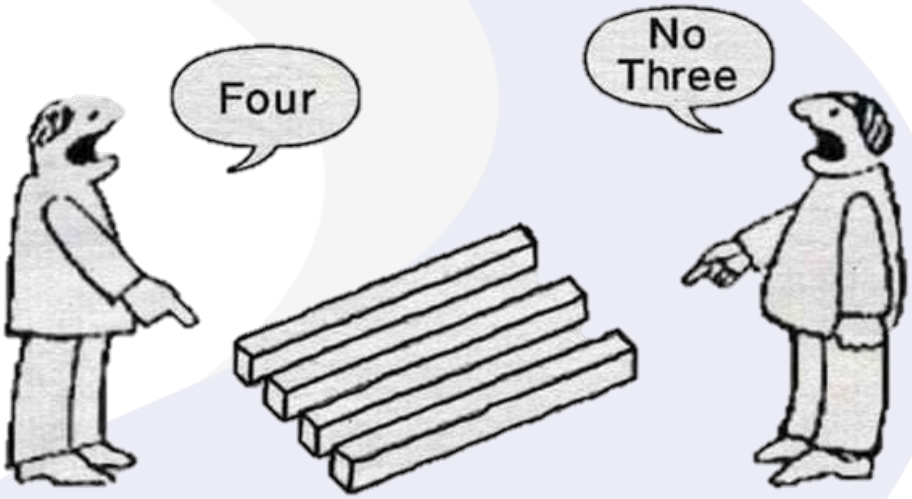
“EVERYTING WE HEAR IS AN OPINION,
NOT A FACT.

EVERYTHING WE SEE IS A
PERSPECTIVE, NOT THE TRUTH”

Marcus Aurelius



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1-Why effective risk communication matters

1.1-Risk communication history.

The concept of risk communication appears during the 1980's as a result of public's claim over environmental policy making; and public information and participation. In the 1970's, people were largely content to leave control in the hands of established authorities, such as the Environmental Protection Agency; however people became visibly upset, distressed, and even outraged when they felt excluded (Covello et Sandman 2001).

Risk communication was created as a scientifically based discipline, to guide the new partnership and dialogue of government and industry with the public, addressing a fundamental dilemma: "The risks that kill people and the risks that alarm them are often completely different".

Fact 1: "There are many risks that make people furious even though they cause little harm, and others that kill many, but without making anybody mad" (Covello et Sandman 2001)

Other factors that have contributed to its rapid growth was the increase in public interest in health, safety and environmental issues, and media coverage of them; the mistrust in risk management authorities and public demand for the right to participate as a full partner in all phases of risk assessment and risk management; the increase on the demand for information generated by public concern about risk from past, present and future activities, and the increase on the awareness by governments and industry that risk controversies often threaten the achievement of their organizational goals.

It is important to note that some authors have explicitly cautioned against an unbalanced re-emphasis on communication exercises that serve solely to increase public trust and consent, rather than on facilitating stakeholder and public dialogue as a contribution to mutual learning and innovation (Irwin 2006; Wynne 2006).

Since the beginning to our days, and according to Leiss (1996), it is possible to differentiate three phases in the risk communication evolution:

1) One-way communication to primarily convey probabilistic information, to educate the public at-risk, and to gain consent over risk management practices and measures.

2) Persuasive communication to change people's risk related behaviours.

3) An emphasis on two-way communication and exchange in which all actors should engage with and learn from each other (Renn 2005).

Nevertheless, risk has become an important element in our daily life as we live in a "risk society", where risk communication is one of the most important aspects of risk management. Risk communication in democratic societies is an interactive exchange of information and opinions concerning risks among stakeholders. The right-to-know and participate principles is nowadays enshrined in local, national, regional and international, and trans-national laws and regulations. Communication of risks has been enshrined as a responsibility of official bodies in a number of European and international policy documents (see box 1), and has been translated into national law and regulation, though to varying

extents across countries (Wright et al. 2006). However is important to note that although guidelines on the communication of technological, chemical, food and health risks have emerged, there is hitherto no generic document that specifically sets out legal requirements or recommendations on the communication of natural hazard related risks at the European level.

Box 1. Legal Requirements and recommendations at the European level

Policy papers relevant to risk communication in general:

→ European White Paper on Governance 2001 (transparency in decision-making processes)

→ IRGC White Paper on Risk Governance; OECD Guidance on Risk Communication for Chemical Risk Management (stakeholder participation, information)

→ Seveso II directive (public information, involving the public)

Policy papers relevant to risk communication on natural hazards:

→ Aarhus Convention (access to environmental information, public participation in decision-making)

→ Sustainable Development Strategy (inform citizens and involve them in decision-making)

→ Water Framework Directive (participation of stakeholders and the public in the management of resources)

→ European Union Directive 2007/60/EC on the Assessment and Management of Floods (involving interested parties in the production, review and updating of flood risk management plans)

1.2-Defining risk communication.

Communication experts and theorists tend to develop very precise and narrow definitions for fields of communication. This is why is capital to well differentiate tow main concepts; risk communication and crisis communication.

Traditionally associate with environmental management, public health, and emergency management, risk communication seeks to inform people about a potential future harm and their associated dangers so that they might take action to mitigate the risk (Seeger et al. 2003; Seeger 2006). There is a general consensus that risk communication is a **two-way process** between the communicator(s) and the recipients of the messages, but beyond that, different definitions often include unique variables and understandings. Mainly risk communication definitions defined it as Covello did in 1992: "process of exchanging information among interested parties about the nature, magnitude, significance, or control of a risk". Other definitions emphasize the importance of risk management (McComas, 2006), the need for dialogue between communicators and stakeholders (Palenchar, 2005), and the necessity of ongoing risk monitoring (Coombs, 2012).

Through risk communication, the communicator hopes to provide the audience with information about the expected type (good or bad) and magnitude (weak or strong) of an outcome from a behaviour or exposure.

"Risk communication deals with might happens (or has already occurred), whereas crisis communication addresses what is currently happening"

(Peter Sandman)

Crisis/emergency communication has its roots in crisis management and public relations (Williams et Olaniran 1998), focuses on

communication during an event or incident. Crisis communication focuses on the message and on the need to distribute accurate, timely and useful information during the emergency (Seegers 2006); the content, form, and timing of the communication can help reduce and contain the harm or make the situation worse.

Risk communication often focuses and conveying messages prior to and during an event, and crisis communication focuses on doing so post-event. Risk communication tends to use message from experts and scientists while crisis communication typically uses messages from authoritative figures. Risk messages, emerge long before a crisis event occurs, and aim to reduce the likelihood of a crisis event occurring in the long term.

In spite of being substantially different, depending on the event characteristics, both risk and crisis communication can deal with known and unknown aspects of risk, including the magnitude of an event, degree of impact, and most effective response.

Box 2. Key distinction between a Risk and a Crisis situation

- ➔ A crisis is a specific incident with a short time frame, while a risk is often more long time span and evolves over the time
- ➔ Risk is controlled and structured whereas crisis can be spontaneous and reactive (Ulmer, Sellnow et Seeger 2011)
- ➔ Crisis is a risk manifested (Heath 2010)

While in this review it is assumed a distinction between risk communication and crisis communication, it is important to note that the terms are often used interchangeably in the literature. That's why we have tried to develop the review maintaining the distinction of both binomial communications situations.

Taking all into account, risk and crisis effective communication is an increasingly essential lifesaving action, based on the people's right to know how to protect their live and goods, and have a responsibility to take informed decisions to protect themselves, their loved ones and those around them. Effective communication not only saves lives and reduces losses; it enables countries and communities to preserve their social, economic and political stability before, during and after an event, by means of performing awareness, disseminating and building up knowledge on hazards and risks, promoting acceptance of risk management measures, improving relationships, enabling mutual dialogue and understanding and involving actors in decision making.

