FIRE-RES

Innovative technologies & socio-ecological-economic solutions for fire resilient territories in Europe

D4.5 IA BRIEF 4.4: REPORT ON WILDFIRE-SAFE VILLAGES

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Abstract: The Galician living laboratory is located in the model village of Trelle (Toén, Ourense), where emphasis is being placed on preparing residents for the impact of extreme forest fires through environmental adaptation, community training, and two pioneering initiatives: on the one hand, the development of the world's first double-action forest fire noze, which combines personal protection and simultaneous extinguishing, and on the other, the creation of a virtual reality scenario to simulate the impact of these extremely dangerous forest fires. These measures aim to raise awareness of the risks among residents and strengthen their response capacity.

Key words: Awareness raising, training, and design of new tools to improve responsiveness.

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1. INTRODUCTION

The urgent need to find solutions to the problems posed by the new type of wildfires for small rural communities has led us to research and work on a viable and realistic proposal that can guarantee the safety and peace of mind of those who have chosen villages as their home because of their quality of life, or those who were born and raised there and have dedicated their entire lives to being part of one, and who now, in their final moments, do not want to or cannot leave them. And that all this can be maintained over time.

The increasing complexity of wildfires in recent years — due to their intensity, erratic behaviour and destructive capacity — has meant that they are no longer an isolated or seasonal phenomenon, but have become a structural threat to rural areas. Those of us who work in this field are fully aware that this is not just an environmental or technical problem, but a territorial, social and economic challenge that threatens the continuity of many small towns.

The situation of villages in the face of these fires is particularly critical. The combination of an ageing population, the loss of agricultural and livestock activity, the discontinuity of the landscape and the scarcity of resources for active land management has created a highly vulnerable scenario. Faced with this reality, and far from resigning ourselves to a purely reactive response, we have considered it essential to move forward in the design of adapted, realistic and scalable solutions that integrate prevention, management and local resilience in a structured way.

2. OBJECTIVE

Creating villages that are safe from wildfires not only involves reducing direct exposure to fire, but also transforming these rural communities into resilient environments capable of anticipating, resisting and recovering from extreme events.

3. METHODOLOGY

3.1. The secure village model

This is the framework for our proposal: a model village that is safe from wildfires, conceived not as a simple theoretical exercise, but as a tangible example of what can be achieved when technical knowledge, social participation and action on the ground are combined.

The model we propose is based on a comprehensive active perimeter defence strategy, with direct interventions such as clearing, pruning, thinning, firebreaks, recovery of cultivated areas and creation of low fuel load areas around the inhabited centre. But we do not stop at the physical: we believe that real and lasting safety is also built on social and economic foundations.

For this reason, this model village also incorporates a key component of training and awareness-raising among the local population, reinforcing the role of residents as active agents of prevention and self-protection. Likewise, the model is based on the economic recovery of the rural environment through projects linked to extensive livestock farming, non-timber forest production (such as mycology), nature and sports tourism, and other forms of sustainable use that contribute to generating a managed landscape and productive mosaic.

Our proposal is not intended to be a universal solution, but rather a replicable benchmark. We want to demonstrate that it is possible to act before the fire, that prevention is more effective when planned with a territorial vision, and that villages can be, with the right resources, safe, lively and resilient spaces. We are committed to intelligent coexistence with fire, based on active land management and strengthening the link between community and landscape.

In short, this model village is a concrete response to a complex reality and an invitation to collectively rethink the role of rural areas in the prevention of large wildfires.

3.2. Strategic actions

To create wildfire safe villages, we have defined a series of specific strategic actions that structure our proposal and allow for gradual, adapted and replicable implementation in other territories with similar characteristics:

1. Safety perimeters around the village

The first step towards a safe village is the design and implementation of an effective perimeter defence system. This involves the creation of multi-layered safety rings, based on strategic silvicultural treatments such as clearing, pruning, thinning, auxiliary protection strips, prescribed burning and, where feasible, the recovery of abandoned agricultural land. These actions not only reduce the continuity and fuel load in the vicinity of the inhabited centre, but also generate a managed landscape, facilitate access for firefighting resources and create functional spaces for productive uses.

2. Raising awareness and training on immerse experiences

In a context of increasing complexity of wildfires, training and raising awareness among the local population is a fundamental pillar. The project incorporates an innovative approach through the use of virtual reality (VR) as an immersive educational tool. This technology makes it possible to simulate real fire situations, evaluate behaviour in risky contexts and offer practical training on self-protection, evacuation, first aid and fuel management on private property. Virtual reality improves knowledge retention, increases participant engagement and breaks down generational barriers to access to training.

3. Testing efectiveness and coordination through drills

Complementing the theoretical and immersive training, practical evacuation and wildfire response drills will be carried out. These exercises have a dual purpose: to test the effectiveness of the protocols designed for each rural community and to strengthen coordination between the population, local authorities, emergency services and firefighting units. In addition, they make it possible to identify operational weaknesses, improve risk perception and consolidate a culture of prevention.

