

FOREST FIRES RISK COMMUNICATION

**OPERATIONAL RECOMMENDATIONS TO
IMPROVE SOCIAL PREVENTION**



**Efficient fire risk communication for
resilient societies**

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1. Introduction

The perception society has of the risk of forest fire determines to a large extent people's response in emergency situations, as well as public support for forest management policies and actions which fire prevention and management services perform in the area. In general, this social perception determines thought and action, and affects all actions performed in the context of forest fire risk management, generally perceived as a catastrophic and random element, as well as its effects.

This document covers a set of practical recommendations to facilitate the communication of the forest fire phenomenon, with the aim of providing information to the public which is as scientifically and technically accurate as possible, with the acceptance of forest fires as a natural disruption of the ecosystem, the predictable character of their behaviour and the generalised premise that certain catastrophic forest fires fall outside of the scope and control of current extinction methods. The document is aimed at all actors involved in the prevention and management of the forest fire risk, offering different guidelines to improve planning and development of risk communication, both at a local level as well as at regional and country level, and with an approach that applies to the whole Mediterranean region.

Broadly speaking, social perception of forest fires can be understood through two different views, which may in some cases be held by a single person. In each case, it is necessary to develop different communication proposals, with the aim of reaching the proposed objectives for social prevention. These two points of view can be summed up as:

(1) **"Forest fire as a threat to be tackled"**: frequent situation in Mediterranean areas with agricultural abandonment processes and large-scale urban development in contact with the forest, a population unfamiliar with the uses and natural dynamic of forest lands and a strong social demand for environmental functions of the forest landscapes, such as biodiversity, scenic beauty, recreational use, etc. In this situation there is no difference between forest fire and fire, both being considered as something negative for both persons and property, as well as for the environment. The presence of fire in the ecosystem is only measured through the ecological losses perceived as irreparable, regardless of the degree of intensity with which the fire or forest fire may burn, and which by extension may affect in different ways the ecosystem - which may even include beneficial effects, though these are eclipsed by the "dramatic" impact of the burnt landscape.

(2) **"Fire as a management tool"**: situation in which fire is used as an efficient tool to manage land and natural resources, and is used, for example, for the removal of vegetation from the fringes of cultivated lands, leftover vegetation from agricultural or forest work, or the removal of shrub vegetation and regeneration of pasture lands. Prescribed or controlled fire (see section 3.8) refers to the updated understanding of fire as a management tool, with multiple uses: recovery of natural habitats for conservation of biodiversity, recovery of abandoned pasture lands, reduction of the amount of forest vegetation in undergrowth for prevention of forest fires. The presence of fire as a tool takes on a special meaning in mountain regions and rural areas with a strong agricultural and livestock sector presence.

Overall, and regardless of the type of relationship fire maintains with the land, whether they are areas historically affected by forest fires or areas where the phenomenon is recent, each context will require different communication strategies to be able to incorporate the necessary specificities allowing for a successful performance, awareness raising, disclosure or social prevention.



2. Baseline recommendations for forest fire risk communication

When communicating the risk, the communicator must provide the public with reliable information on the type of risk they are exposed to, as well as the possible effects at different levels (social, economic and environmental). Generally risk communication will involve a discussion on the negative impacts as well as the probability that they occur, the effects they would have and the possible solutions to reduce the risk. All this should promote a greater understanding of the phenomenon and boost awareness on actual exposure to the risk, in parallel with orienting decision-making to reduce vulnerability.



Journal Club: Fire ecology and the forest fire regime in landscape management (6 October 2012). Experience sharing between experts following the large-scale forest fire 'La Jonquera' (approximately 13000 ha affected), Alt Empordà (Girona). Source: Pau Costa Foundation

The following table covers a set of basic rules on the communication of the risks, applicable in the case of forest fires.

SEVEN CARDINAL RULES IN COMMUNICATION OF RISK¹

1. **Accept and include the target group as an ally.** The ultimate objective is to ensure an informed, involved, interested, prudent public, prepared to cooperate.
2. **Carefully plan and evaluate efforts.** Different aims, audiences and media require different actions.
3. **Listen to the specific worries of the public.** People usually worry more about confidence, credibility, specific competence, impartiality and empathy than about statistics and details.
4. **Be honest, frank and open.** Confidence and credibility are difficult to obtain, and once lost it is almost impossible to recover.
5. **Work with other trustworthy sources.** Conflicts and disagreements between organisations makes communication with the public much more difficult.
6. **Be aware of the needs of the media.** The media tend to be more interested in policies than in the risk, in simplicity rather than complexity, in danger rather than safety.
7. **Speak clearly and with compassion.** Never allow your efforts to prevent the tragedy of an illness, injury or death from being recognised. People may understand the information on risk, even if they do not agree, or are not satisfied with the management performed.

¹ Covello, V. and F. Allen (1988). *Seven cardinal rules of risk communication*. Washington, D.C.: Environmental Protection Agency, Office of Policy Analysis

Two important points to bear in mind:

- **Provide an open and honest flow of information to the public:** Generally, communication approaches which aim to reduce public panic through biased information or through unfounded over-protection, are, in effect, much more harmful than the real information, as harsh as it may be. With the aim of avoiding these undesirable approaches, it is recommendable that:
 - Messages are prepared to anticipate and respond to expected questions.
 - Messages are tested by the public to guarantee that they are culturally and demographically relevant.

In the case of forest fires, people must perform a series of actions depending on the measures to be taken (confinement, distancing or evacuation), based on which information must be accurate, and under no circumstances must it minimise the possibility of damage occurring.