1.3- Risk communication obstacles.

According to Sandman and Covello (2001), risk communication has to overcome 4 major obstacles to be an effective process and reach the specific purposes to ensure optimal levels:

- Uncertainty: The lack of environmental data and the complexity of the major events and its uncertainty with regards to the potential harm, are a large gap in our understanding of risk, and present a critical challenge. This uncertainties can justify conflicting interpretations of the data, typically grounded as much in value judgments as in scientific judgments.
- Distrust: Commonly associated with the uncertainty, the mistrust comes from the disagreement among experts and the lack of skills of these to well communicate facts to the rest of actors.

However others behaviours take importance on the distrust generation, such as mismanagement and incoordination among risk organizations, lack on public participation and dialogue, and frequent distortions and exaggerations of the reality.

- Psychological and social factors: The way the society perceives, process and understands information about risk, have an important role into the effectiveness of communications. Factors such as heuristics (mental short cuts), apathy, overconfidence, unfamiliarity with risk data, desires and demand on scientific certainty, reluctance and the risk perception depending on the outrage factors (uncertainty, involuntary exposure, and lack of trust in official sources); are identified as the main drivers to consider when communicating effectiveness risk information.

Fact 2: " Less than 5% of public stress is drivers by facts; research shows that public concern is based 95% on perception and not on facts"

Fact 3: " People wants absolute answers, they demand to know exactly what will happen, no what might happen"

Fact 4: "People trend to assign greater probability to events of which we are frequently reminded"

Fact 5: "Strong beliefs about risk, once formed within a particular social and cultural context, changes very slowly and they can be extraordinarily persistent in the face of contrary evidence"

Fact 6: "Risk is multidimensional, and its mathematical size (hazard probability) is so important than the social one (Vulnerability)"

In order to face all this obstacles, many authors and organizations have analysed the basis of the risk communication and summarized the key points to reach the successfully communications levels. In this sense, in 1988 it was published the first policy guidance coming from the United States Environmental Protection Agency (EPA), with the 7 cardinal rules of risk communication (Covello et Allen 1988):

1. *Accept and involve the public as a legitimate partner*. The ultimate goal of the communication strategy is to produce an informed public, not to defuse public concerns or replace actions.
2. *Plan carefully and evaluate the outcome of the communication efforts*. Different goals, audiences and media require different actions.
3. *Listen to the public's concerns*. People often care more about trust, credibility, competence, fairness and empathy than about statistics and details.
4. *Be honest, frank and open*. Trust and credibility are difficult to obtain; once lost, they are almost impossible to regain.
5. *Work with other credible sources*. Conflicts and disagreements among organizations make communication with the public much more difficult.
6. *Meet the needs of the media*. The media are usually more interested in politics than in risk, in simplicity than in complexity, and in danger than in safety.

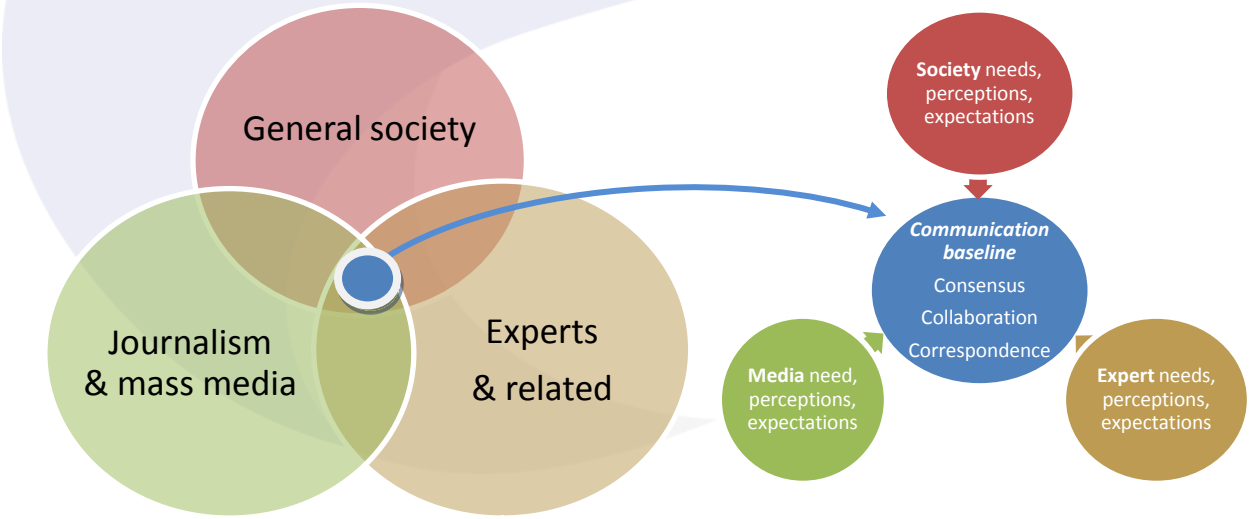
7. *Speak clearly and with compassion.* Never let efforts prevent acknowledgement of the tragedy of an illness, injury or death. People can understand risk information, but they may still not agree. Some people will not be satisfied.

Since that moment, the number of guidelines, manuals, instructions and recommendations focused on efficient risk communication has increase around many organizations and institutions who lead with risk issues at national and international level (e.g. FEMA, UNISDIR, UN …).

1.4- Risk communication actors.

Risk communication uses many communications techniques ranging from media and social media communications to mass communications and stakeholder and community engagement. It requires not only the understanding of stakeholder perceptions, concerns and beliefs, as well as their knowledge and practices, but also those from all other groups and collectives involved into the society's dynamics; that is the individuals or groups, public or private institutions in small or mass communications settings. Communication may take place within and across local, regional, national or international levels and involved actors can be regarded as nodes in communication chains or networks between which information flows in one or many directions. The strength, stability, frequency and direction of the information flow, and the centrality of the actors are the defining characteristics of such networks. Then if a node of the communication net fail, the rest of elements depending on it will be misinformed, enabling the occurrence of some of the previous communication problems listed previously. Once the audience is analyzed, the message can be improved for effectiveness.

That's why is so important to identify and understand the different actor's requirements participating in the communication relationships and find the common baseline through the meeting points between the groups. In this sense they can be grouped in tree main types, according to Gray et al. (1998) and Cruz Maezin (2008):



The complexity of natural hazards and the diversity of actors involved, usually within an uncertainty context and even more important, with many perceptions for a given risk, diminish the system's capacity to perform and grow up the scope and dimension of the multi-actors nexus point. As appointed above, there is a conflict in many cases between the perspective and expectations of officials and experts on the one hand and the general public on the other; being media the perfect linking bridge among them, by means of its basic principles (neutrality, veracity and objectivity) and its scope worldwide.

