The opportunities of cultural fire for catastrophic fire risk management in Navarra region (Spain)

Cultural burning have historically been used in Europe for land management. However, fire exclusion policies and new land management systems introduced in the 19th century led to a landscape change and current wildfire risk. Besides, climate change induced a convective fire behaviour posing new challenges to the civil protection system.

This paper addresses this challenge in Navarra, a particularly critical region in Spain due to its geographical position between the Mediterranean and Atlantic ecological domains. Traditional fire use practices are revisited to assess options for their recovery and adaptation to the new socio-spatial and climatic context to reduce vulnerability to catastrophic fires.

We use methods of Historical Geography to collect and analyse geohistorical documentary sources, cultural writings, legal texts, and geospatial data. A qualitative assessment of cultural fire heritage and historical forest fires interaction is used from the Geography theory on space-making. The 'living with fire' paradigm is also applied to show that Navarra could benefit from a renewed traditional knowledge of cultural fire implementation for wildfire risk management from a collective learning process and conflict resolution approach.

The main results of this study are: (1) the collection of historical evidences of community-based fire use practices for land management; (2) a georeferenced database of pre-statistical fire records in Navarra since the 16th century; and (3) the analysis and characterization of fire management know-how, and its interactions with landscape dynamics and fire regime change.

We found that cultural fire was linked to a regime of frequent and small wildfires, while fire exclusion and land management change created the spatial-based scenarios of contemporary fire risk. Therefore, we foster the renovation and adaptation of fire culture to the current socio-environmental conditions to enhance social and landscape resilience to large wildfires.

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