- **Emphasise that there is a planning process:** With the aim of transmitting a sense of security by eliminating the random nature which a large proportion of the population notices during an emergency, it is important to communicate that the response is planned, explaining the functions and responsibilities which each actor assumes, as well as the possible solutions. Helping people to understand the process before the forest fire occurs facilitates coordination, appropriate decision-making and anticipation, which increases a sense of security and avoids behaviour caused by panic. These measures, apart from improving communication, also help increase credibility, a fundamental component for involving people actively and in the long term. ¹¹

Specifically, communication of the forest fire risk must aim to reduce uncertainty about the following basic questions:

- What are the dangers of living in an area vulnerable to forest fire?
- When and what type of protection measures can be implemented to minimise the vulnerability of a community or infrastructure?
- How can I reduce the risk of the woodland burning?
- Are the prevention and protection measures implemented enough and adequate to safeguard against the risk?
- Am I prepared to successfully get through an emergency situation caused by a forest fire?

To be able to respond to these and other questions on the risk of forest fire, making a distinction between two situations is recommendable: the situation during the emergency and occurrence of the forest fire, and the situation outside of the forest fire event. The communication needs, the mood of the receptor depending on the imminence of the risk and the nature of the uncertainty in each of the needs are very different and may require specific approaches with regard to both the content and format of the messages.

Communication during the emergency is complex and many variables are at play which interfere with the correct diffusion and assimilation of the message by the public. The media impact of forest fires is very high, and as the management of information grows with the severity of the fires, it becomes more important.

¹¹ *Crisis and Emergency Risk Communication. 2014 Edition. First Edition Authored By: Barbara Reynolds, Ph.D., Centers for Disease Control and Prevention*

The media may take on a role as an ally both in the diffusion of official and quality information during the emergency, and in the diffusion of the importance of forest management and preventive measures in general. However, the need to inform in real time, the stress of the actual emergency and the uncertainty generated by unverified information (e.g. through unofficial information via social networks), or due to the lack of updated information, make the correct understanding of the role and behaviour hoped for from the person affected by the forest fire difficult. At the peak of the emergency, the main type of information to transmit will be to address emergencies in terms of population safety (scope of the flame front, communication routes, public transport infrastructure or affected population, recommendations on confinement or evacuations, etc.). Whilst the forest fire continues to spread, the main request for information from the population will be centred on the land area affected and the exact and real-time location of the forest fire's progress.

The creation of a press office which simultaneously develops a trust-based relationship with the media and institutions, can facilitate the management of information during the emergency. Other actions which can be implemented are:

- Performance of joint press conferences with all actors participating in the management of the emergency (fire fighting and rescue services, civil protection, police, forestry service, etc.) to unify, overall, information and transmit an image of coordination and collaboration, which is also required from the local actors and the population.
- Use of informative adverts during high-risk periods, via local/regional level programmes, issuing messages adapted to the activities and risk periods (e.g. recommendations for good practice during harvesting of cereal, burning of leftover vegetation or responsible behaviour in forested areas).
- During the forest fire, centralising and punctually informing about the progress of the forest fire and any relevant news (with the aim of also compensating the inaccuracies which accompany non-official information via social networks).
- Organising and supporting the media in taking photos of the forest fire, facilitating the obtainment of graphic resources, and guaranteeing the safety of the journalists.

When planning the communication during the emergency, some elements to take into consideration are:

- Link risk management actions with “standard forest fires”^{III} which establish the propagation patterns which may be produced in each landscape.
- Have responses prepared on the common aspects of the information provided to the public, facilitating the response to the urgent requests.
- Prepare drafts of the messages on common elements (impact to roads and inhabited centres, confinements and evacuations, etc.) to communicate during the forest fire.
- Identify in advance spokespersons, necessary communication resources and the mechanisms to obtain them.
- Practice following the action or response plan, using the messages already created, tweaking the plan and messages as necessary in each area.

^{III} It is referred to the future forest fire that will take place in a specific location according to its topography, vegetation and meteorology. To learn more: Costa, P.; Castellnou, M.; Larrañaga, A.; Miralles, M. and Kraus, D. 2011. Prevention of Large Wildfires using the Fire Types Concept. (U GRAF, Ed.). (Departament d'Interior de la Generalitat de Catalunya) Barcelona. 87p.

- Promote partnerships and coordinated communication with other information sources and communicators within the expert forest fire community.

The objectives of the **communication during the phase prior to the forest fire** may be more ambitious since they are not subject to the communication urgency of the emergency, with regard to awareness raising and education of the public in understanding the phenomenon and its dangers, and in the explanation of the different alternatives to minimise its occurrence (prevention of ignitions) and the vulnerability of persons and infrastructures (self-protection measures, good practices in case of wildfire, etc.).

The same press offices, making the most of their contact with the media during the emergency, are a good platform for organising reports and journalistic articles on wildfire prevention and risk management actions throughout the year.

The information itself in this phase may be communicated using more flexible and varied formats, such as traditional information and awareness-building campaigns, long format reports, news items on related events, etc. Some of the communication elements which may be taken into account:

- Explain the difference between fire as a natural element of the ecosystem and management tool, and forest fire as a threat and emergency, as well as the consequences of both for the safety of persons and their property, as well as for the forest environment.
- Make known the structural causes of the current context of the forest fire risk, related to changes in land use (increase in the expanse and density of forests) and climate change (increase in number of days with potential risk due to high temperatures and low humidity of vegetation).
- Describe the dangers associated with the forest fire risk and its direct effects on safety.
- Offer guidance on the course of action to take in case of a forest fire.
- Make known the necessary prevention and self-protection measures to reduce vulnerability of persons and their property.
- Make the public aware of the danger of igniting a fire and responsible behaviour in areas at risk.
- Promote communication partnerships with other institutions and associations, with the aim of strengthening the credibility and coherence of the message.

Prepared messages must be as homogeneous as possible and be based on solid corroborated information, which is as widely agreed on by the different recognised parties involved in forest fire risk management (public administrations, research sector, professional associations, NGOs, etc.). It is recommendable that an evaluation of the success of the messages is included to be able to adopt the corresponding improvements in the next publications.