In this conceptual frame model, the development of a risk communication strategy could allow the accomplishment of important goals (Plana, E., 2011):

1. Socio-cultural change in terms of risk awareness and related knowledge
2. Improve the media teaching skills after, during and before an event
3. Improve the knowledge and information exchange among involved actors

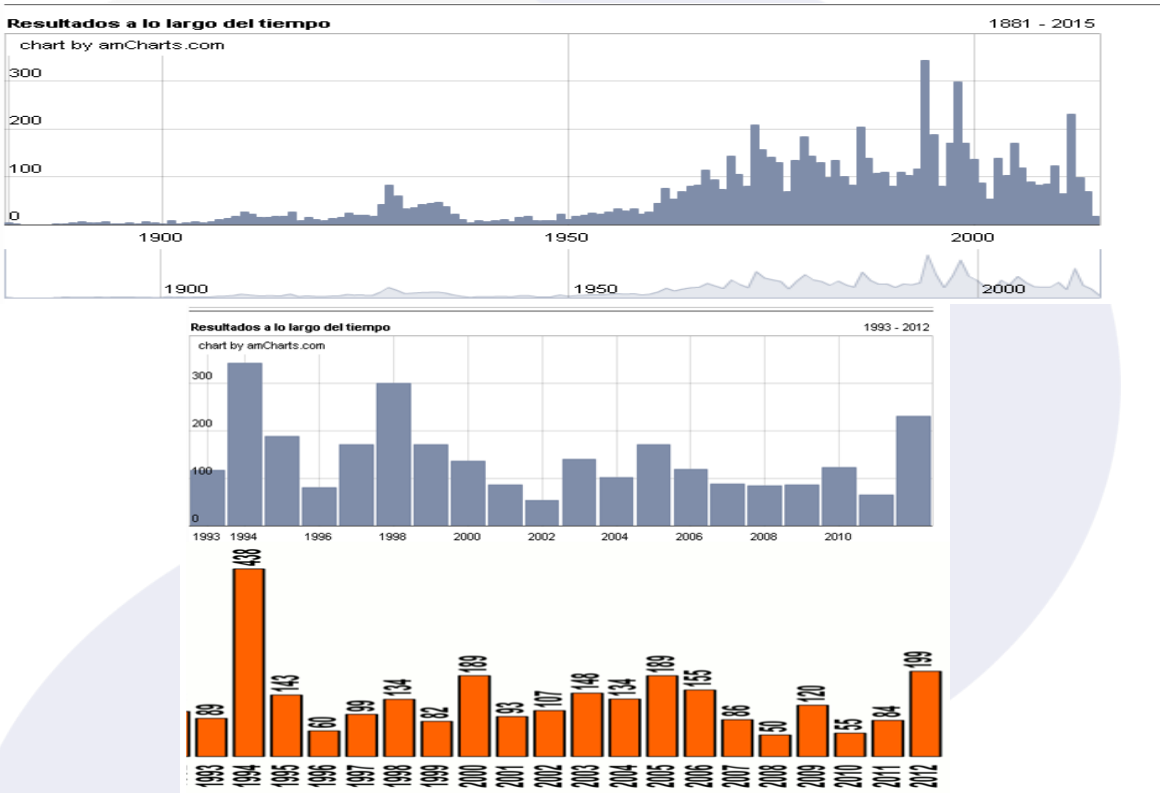
Taking all into account, effective risk communication needs to be adapted according to the addressed and involved target audience/actors, considering full time its necessities, perceptions and expectation.

2- The role of mass media and journalism in risk communication.

As it has been pointed previously, media are key mediators of communication between the public, the science and the political and management spheres regarding natural hazards (Beck 1992). Since long time, mass media such as television, radios or the press, are the most prominent information channel related to risk communication for general public, reaching various audiences across geographical and political borders; playing the role of "watchdog" of a society (Perko, T., 2012). The social function of media, informing and communicating all the natural hazard issues and wildfire related topics have been increasing during the last years according to the general interest and the scientific progresses in this field; and according to the natural evolution of the risk communication stages (see section 1.1). In fact, media are historically the main information channel of general society to certain topics restricted to little audience or particular groups with specialized profile (science journal customers, e.g. Nature, Science…). In this sense it has played a crucial role in the social dissemination and divulgation of new researches, knowledge and recommendations with regards of risk legitimacy and sociability; with special attention during the last 50 years based on the people's will and right to know. However, the trend of publications (in number), follows a correlation according to the wildfire occurrence and its magnitude,

being the worst fire years (in terms of surface affectation, damage severity and people injured or dead) those who capitalize the most attention of media (Dominguez et al 2014) (see Box 3).

Box 3. Evolution of wildfire news published by a reference Spanish newspaper during the last century. Up- number of forest fire news published during period 1881-2015; Down- Comparison evolution number of publications (blue columns) Vs evolution of burnt area amount x10³ ha (orange columns) during the period 1993-2012 in Spain. Source: http://www.lavanguardia.com/hemeroteca/index.html



Both media and journalism are legitimate as the main actor when communicating and sharing information to society; in part because of its methodologies, professional responsibilities and ethics; and in part because of its worldwide infrastructure's accessibility.

All these characteristics allow media to communicate about risk/crisis management and risk education. In this sense, risk communication plays a critical role into the response phase once an event strikes (coverage of immediate aftermath of disaster), meanwhile education aims to help people to understand the factors and elements which intervene into the event dynamics and resilient risk culture building up.

But journalists do not only report about reality, they also influence it with respect to the perception and interpretation (Eisensee and Strongberg 2007, Wachinger and Renn 2010), because they shape peoples reality when these do not know anything or enough about a particular issue until they are reported by media (Lakoff 2010). Then what people know about it is essentially what media tells, therefore they can promote specifics attitudes formations and manifestation; desirables or not (awareness, concern, interest, outrage, impotence...) (Pyne 1997, Höppner 2010). This reality's influence is not always volunteer, commonly in the field of natural hazards and risk communication, misconception and preconception comes from a lack of knowledge and inexperience dealing with the phenomena. Nevertheless in additional and in some cases the own nature and philosophy of the media business, acts as a filter, canalizing and reshaping the original information, according to its potential customers and

sale lines. Both considerations will have an important role on the total amount of published news (by one concrete topic) and its impact factor on the society, as well as how that audience understand, reacts and prioritizes the problem amongst other news. In any case, that consideration will be discussed on section 3.

Furthermore media has another important role on the multi actor relationship creation, maintenance and/or degradation, because they allow citizenship to meet, to follow and to evaluate other actors involved on the risk management (scientist, politicians, specific society groups, governmental agencies…). Journalism gives public visibility of all agents and actors enrolled into the risk and emergency management; what can certainly have important implications and consequences on the rights and responsibilities of these collectives during the development of their activities. In fact is a two-edged sword that can improve or destroy the actor's reputation according to its abilities to handle the risk and the trustworthiness of their performance. That's why media have empowered the information and communication under the right to know, as Warren Buffet summarizes in the sentence: "It takes 20 years to build a reputation and 5 minutes to ruin it, if you think about that you will do things different".

Taking all into account, media are crucial elements into a risk culture society as direct or indirect actor, being in some events the major dissemination channel of information allowing and facilitating the real-time communications between risk managers and citizenship (and vice versa with the new communication technologies, e.g. social media), and in some other just explaining and transferring the state of the art and knowledge advances on a given topic in order to promote the public awareness and proactive attitudes. Those are the main reasons why media are included as a key actor with a fundamental role into the most important international instrument for natural disaster risk reduction, the Sendai Framework for Disaster Risk Reduction 2015- 2030 (United Nations - UNISDIR) (see Box 4); and why they are taken into account in all the risk cycle phases.

Box 4. Role and importance of media communication capacity into the 1st priority of SENDAI framework for Disaster Risk Reduction 2015-2030.

