



Funded by
the European Union

BEST PRACTICES FOR FOREST FIRES IN EUROPE





Funded by
the European Union

This publication is funded by the European Union. The entire responsibility of its content belongs to Pozantı Municipality and does not necessarily reflect the views of the European Union.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ





Funded by
the European Union

Content

BEST PRACTICES FOR FOREST FIRES IN EUROPE	Error! Bookmark not defined.
Introduction.....	3
BEST PRACTICES IN EUROPEAN UNION.....	6
Use of Remote Sensing in Monitoring Wildfires	7
The Joint Research Centre of the European Community	7
EFFIS - The European Forest Fire Information System.....	8
European Civil Protection and Humanitarian Aid Operations.....	10
Wildfire Prevention Action Plan.....	11
BEST PRACTICES by SELECTED EU COUNTRIES	13
SPAIN	14
Wildfire prevention programme (PPU) Programme.....	14
Network of Pasture-Firebreak Areas of Andalusia (RAPCA) Programme	16
Strategic Guidelines for Wildland Fire Management in Spain	17
Forest Defence Groups in Catalonia	19
PORTUGAL	21
Forest Intervention Zones (FIZ) in Portugal.....	21
AGIF - Agency for the Integrated Management of Rural Fires.....	23
The National Plan for Integrated Rural Fire Management.....	24
Successful Initiatives for Wildfire Risk Awareness in Portugal.....	24
ITALY	27
Unified Aerial Operations Centre (COAU) and Forest Fire Management in Italy	27
The “Forest Fire Project” - Using cartographic data to fight forest fires in Italian national parks.....	29
Twinings Between Regions to Fight Forest Fires.....	30
Summer Camps for Youth	30
Fire Prevention for Wood Supply Chains (Pre-Feu) Project in the Susa Valley.....	30
FRANCE.....	33
Wildfire Prevention Campaign in France	33
Group of Tools for Fire Fighting and Land Use Planning (GOLIAT) Project in Corsica	33
ZAL (Zone d'Appui à la Lutte)	35
ONF's Integrated Fire Risk Management Strategy for the Fontainebleau Massif	36
Compulsory Brush Clearing Mapping Initiative in France	37
BEST PRACTICES FROM OTHER EU MEMBER COUNTRIES	39
Be Summer Ready Campaign in Ireland.....	40
Automated daily wildfire risk forecast system in Slovenia.....	40
Utilizing Video Surveillance for Forest Fire Monitoring and Prevention in Croatia	41
Mobilising Local Citizens for Fire Prevention in Greece	42
Fire Danger Rating System in Sweden	43
Insights and Recommendations for Pozanti Municipality	45
Insights	45
Recommendations.....	45
CONCLUSION	47
REFERENCES.....	49

Introduction





Funded by
the European Union

This report, based on extensive desk research, serves as a guide to improving policy frameworks and municipal action plans with a specific focus on managing forest wildfires. Although climate change is acknowledged as a contributing factor, the primary focus is on strategies for wildfire prevention and control. Drawing from a wide range of research sources, this document aims to provide a detailed review of forest management policies, firefighting strategies, community engagement, and the practical measures already implemented by EU countries to address wildfires.

Wildfires are becoming more frequent and intense, partly due to changing climate conditions. This document centres on the direct challenges of wildfire management, analysing how forest management policies across the EU are being adapted to better prevent and respond to these emergencies. It emphasizes the need for focused strategies specifically tailored to wildfire management.

The report thoroughly investigates the diverse approaches EU member states are employing to mitigate the risks of wildfires. It compiles insights from various policy documents and action plans to highlight innovations in firefighting, technological advancements, and cooperative efforts that bolster national and local resilience to wildfires.

Significant attention is devoted to the role of community involvement in wildfire prevention and management. It explores how EU countries are activating community engagement through their policies, which is crucial for effective wildfire response and sustainable forest conservation.

Central to the report is a detailed exploration of the specific actions taken by EU countries to address the challenges posed by wildfires. It assesses how nations are revising forest management practices and incorporating advanced technologies, focusing on the necessity of proactive and adaptable strategies in wildfire management.