3. Fire and forest fires communication elements

3.1. THE NEED TO BROADEN UNDERSTANDING ON FIRE AND FOREST FIRES

Forest fires are perceived by society largely as a threat. The need to promote responsible behaviour and avoid ignitions, the inadequate use of traditional fire (stubble or pasture land burning) and the increasing danger this implies for the population, high-intensity forest fires propagating out of control, have motivated awareness campaigns which portray the forest fire as the enemy to combat using all measures available. These campaigns have been very effective in reducing the number of forest fire and raising awareness about the need to protect woodlands from catastrophic forest fire. However, indirectly, they have also relegated the ecological and environmental functions which the fire may also offer and which are necessary for the correct functioning of certain natural ecosystems. Faced with the need for a new approach to the problem and to be able to improve the participation of the public in current forest fire risk management, it becomes necessary to broaden the understanding of bad fire and good fire.

How can the negative understanding of fire and forest fire be reversed after so many years of promoting this point of view?

Moving forward towards a better understanding of the phenomenon, disclosing the ecological function of fire and distinguishing it from necessary prevention and management measures to address the risk of catastrophic forest fire (which may include, for example, the use of good fire such as controlled burns), would allow a broader understanding to be offered.



Journal Club: Òdena Forest Fire. Meeting following the large-scale forest fire of Òdena with forest fire experts and inhabitants of the affected area. Source: Pau Costa Foundation

The following sections cover some of the key concepts and ideas, widely accepted at expert community

level and with a scientific basis, which provide a broader understanding of fire, wildfires, and their relationship with human beings and the natural environment.

3.2. THE HISTORICAL RELATIONSHIP BETWEEN FIRE AND HUMANS

Fire has been an important part of all cultures and religions from prehistoric times to present day and was vital for the development of civilisations.

Fire control by the first humans was a defining moment in the cultural aspect of human evolution. Fire as a source of heat, protection and as a method for cooking food, became essential. These cultural advances allowed the geographic dispersion of humans, cultural innovations, as well as changes in diet and behaviour. In addition, the ability to create fire allowed for human activity to be continued during the hours of darkness.

From a natural evolution perspective, fire has been present in many ecosystems for hundreds of millions of years due to natural causes, helping to mould the global distribution of these systems and maintaining the structure and function of plant and animal communities adapted to wildfires. Fire is also an important evolutionary force which humans used to mould and shape the landscape.

3.3. FOREST FIRES AS A NATURAL DISTURBANCE OF THE MEDITERRANEAN CLIMATE

The Mediterranean climate is characterised by the coincidence during the dry and hot season of dry electrical storms, which has facilitated the presence of natural “fire” disturbance in the environment. Consequently, many Mediterranean plants have acquired a series of adaptation strategies which have allowed for the persistence of recurrent forest fires.

Each species is adapted to an ecologically sustainable fire regime, for a determined frequency, intensity and seasonality of natural forest fires. As such, the forest fires are not necessarily detrimental to biodiversity, although there may be fire regimes altered by human action which may affect this biodiversity. To maintain the conservation and good functioning of the ecosystems, it is important to promote environmentally sustainable wildfire regimes and to avoid ecologically unsustainable fire regimes.

3.4. WHY ARE THERE MORE SEVERE FOREST FIRES IN THE PRESENT? WHAT HAS CHANGED?

During the 20th century, the wildfire regime in temperate latitudes underwent changes related to the characteristics of the ecosystem as well as to changes in ground use. In Mediterranean Europe, during the industrialisation period, people migrated from rural contexts to industrial centres, favouring the abandonment or reduction of agriculture, pasturing and a reduction in the use of forest fuels in favour of fossil fuels.

This combination of factors gave rise to a new period of recolonisation by the forest of

agricultural and pasturing lands which, together with the growth and ageing of various plantations implemented to protect the forest floor from erosion, have promoted a drastic change in the structure of the traditional landscape in many areas of the Mediterranean. In a few decades, the landscape has changed from a mosaic of crops and pasture lands, punctuated by small strips of not very dense forest (due to livestock) and with very little waste vegetation on the forest floor (due to collection of firewood), to a landscape dominated by dense and continuous forests, with a lot of forest vegetation (which in terms of wildfire risk translates into large fuel loads). This accumulation of fuel as well as its spatial distribution, highly interconnected in a vertical (vegetation strata) and horizontal (bird's eye view) plane, has allowed the generation of new types of wildfires with huge destructive power and which are very difficult to control and extinguish.

In parallel, urban areas have expanded towards the forested areas, to the point of homes coming into direct contact with the forests, often without being aware of or managing the risks that this involves. The interaction of the forest with urban sectors poses a double challenge: on one hand, the urban use means an increase in the danger of ignition and generation of wildfires (due to accidental or deliberate reasons, negligence, etc.), and on the other hand, homes and infrastructure are vulnerable to the impact resulting from a wildfire originating in the forest. This last situation generates a social crisis which for practical purposes focuses the majority of extinguishing resources around inhabited centres to minimise the impact on persons and their property, disregarding the propagation of the wildfire within the forest areas. Recent witnesses of this situation, with negative results - loss of human life and property, can be seen in Greece, Portugal, California, Chile or Australia amongst others.

The direct result of this combination of factors is a growing tendency for forested land and for urban-rural interface, vulnerable to a catastrophic high-intensity wildfire which is outside of the technical capacity for control and extinction.

3.5. CLIMATE CHANGE AND FOREST FIRES

Rain and temperature are the main environmental factors that influence the condition of vegetation in terms of humidity and flammability and, as such, have direct effects on the behaviour of forest fires in terms of the intensity of the flames (measured for example in their longitude), speed of propagation, capacity for containment by strips of bare land (such as firebreaks or around urban areas), etc. Climate change has a direct impact on both factors, in general towards a more arid and hot climate, which is causing the frequency, seasonality and criticality of forest fires to become worse, making their consequences even more serious.

