

Task 2. Review of obstacles that can hinder the integration of key innovative knowledge, tools and practices into the planning process

Some key factors behind the underlying causes of wildfires in Southern Europe: Challenges to be solved

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1.- Increased levels and propensity to burn of fuels

The abandonment of wood mobilisation and grazing, along with the reduction of diversity of the landscape mosaic generate an increase in the continuity of the wood fuel, both horizontally (superficies) and vertically (from under-storey to canopy). Former grasslands and camps are reforesting naturally, and natural forests show an increase of tree density and of shrubs presence. These high fuel loads, under appropriate and recurrent climatic conditions, pave the way to massive wild fires of high intensity (length and intensity of flames and propagation speed), which largely overcome the technical and operational fire-fighting capacity on the field. In these conditions, those fires are able to generate secondary fires several kilometres away from the main fire line, through the sending of burning chunks of vegetation (spotty fires) thanks to the hot air convection and the wind. The fires can then “jump” over roads and highways, hilltops, and cultivated or urbanised areas.

Beyond the quantity of wood fuel available, we must consider also its propensity to burn as an element of equal or sometimes even higher importance. It is linked to the humidity levels of the vegetation, and the local climatic conditions regarding temperature and wind. Climate change scenarios seem to predict an increase in the number of days where the vegetation is susceptible to burn with high intensity. Furthermore, when subject to this climatic stress, the vegetation is more vulnerable to the rest of natural perturbations: diseases, windstorms, snow damage, pests, etc... which can significantly increase the levels of dead wood and thus of combustible and propensity to burn.



Wildfire in Pyrenees mountains. Ger and Guils de Cerdanya, august 11th 2012



Prescribed burnings (left) and wildfire (first slope) in the same valley of Catalan Pyrenees (Cardós valley)

Without a direct action on the wood fuel loads within the forested areas at landscape level, there is no way to reduce the potential of a forest fire to become wildfire. The new and increasing propagation capacity of the forest fires due to this increase in wood fuel loads in the last decades is in itself a limit to the suppression service, our capacity to manage the emergencies, despite all the large progress done in knowledge and technologies regarding fire-fighting.

2.- A lack of Eco-systemic approach of forest fires

Forest fires due to natural causes (mainly lightning), are a perturbation present in many ecosystems worldwide. They are a specific element of each and every landscape, helping define the relationship between their constituting species and the types of forests they host. The vegetation has thus adapted to the fire, both through natural regeneration and structural (size and density of trees) strategies. Some species are adapted to rare high intensity fires while others are adapted to frequent low-intensity fires with a 5-30 years frequency, and in some landscape both regimes are found.

Grazing has specifically been in Southern Europe, with the reduction of under-storey vegetation and natural regeneration, an activity emulating the consequences of low-intensity fires. This in turn has allowed the forests to become somewhat fire-resistant. On the contrary, with the current presence of high levels of shrubs and small trees densities, many forests are away from their ecological optimum, and vulnerable to large fires to which they are not adapted, to the point to endanger their capacity to regenerate naturally afterwards.



Open stands of *Pinus nigra* in Catalan Pre-Pyrenees from traditional use of combined wood extraction and grazing the understory with cows (Busa massif, May 2014)



Open stands of *Pinus ponderosa* with a prescribed burning program in NW of America (Idaho, USA, October 2010)

We must change our conceptual paradigm and move towards integrating forest fires to the overall ecosystem, as a tool to prevent massive and catastrophic wild fires, and thus start to distinguish between acceptable/good fires and undesirable/bad fires. Without the control of wood fuel levels through agricultural activities or prescribed burning, this fuel keeps accumulating, reinforcing the preconditions to have a high intensity fire. Extensive prescribed burning programmes, or, the management of natural low-intensity fires, are tools that must be integrated into local policies of the prevention and extinction of wildfires.