This report provides critical insights for the ongoing project "Stronger Fight Together Against Flood, Heavy Rain and Drought," particularly in areas like Pozantı and Karaisalı Municipalities, and the project associates around the Toros Forests in Adana. These local communities face significant wildfire risks due to their geographical and climatic conditions. Drawing from past experiences with wildfires in these areas, the report offers targeted recommendations to specifically address the unique challenges faced by these municipalities, providing practical solutions that can be applied to similar environments.





Funded by
the European Union

Finally, the strategies and solutions outlined are designed not only to support the specific needs of the "Stronger Fight Together Against Flood, Heavy Rain and Drought" project but also to provide valuable tools for other communities in the region to improve their wildfire management practices and enhance overall resilience against future fire incidents.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ





Funded by
the European Union

BEST PRACTICES IN EUROPEAN UNION

Forest wildfires pose significant environmental, economic, and social challenges across the globe, and the European Union (EU) has been at the forefront of developing innovative strategies to manage and mitigate these risks. This section explores the best practices within the EU for wildfire management, focusing on advanced technologies and coordinated efforts.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ





Funded by
the European Union

Use of Remote Sensing in Monitoring Wildfires

In 2018 the European Commission's Directorate General for the Environment commissioned a study to assess the contribution of (satellite based) Earth Observation (EO) to forest monitoring systems by reviewing the available scientific literature and by summarising existing operational or experimental attempts at European and global level.

Thanks to the collected information, it was possible to describe the advantages and limitations of various remote sensing techniques and to design strategies and recommendations for effective use of EO data at European level for six highly relevant threats, including wildfires. To prevent ignition and to reduce the impact of wildfires, EO-based monitoring systems can be used during three stages: before the fire (pre-fire), during the fire (active), and after the fire (postfire). In all stages, remote sensing can support wildfire management:

- Pre-fire, to reduce the ignition risk, knowledge about fuel types and their conditions is extremely informative. This information was found to be accessible from optical datasets from Sentinel-2, combined with suitable weather information and forest structure information (e.g. gap-size distribution and vertical forest structure).
- During an active fire, forest firefighters should ideally be supported by thermal imagery, which they can use to better judge the situation and adapt response actions. Currently, suitable EO sensors for this task are not well adapted to smaller forest fires but future Copernicus satellites should ideally have at least one thermal sensor at 50 m spatial resolution with 5 days revisit time to address this gap. Meanwhile, currently available coarse resolution (and geo-stationary) thermal sensors could be further exploited for assessing large-scale fires and drought conditions.
- Post-fire, satellite monitoring can help describe the altered state of the landscape and help to decide on recovery actions. The provided information can then be complemented by information on fire severity and finally the monitoring of vegetation recovery.

The Joint Research Centre of the European Community

Wildfire management in Europe involves collaborative efforts at the continental level, with The Joint Research Centre of the European Community playing a significant role. The European Forest Fire Information System (EFFIS) is a key component of this strategy, jointly established by the European Community and fire services from EU Member States, non-EU European





Funded by
the European Union

countries, as well as Middle Eastern and North African countries. The aim is to harmonize wildfire risk assessment practices in compliance with EU rules.

The pan-European wildfire risk assessment conducted by The Joint Research Centre considers various risk dimensions and sources of uncertainty. It focuses on evaluating the cumulative impact of wildfire danger on people, ecosystems, and assets located in sensitive areas. This comprehensive approach allows for a more nuanced understanding of the challenges posed by wildfires across the continent.

The Expert Group on Forest Fires (EGFF) plays a pivotal role in this process, bringing together fire management representatives from 43 countries in the European region. Their involvement ensures a broad and diverse perspective, facilitating the exchange of knowledge, best practices, and collaborative efforts in wildfire prevention and management.

By leveraging shared expertise and resources, these collaborative initiatives contribute to a more effective and coordinated response to wildfire threats. The overarching goal is to enhance the overall resilience of European landscapes, reduce the impact of wildfires on communities and ecosystems, and foster a united approach to wildfire management that transcends national boundaries.

EFFIS - The European Forest Fire Information System

The European Forest Fire Information System (EFFIS) plays a pivotal role in wildfire management, offering crucial support to forest protection services in EU countries. EFFIS, established in 1998, operates within a collaborative framework involving the Expert Group on Forest Fires. In 2015, it became an integral part of the Emergency Management Services under the EU Copernicus programme, reflecting its broad integration into emergency response and disaster management strategies.

