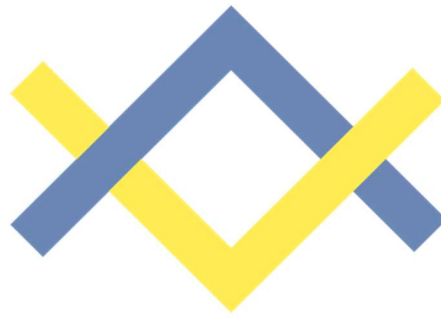




The HuT

Bridging science and stakeholders: advancing fire risk mitigation and adaptation through modeling and participatory dialogues

‘The HuT for Me and You’
Narrative

DEMONSTRATOR 8
Ogliastro
(Italy)

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The Human-Tech Nexus: in a few words

In the Mediterranean region, fire management faces growing challenges due to the complex interplay between land use changes, socio-economic dynamics, climate change, and the declining effectiveness of traditional firefighting under extreme weather conditions. In response, researchers have increasingly emphasized the need for adaptive fire management and enhanced landscape resilience through integrated, holistic approaches. The Ogliastro-DEM8 case study in Sardinia, Italy, developed under the Horizon Europe-funded HUT project (*The Human-Tech Nexus – Building a Safe Haven to Cope with Climate Extremes*), addresses this need by supporting the development of science-based, effective adaptation and mitigation strategies for forest and wildland-urban interface fire prevention.

Ogliastro, between sea and mountains

Ogliastro, a former province in Sardinia (Italy), shares a high percentage of forested land, agricultural areas, and urban-rural interface zones. The region is exposed to a variety of natural hazards, including floods—such as the severe event in Villagrande in 2004—and a wide range of dry hazards, most notably prolonged heatwaves, droughts, and wildfires. Dry hazards are particularly significant, not only because of their frequency and intensity, but also due to their ability to compound and cascade into more severe impacts. These events pose serious risks to human life, infrastructure, and socio-economic assets, including forests, animal farms, road networks, entire villages, and the vital tourism sector.

A particularly striking example occurred in July 2019, when a long-lasting and intense heatwave during the first ten days of the month, combined with strong northwesterly mistral winds, triggered a large-scale wildfire on July 13th near Lido di Orri (Tortoli). The fire rapidly spread across the landscape, mobilizing hundreds of firefighting personnel along the active fire front. Over less than two days, the blaze destroyed more than 750 hectares of Mediterranean shrubland, agricultural land, and rural homes, and caused the death of numerous domestic and wild animals. Approximately 8,500 beachgoers were evacuated from coastal areas, along with residents of 35 homes, a rural guesthouse (agriturismo), a camper site, and a campground.

Despite having a resident population of around 57,000 (as of 2016), Ogliastro experiences a dramatic seasonal surge in visitors. During the summer, this number increases nearly tenfold in the city of Tortoli alone and at least doubles or triples in smaller towns such as Lotzorai and Cardedu (2019 data). As a result, densely populated wildland-urban interface (WUI) areas become particularly vulnerable during high-risk periods. Most of the seasonal population—composed largely of tourists—is unaware of the local fire risk and unprepared to react promptly in case of an emergency.

This combination of growing climate pressures, expanding WUI zones, and limited public awareness makes Ogliastro a compelling case study of how climate change is increasingly affecting Mediterranean regions—not as a distant threat, but as a lived and growing reality.



Voices of Ogliastro

Stakeholder perceptions of wildfire risks in Ogliastro

Institutional actors and agro-livestock operators in Ogliastro are highly aware of the wildfire risks. They are concerned, since the effects of climate extremes have become more visible and tangible - manifesting through longer and more frequent droughts, early vegetation drying, longer wildfire seasons, larger and more dangerous wildfires. These changes are not only challenging emergency response operations, but are also disrupting agricultural productivity, resilience of rural livelihoods, safety in the WUI areas.

Institutional actors - such as the Corpo Forestale e di Vigilanza Ambientale (CFVA, regional forestry corps responsible for surveillance, fire detection, firefighting operations and law enforcement), the regional agency FORESTAS (engaged in forest management and support to firefighting operations), Civil Protection units (coordinating emergency response and evacuation), and local volunteer groups (supporting patrolling, and evacuation efforts) - play a crucial role in wildfire risk management across the region. They perceive wildfire risk as high or moderate for their community and territory. All foresee changes in fire frequency or extent over the past 30 years.

Among the agro-livestock operators surveyed—primarily small-scale farmers and shepherds mainly managing mixed-use land for grazing - most view wildfires as a significant problem, with only one considering them of little relevance. These individuals often work in isolated or peri-forest zones, where fire exposure is particularly high during summer months. The majority of respondents rated the fire risk as high, two considered it extreme, and three moderate. Regarding fire trends, nine participants perceived an increase or change in fire dynamics, while four reported no variation, and another four expressed uncertainties. These findings underscore a strong level of awareness and concern among land-based workers, who directly experience the impact of climate extremes on their fields, livestock, and infrastructure.