4. Exchange of experiences and lessons learned (Portugal and Chile)

Knowledge is not built in isolation. Therefore, the project envisages participation and collaboration with similar initiatives developed in other territories particularly affected by extreme wildfires, such as Portugal and Chile. Through technical visits, virtual meetings and knowledge-sharing platforms, mutual learning, the transfer of good practices and

the creation of international alliances will be promoted to reinforce the effectiveness and sustainability of local actions.

5. **Strategies for local economic revitalization and project support**

A safe village cannot be understood without an economically vibrant and socially cohesive environment. For this reason, we held a meeting with representatives of the Galician Agency for Rural Development (AGADER in its acronym in Galician), the Galician Forestry Industry Agency (XERA, in its acronym in Galician) and two researchers from the European Forest Institute (Sven Wunder and Cecilia Facarolli), and subsequently with local residents to inform them that, with the help of our Administration, a platform could be set up to provide technical advice and support for the financing of viable economic initiatives that contribute to the active management of the territory and the stabilisation of the population. Priority would be given to projects related to landscape and natural resource management, such as extensive livestock farming, organic farming, beekeeping and mycological exploitation, as well as proposals for sports and nature tourism that reinforce the link between sustainability, development and prevention.

3.3. The village of Trelle as pilot

The choice of the village of Trelle (71 inhabitants) as the setting for this pilot initiative to develop a model village that is safe from extreme wildfires is based on a clear convergence of factors that make it a representative, strategic and highly significant case within the rural context of Galicia and, by extension, the north-west of the peninsula.

Located in southern Galicia, Trelle is immersed in one of the areas with the highest incidence of wildfires in Spain, placing it at the epicentre of the problem that this project aims to address. Its location, surrounded by extensive forest areas—especially fast-growing conifers such as pine—represents a landscape configuration of high continuity and high fuel load. These conditions, combined with rugged terrain, increasingly extreme weather and a progressive loss of traditional land management, make this environment a scenario of extreme risk in the event of possible sixth-generation fires.

The village of Trelle also represents a socio-demographic reality that is unfortunately becoming increasingly common in rural areas: an ageing population, limited generational renewal and loss of human capital due to the exodus of young people to urban areas. This weakening of the social fabric not only has consequences for the economic and cultural viability of the village, but also increases the vulnerability of its population to threats such as wildfires, given that many of its inhabitants do not have the physical capacity to evacuate quickly or sufficient knowledge about self-protection.

Another key factor in the selection of Trelle as a pilot village is its high soil fertility, a factor that has historically favoured abundant and sustained plant growth. However, in the current context of rural abandonment and climate change, this natural wealth has resulted in the uncontrolled growth of highly flammable vegetation, both in abandoned

agricultural areas and on the edges of roads and private properties. This phenomenon has led to a critical accumulation of fuel, which, in the event of adverse weather conditions—wind, high temperatures, and low humidity—could easily result in a fire of extreme behaviour.

In this regard, Trelle has all the key characteristics needed to validate, evaluate and highlight the effectiveness of the proposed model:

- High exposure to risk, both due to the type of vegetation and the landscape configuration.
- Presence of a vulnerable population, which reinforces the need for intervention in terms of prevention, training and self-protection.
- High value as a replicable case, as it represents a type of village that is common in Galicia and the north-west of the peninsula, in forested areas with low population density.
- Availability of a suitable environment for protective forestry work, including safety rings and areas with low fuel load.
- Potential for economic revitalisation through productive projects linked to land management, such as extensive livestock farming, mycology, beekeeping and nature tourism.

In addition, the structure and size of the village allows for the controlled and measurable implementation of all the actions contemplated in the project: perimeter landscaping work, virtual reality training, drills and the design of evacuation and/or confinement plans, as well as support for the implementation of complementary economic activities.

This framework allows us not only to work on physical and social risk, but also to create a true laboratory for rural prevention and resilience, with the capacity for technical monitoring, evaluation of results, and documentation of processes for future replication in other territories.

In short, Trelle is not just a suitable place; it is the necessary place. Because its landscape, social structure and risk situation bring together the main challenges faced by many Galician and Spanish villages. And because demonstrating that Trelle can be transformed into a safe and resilient village also demonstrates that it is possible to open up a new path for the future of rural areas in areas at high risk of extreme wildfires.

Figure 1: Aerial view of Trelle.

4. STRATEGIC ACTIONS

Strategic actions have been planned and implemented to reduce the load of plant fuel, including clearing, pruning, thinning, thinning out dry or submerged trees, and prescribed burning, together with the improvement of key infrastructure (adaptation of roads, firebreaks, and forest tracks). These interventions seek to minimise the impact of extreme wildfires on the village and facilitate access for the Prevention and Extinction Services in the event of an emergency.