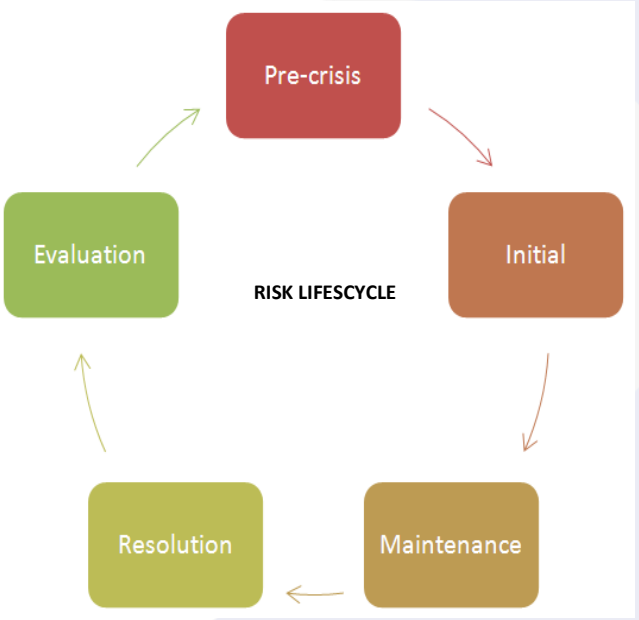
Priority 1: Understanding disaster risk

1-To promote and enhance, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data and information, as appropriate, communications and geospatial and space-based technologies and related services; maintain and strengthen in situ and remotely-sensed earth and climate observations; and **strengthen the utilization of media, including social media, traditional media**, big data and mobile phone networks, to support national measures **for successful disaster risk communication**, as appropriate and in accordance with national laws.

2-To promote common efforts in partnership with the scientific and technological community, academia and the private sector to establish, **disseminate and share good practices** internationally

3-To develop effective global and regional campaigns as instruments for public awareness and education, to promote a culture of disaster prevention, resilience and responsible citizenship, generate understanding of disaster risk, support mutual learning and share experiences; and encourage public and **private stakeholders to actively engage** in such initiatives and to develop new ones at **the local, national, regional and global levels.**

With regards to the risk cycle and risk communication, it is important to keep in mind that every risk, disaster or crisis evolves in phases, as well as their communications needs. That's why is crucial to differentiate these phases and be able to adapt the communications requirements according to each specific types of information and audience (actors). In this sense, media's communication plays a multiple role into different phases:



Pre-crisis phase is dominated by educational information in order to educate the general public about the risk providing messages and recommendations of awareness and actions to reduce the likelihood of harm; as well as anticipate and develop likely preliminary answers to audience questions.

Initial phase is dominated by rapid communication and factual information to convey empathy and reassurance on affected people; and reduce uncertainty as much as possible in order to promote self-efficacy through personal response activities.

Maintenance phase is dominated by real time information and communication aiming to ensure public updates, ongoing understands and risk mitigation measures; correcting rumours, unclear facts or misunderstandings amongst public.

Resolution and Evaluation phases are dominated again by educational information and communication, with the objective to provide precautionary measures, tools to be prepared in future similar events, and persuade public to support preventive policies and advocate for risk reduction culture. Raise public awareness.

3- Effective media risk communication; considerations and constraints.

Media's effective risk communication is key to improve and consolidate the risk culture into the new environmental and social context; however many communication obstacles and constraints has to be progressively overcome to evolves through the highest communication status and accomplish with strictness the media's roles. Constructing a news of a given problem and its conceptual frame, involves a process of information selection and weighing which inevitably results in the amplification and attenuation of risks or other aspects of perceived reality. Even though it have been previously pointed the basic risk communication obstacles and the 7 cardinal rules to solve them (see section 1.3), some other important limitations in the field of wildfire risk communications are identified as so important and challengers. Therefore all these needs to be taken into consideration when performing a communication aiming to get the closest reality level and therefore avoid as much as possible the influence and subjectivism of reliability (see section2).

Nevertheless it is important to underline that all following factors are considered as media's efficiently communication constraints, but also has to be understood as intrinsic conditions (not always easily amended) to consider carefully by the rest of actors involved in risk communication relationships (e.g.

risk managers and risk educators), in order to properly adapt as well its communication techniques and procedures according to media characteristics.

Most relevant constrains of efficient risk communication in wildfire events coverage are (adapted from Boykoff 2007, Carvalho 2007 and Wilkins 2000):

3.1- Type of media; physical and technological limitations.

The gender of media and its physical support has traditionally determined the way and style of communicate; is quite difficult to communicate the same information by different channels such as radio, newspaper, TV…. Each type uses a specific channel according to its possibilities and physical limitations, which means restructuring the message (in form and content) and all the complementary support material (pictures, videos, illustrations, sounds…). That's why, until arrival of new technologies communication (internet) each kind of media had a reference information role; radios and TVs were used as real-time information source during an emergency, meanwhile magazines and newspapers were most relevant providing educational materials after the hazard (even if they also could cover the emergency). Amongst all, TV seems be the most relevant media channel in wildfire communication, because is a strongly visual media and can make a great emotional appeal to large audiences, if combined with discussion groups (Wisner 2006); if compared with newspaper or radio news.

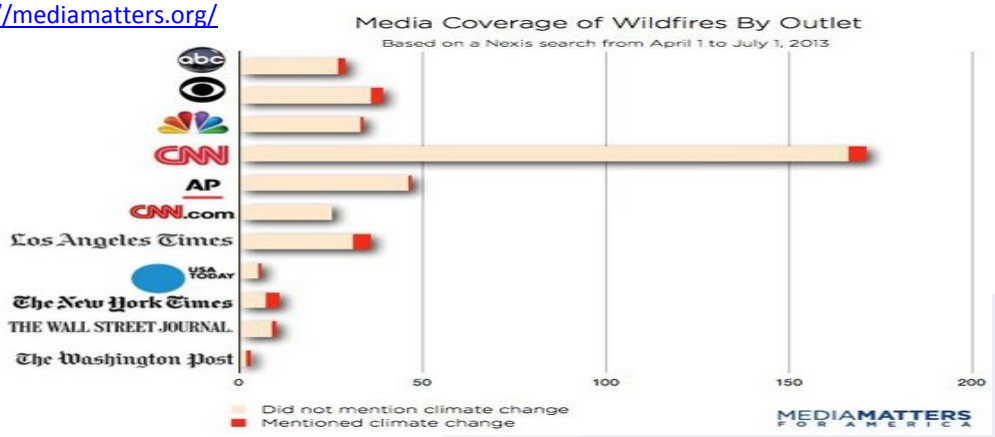
However, nowadays these media information profiles have almost disappeared by means of internet possibilities. Internet is an multi-channel (reading, viewing, writing, talking and listening) mode of communication; who has given all media the opportunity to inform on real time updates and with all kind of visual material, allowing them to perfectly inform during or outside the emergency, helping them to develop the media multi roles (keep informing and perform an educational framework).

3.2- Geographical scope and ideology setting.

The geographical component plays also an important influence on the information treatment, with special attention on its detail and relative relevance in front other news. In fact the regional coverage of a wildfire event is often more detailed and extended that national one, particularly when the regional media scope has a rural audience, historically more sensitive and close to the fire phenomena compared to the urban audience. The public interest on wildfires depend on how they could be affected direct or indirect by it on their social and economic activities, therefore rural areas are most concerned on wildfires economic effects with regards urban audience, which present more environmental and landscaping concerns. The same effect can be observed on media and its coverage style and interest (communication and information); but another important factor could redefine the journalism task, that's the media's ideology. The political preference of the media owners and its customers has a crucial importance in the information treatment and how they focus the problem and its repercussions (see Box 5). In general terms, some studies have showed that high politicization levels on wildfire coverage, has a significant bias as a function of media policy tendency or preference (Dominguez 2014); being regional ones, the most news publishers (in number) and wider coverage (in time investment); while the national ones done a superficial coverage based mostly on published news by information agencies. The same trend is observed when progressive media ideology face conservative ones, with regards on the coverage dedication but also on its main topic; progressive focus mainly in social and economic aspects aiming to found political responsibilities, and conservatives with mostly news focused in technical and neutral information aiming to defence public administrations and policies. A few media have focused on

the wildfire events as a natural problem intrinsic to the environment dynamics (e.g. Mediterranean vegetation and weather conditions).