Everything points to climate change reducing rain during spring periods, which together with the early arrival and recurrent nature of heatwaves, will contribute to ideal environmental conditions for generating more virulent and intense fire behaviour.

3.6. CURRENT SITUATION REGARDING FOREST FIRE RISK: LOW-INTENSITY FIRE AND LARGE-SCALE FOREST FIRES

Contrary to how it may seem, the extinction of all forest fires as quickly as possible has produced landscapes with high and continuous levels of fuel loads which under certain meteorological conditions, in case of fire, means this fire easily develops into a high-intensity wildfire which is difficult to control. This situation is known as the suppression paradox. Current technology means are very efficient in controlling and extinguishing most wildfires. However, the remaining fires, which are few, are responsible for affecting the majority of burnt surface.

When high fuel loads, adverse meteorological conditions and an ignition source coincide in the same place, the behaviour of the resulting wildfire may be so extreme that it is not possible to manage its control and extinction until said meteorological or fuel conditions change. These particular cases, in which all efforts by the extinction teams are ineffective are described as wildfires out of the suppression capacity. Contrary to what may be thought, the solution to the problem of large-scale forest fires is not linked to increasing the scope of extinction means and resources (more planes, trucks, staff, etc.), since each small wildfire extinguished today supposes a potentially large-scale wildfire tomorrow. Therefore, the solution to these destructive events must include altering and regulating the amount of fuel which feeds the fire. Having planned forest structures at a landscape level which do not allow for wildfires to develop outside of the extinguishing capacity is, currently, the major challenge in the management of forest fire risk.

3.7. FIRE AS AN ECOLOGICAL FACTOR AND LAND MANAGEMENT TOOL

The traditional use of fire as a tool for managing agro-forestry resources, goes back to ancient times. From burning of overgrown pasture lands the length of the Pyrenees, to burning of forested areas to promote open spaces and encourage hunting, and even burning of agricultural plant remains, fire has been used extensively in all Mediterranean civilisations. However, its general lack of use over the last century, motivated by preventive and repressive policies for controlled fire, understood as a factor for wildfire risk, has largely dispelled the knowledge and social acceptance of the positive role of fire. From various perspectives, the use of good fire to prevent bad wildfires is being promoted. The challenge lays in how to improve the social acceptance of fire as a management tool.



Fire as a tool for management of natural resources and prevention of forest fires. Image of a prescribed burn. Source: Pau Costa Foundation

3.8. LOW-INTENSITY FIRE AS AN OPPORTUNITY TO IMPROVE FOREST'S HEALTH

Low-intensity fire which does not spread out of control, benefits forests and can be vital for the survival of some species and for maintaining biodiversity. Fire also allows the competition to be regulated between trees with regard to the competition for resources (water, light and nutrients). The death and elimination of the dominated trees which have no future viability, allows better positioned trees to grow under favourable conditions and to maintain optimal health levels.

Fire can help to regulate the presence of exotic vegetation (not autochthonous) which competes with native species for nutrients and space, favouring the growth of species adapted to the effects of fire (Mediterranean vegetation) over those not adapted. The ashes produced by the fire add nutrients to the ground, increasing its fertility and favouring the development of a rejuvenated vegetation with increased vitality. Fire also provides a form of control of forest plagues and illnesses via natural selection of the healthiest and most resistant trees.

Some plant species depend on the existence of fire for the complete performance of their life cycle. In some cases, forest structures which self-perpetuate through fire regimes every 3 to 25 years have been recognised. For example, some trees have thick barks resistant to the heat of the flames and also pines, which require heat to open and release their seeds to ensure the reproduction and continuity of the species over time. Without the presence of the fire disruption, the species adapted to this heat may succumb to the benefit of other less adapted competing species.

In addition to all the benefits previously mentioned, the burnt trees provide a habitat for nesting birds, homes for mammals and a nutrient base for new plants. When these trees decompose, they return even more nutrients to the soil. Together, fire can act as a catalyst for promoting biological diversity and healthy ecosystems.

3.9. PRESCRIBED BURNING AS A TOOL FOR WILDFIRE PREVENTION

Scientific knowledge has allowed the fire propagation characteristics and effects on different forest ecosystems to be known with a high degree of accuracy. Under determined meteorological and topographic conditions, and depending on the objectives which the forest management sets out, prescribed burns make obtaining the benefits listed in the previous point possible, and also permit the execution date to be planned. Their use requires highly specialised professionals.

In addition to the benefits of the low-intensity fire, prescribed burns are a training tool permitting practice using real fire, to be able to improve coordination of extinction means and tactics. They are also used to perform controlled burns in areas very sensitive to and with a high recurrence of anthropic ignitions (controlled burning of material which may burn in an uncontrolled way).

For more information, see: *Plana, E.; Font, M.; Serra, M.; Borràs, M.; Vilalta, O. 2016. Fire and forest fires in the Mediterranean; a relationship story between forests and society. Five myths and realities to learn more. eFIRECOM project. CTFC editions. 36pp. http://efirecom.ctfc.cat/?page_id=474 and <http://www.lessonsonfire.eu/>*

4. Specific recommendations for a forest fire risk communication aimed at targeting different audiences

4.1. A SHARED COMMUNICATION OBJECTIVE AND DIFFERENT MESSAGES ADAPTED TO TARGET AUDIENCE

The previous chapters have described the effect which changes in land use, increase in urban-rural interface, climate change and the suppression paradox have on current forest fire risk. Ensuring communities resilient to forest fires risk is a basic objective to be able to manage forest fires as a natural disturbance of the Mediterranean ecosystems and minimise the negative impacts on the population, infrastructures and forest environment. Moving forward towards an increased social resilience means in large part ensuring a better understanding of the differences between fire and forest fire, as well as the promotion of landscapes less vulnerable to out-of-control wildfires, and an improvement of the knowledge of actual exposure to the risk and the effective response in case of an emergency.