Figure 2: Managed forest

4.1. Strategic Action 1: Safety perimeters around the village

Introduction

On 7 August 2020, an exceptional wildfire broke out in the mountains belonging to the parish of Moreiras-Trelle, in the municipality of Toén (Ourense). This event was notable for the rapid formation of a pyrocumulus cloud in less than 15 minutes, a phenomenon that is unusual in fires of limited surface area. The rapid evolution of the pyrocumulus cloud in a relatively small area highlighted the uniqueness of the orographic, meteorological and vegetation fuel load conditions present in the area.

The interaction between the rugged terrain, native vegetation and extreme weather conditions, including temperatures above 38 °C and winds gusting up to 22 km/h, favoured intense convection and the generation of this type of high-intensity fire, which hinders extinguishing efforts and increases the risk to the population and emergency teams.

The village of Trelle, due to its geographical characteristics, its exposure to extreme events, and its connection with rural recovery initiatives, has been identified as a strategic location for the development of a living lab within the framework of the European Fire-Res project. This living lab, conceived as a space for experimentation and co-creation of innovative solutions to extreme forest fires, integrates scientific knowledge, citizen participation, and technology applied to land management. The Atlantic living lab, centered in Trelle, focuses on the design of rural resilience models, the protection of inhabited areas, and post-fire ecological restoration, making this village a benchmark for climate change adaptation in rural-forest interface areas.

Climogram of the Moreiras-Trelle Area

Below is the synthetic climogram based on average data from the Ourense meteorological station (1981–2010 period), which reflects the thermal and rainfall seasonality of the region where Trelle is located.

Table 1: Climogram of the Moreiras-Trelle area.

Month	Average temperature (°C)	Precipitation (mm)
Jan	7.0	110
Feb	8.5	80
Mar	11.5	85
Apr	13.5	90
May	17.0	100
Jun	21.0	60
Jul	24.0	35
Ago	23.5	40
Sep	20.0	60
Oct	15.0	120
Nov	10.0	120
Dec	7.0	110

Figure 3: Start of the Toén fire.

Figure 4: Fire growth phase of the Toén fire.

Figure 5: Toén fire prior to the formation of the pyrocumulus cloud.

Figure 6: Pyrocumulus cloud of the Toén fire.

Objectives

On Wednesday, 2 June 2021, the declaration of the model village of Trelle (Toén-Ourense) was published in the Official Gazette of Galicia. https://www.xunta.gal/dog/Publicados/2021/20210602/AnuncioO90-180521-0003_gl.pdf

The objective of this project is to consolidate the village of Trelle as a benchmark for comprehensive risk management in rural environments, ensuring its safety in the face of natural contingencies. The main focus is on prevention, mitigation and response to wildfires, with special attention to extreme fire scenarios. This strategy seeks to anticipate the possibility of an extreme event and minimise its effects on the people living in the village and their property.

To achieve this objective, the following actions were carried out:

Detailed assessment of the history of wildfires, fire simulation with real meteorological data, reproducing the hazards and vulnerable areas, providing valuable information for the implementation of strategic prevention operations.

Interventions

- Intervention area of the model village of Trelle: 36.91 ha.
- Design and implementation of vegetation load reduction measures (clearing, pruning, prescribed burning) aimed at interrupting the continuity (vertical/horizontal) of plant fuel.
- Area cleared, pruned and shredded: 17.1 ha.

- Proposed prescribed burning: 20.1 ha.
- Proposed burning under trees: 46 ha.