Box 5: Wildfire information treatment according media's ideology in the USA. Source: http://mediamatters.org/



A study of wildfire coverage from April through July 1 in connecting climate change to wildfires in Colorado, New Mexico, California and other Western states, still generally failed to mention the link. Results shows that print and TV media only mentioned climate change in 6 percent of coverage, while climate change has officially[1] and scientifically[2] been declared as one of major factors for increasing severe wildfires occurrence, and therefore increased the risk of wildfires. Furthermore, it can be figured out the relative importance of wildfire occurrence by each media type according to its ideology and target audience.

[1] *Major Report: "Wildfires in the United States Are Already Increasing Due To Warming." In a comprehensive report commissioned by the Bush administration and released in June 2009, the U.S. Global Change Research Program said earlier snowmelt and drier soils and plants have worsened wildfires in Western states.* [2] *Flannigan et al. 2005; Pechony & Shindell, 2010; Westerling et al., 2011*

All these arguments are directly confronted with the 4th and 5th risk communication rules (see section 1.3) and actually reacts as authentic obstacles to consolidate the public credibility and trust: as some authors (Davis 2006, Johnson 2009) signals "research on media coverage of national fire policy reveals that increased media attention, presentation and criticism are a major influence on public attitudes and policy shifts at the national level" (Paveglio et al 2011).

Aiming to respond to this bias and mainly focused on the root problem without objectivism's influence, during last years has appeared a new concept/philosophy of information/communication by means of NGOs. Nowadays NGOs have been positioned as a real alternative to traditional disaster risk reduction actors and agencies; as well as majority of media with regards of environmental issues and concerns.

As a matter of fact, NGOs are considered into the International Strategy for Disaster Reduction of the United Nation (UNISDIR), as key actors of risk management: *"Over the past years, some NGOs have committed themselves to advocate for policy changes. Others have been active in mainstreaming DRR into rehabilitation and recovery programmes. Many others have engaged actively in capacity building, knowledge transfer and public awareness in communities at risk. All these efforts have contributed to reducing the vulnerability of those living in disaster-prone areas and increasing their resilience through educational activities and capacity Building*" (UNISDIR 2006).

In the field of wildfire, many NGOs are developing an important educational role, aiming to disseminate as accurate and reliable as possible all the scientific and technical knowledges to general society; manly focused on the environmental and social role/effects of fire, instead of searching for a direct guilty and

responsible. Its strategies are based on communicate all the wildfire factors traditionally uncovered by media (such as relations of forest and fire, environmental effects of fires harmful or beneficial …) and being a knowledge bridge between experts and general public, in order to social awareness building and to advocate for policy changes. Some relevant examples are the Greenpeace organization or the WWF.

Furthermore, some NGOs have assumed additionally the role of expert actor, supporting and developing researches into forest fire domain, such as The Nature Conservancy Organization and its worldwide fire program (maintaining natural fire role) and training (prescribed fire management).

3.3-Conceptual and temporal frame.

Usually it is difficult for journalists to cover stories with complex and specific roots, which need expert skills and longtime study investment (years) to be well understood. Therefore the author may or may not have any particular expertise on the topic and each author places his/her own particular interpretation of the findings into their work; compromising again news reliability.

Wildfire as a scientific discipline is one of most complex into EU natural hazard possibilities; because its interaction with multiple dynamic variables (environmental, social, economic…) which evolves daily; giving them important uncertainty levels with regards to its occurrence and repercussions (social or environmental). Actually independently of the expert knowledge status on wildfire phenomena, there is an important lack on transfer between scientist community and other actors, with special attention on media (MESSENGER 2006), which turns into an isolation atmosphere amongst both actors and difficult knowledge updating. Into this scenario, the wildfire traditional myths and misconceptions spread freely within the journalist base knowledge, and promotes the wrong comprehension of phenomena into the actual context. A clear example of this situation is found in many fire news, who focuses most relevant media's attention on the causality and the yearly fire statistics, instead of treating the subjacent problem such as the forest structure, or weather conditions causing the event. But journalists cannot easily ask for this information if they are not aware about its importance, so an environmental specialization is evidenced in the journalism curricular frame, as well as during the professional career, in order to consolidate an specific knowledge background and establish the basis of environmental's particularities coverages (APIA 2015). This situation will allow environmental journalists, to making easily and robust connections among different sub-disciplines and to some extent, among different investigation lines, avoiding usual misunderstands and misconceptions and keeps updated on all the wildfires discussions and advances; and at least to get a right workbook of wildfire terms and concepts. In sum, this will certainly increase people's understanding of the real problematic of forest fires and their role, as well as the main concerns and limitations to face the problem by the public administrators and agencies.

In addition, fire has an important temporal component with regards to its major occurrence period (fire season), mainly concentrated during summer seasons (into Mediterranean basin). This particularity, results in a predefined fire news season, where fire coverage is something usual and even normal by media and general public, but into new and coming context (according to climate change predictions), where fire seem to be potentially present during all year, it won’t be apply; for instance the Pyrenees’s winter forest fires. Media have not detected yet this opportunity to inform and communicate about this ongoing phenomena, as a way to educate communities at risk (wildland urban interface) to allows them implementing evaluations and risk reduction recommendations for instance; reinforcing at same time the role of media as the most relevant public advisory, which will strengthen public trust and credibility.

3.4-Media discourse and framing.

The "Information Age" has brought with it access to a tremendous volume of accounts that address environmental issues. These accounts appear routinely in the popular and scientific media. Newspapers, magazines, books, web sites, radio and TV broadcasts all attempt to present information, which the public generally accepts as objective and factual. However, reports are frequently sensationalized or exaggerated and there is often reason to suspect bias. Also, space limitations often necessitate shortening and perhaps over-simplification of the findings. As a result, reliability may be somewhat diminished.

In general terms, media discourse frequently report results of forest fires as catastrophic events, leading the public to believe so. Detail on role of fire, variation in patterns of burning, proportion of area that survives fire and post-fire landscape over time is usually lacking, giving special attention on the damages and total burn area affectation (black landscapes).

Headlines of articles published in newspapers and magazines are used to capture the reader's attention, therefore the words and phrases that are chosen to describes wildfire in the headlines follows a specific lexicon (e.g. "scar", "horrible beast", "raging", "inferno", "ravaging", "blaze's wrath", "inferno", "apocalyptic"…). These vocabulary choices clearly portray fire as something to be feared and with an own personality; a common enemy who must to be fight and overcome at all cost (just as a military context) because it is here to take away our goods and services without mercy. Oppositely, the potential positive aspects of wildfire in forest ecosystems receive little attention in articles headlines.

Images (photographs, diagrams, video) can also be used to portray wildfire and often accompany articles in newspapers, magazines and on-line. These images have tremendous "curb appeal" and are used to attract the reader. The images that are most often chosen are those that show crown fires or the impact that fires have on human structures. Another popular image used in the media are the firefighting resources, as a war-like imagery like this builds on the assumption that "wildfire is the enemy" and we are using sophisticated technology to wage war against it (Johnson et al 2006). In this sense, fire manager resources are seen as authentic heroes (Dominguez 2014).

Taking all into account, is important to mention that this particular framing and discourse of wildfires has probably its roots on the fire prevention campaign of the USA Forest Service dating from the beginning of 1940, aiming to sensitize general public as a main fire ignition source. The message was mainly focused on the human causality and the negative effects of severe wildfire, instead of explaining other relevant factors such as the forest unmanagment and its repercussions on the fire spread and its growth, or the exclusion of fire and its natural role as an element of Mediterranean forest dynamics (Pausas 2012). This has created the perception (of society and therefore future journalist generations) of fire as a one of worst environmental enemy, which is mandatory to eliminate without any doubt (Box 6).

Box 6: Different examples of fire prevention and sensitizing campaigns used by public forest administrations. Left: USA, 1940; Middle: Spain, 2008; Right; France, 2015.