EFFIS provides up-to-date and reliable information to the European Commission, European Parliament, and relevant services responsible for forest protection. This comprehensive system encompasses various applications tailored to enhance wildfire management efforts:

- a) Monitoring and Early Warning:
 - Data Collection: EFFIS aggregates data from diverse sources, including meteorological data, satellite imagery, and ground observations, facilitating continuous monitoring of wildfire risk.





Funded by
the European Union

- Early Warning Systems: The platform incorporates predictive modeling for early detection, enabling the identification of high-risk areas.
- b) Collaboration and Information Sharing
- International Collaboration: EFFIS promotes information sharing among EU countries and neighboring regions, recognizing the transnational nature of wildfires and the need for a coordinated response.
 - Expert Networks: Involvement with the Expert Group on Forest Fires ensures collaboration among experts, fostering the exchange of strategies and best practices in wildfire management.
- c) 3. Technological Applications
- Satellite Technology: Integration of satellite technology enables real-time monitoring of fire dynamics, hotspots, and burnt areas, enhancing the effectiveness of wildfire response efforts.
 - Forecasting Tools: Advanced forecasting tools provide insights into wildfire trajectories, supporting strategic resource allocation and preventive measures.
- d) 4. EU Copernicus Programme Integration
- Copernicus Framework: EFFIS's incorporation into the EU Copernicus programme emphasizes its role in broader emergency management, utilizing satellite data for comprehensive environmental monitoring, including wildfires.
- e) 5. Public Awareness and Communication
- Fire News: EFFIS includes a public-facing component with daily updated Fire News, disseminating information about ongoing wildfires, their impacts, and response efforts. This contributes to public awareness and understanding.
- f) 6. Adaptation to Regional Fire Regimes
- Tailored Approaches: EFFIS considers diverse fire regimes across Europe, utilizing the Canadian Fire Weather Index System and sub-indices. This adaptive approach ensures objective fire danger values suited to regional characteristics.

EFFIS aim to enhance preparedness, response, and recovery efforts. Their integration into broader frameworks and emphasis on collaboration reflect a proactive and resilient approach to mitigating the impact of wildfires across the European continent.





Funded by
the European Union

European Civil Protection and Humanitarian Aid Operations

Wildfires accounted for 30% of all aid requests made between 2007 and 2019 via the EU's Civil Protection Mechanism.

During crises and emergencies, the European Union Civil Protection Mechanism makes sure that timely information is sent to all EU Member States and the Participating States to the Mechanism. It also coordinates pan-European assistance. Upon the Mechanism's activation by any country worldwide, it guarantees the prompt deployment of personnel and resources that are specifically designed to meet the demands of each unique situation.

The Emergency Response Coordination Center of the European Commission is the operational hub of the Mechanism. With assistance from national and international monitoring agencies like the European Forest Fire Information System, the Center keeps an eye on forest fire threats and crises throughout Europe. The Center works with national authorities from the EU Member States each year at the start of the forest fire season. Throughout the forest fire season, states will keep in regular communication with national authorities and exchange information about the state of prevention, preparedness, and response efforts.

Firefighting aircraft and helicopters are part of the new European reserve of capacities known as the "rescEU reserve," which was established in March 2019 as part of an overhaul to the EU Civil Protection Mechanism. It includes notably a fleet of firefighting planes and helicopters, in addition to medical evacuation planes, and a stockpile of medical items and field hospitals. The rescEU reserve also includes mobile shelters for those displaced. rescEU is 100% EU-financed, including costs for purchase, operation and maintenance. Thirteen firefighting aircraft and six helicopters from Croatia, Cyprus, France, Greece, Italy, Spain, and Sweden are available to other EU member states in an emergency. More money is also being invested in knowledge-sharing and readiness initiatives under the new system, even with the unique obstacles presented by COVID-19 limits that prevented the majority of tactical international reunions and the sharing of real-world experiences.

In 2019, there were five instances of the Mechanism being activated for forest fire crises in Greece, Israel, Lebanon, Bolivia, and Guatemala. Additionally, to aid national authorities in responding to wildfires, the Copernicus Emergency Management Service regularly publishes satellite maps on demand. Copernicus created 108 maps of wildfire-affected areas that same year.