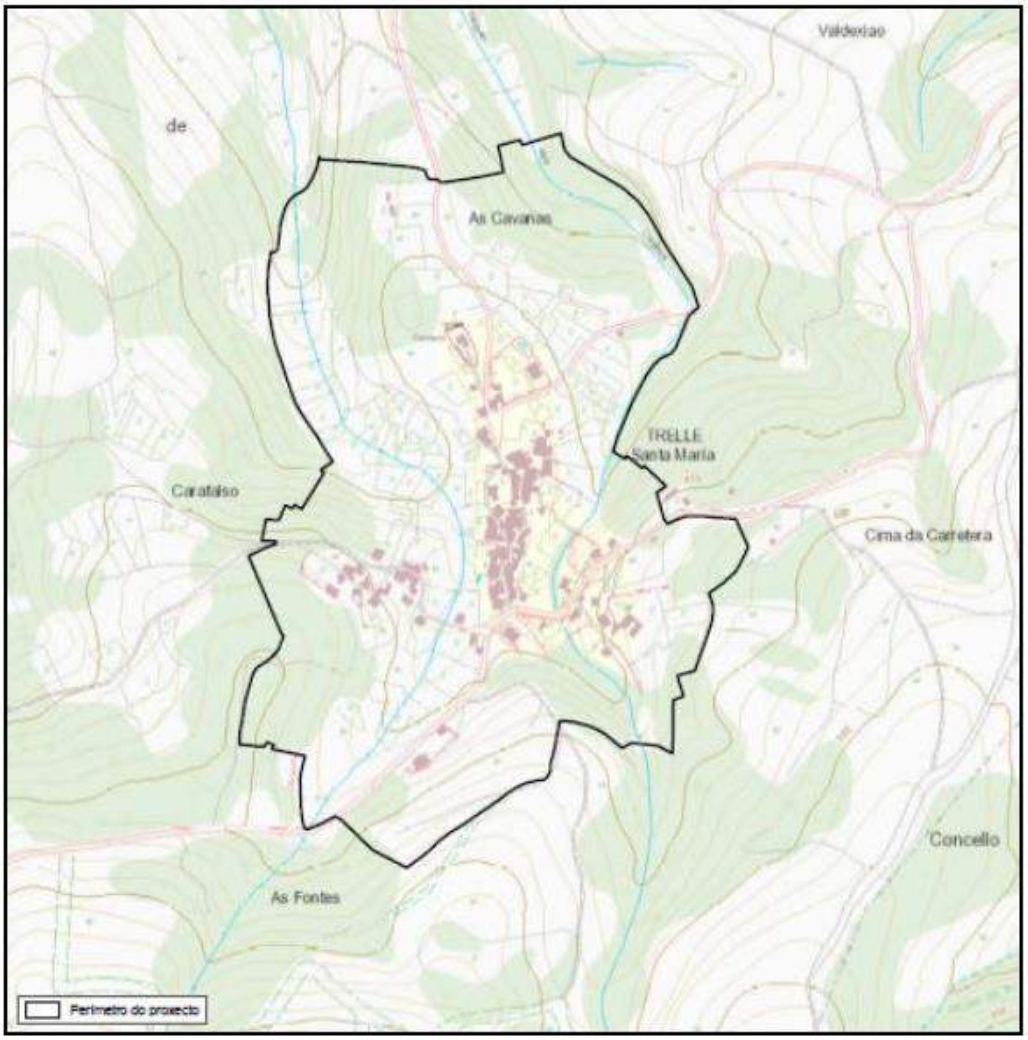

Figure 7: Intervention area of the model village of Trelle.

Figure 8: Farmlands surround the village of Trelle. Source: American flight (1954-56).