3.- The increasing wildland urban interface and the need of citizens protection within the crisis management

In front of a high-intensity forest fires, the limit of the extinction capacity is overcome by the speed of propagation of the fire. Fire-fighters facing extremely hot, high or rapidly moving flames have to retreat temporarily until the intensity of the fire reduces and allows them to be effective. In those cases, a critical factor is when the fire is near or entering urbanised areas. The priority turns then to the protection of people and infrastructures and all resources and efforts are focused on that task. This situation can be worsened in the case of simultaneous fires. Besides the urbanisation of forested areas, there has also been in the last years a natural reforestation nearby villages and their industrial or commercial areas, due to the abandonment of traditional agricultural activities which surrounded those villages. This increased vulnerability to forest fires of the buffer zones between villages and cities, and the forested areas, means that in the coming years, fire-fighting will have to focus significantly on civil protection aspects (confinements, evacuations, transit control, ...) with a direct influence on the capacity to manage the emergencies.

We must actively control the interfaces between urbanised and forested areas, to reduce their vulnerability to fire, in order to avoid in the future having to concentrate on these areas the fire-fighting resources, and allow an adequate level of auto-protection for both people and houses. Though buffer zones, and actions directed at reducing the capacity of nearby forest to generate secondary fires, and reducing densities nearby the houses and building which could open the door for a forest fire to become an urban one.



The high urban-forest interface vulnerability constrain the efficiency of suppression system (Jonquera fire, august 2012)



Media attention and social awareness give us an opportunity to explain better the role of fire in the ecosystem (Empordà, july 2009)

4.- The inertia of the institutional framework and a lack of individual response

Traditionally the management of fire prevention and extinction policies is carried by public authorities. Only at the very beginning were the land owners responsible for the extinction costs. In some countries, big forest companies owning large cultivated forests, operate their own extinction systems. The necessity of having public policies regarding prevention and extinction must in no way be a waiver for the individual responsibilities in a society as a whole which benefits from the forests. All citizens must be made part of the reduction of the fire risk and of its management in case of crisis:

- It is important to raise awareness regarding the vulnerability of our natural environment, the responsible use of forested areas, and of the use of “good” fires to prevent “bad” ones.

- A changing risk context forces us to revise the current set of knowledge regarding prevention and extinction. We must update our concepts and techniques. For instance, rural areas without any large fire in the last 40 years have not had the opportunity to learn and react to a real fire.
- The vulnerability of housing to forest fires has to be minimised not only in the buffer areas between urban and forest zones but also in the surrounding space of the house. A good example is the taking into consideration of prevention measures by insurance companies.
- We have to better explain the natural cycles of fire in the ecosystem and the need of vulnerability reduction policies at landscape level, which, at the same time, help to get public support for fuel reduction actions, like prescribed burning programs and natural fires management under the frame of green economy initiatives.

5.- Dichotomy between technical knowledge and operational capacity to integrate it

The greatest scientific advance of the last years in this field has been the determining of spreading patterns for each type of wildfire that can possibly happen in a given territory. This has been use for risk planning, thanks to the identification of priority areas which can potentially slow down a forest fire, and, during actual fire-fighting to anticipate possible moves of the fire. Nevertheless this knowledge is imperfectly applied on the field due to severe legal and individual challenges.

Regarding risk planning, it is important to strengthen the normative importance of forest fire risk planning instruments, in order for them to be more easily and frequently be included within urban, territorial and rural planning.

Regarding fire-fighting, permanent training and the sharing of both good and bad experiences are fundamental to integrate new knowledge into the operations. International labels for the training would guarantee a certain level of understanding and cooperation between different fire-fighting teams.

We must improve the dissemination and integration of new knowledge on forest fires behaviour into existing local policies for both prevention and extinction. Some events of wildfires are a consequence of the non-effective integration of such knowledge or because of insufficient coordination within the public bodies. We must also progress towards a greater integration of fire risk management within other transversal and territorial policies, from a cost-efficiency perspective. The reduction of the fire vulnerability of our landscapes brings great benefits in front of the costs avoided from the fires.