Funded by
the European Union

Wildfire Prevention Action Plan

To enhance the effective management of forests and landscapes, minimize the initial ignition of fires, and mitigate their consequences, the Commission has proposed a fresh action plan for wildfire prevention. This initiative will fully utilize the resources available through the EU Civil Protection Mechanism, incorporating the Union disaster resilience goals expected to be ratified by the conclusion of 2022. It will supplement the readiness initiatives within rescEU and draw upon additional EU strategies, such as the EU Forest Strategy.

The proposed set of ten actions is structured around three key themes, aimed at protecting our forests from wildfires:

a) Improved capacity to prevent wildfires:

- Strengthen capacity building through targeted peer reviews on wildfire prevention and preparedness
- Develop disaster scenarios including wildfires (Article 10) and develop specific wildfire prevention disaster resilience goals
- Good practice guide on wildfire prevention, with national civil protection and forest management experts building on other EU policies (e.g. EU Forest strategy 2030, Biodiversity strategy, Adaptation strategy actions) and existing guidance and recommendations
- Good practices on raising wildfire risk awareness to enhance prevention, followed by development of a good practice guide further development of disaster risk awareness, public information and education with the aim to further enhance citizen protection, preparedness and prevention
- Development of new wildfire risk awareness and communication actions at EU level
- Launch a dialogue process with Member States on wildfire disaster prevention with recurrent UCPM activations for wildfires

b) Improved knowledge on wildfires for increased prevention

- Model the economic and geographic impact of future wildfires, to better understand and plan for the future financial needs for response and prevention
- Improve the assessment and mapping of wildfire risk, taking a multi hazard approach and climate change scenarios into account, and to encourage improved collection of data on past disaster events





Funded by
the European Union

- c) Increased financing of wildfire prevention actions
1. Encouraging use of UCPM prevention and preparedness funding instruments for national, cross-border or pan-European projects to support wildfire prevention and improve the uptake of good practices
 2. Encourage further use of EU funds for investing in wildfire prevention and analyse the current uptake of EU funds for disaster risk management.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ



KEAN
ΚΥΤΤΑΡΟ ΕΝΑΛΛΑΚΤΙΚΩΝ
ΑΝΑΖΗΤΗΣΕΩΝ ΝΕΩΝ



Funded by
the European Union

BEST PRACTICES by SELECTED EU COUNTRIES

To showcase strategic guidelines, community involvement, technological use, and cross-regional collaborations to mitigate wildfire risks effectively, initiatives of Spain, Portugal, France and Italy are examined.