Communication of the forest fire risk must, therefore, adapt the message and communication tools to the different target groups. The level of prior knowledge of the phenomenon, the local (rural or urban) understanding of the forest environment and of the wildfire, or past experiences with (or without) wildfires, are all factors to take into consideration to achieve effective communication.

4.2. FOREST FIRE RISK COMMUNICATION AT THE COMMUNITIES AND MUNICIPALITIES

4.2.1. The diversity of the local context

Communication tools must be adapted to the scale of the work for the target group, considering that to maximise the efficiency of said communication the same method used at national level cannot be used at local level, or for a rural audience, who are aware of the effects of interaction with the forest environment which urban groups, generally unaware of the risks and responsibilities of living in contact with the forest, are not aware of.

On the other hand, communication actions which hope to promote direct actions by the public are more efficient if they are transmitted adapted to the particular situation and the environment of each case. This makes the incorporation of neighbourhood or homeowner associations, farmer groups, town councils and all local stakeholders involved in the design of risk tools and communication messages.

The following sections cover the communication recommendations for three groups of final recipients directly affected by the forest fire risk.

In this local context, there are typically two type of populations with very different characteristics:

- The inhabitants who have traditionally lived in and from the rural environment, familiar with the forest dynamic and ecology and fire uses.
- People from urban areas who have established their first or second residence in homes or residential areas located within or in the immediate surroundings of the forest. In general, they show a high level of unawareness of the risks and responsibilities of living in a natural environment. Their concept of nature is that of a static resource, to which any alteration always has negative effects.

This enormous difference means that efficient communication must be designed specifically for each population group.

It is also worth noting that both the local population and municipal elects and specialists, who are normally responsible for leading communication campaigns, should be considered in this target group.

4.2.2. Risk communication for traditional rural population

Although this population sector has a broad understanding of the rural environment, on occasion their needs and opinion have not been taken into account when designing forest management strategies such as policies for protected spaces, reforestation and plantation in publicly owned areas, reduced forest support in private farms, or the actual wildfire prevention strategy. This situation may cause that a significant part of this population has a negative perception of the management performed in the forest environment, since it is them, to a large extent, who have suffered the consequences of these policies, e.g. loss of surface and quality of pasture lands which has resulted in the unsustainability of rural life.

Based on this situation, the following guidelines for communication of information more efficiently are provided:

- An in-depth knowledge of the environment in which the action is to be performed is necessary, as is planning of the planned actions which takes into account the inhabitants of the area.
- Include all groups to which the information may be of interest, including local bodies who can to develop strategies which affect the forest dynamics.
- In direct communication actions, carefully elect the person to perform them, so that they are identified by the audience as someone who understands their demands.
- The main problem of rural society is often not the forest fires, but rather the depopulation and progressive disappearance of their way of life and that of their ancestors.
- It should be communicated that the solution to their problem is also the challenge of forest management, to encourage them to join their needs to form a united front with a shared objective.
- To improve the impact of actions, it can be communicated that forest management and

prevention of large-scale wildfires is a tool to ensure the maintenance of rural life, and not an end to itself, and that the inhabitants of the area are jointly responsible for its ultimate success.

- In addition, rural populations must be made aware that the current conditions require traditional tools but which have been adapted to the new risks, and that individual actions which do not take into account all the aspects of the new situation may produce catastrophic results.
- Finally, the increasing value of natural resources and sustainable systems for development at an international level must be shared, so that international support for the recovery and valuing of rural life can be communicated.

Approaching the situation through a close relationship, from a technical and social point of view, and adapting it to the reality of rural life, will ensure an ally for forest management with a rich knowledge of the land.



BASIS FOR INTEGRATION OF THE LOCAL POPULATION IN THE PREVENTION AND EXTINCTION OF WILDFIRES

Prevention and extinction tasks are fundamentally the responsibility of public institutions, but nevertheless it is still a good opportunity to involve local communities in the management of the natural risks in their area.

With regard to forest fires, the local population and especially the residents in forested areas may be addressed from different perspectives, and each will need a different social strategy. The main roles and effects are:

- **Actors vulnerable to the danger of wildfires:** encourage awareness of vulnerability to the risk of wildfires, promote self-protection of homes and train in protocols for behaviour in case of wildfire.
- **Actors who generate wildfire risk:** the increasing context of risk (due to the increase in fuel or conditions of increased aridness) can call into question cultural practices for land use and require their regulation and even prohibition. In this context, changes are over the medium term or even generational, and require long-term support. Conversely, negligent or even intentional actions must be firmly invalidated in the context of the regulatory framework and the application of laws. The local idiosyncrasies must not influence the application of laws, and maintaining authority and exemplariness is fundamental to avoid land disputes which are complex to manage.
- **Actors who mitigate wildfire risk:** proximity to forests and forested lands is a baseline argument for motivating the local population to protect the forests from wildfire risk. Active or passive monitoring, maintenance of paths and water points, financial compensation from forest spaces (shared benefit formulas), the participation of school children and development of environmental educational activities with outside populations, are some of the actions which can be developed with the local population and interest groups. On occasions, the organisation of the local population in the form of associations offering recognition of its work and establishing public-private formulas with shared objectives and interests, may be revitalising elements to take into consideration. The forest fabric must not be perceived as an impediment to development of the local population, but rather as an opportunity.

In this sense, specific roles can be defined for local communities with regard to voluntary or paid tasks on prevention (monitoring and warning, maintenance of preventive infrastructures such as paths, water points, etc., daily evaluation of risk, etc.) and extinction (facilitating logistics, participation in support tasks, etc.). Some key elements of the applicable participative governance for integration of the communities in the management of wildfire risk are:

- Inspire sufficient empathy, defining participative formulas where the demands of the communities are incorporated in the planning and execution processes of the forest works.
- Define common objectives, and joint responsibility of the parties, in a collaborative and reviewable context.