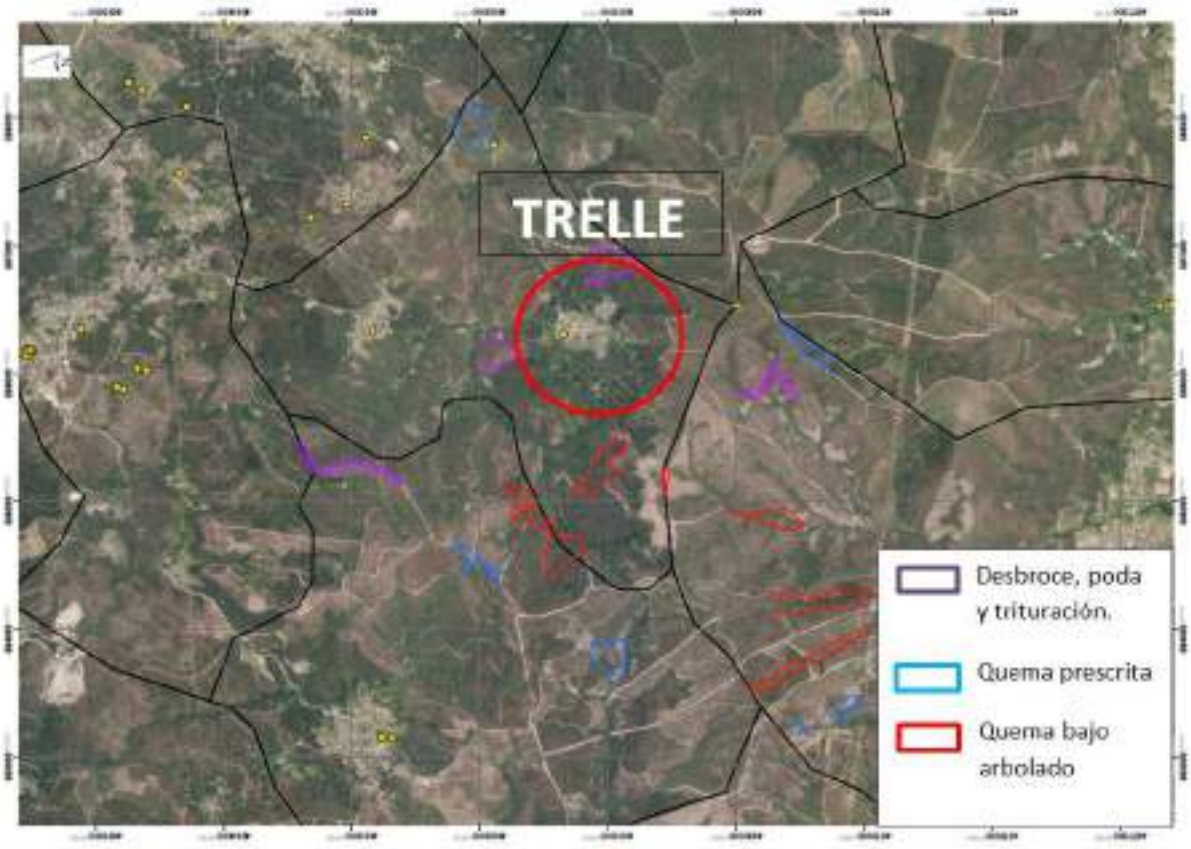

Figure 9: Localization of vegetation load reduction measures.

Table 2: List of vegetation load reduction measures.

	Vegetation reduction measures	Area of implementation
2	Clearing and Pruning	5.5
3	Burning	3.7
4	Burning	6.4
5	Tree Burning	0.4
6	Clearing and Pruning	6.4
7	Tree Burning	3.0
8	Clearing and Pruning	2.6
9	Clearing and Pruning	2.6
10	Tree Burning	8.1
11	Burning	2.3
12	Tree Burning	7.7
13	Tree Burning	4.7
14	Tree Burning	8.2
15	Tree Burning	6.5
16	Burning	2.0
17	Burning	0.3
18	Burning	5.4

Review, improvement and updating of forest infrastructure, tracks, roads and firebreaks, creating interconnected safety rings, optimising access for firefighting resources, facilitating the manoeuvres of operational units.

- Length of firebreaks: 23,562 m.
- Length of forest tracks: 1,559 m.

Figure 10: Length of firebreaks and length of forest tracks

2	0 Cortafuegos	1196	12	1,4	2022
3	0 Cortafuegos	362	15	0,5	2022
4	0 Cortafuegos	1473	15	2,2	2022
5	0 Cortafuegos	447	15	0,7	2022
6	0 Cortafuegos	421	15	0,6	2022
7	0 Cortafuegos	3056	15	4,6	2022
8	0 Cortafuegos	284	15	0,4	2022
9	0 Cortafuegos	1586	5	0,8	2022
10	0 Cortafuegos	425	6	0,2	2022
11	0 Cortafuegos	866	8	0,7	2022
12	0 Cortafuegos	711	14	1,0	2022
13	0 Cortafuegos	1159	14	1,6	2022
14	0 Cortafuegos	321	17	0,5	2022
15	0 Cortafuegos	722	17	1,2	2022
16	0 Cortafuegos	562	14	0,8	2022
17	0 Cortafuegos	464	12	0,6	2022

18	0 Cortafuegos	472	16	0,7	2022
19	0 Cortafuegos	132	8	0,1	2022
20	0 Cortafuegos	599	14	0,8	2022
21	0 Cortafuegos	686	20	1,4	2022
22	0 Cortafuegos	296	15	0,4	2022
23	0 Cortafuegos	349	4	0,1	2022
24	0 Cortafuegos	486	4	0,2	2022
25	0 Cortafuegos	431	4	0,2	2022
26	0 Cortafuegos	1203	16	1,9	2022
27	0 Cortafuegos	1059	8	0,8	0
28	0 Cortafuegos	460	12	0,6	0
29	0 Cortafuegos	915	12	1,1	0
30	0 Cortafuegos	864	4	0,3	0
31	0 Pistas	894	5	0,4	0
32	0 Pistas	665	5	0,3	0
33	0 Cortafuegos	485	8	0,4	0
34	0 Cortafuegos	144	8	0,1	0

*Cortafuegos: firebreaks

The fuel reduction and infrastructure adaptation measures have been financed with own funds through the Wildfire Prevention Service.

Conclusions

As a result of the actions carried out by the Wildfire Prevention Service, the Trelle area now has a proactive prevention and defence system that not only minimises the risk of fire under normal conditions but also guarantees a rapid and coordinated response to extreme weather events.

4.2. Strategic Action 2: Raising awareness and training on immerse experiences

Introduction:

In a context of climate change and progressive abandonment of rural areas, extreme wildfires are no longer a sporadic threat but have become a systemic risk that particularly affects territories with poorly managed urban-forest and rural-forest interfaces. Galicia, and in particular the province of Ourense, represents a critical area in this new scenario.

The model village of Trelle, nestled in the heart of Ourense in rural Galicia, is the focus of a pilot project within the Living Lab Galicia of the European FIRE-RES project. From a visionary communication perspective, these training activities not only impart knowledge but also empower the community to become an active agent in addressing the challenge of wildfires. With an inclusive approach, a training programme has been designed that encompasses civilians of all ages, with a special focus on older generations, who are aware of their fundamental role in passing on decades of experience.