Source: http://www.smokeybear.com/ http://www.juntadeandalucia.es http://www.prevention-incendie-foret.com

Along 70 years of fire preventive campaigns, message still dominated by fire as a public enemy, by human as main occurrence factor and by firefighting resources as heroes; aiming to create a general sense of fear and hate to fire and trying to exclude it definitely from our forest; paradoxically managed with and by fire along its history.

3.5- Information sources and coverage needs.

Journalists are bombarded with facts and so-called facts. These come from a wide variety of sources; stakeholders, contacts, the journalist's own research or the event's witness. The information source has an important impact on the coverage, in terms of message and content (discourse and framing) but also in terms of credibility. That's why most media organizations have a general rule, that all facts should be confirmed by two reliable sources. Often the wires will be counted as one source. The journalist then has to find another source that is willing to go on record to verify the information. Notwithstanding, frequently media don't have identified exactly the official sources of information and links where to get all kind of robust and contrasted material to build the coverage with rigor and reliability during a wildfire event. In fact a US survey[1] has revealed that an overwhelming majority of reporters and editors use social media sources for researching their stories as 56% say social media is important for reporting and producing the stories they wrote. Among social media 89% of journalists make use of blogs while conducting their online research, while 96% turn to corporate websites. But in this approach, reliability may be further compromised, because of the uncontrollable rumours and the malicious misinformation. That situation has a special importance and crucial repercussions during a wildfire emergency; having compromised to date many emergencies management, because the extra uncertainty degree that rumours cause on the population, acting directly on its behaviour and reaction in front the official recommendations and actions to be implemented during the crisis; and in some cases allowing emergency management to collapse.

Responding to these situations, forest fires and emergency managers have undertaken two major measures; in one hand they have created the specialized figure on communication officer (public information officer) during an emergency; which is in charge of being the official connection between emergency managers and media. The main function of the officer is to provide updated information to

journalist and to answer any question with regards, arrange for meetings between media and incident personnel, as well as provide official support material such as images, statistics, audios…, keeping into account the media needs and understanding their job limitations and capacities.

In the other hand and regarding the social medias constrains, most official agencies have created official accounts on most popular social media nets (e.g. Tweeter and Facebook) to disseminate and communicate all kind of information related to the emergency, ensuring the legitimacy and veracity of the information reported. Therefore, any journalist can be convinced of the reliability of the information and source, and use data to build its own coverage and news.

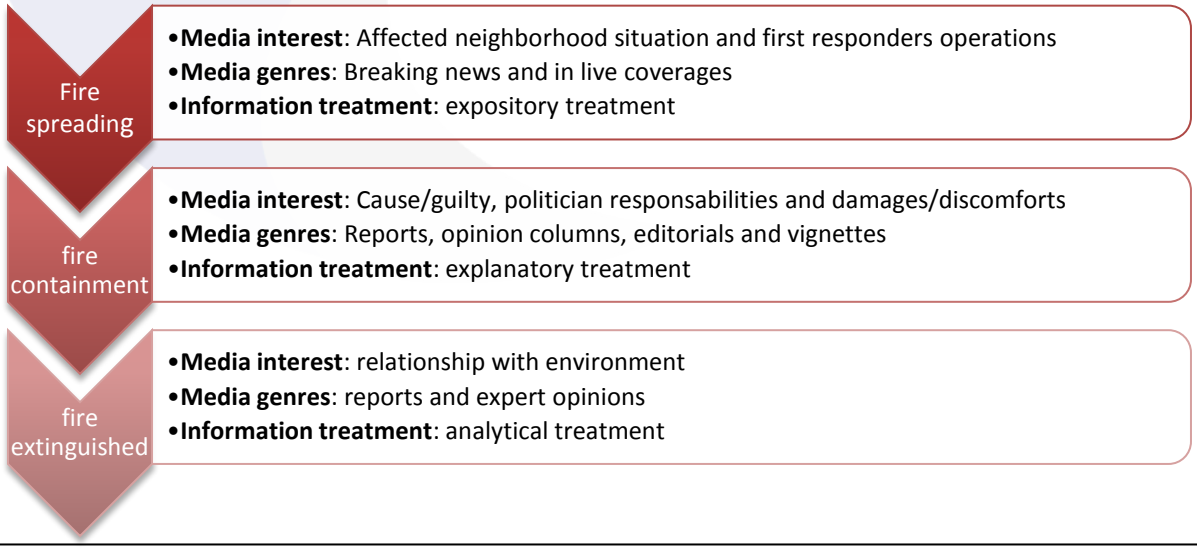
***Fact 7:** "In today's digital environment, where rumors and false contents circulate, journalists need to be able to actively sort out true, authentic materials from the fakes."*
(Wilfried Ruetten)

[1]http://www.cision.com/us/about/news/2010-press-releases/national-survey-finds-majority-of-journalists-now-depend-on-social-media-for-story-research/

3.6- Wildfire crisis status.

Finally it has to be considered that forest fire crisis evolves according a lifecycle, and in each status different needs and answers are required by media (see section 2). This means all the previous considerations can also change or vary substantially in each subsequent status. In this sense and according to some authors (Dominguez et al 2014) it can be identified determined trends on the wildfire evolution and the information and communication treatment style by media (Box 7). Specifically important differences are found during the fire growth and spread phase, the phase of fire stabilizing and control and the status of fire extinguished. In this sense, during the first status, media focus mostly on the human dimension of the threat (neighbourhood evacuations, injuries and fatalities and extreme conditions and technical difficulties for firefighters for instance); using the live coverage and breaking news as main coverage style. During the second step (fire stabilization), the content is most likely focus on the responsibilities and guilty search and wondering if someone (with special attention on politicians) could be avoided the event and damages caused, by means of opinion and position papers, but also on the daily news. Finally on the last phase, the media focus is more interested on the expert criteria and reviews, with a deep and detailed analysis of the event.

Box 7: Evolution of wildfire status and media information treatment .Source: Modified Dominguez et al 2014.



4. Media efficient Risk Communication; available tools.

According to all media roles involved into risk management and its relevance on multiple levels and actors (section 2), and keeping in mind all the constraints and obstacles that can distort and weaken the information reliability (section 3) and therefore the general public trust as well as risk institutions reputation; many agencies and organizations have developed guidelines, recommendations and programs to improve and solve this media gaps and weaknesses coverage.

4.1 Media specific tools and programs for wildfire comprehension.

First step to communicate about an event or phenomenon is to properly understand it. But not only the own nature and context of forest fires are to be assumed by journalist, also the complex human organization surrounding it, in special the different actors and agencies involved in the fire prevention and fire fighting systems and roles. Therefore media would be prepared to ask broader questions regarding wildfire, not just those that seems immediately relevant; for instance present the multi-dimensional reality of wildfire risk.

According to these objectives, some authors and organizations have published documents (guidelines, digital platforms, booklets …) where to summarizes the most important fire concepts, in a specific and clear way (without algorithms nor scientific discussions) in order to ensure the journalist comprehension.

In general terms these tools mainly focus on developing the following topics:

- Fire behaviour and its correlation with weather, topography and vegetation (fire behaviour tetrahedron)
- Fire forces alignment concept (based on Campbell prediction system language)
- Fire distribution and ignition causes thought a territory
- Fire history evolution of the given placement and context (interaction between human and environment)
- Fire effects (both negatives and positives) with regards social, economical and environmental factors.
- Fire risk management and planning
    - Prevention tools
    - Extinction resources and capacities
    - Rehabilitation techniques
- Actors and agencies involved in fire management (who is who and what they do)
- Common myths and facts about wildfire
- Recommendations and best practices on communicating fire issues
- Glossary of terms and concepts
- Information sources and official contacts

Following this conceptual frame, at the Mediterranean regional level appear 3 main guidelines (in order of interest):

- "Guidelines for wildfire comprehension and its information treatment" (Plana, E. et al 2007), edited in Spanish and Catalan by Catalonia Forest Science Centre, and developed under the Biodiversity Fundation EU funded programs.
- "Wildfire, guidelines for trainers and media" (Ecologistas en Acción 2007), edited in Spanish by the NOG Ecologistas en Acción, and developed under the Biodiversity Fundation EU funded programs.
- "Forest fires in the Mediterranean: a burning issue" (WWF Mediterranean 2003), edited in English by NGO WWF.