Some motivational elements which affect the action capacity of the individual are the perceived effectiveness of the actions to reduce the risk, confidence in the capacity to correctly perform the actions, perceived responsibility regarding management of the wildfire risk and confidence and credibility of the institution promoting the actions. All these must be adequately incorporated into the communication tools directed at the population to improve their efficiency.

4.2.3. Risk communication for neighbours and owners of the residential areas

Wildfires in the urban-rural interface are currently one of the most frequent civil protection emergencies in inhabited area where forest fires are a part of the forest dynamics.

The specific characteristics of this type of interface require solutions tailored to these:

- Mutual invasion between urban and forest areas, with the reciprocal risks that are derived from both.
- Non-rural population, with no knowledge of the forest environment, its risks and dynamics.
- Extrapolation of urban lifestyle to rural context, without being aware of the responsibilities which comes with living in an environment with its own characteristics which are completely foreign to human settlements.
- Generally, the forest fire risk has not been taken into account in urban planning of the interface (width of roads, water tanks and hydrants, green hedges) which means an increase of vulnerability for persons and homes.
- Not all construction techniques are compatible with the interface.

Like the section above, all bodies involved in forest fires must be present to ensure effective communication, in particular neighbourhood associations, environmental groups, town councils, as well as other local bodies and associations (environmental, cultural, etc.).

On the other hand, and given the frequency of interface wildfires, a programme of measures to take in case of an emergency must be incorporated into the communication which is transmitted to all inhabitants of the area so that, where necessary, the action time can be optimised.

The possibility of encountering reservations from neighbours must be considered, who may consider the measures to take as an interference in their way of life, a change to their environment, who place all responsibility for their protection on the emergency services regardless of its decisions, or who consider that the measures to take are costly with regard to their perception of the wildfire risk. To resolve these difficulties, it is important to communicate all concepts developed in the third section of this document, emphasising that forest fires occur, have occurred and will occur and that it is homes which have colonised forest lands and not the inverse. Raising awareness on the risks derived from the forest environment and the responsibility of homeowners to implement prevention measures is essential.

In this sense, providing owners with tools for self-evaluation of the risk for homes and the measures to take depending on the results obtained, may facilitate awareness raising and promote individual actions.

To reduce the vulnerability of a house or plot of land, two general recommendations for the management of the wildfire risk are given:

- Maintain an adequate defensible space, and
- Reinforce the home using construction materials resistant to fire.

The defensible space is the area in immediate contact with the home where all dry vegetation must be removed and the density of trees and bushes, and all garden elements that could provide an extra fuel load (gas bottles, garden furniture, awnings,...), must be reduced. This buffering zone creates a physical separation between the wildfire and the home and is necessary to slow or stop the propagation of forest fires, protecting the home from the flames, whether through direct contact with the flame or through the radiating heat. The defensible space is also important for the protection of firefighters when protecting a house.

The reinforcement of a house means the use of construction materials which can resist the effect of contact with ashes, which could generate secondary outbreaks and could penetrate the inside of the home.

The combination of both the defensible space and reinforcement of the building is necessary, to be able to properly equip a house with a better chance of successfully surviving a forest fire.

With the aim of supporting local actors in the understanding of these elements, the eFIRECOM project has developed additional tools.

✓ **A guide for inhabitants of the urban-rural interface:** evaluating vulnerability to the wildfire risk. This easily accessible document allows inhabitants of these areas to assess their situation through the integration of different variables. It is important that the document reach different groups, and therefore the language it uses must be simple and avoid technical terminology. Furthermore, the use of graphics and illustrations is also recommended to promote its reading. The variables which can be integrated into its content for the self-evaluation will be adapted to the specific context of the area.

The document may start with a brief review supported by figures of events which have occurred in the same region where the guide is being published, including causes of the incident and consequences, so that the reader feels involved and does not see success as something foreign to him which occurs in other areas. Presenting these figures very visually, using iconographies, maps and images of the success is recommended.

In the section concerning the actual self-evaluation, the first variable to explain is the location of the house or the property, evaluating the danger depending on the topography, proximity and building density of the area where the property is located, and also the type and density of vegetation around the house.

Another variable for self-evaluation is the materials used to construct the property and its external parts, and its state of cleanliness with regard to plant remains: construction

materials, roofing, windows (in wood, PVC or metal...), pipework, or chimney flues. With regard to the exterior, the material of handrails, existence of awnings, the material used to fence off the property, barbecue installations, fuel management, and access points to the house may be evaluated.

Lastly, it is very important to evaluate the task of scrub clearing performed on the property and knowledge of legislation on scrub clearing of a property.

Following the evaluation of these aspects, it is a good idea to briefly review the important points to take into account to reduce the risk.

This tool will allow the propagation of the fire to be limited to a maximum and to guarantee the protection of homes.

✓ **A guide for municipal specialists** for addressing the problems of wildfires in the municipality, with the aim of covering in a single document all the elements which the municipal staff responsible for these issues must consider, highlighting the key points.

To begin the guide briefly reviews the basic concepts on wildfires, specifically in the context of Mediterranean forests: cause of the wildfires (with data from the area in question), the threats and measures for reduction of the risk.

The following chapter focuses on the municipality involved and provincial authority, and reviews the base documents at provincial level which provide the specialist with the information necessary to be aware of the risks of its municipality, the protection plan and municipal monitoring plan.

The next three chapters address the regulatory measures, protection of the forest and homes, and factors for reducing the vulnerability of inhabited areas of the municipality.