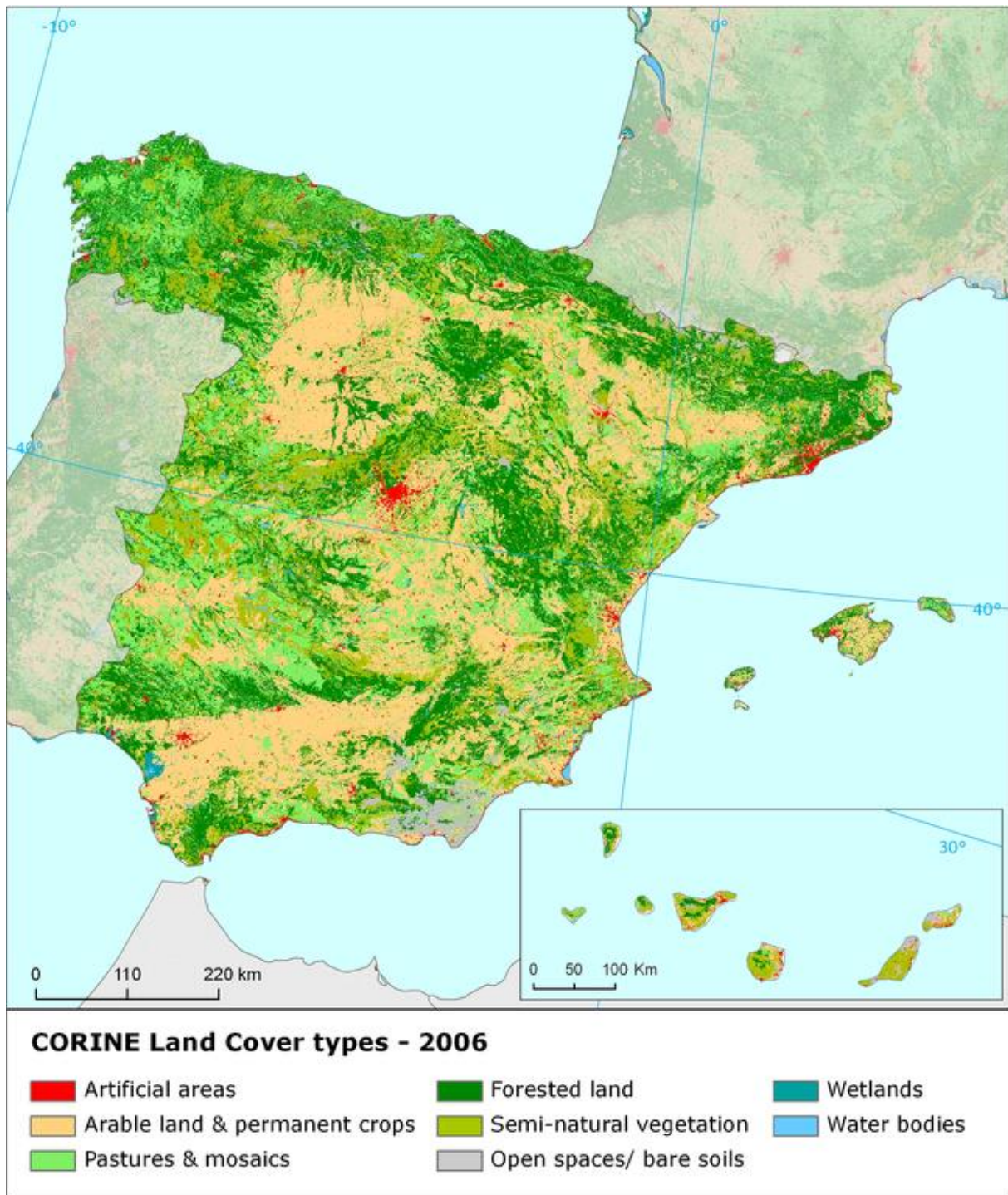
ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ





Funded by
the European Union

SPAIN



Source: European Environment Agency

Wildfire prevention programme (PPU) Programme

a. Overview of the Wildland-Urban Interface in Catalonia





Funded by
the European Union

Spain encompasses approximately 1.1 million hectares of Wildland-urban interface (WUI) zones, with Catalonia ranking as one of the most fire-prone regions in the Mediterranean. On average, Catalonia experiences about 650 fires annually, which consume around 11.5 thousand hectares of land. A notable characteristic of these wildfires is that a small number of large-scale events account for the majority of the area burned.

b. Legislative Measures and Community Responsibilities

In response to the heightened wildfire risk, particularly in WUI areas, Catalonia implemented a law in 2003 that mandates communities to establish and maintain a security buffer zone around buildings and villages. This zone is intended to reduce the fuel load from uncontrolled vegetation, thereby diminishing the risk of fire spreading. The law also requires communities to maintain a network of accessible fire hydrants, formulate self-defence plans, remove dry vegetation, and keep ditches and roads clear from flammable materials. Failure to comply with these requirements may result in sanctions.

c. The Provincial Deputation of Barcelona's Role

To assist communities in adhering to these preventive measures, the Provincial Deputation of Barcelona (DIBA) initiated the Wildfire Prevention Programme (PPU) in 2004. The programme provides crucial support to communities, particularly those that lack the necessary technical and financial resources. This support includes funding and technical assistance for the initial establishment and ongoing maintenance of the protective zones.

d. Impact of the PPU Programme

Since its inception, the PPU programme has provided financial and technical assistance to hundreds of municipalities and residential areas. This support has significantly enhanced the resilience of communities residing in the WUI zones against the threat of wildfires. Through continuous effort and cooperation, these areas have become better equipped to manage and mitigate the dangers posed by wildfires.

This structured approach highlights the systemic measures taken by Catalonia to mitigate wildfire risks in WUI zones, emphasizing the collaborative efforts between government entities and local communities.