When it comes to their perceived changes in the territory, Institutional actors listed “larger and more dangerous wildfires” as the second most important change, while agro-livestock operators believe it is an increase in the number of events, followed by “more extensive or more dangerous wildfires”, “greater property damage”, and “greater media coverage of the wildfire season”. Institutional actors placed less emphasis on “increased media coverage of the wildfire season” and “greater property damage”.

Concerning climate change impacts (e.g., prolonged droughts and heatwaves), these are seen by both groups of actors as the main driver of changes in wildfire intensity and frequency. Other drivers included the abandonment of agro-silvo-pastoral and forestry practices, vegetation growth, and negligence from those living or working in rural areas. Institutional actors also point to a decline in firefighting and prevention efforts and indifference toward prevention policies, whereas agro-livestock operators emphasize recklessness from those unfamiliar with the landscape. Notably, all participants expect wildfires to become more intense and frequent in the future.



Strengthening awareness and co-develop fire prevention and risk mitigation strategies

The main objectives of DEM8 are: 1) Raising awareness of the problem and the risks associated with wildfire in the Ogliastro sub-region; 2) Co-design and co-develop prevention and risk mitigation strategies and options by applying innovative and integrated fire modelling, financial instruments, and participatory approaches. 3) Co-define effective pathways for adaptation and risk mitigation to reduce the impact of wildfires in the short and medium term.

Co-define effective pathways for adaptation and risk mitigation

Within The Hut, Ogliastro DEM8 aims at providing the science/knowledge base needed to assist policy and decision-makers on the co-definition of adaptation and mitigation pathways effective in reducing the impacts of fire events in the short- and medium term under a changing climate. Towards this aim, innovative tools and stakeholder engagement, including participatory approaches, are being developed.

Combining modelling and participatory approaches within a disaster risk reduction framework

Towards this aim, DEM8 is structured around three interlinked components: 1) Fire Behavior Modeling: Simulating high-resolution fire scenarios under current and future conditions to evaluate adaptation and risk reduction strategies, including Nature-based Solutions (NbS). 2) Stakeholder Engagement: Facilitating participatory processes to integrate local knowledge, discuss fire-smart land management, and identify enablers and barriers to systemic risk reduction. 3) Innovative Insurance Solutions: Developing a prototype for financial tools to reduce wildfire risk and support affected communities.

These components are designed to work synergistically, ensuring that the proposed solutions are scientifically sound, socially acceptable, and practically implementable.

Engaging the Community

To foster engagement, dialogue and collaboration among stakeholders involved in fire risk management, *The HuT* organized - in November 2023 - two local DRR workshops. The two events lasted approximately 2 hours and began with an introductory session designed to provide participants with a broad understanding of the global context of climate change, the need for climate adaptation, and the specific wildfire situation in Ogliastro. This segment also introduced *The HuT* project, its objectives, and the tools and strategies (modelling, financial and participatory tools) proposed to improve fire risk management and resilience in the region. Then, using a Collaborative Learning (CL) approach, the session emphasized fostering enhanced communication and collaboration among stakeholders as a crucial step towards co-developing locally adapted, resilient strategies. Data on 1) participants' perceptions of wildfire risks and dynamics and 2) direct experiences with fires and prevention measures were collected through a survey. Then participants subsequently engaged in structured discussions around two key themes. In the first part



of discussion, they examined the barriers and enablers influencing the implementation of land management and fire prevention strategies. To facilitate dialogue, participants were provided with a concise list of pre-identified barriers and enablers as a starting point for discussion. The second discussion focused on potential strategies and interventions for land management and wildfire prevention. Here, participants were invited to share their opinions and ideas, building upon a set of proposals initially identified by CNR and CMCC through an extensive literature review.



First workshop with territorial and regional fire management entities

Our stakeholders

Stakeholders were identified through expert consultation and targeted invitations to ensure a balanced representation of relevant sectors. The workshops gathered 36 participants, divided into two events with two stakeholder groups: one comprising local administrators and representatives from territorial and regional fire management entities (n=19), and the other consisting of agro-livestock operators (n=17). A focus group was organized online to reach the target group of tourism operators (n=5), because engaging this stakeholder group proved challenging.

Among these institutions were the Forestry and Environmental Vigilance Body of Sardinia (CFVA), the regional forestry agency FORESTAS, the national fire and rescue service, civil protection authorities (General Directorate of Civil Protection), volunteer organizations, and local government representatives.

Outlook

The next steps of this work will involve: (i) integrating feedback from a second stakeholder workshops to refine the representation of land management and adaptation strategies in the models; (ii) evaluating management strategies by testing different combinations under various climatic conditions to assess their effectiveness in influencing fire behavior and mitigating overall fire impact; (iii) engaging stakeholders by presenting the key findings in a fourth workshop aimed at supporting policymakers and decision-makers in defining adaptation and mitigation pathways that effectively reduce fire impacts and associated costs in the short- and medium-term under a changing climate;



(iv) providing actionable guidance by translating the results into practical recommendations for policymakers, insurance companies, land managers, and local communities.

The strength of this demonstrator lies in its ability to combine scientific modelling with stakeholder dialogue through a participatory approach, supported by interdisciplinary methods drawn from geography, sociology, and anthropology. This integration enables an effective dialogue between modelers and the complexity of real-world contexts, fostering the co-construction of fire-smart solutions and adaptation strategies.