Lastly, the guide concentrates on the municipal regulations for scrub clearing as well as the actions which the town council may undertake to raise awareness and inform inhabitants. Given that the occurrence of a forest fire is very likely in the short to medium term, communication of the risk must also include recommendations on how to act in case of an emergency.

RECOMMENDATIONS IN CASE OF FOREST FIRE

Some of the main safety recommendations to take into account in case of a wildfire are:

- In case of a forest fire, keep calm at all times and instil a sense of serenity in those around you.
- Call the freephone emergency number 112 and provide specific information of the location of the wildfire.
- Leave your house only if there is enough time for a safe evacuation and you know the main and alternative exit routes.
- If the security forces give you the instruction to remain where you are, distance yourself or to evacuate, follow their instruction immediately.
- Put on long sleeve tops and trousers made of wool, cotton, leather, etc. and avoid synthetic materials. Also avoid loose-fitting footwear.
- Stay together and set a pre-established meeting point in case a family member goes missing.
- Before leaving your house, close all doors and windows if there is time. If you cannot leave your house due to the closeness of the wildfire, inform the emergency services on 112.

In case of confinement:

- In brick constructions, confinement is a safe option and the only recommendable option in wildfires with extreme behaviour.
- Disconnect the supply of butane gas, natural gas, diesel oil, etc.
- Remove objects from around the house which could burn and furniture from the garden.
- Close all doors and windows to avoid ash-filled smoke dragged by the wind from entering your home. Blinds must be lowered.
- Place well soaked towels, rugs or cloths in all the holes or cracks of external doors and windows. Smoke enters through the upper part of the holes.
- Remove internal curtains or at least draw them open.
- Also close metal shutters. Consider installing protective shutters.
- Ensure that a hose sufficiently long enough to reach any part of the house and structures near to the house within your property is at hand.
- Fill the bath and sinks with water in case it is necessary and have at hand buckets or other recipients for quick use if necessary.
- Store the car in the garage and close all the windows.
- Facilitate the entry of firefighters to the property, and their access to swimming pools and ponds.
- Extinguish any embers or burning particles. Review the places where there is no one in case any embers have entered.
- Listen to the radio to be able to receive instructions from the emergency services.
- Do not use the telephone if it is not to inform the authorities, since the lines may go down.

For more information, see: Font, M.; Chauvin, S.; Plana, E.; Garcia, J.; Gladiné, J.; Serra, M. 2016. *Forest fires in the wildland urban interface. Elements for the analysis of the vulnerability of municipalities and homes at risk of wildfires. eFIRECOM project. Editions CTFC. 22pp.* http://efirecom.ctfc.cat/?page_id=657 and <http://www.lessonsonfire.eu/>

4.2.4. Risk communication recommendations to promote actions at local level

Although the above recommendations are aimed at obtaining direct results on the perception of the forest fire risk by the inhabitants of the forest environment and of the urban-rural interface, there are other actions which may be performed at local level, which appeal to a sense of belonging to the area, to implement bio-economy strategies to achieve the settlement and development of the local population. The objective will be to reverse

the rural exodus and traditional uses, favouring and promoting the harnessing of forest resources and their products.

For this aim, it will be necessary to consider the role of consumers, since they are fundamental and play an essential role in the development and promotion of sustainable production. Prioritising the consumption of products manufactured using raw materials sourced from local and sustainably managed sources, ensures a reduced environmental impact and added value for local industries, as well as their role in attracting a population to the area. Promoting sustainable consumption and production are important aspects of sustainable development, which depend on reaching a level of economic growth which is compatible in the long-term with environmental and social needs.

Local and municipal bodies may promote the consumption of products which favour the prevention of forest fires in the community or municipal area, encouraging, for example, the consumption of these products in schools, hospitals, sports clubs, public buildings or during festivities.

There are products which encourage the prevention of forest fires: whether this is because they reduce the amount of forest fuel available to feed the wildfire or due to promoting activities which value the need to preserve the ecosystem and its resources. Some of the most important examples of these products are:

- **Biomass as a source of energy:** The energy obtained from controlled combustion of timber resources can come in a wide variety of formats: firewood, wood chips, pellets or briquettes are good examples. The type selected will depend on the specific needs of each case, however, it is important to have a guarantee of the origin of the biomass fuel.
- **Products originating from grazing:** Extensive grazing produces meat, wool, leather and milk, and all their derivatives. All these products ensure an active prevention of wildfires, since the livestock directly acts by eliminating to a large extent the herbaceous and shrub layer (responsible for transferring the fire from the surface to the tree crowns). And even more so when the livestock concentrates in particular on firebreak areas or zones, and strategic points for fuel management to support extinguishing tasks in case of a wildfire, facilitating the maintenance of mentioned infrastructures.



Extensive grazing as a producer of meat, wool, leather or milk, and as a tool for preventing forest fires. Source: Pau Costa Foundation

4.3. FOREST FIRE RISK COMMUNICATION FOR CHILDREN, YOUTH AND THEIR TEACHERS

The concepts explained above must be taught from school level. In this way, teachers will be able to mould children and adolescents into communicators of the information, which must be spread to the population with the aim of changing the general perception of fire. As such, all education programmes will start with training of school teachers in topics such as ecology and forest fire management, which are often an unfamiliar subject for educators.