Throughout the four years of the project, at least one in-person workshop has been scheduled each year, combining practical workshops with theoretical sessions. These sessions, run by professional wildfirefighters from the Wildfire Prevention and Extinction Service (SPIF, in its acronym in Galician), which is part of the General Directorate for Forest Protection, offer advice on prevention and self-protection, while also showcasing the latest advances in early detection and communication technologies in emergency situations. Each participant is given an informative guide, in leaflet format, which summarises essential protocols, risk identifiers and possible evacuation routes, or confinement in safe places in the event of extreme wildfires, thus ensuring that the learning transcends the classroom and remains in the memory of the residents of Trelle.

Impact measurement is carried out through drills designed to recreate real scenarios of the possible impact of an extreme wildfire in the village's surroundings. These exercises evaluate not only the speed of response but also community cohesion and the correct application of the procedures learned. Thanks to high participation (more than 70% of Trelle's residents have attended one of the workshops), the project has succeeded in strengthening collective preparedness for the potential impact of an extreme wildfire.

Looking ahead, FIRE-RES's Living Lab Galicia is committed to making Trelle a European benchmark for safe villages. The combination of face-to-face training, dynamic talks and materials adapted to all users envisages a village capable of anticipating emergencies and

sharing its best practices with other model villages in Galicia, as well as other vulnerable territories in Europe and around the world. In this way, the training activities not only provide specific skills, but also encourage a shared vision: a safer rural world with greater risk awareness.

The Trelle model safe village, as the epicentre of Living Lab Galicia, has clear goals to make the village a benchmark for resilience to wildfires, strengthening its awareness of the risk and its preparedness for extreme wildfires, encouraging at least 70% of the population to be prepared, to know and apply prevention and self-protection practices against fires. Testing technologies for early detection and digital communication that improve emergency response capabilities.

The programme is structured around four thematic workshops, designed to transfer technical knowledge and encourage the active participation of the population in self-protection.

Workshop 1: Current situation in rural Galicia and roadmap for the new type of wildfires

Introduction:

The first day addressed the current state and recent evolution of rural Galicia and its direct relationship with the new behaviour of wildfires. The probability of sixth-generation fires occurring and their impact on rural areas with forest interfaces, high fuel loads and poor land-use planning was discussed.

Objectives:

Our first objective was to analyse the structural causes of the risk of extreme wildfires in Galicia, to introduce the concept of the 'model safe village' as a tool for adaptation and self-protection, and finally, to establish a common roadmap for preparedness and prevention.

Methodology:

To this end, we organised a presentation led by experts in rural dynamics and fire management, followed by an analysis of recent fire incidents and their recurrence over time. The session concluded with a participatory round table aimed at gathering perceptions, opinions, and proposals from attendees.

Conclusions:

We concluded that there is a disconnect between forestry regulations and the social reality of rural areas. The lack of active land management has turned many villages into veritable 'powder kegs'. Above all, we highlight the absolute willingness of the participants in this first contact, who are the ones who will be able to implement the proposals reached once the project is completed.

Figure 11: Meeting of workshop 1

Participants:

- Head of Forest District V (Fisterra).
- Environmental officer (Forest District V).
- Head of Forest District XII (Miño-Arnoia).
- President of the Trelle Forest Community.
- Forestry technician from Forest District XII.
- Environmental officer from Forest District XII.
- Head of analysts at the Galician Wildfire Prevention and Extinction Service (UTA).
- Head of the Civil Protection group in Verín (Ourense).
- Mayor of Toén (Ourense)
- Forestry technician for Forest District IX (Lugo-Sarria).
- Technician responsible for the Ourense forest area.
- Deputy Director General of the Galician Agency for Rural Development (AGADER).
- Representative of the Galician Regional Police on wildfire matters.
- Forestry technician for Forest District XII.
- Representative of the Directorate General for Forest Protection.

Workshop 2: Awareness and training for village residents on the rural-forest interface and the possible exposure of Trelle to an extreme wildfire

Objectives and methodology

In this second meeting, we delved deeper into the concepts of the rural-forest interface, community vulnerability and individual self-protection measures. We proposed specific risk scenarios for Trelle, based on its topography, urban planning and adjacent forest mass.

Our main objectives were to raise awareness among the population about their real exposure to extreme wildfires and to identify critical points in the village: escape routes, safe areas and possible firebreaks. We also provided instruction on individual and collective self-protection measures.

To this end, we held a workshop using local cartography, orthophotos and propagation models, worked on designing a neighbourhood emergency plan and carried out a simulation of a typical rapidly evolving wildfire scenario.