Nevertheless much more international information about fire concepts and fire actions can be found by journalists on:

- European Forest Fires Information System: http://forest.jrc.ec.europa.eu/effis/
- Society of Environmental Journalists webpage; wildfire section: http://www.sej.org/library/forests/wildfires

Other interesting examples are the trainings and workshops addressed to journalists; as for example the seminar organized by the Catalonian Forest Sciences Centre (http://efirecom.ctfc.cat/?page_id=230) or the seminars organized by the Pau Costa Foundation(http://cpf.gencat.cat/web/.content/or_organismes/or04_centre_propietat_forestal/04_actualitat/detall_noticia/agenda/2015/Jornada-IC_Pau-Costa.pdf) or the Spanish Ministry of Environment (http://www.efeverde.com/noticias/jornadas-sobre-comunicacion-e-incendios-forestales/).

However, this examples occurred once in the lifetime, it has not been detected any regular training or on-line course, specifically addressed to media collective, except the singular case of the U.S.A National Wildfire Coordinating Group who invites news media to voluntary attend basic firefighter courses with federal and state providers (if there is sufficient room for them) as an opportunity for information and education (Wildland Fire Incident Management Field Guide 2013).

Others experiences with potential interest to be applied on the field of wildfire and media are the exchange of roles between journalists and fire managers, as a great opportunity to meet themselves and understand in first person both collectives needs and limitations. Even if there is not recorded any particular situation in the case of firefighters and journalisms, in France they have done something similar with scientists and journalists and broadcasters. In fact on 2005 the French Association for Scientific Journalists for the Press (AJPI) exchanged the schemes in an attempt to foster a greater understanding between both collectivities and promoting an appreciation of each other working processes and environments.

4.2 Tools for efficient disaster/crisis media communication.

Communicating forest fires events issues during an emergency has few differences compared to other crisis situations such as floods, earthquakes, Tsunamis… That's the reason effective communication during a natural hazard crisis has commonly elements independently of its nature. These common points are those really important to be understood and shared amongst journalists covering the event, in order to perfectly achieve its role and social functions into the risk management.

Since long time ago disaster experts are working on the techniques and best practice when working together media and risk managers. In fact, first step was taken by National Research Council who organized workshops in February 1979 in USA on media and disasters. National Academy of Science published its first report in 1980 which was entitled as Disasters and Mass media. This report was the first attempt to focus on the media conduct during disasters. This report also highlighted the roles that media can play in times of disasters, which include raising awareness about the hazard by educating them, educating about the disaster warnings and its dissemination, details of hazard or disasters and its impact (including physical, economic, social, psychosocial), information provider about the sources of disaster assistance and coordinating with government and emergency response organizations.

Since those first guidelines, many other documents have been published by all kind of organizations (national or international) around the world; nonetheless the basic content and concepts remains almost constant, even though they have been updated and developed in detail.

From all existing and from those more recent, it can be summarized its content and general structure as follows:

- Terminology and general definitions
- Concept of risk and disaster risk reduction
  - Disaster statistics and trends
  - Causes of disasters
  - How to prevent disasters
- Media's roles on disaster risk reduction
  - Tips to ensuring good disaster risk reduction coverage
- Feedback from audience and lessons learned
- Useful information on natural hazards
- Resources, sources and contacts

Some of the most relevant examples, according to its international recognition and validity are:

- "***Know Disaster, Tell Disaster Risk Reduction Training Handbook for Media Professionals***" edited by United Nation International Strategy for Disaster Reduction in 2009.
  This handbook is for media professionals who are interested in issues regarding disaster risk reduction such as:
  - What is the concept of disaster risk reduction? I don't know the ideas of DRR broadcasting.
  - What kind of disaster risk reduction programs can media professionals produce in order to raise awareness of local people?

After reading each tip, media professionals can discuss how they can resolve the problems their stations face. Media stations are able to hold workshops by utilizing this training handbook. By establishing main themes, it is possible to exchange ideas and problems that staff face.

- "***DISASTER THROUGH A DIFFERENT LENS. Behind every effect, there is a cause; A guide for journalists covering disaster risk reduction***", edited by United Nation International Strategy for Disaster Reduction in 2015.
  This guidebook is for journalists and the media who are interested in learning more about disaster risk reduction issues and the way they can react to perfectly cope with risk manager objectives.

Box 8: Some important tips to be undertaken by emergency coverage journalists .

- Develop private contacts with disaster experts before disasters happen; know who they are, their exact speciality and have regular contact with them. A guide for journalists covering disaster risk reduction
- Have a contact list for experts in urban risks, early warning systems, climate change, gender, environmental and development issues to enrich the disaster story
- Have contacts with national and local meteorological departments, disaster managers, ministers and ministries involved in disaster reduction, civil protection or civil defence
- Become familiar with the most disaster-prone zones and vulnerable areas
- Keep a track record of past disasters and lessons learned
- Get familiar with the main prevention and mitigation measures taken by your authorities so that you are ready when disasters strike.
- Base your information only on sound scientific knowledge.
- Invest in disaster risk reduction knowledge to dig out stories later on
- Be first, be right and be credible

Other available guidelines have focus on the importance of the ethical responsibilities of disaster coverage, in order to understand the psychosocial impact of a disaster and reflect a respectful treatment of affected people.

Two representative examples are:

- "***Manual periodístico para la cobertura ética de las emergencias y los desastres***", edited by PanAmerica Health Organization (OPS) in 2011.
- "***Guia para la cobertura periodística responsable de desastres y catàstrofes***", edited by the Audiovisual Communication Public Defence Service of Argentina in 2013.

Finally, is interesting to mention the work done by the European Journalism Centre (Silverman, C. et al 2014) with regards of the information 2.0 treatment during an emergency and its reliability; "***Verification Handbook, a definitive guide to verifying digital content for emergency coverage***". This guideline describes the best practices when verifying and using social media information, as well as practical recommendations to be prepared when facing disaster situations in the media news centre.

4.3. Tools for risk education through media communication.

In contrast to crisis communication events, communicating risk educational issues is mostly based on the capacity to disseminate complex concepts in an easy way to a particular target audience. In this scenario, the timeframe is not a limitant factor, what allows elaborating complex and attractive news to conduct the message. Again the previous knowledge on the hazard (wildfire) and the risk management system and status (prevention, mitigation, exposures…) will determines the success or failure level of the message and its impact on society. The main objective of this communication and information style is to help authorities to implement social change in order to perform amongst collectivities at risk, the abilities to perceives its exposures and adopt the best prevention and mitigation practices; for instance the wildfire's prevention and self-protection action into a wildland urban interface, or the awareness attitude according to the daily fire risk danger.

Another important role of media risk education communication is the capacity to explain to the general public (directly affected or not), the existing context, its threats and consequences, and what has been done until now to respond to it, as well as to introduce the implementation of new approaches to manage the problem (e.g. prescribed burns, new firefighting strategies, or new prevention and protection policies).