Group of students from the Puig i Cavaller de Gandesa school (Tarragona) performing an awareness building activity on forest fires as part of the eFIREcom project. Source: Pau Costa Foundation

The concepts to communicate adapted to the knowledge and education level of the school children must be defined in the guidelines for development of education programmes, which includes the ecology of fire and education in terms of safety:

- *"Fire is an essential and natural process."*
- *"Leaving nature to its own devices to plot its own course has consequences, risks and compensations."*
- *"All components of the environment function as a dynamic, interdependent and interrelated system."*
- *"Scientific knowledge about fire and its behaviour is important."*
- *"People are part of nature, and their actions have effects on the Earth."*
- *"The influence of society has altered natural fire cycles, which has triggered a dangerous and difficult accumulation of fuel in wild areas."*
- *"Persons, especially those living in the forest, have the responsibility to care for nature."*
- *"The complexity of managing forest land is directly related to the number of persons who live near or within its limits."*
- *"There are limits to sustainable development."*
- *"Forest fires are not the problem, but rather the result."*
- *"The risk of wildfire is not simply a residual problem of summer."*
- *"Currently, the conditions of some forests are not natural or healthy."*

- *"Due to the abnormally dense conditions, our forests are at risk of destructive forest fires, insect infestations and illnesses."*
- *"There is only one option for the future: to improve the general health of the forests and to reduce the risk of high-intensity destructive forest fires. This can be done by reverting to past environmental conditions."*
- *"Prescribed burning is a tool used by the forest management services to comply with the objectives of the ecosystem."*
- *"Fire extinction management is effectively disaster management."*
- *"The cost of prevention today will be a saving for tomorrow in terms of extinction and restoration."*
- *"Prevention management through planning, rural development and landscaping takes priority over extinction management (emergency, uncertainty, contingencies, etc.)."*
- *"Without extinction, prevention is useless; without prevention, extinction is impossible."*

The aims and objectives to be set by the communication programmes for school children, adolescents and teachers, are given below:

- ✓ To construct an educated society who is involved in the ecology and management of forest fires.
- ✓ To promote a risk culture which reduces exposure to risk and encourages mitigation.
- ✓ To build a close relationship of collaboration and knowledge exchange between local communities and forest fire extinguishing services.
- ✓ To communicate a basic understanding of the scientific principles related to the role of fire in the ecosystem and forest management.
- ✓ To obtain the support of the community in forest programmes and management techniques.
- ✓ To demonstrate real-world applications in the lessons taught in text books.
- ✓ To provide opportunities for the students to learn about a variety of potential career paths.
- ✓ To demonstrate and raise awareness of the opportunities offered by rural life, integrating a new economic development model based on the reduction of uncertainty through environmental knowledge to build resilient communities.

For more information, see: *Baby Burn and Fierce Flame, from fire to forest fires. eFIRECOM project. PCF editions. 28pp. http://efirecom.ctfc.cat/?page_id=491 and <http://www.lessonsonfire.eu/>*

4.4. FOREST FIRE RISK COMMUNICATION FOR JOURNALISTS AND COMMUNICATORS

Forest fires are one of the environmental impacts which arouse most interest from society and the media, especially in the context of the Mediterranean where its recurrence and virulence affect large areas of forest and threaten persons and infrastructures. The spectacular nature of the flames and the emergency and human situations capture the attention of the media during a period, the summer, with little reportable news.

All this provides the media with the opportunity to become involved in improving social understanding of the phenomenon and of wildfire management. This is of special relevance in the current context of risk, when many of the most severe wildfires become global emergencies where protection of the population, homes and infrastructures and the extinction of the wildfire occur simultaneously. Increasingly, the strategies for risk management include communication as a tool to improve social prevention and efficiency of extinction in case of an emergency.

However, the reporting of wildfires is conditioned by many factors, such as prior knowledge by the journalist of the phenomenon, ability to explain complex issues with short messages and limited time, or the urgency of the news item especially during the emergency.

The apparent complexity of the fire phenomenon may be more easy to unravel by addressing the risk components separately, such as: **cause of the ignition** or appearance of the wildfire; cause of **capacity of a fire to propagate** through the landscape and become a large-scale forest fire devastating thousands of hectares; **climate change**, which aggravates the probability that a wildfire propagates more rapidly and with higher intensity, and the **capacity of the wildfire to impact persons, homes and infrastructure** due to increased urban use of the rural environment.

When preparing the communication of the risk of wildfires, bear in mind that a large proportion of society is not aware of the **base causes** of wildfires, simplifying the phenomenon in terms of its accidental character, fatality and “extraordinary” climatic conditions. The **paired capacity for propagation - capacity for extinction** and the predominant view of fire as an **enemy to combat**, infrequently addressed by the media, alters its **environmental role** and complicates understanding the possibility of reducing vulnerability by adapting the landscape to the fire disruption as a prevention strategy. The limited recognition of the benefits of **forest and agriculture and livestock management** for wildfire prevention, is made more difficult by the myth of the *virginity* or *inviolability* of the forests (“cutting down trees is bad”). However, the efficiency in the majority of forest fire ignitions and urban design in the fight against fire emphasises the **technology myth**, according to which technology can always put out flames. **Climate change and changes in use** means populations in vulnerable areas recognise that “never before had we seen wildfires of such virulence”, and new populations are affected by the phenomenon little known to them.

Preventive actions for fuel (in line with the expression “winters put out fires”) have difficulty competing at a communication level with the spectacular nature of the extinction means. However, there are wide range of options to highlight in an appealing way the social and environmental benefits of rural development as a tool for prevention of wildfires (consumption of local produce, quality of landscape, conservation of protected areas, etc.).

Avoiding the political and media manipulation of the wildfire phenomenon (regaining control on topics such as the lack of coordination between firefighters and locals which may be widely decided, which complicates the slow-paced debate necessary post-debate) and the sensationalist treatment of catastrophic events also helps.

Ultimately, as wildfires interact more and more with society, it becomes more urgent to address the communication of the risk and for the media to be able to develop an essential role so that people are part of the solution and not the problem, and to promote public support of the policies, many of which are cross-sector and applicable in the medium and long term, for management of wildfire risk.

For more information, see: Plana, E.; Font, M.; Serra, M. 2016. *FOREST FIRES, Guideline for communicators and journalists*. eFIRECOM Project. CTFC Editions. 28pp. http://efirecom.ctfc.cat/?page_id=477 and <http://www.lessonsonfire.eu/>





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