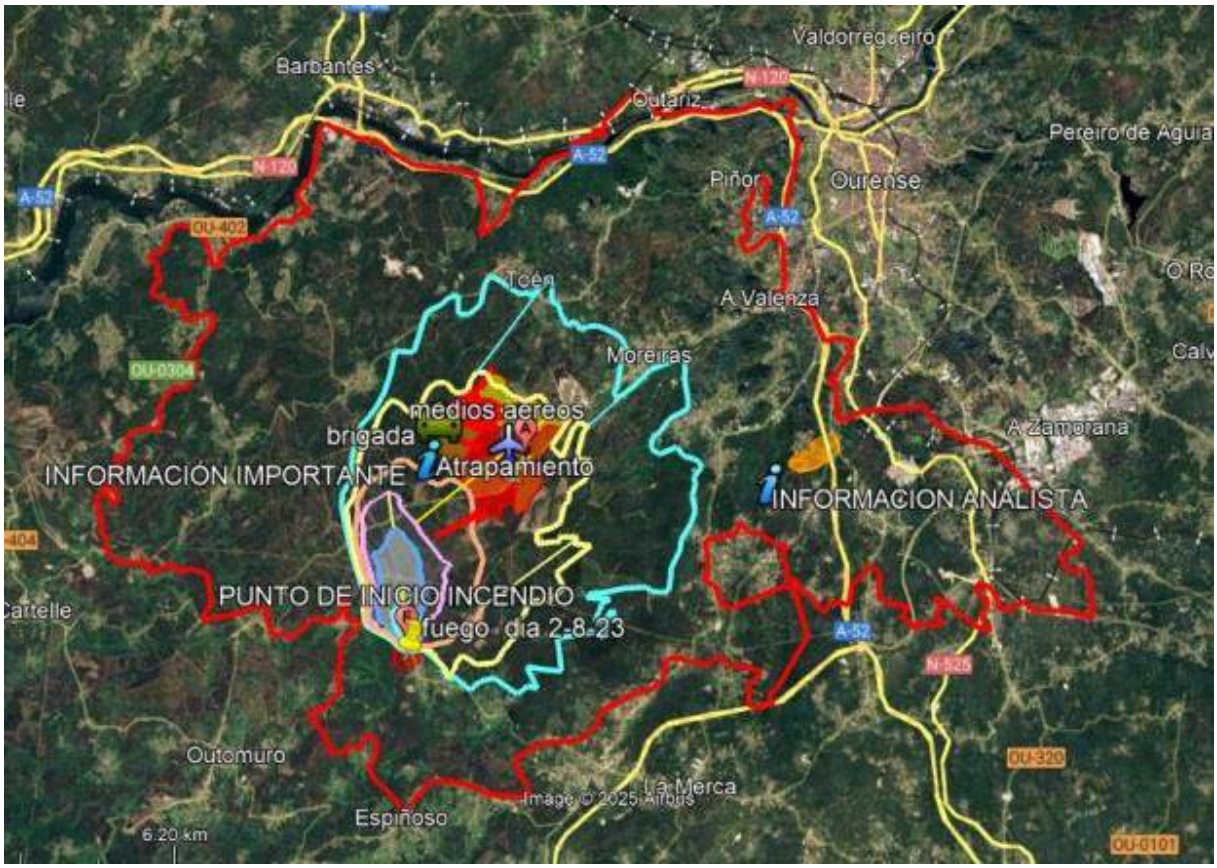

Figure 12: Vegetation load reduction measures.

At this point, we should highlight the implementation of Virtual Reality as an innovative training tool. Training through immersive experiences.

Figure 13: Simulated wildfire with Virtual Reality.

To this end, we implemented our innovative initiative in the Atlantic living lab: Safe Villages, using VIRTUAL REALITY as a training tool. We designed an immersive experience that placed residents in the midst of a large forest fire approaching the village, with flames rising in the distance, thick smoke darkening the atmosphere and the crackling of vegetation commanding respect.

Conclusions

We saw first-hand that the village is highly vulnerable, mainly due to the abundance of plant fuel and the proximity of forests to homes. We consider it essential to establish perimeter protection zones, improve the design of escape routes and correctly signpost confinement areas.

And very importantly, there is a clear need to include elderly people and those with reduced mobility in the system through a personalised assistance plan.

Figure 14: Meeting of workshop 2

Figure 15: Second meeting of workshop 2

Figure 16: FIRE-RES leaflet for workshop participants.

Figure 17: FIRE-RES leaflet for workshop participants

Participants:

- Wildfirefighters assigned to the Directorate-General for Forest Protection (Galician team responsible for the Atlantic Living Lab FIRE RES).
- Residents of the village of Trelle (Toén, Ourense).

Workshop 3: Emergency drill and practical exercises

Introduction

This session was eminently practical and allowed participants to test the knowledge acquired during the previous workshops in a real-life setting. A comprehensive drill was carried out involving the entire community of Trelle and a large part of the Galician Wildfire Prevention and Extinction Service (SPIF), with exercises in logistics, coordination and use of resources (land and air).