Some media guidelines to ensure an educational message into a new/report, is found on the U.S. National Interagency Fire Centre web page (www.nifc.gov/index.html):

Printed materials, including general information handouts, site bulletins, and brochures, should include a fire prevention message. The use of an icon should be encouraged in order to emphasize the prevention message. Media campaigns can be initiated which include show-me tours, photo opportunities, and demonstrations, and solicit support for public assistance in fire prevention programs. Appropriately located signs and posters with carefully worded prevention messages are effective.

Following are sample tactics for consideration when developing a prevention education plan:

Mass Media Television

- Prepare seasonal public service announcements and interviews for local use.
- Coordinate efforts with fire prevention cooperators to develop television public service announcements.
- Monitor and facilitate the national Advertising Council activities with local stations.
- During local fire incidents, stress the importance of increased fire prevention efforts.
- Participate in morning or afternoon local television talk shows.
- Continue presenting rotating fire prevention messages on cable television.
- Work with meteorologists to provide fire danger and prevention messages in their forecast.

Mass Media - Print/Radio

- Provide local radio public service announcements to appropriate stations.
- Provide local written media with timely news releases.

- Develop a schedule of local fire prevention activities and prepare news releases to be used on a scheduled basis.
- Provide local print media with timely news releases.
- Assist local print media to obtain Advertising Council materials.

To do so, some fire education key messages (Box 9) have been positioned as effective in treating the natural role of fire in some ecosystems, the actions taken by land management agencies to reduce risk and the need for partnerships among agencies, communities, stakeholders and so on, to understand and prepare for facing a wildfire.

Box 9: Key messages for fire education communication. Source: U.S. National Interagency Fire Centre

1. Wildland fire is an essential, natural process.
2. Society's influence has altered historic fire cycles, leading to a dangerous and difficult buildup of vegetation in our wildlands.
3. Land management agencies are committed to a balanced fire program that will reduce risks and realize benefits of fire.
4. Improving the health of the land and reducing risks to communities requires partnerships among federal and state agencies, tribal governments, fire departments, communities, and landowners.
5. Public education is necessary to the success of fire management programs.

Finally there are the television's documentaries, reality television shows, docu-series and films media genre with an increasing interest on wildfire communication. This kind of productions mainly aims to show what happens inside a wildfire and how the firefighter crews and its resources develops their job into so particular conditions; however there are also other productions who aims to disseminate other relevant fire issues in a more educational context.

Some recent examples of TV productions are:

- *"**Wildfire, to adapt or to die**"* Produced by the program Quèquicom as a docu-serie of Catalonia regional TV (TV3), for scientist contents divulgation addressed to general public but with special interest to youth by means of experiments and graphic explanations about the forest fire issues.
- *"**The Great Silence, Horta de Sant Joan**"*. Produced by Catalan Television with the collaboration of Brutal Media production, in 2015 the documentary received the II PRO-DOCS Award. Last April 22th was screened in the *13th International Wildland Fire Safety Summit* (Boise, Idaho, USA) with a special award for all the fire community. A documentary to explain reasons, mistakes and lessons learned form the worst wildfire incident of Catalonia (summer 2009) with many firefighters inured and five fatalities.
- *"**Life in flames**"*, a Spanish documentary-film production of "La Claqueta" 2015. Tells the story and life of 3 firefighters of a Spanish elite crew before, during and after the extinction activities. Is a kind of tribute to the firefighter's collective of Spain, in an attempt to give visibility to all society and obtain greater social recognition.
- "***Years of living dangerously; Fire Line***" U.S.A docu-serie production by Showtime prod.2014, on 2014 has won the Emmy Awards. Is one of the biggest environmental divulgation productions ever, with the participation of many famous actors and stars, such as Matt Daemon, Harrison Ford, Jessica Alba, and Arnold Schwarzenegger amongst others as main correspondents.

Production aimis to explain and sensitize society about the climate change, its causes and repercussions on our life; therefore one chapter is dedicated on North America wildfires situation and its challenges.

Independently of the production type and objectives, there is a great example of guideline to provide basic information on the policies and processes followed in considering proposals when the use of official resources (firefighting crews, incident management teams and wildland fire equipment) is need to do the media production.The guideline edited by the NIFC, follows a 5 step process in facilitating feature films, documentaries and television shows involving U.S federal wildland fire personnel, and have identified some media tips and red-flags conditions to help producers and journalists to prepare its proposal efficiently (box 10).

Box 10: Considerations for succeed on wildfire film productions. Source: National Interagency Fire Centre

TIPS: achieving follow tips will ensure the production

- Work with agencies to find a topic or an approach that works for both parties.
- Allow *plenty* of lead time before you plan to start filming.
- Access to a crews and locations on a fire cannot be guaranteed**.** The Incident Commander has the final authority for approving documentary and news filming inside the fire action zone.
- Be up-front with federal agencies as far as who you are talking to.
- Do your research; the more knowledgeable producers are on the subject of wildland fire, the more effectively we can work together. Calling a pulaski a "chopper," and confusing a "team" and a "crew" on a fire usually means you have not taken the time to understand your subject.
- Embrace the same commitment to safety as we do. Media representatives will be required to wear PPE when working on or near the fireline, and have an appropriate safety briefing. PPE must meet National Fire Protection Association (NFPA) and National Wildfire Coordinating Group (NWCG) standards.

REDFLAGS: conditions to avoid on the production's purpose.

- Filming fire personnel when they are off duty.
- Treatments in which the elements of drama overshadow factual information.
- Proposals which seek to focus on a few "characters" on a crew.
- Treatments that distort or inaccurately present firefighters' true roles.
- Proposals with overly risky elements or expectations.
- Proposals with no tangible benefit to the government.

5. Final remarks; future challenges and opportunities.

Taking all into account, important steps have been done during last years in the field of risk communication by means of media and journalism, but specifically considering the case of wildfire risk, further improvements must be done in order to solve actual weakness and to perform into a more efficient risk management through the so claimed effective communication.

Even more in the Mediterranean basin, where present wildfire context and the predicted situation of near future, will result in an important increase of large wildfire occurrence affecting and threatening human settlements as well as social and environmental goods and services. This extra added level of social vulnerability and damage exposure, will need to be undermined (in part) by a new generation of journalists with a wide environmental background knowledge and expertise, but also with a clear specialization in the domain of wildfire risk and emergencies. Both skills combination will enable journalist to make the factual connections of a given problem, affected by multiple sectors and dimensions; such as the case of forest fires. That specialization in forest fires must focus and lead on journalist in understanding the general concepts and processes which influence the phenomena in order to avoid coverage and headlines dyed with dramatism or sensationalism. A solid frame knowledge enough deep to allow intense discussions and argumentations with significant considerations and not just speculations founded on misconceptions, preconceptions or political influence/convenience.

Cover image of the book "Fahrenheit 451"; temperature which book's paper becomes in flames. Author: Ray Bradbury 1953.

Being first, being right and being credible, would consolidate media roles and its social responsibilities, with special attention during the emergencies and crisis status, where journalists are a crucial key actor of the disaster management through effective communication based on proper risk information treatment. In this sense, one of biggest challenges journalism has to deal, is the information management coming from social media (information 2.0.); because new communication technologies even to be positioned as main future communication channels, confronts many benefits as limitations. In one hand the advantage of disseminating information in real time everywhere with fastest rate of spread, in the other hand the inconvenience of reliability and robustness of the information and its provenance source (rumours and fakes). Reason why future risk communication journalists must have abilities to perfectly manage digital information when driving a coverage or constructing news.

Finally would be necessary more media investment and dedication in risk education in order to consolidate the so demanded and necessary risk culture society. Working with and in parallel with risk managers actors and related stakeholders, would perform the understand and implementation of best prevention and protection behaviours amongst collectives at risk and therefore would ensure a better coexistence and tolerance between society and unavoidable natural risks.

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