Objectives

The main objective was to assess the degree to which the population had assimilated the concepts.

To do this, it would be best to put the emergency plan into practice: evacuation, confinement, meeting points and training in the use of first response tools: hydrants and hose laying.

Methodology

We activated a standard drill with a fictitious fire alarm, which consisted of a timed evacuation and confinement exercise. We also included technical training with the support of SPIF personnel.

In one of the manoeuvres, we demonstrated and tested a state-of-the-art tool created by wildfirefighters in Galicia, the double-action forest lance, the only forest lance in the world capable of effectively extinguishing fires while protecting the wildfirefighter from the radiation of the flames by means of a water shield.

Conclusions

The community responded effectively, although shortcomings were detected in internal communication and coordination between scattered homes.

The role of 'neighbourhood leaders' as key figures in organising the immediate response was reinforced.

Basic technical training (watering, hoses) was well received and future refresher sessions were requested.

About these practical guidelines with the double-action wildfire lance, simultaneous extinguishing and protection. The only wildfire lance in the world capable of effectively extinguishing flames while protecting the wildfirefighter from the dreaded radiation of the fire.

Figure 18: Workshop 3 drill

Figure 19: Workshop 3 drill

Figure 20: Left image: Workshop 3 practical exercises. Right image: Workshop 3 practical exercises.

Workshop 4: Proposals and possible solutions for the rural-forest interface

Introduction

The programme concluded with a technical meeting with national experts in forest management, land-use planning, fire protection and resilient landscapes. Innovative proposals that can be adapted to rural contexts such as Trelle were presented.

Objectives

Of course, to propose medium- and long-term structural solutions to reduce risk.

It will be very important to identify collaborative strategies between the administration, the community and the forestry sector.

And finally, to reinforce the role of education and continuous training in fire culture.

Methodology

For this last workshop, we used the model of keynote lectures by top-level experts and technicians.

Conclusions

Villages must definitely be integrated into local civil protection systems, with their own resources and continuous training. Strategic land use planning is essential, with criteria of discontinuity and multifunctionality of the territory.

We are convinced that the village of Trelle can become a replicable benchmark for other rural areas in the north-west of the peninsula.

Figure 21: Meeting of workshop 4

Figure 22: Meeting of workshop 4

Figure 23: Meeting of workshop 4

Participants:.

- Director of the school for gifted children in Piedmont, Italy)
- Forestry engineer)
- Staff from all professional categories of the SPIF (Galicia)
- Director General of Forest Defence, Regional Ministry of Rural Affairs

Final conclusions

The pilot project carried out in Trelle shows that community involvement and ongoing technical training are two key things for dealing with the new threat of extreme wildfires. Change needs to be structural, but also deeply cultural: we need a new kind of fire literacy, adapted to the 21st century.

The combination of technical diagnosis, community participation, real-world practices and the transfer of specialised knowledge has set a valuable precedent that deserves to be replicated, expanded and systematised. Strategic recommendations:

We would like to conclude this work by adding some **STRATEGIC RECOMMENDATIONS** that we consider vital to the success of this initiative:

On the one hand, it would be essential to incorporate annual continuing education to maintain and update the knowledge acquired.

On the other hand, it is very important to create a local emergency response protocol validated by civil protection.

Of course, the village must be equipped with sustainable and maintainable first response resources (fire extinguisher backpacks, water points, etc.). Cultural and physical firebreaks must be established at the forest interface.

And most importantly, public policies must be promoted to support the agroforestry mosaic as a natural barrier against fire.

4.3. Strategic Action 3: Testing efectiveness and coordination through drills

Introduction

To complement the theoretical and immersive training, we carried out a practical drill on evacuation, confinement and response to wildfires. This exercise allowed us to identify operational weaknesses, but also to improve risk perception and consolidate the idea of prevention.

The practical drill is a key tool for testing the effectiveness of the measures put in place and reinforcing the village's preparedness for real emergencies.

Participants:

- Residents of the safe model village (TRELLE)
- Galician Wildfire Prevention and Extinction Service (SPIF)
- Galicia team coordinating the Atlantic Living Lab
- Mayor of the town (Toén)
- Firefighting helicopter from the A Merca base
- UTA (Tactical and Analysis Unit)
- UDEX (Firefighting Directors Unit)

Objectives

- Strengthen coordination between the population, emergency services and firefighting units (in this case, both were represented by the SPIF).
- Test the knowledge acquired by the population in training activities and awareness talks.
- Measure the response and coordination capacity between the population and emergency services (in this case, the SPIF).
- Identify logistical, communication or structural weaknesses that could compromise the effectiveness of evacuation or self-protection.
- Reinforce risk perception among the village's inhabitants.
- Prior coordination with emergency services and firefighting equipment.