Funded by
the European Union

Network of Pasture-Firebreak Areas of Andalusia (RAPCA) Programme

a. Increased Wildfire Risk and Response in Andalusia

Andalusia, a region in Spain, has seen a growing wildfire risk due to rural abandonment and the accumulation of fuel materials, exacerbated by successful fire suppression strategies. In response, the Andalusian General Directorate of Management of the Natural Environment initiated the Network of Grazing-Firebreaks in Andalusia (RAPCA) in 2005. This innovative programme leverages targeted grazing by sheep, goats, and cows to reduce biomass and enhance fire resistance in strategic areas.

b. Programme Management and Strategic Grazing

Managed by the Andalusian Public Agency of Environment and Water, RAPCA strategically utilizes grazing in regions that already have fire prevention infrastructure and a robust tradition of livestock farming. By 2016, RAPCA had partnered with 223 shepherds, covering over 6,000 hectares, thus contributing significantly to wildfire prevention, economic efficiency, and better land use. The grazing intensity is carefully planned to coincide with the period before the wildfire season, allowing shepherds to determine the optimal timing and method for grazing based on biomass reduction needs.

c. Financial Incentives and Cost Savings

RAPCA offers financial incentives including an initial bonus and variable payments that reflect the difficulty of grazing certain areas. This payment scheme is not only designed to compensate shepherds for their efforts but also aims to save up to 75% of costs compared to mechanical vegetation management in firebreaks. The total expenditure for RAPCA was estimated at €822,000 in 2017, which represents about 1% of the Forest Firefighting Plan of Andalusia's budget allocated to fire prevention.

d. Success Factors and Future Plans

The success of RAPCA hinges on several factors: its integration with the Forest Firefighting Plan, continuous political support, trust-building through effective monitoring practices, and budgetary integration. The programme also seeks to revive traditional shepherding activities and is planning expansions to include private forests. Despite some challenges in covering all operational costs, shepherds remain motivated by community involvement, improved relations with forest administrators, and recognition of their critical role in wildfire prevention.





Funded by
the European Union

e. Impact of Grazing on Fuel Management

Grazing as a fuel treatment plays a pivotal role in wildfire prevention. RAPCA specifically rewards shepherds for their contributions to biomass control and maintenance of fuel breaks on public forest lands that are highly susceptible to wildfires. Shepherds commit to consuming a set amount of vegetation growth each year, with payments facilitated through contracts with the local environment and water agency. This agency is also responsible for evaluating suitable areas for the program and monitoring the outcomes of grazing annually.

Overall, the RAPCA programme represents a sustainable and effective strategy for reducing wildfire risks through targeted grazing, proving vital for managing challenging landscapes in Andalusia.

Strategic Guidelines for Wildland Fire Management in Spain

This strategic guideline has been published in 2022 by Ministry for the Ecological Transition and the Demographic Challenge. It aims to reduce the impacts generated by wildland fires' social, economic and environmental effects by seven specific objectives. These guidelines are crafted to provide a comprehensive approach to managing the threat of wildland fires by integrating sustainable land management practices, societal involvement, and technological advancements, thereby enhancing the resilience of ecosystems and communities to fire-related disturbances.

a. Manage the rural geography to achieve sustainability in the face of wildfires.

Support the sustainable forest management, the preservation of traditional agriculture, extensive livestock raising and forestry, the appreciation of agricultural and forestry products, including the services and externalities that wildland affords society, the competitiveness and profitability of forest holdings, the co-responsibility of individuals in the forestry management of their wildland through participative management, balancing of interests, and governance, and land planning.

b. Reduce the risk of wildland fires, adapting ecosystems and preparing society for their occurrence.

This objective includes lines of action contributing to preventing wildland fires or reducing their effects, enhancing the ability of ecosystems and society to confront risk in favourable





Funded by
the European Union

conditions, minimizing negative consequences, and, when applicable, seizing opportunities generated from their positive effects.

c. Involve other strategic sectoral policies in wildland fire risk management

Wildland fires are a cross-cutting problem requiring responses from different spheres and particularly the involvement of public policies directly or indirectly affecting the same geographical area. The alignment of certain sectoral policies considered strategic is proposed under this objective.

d. Adapt wildland firefighting organizations to the new scenarios and reinforce cooperation

New climate change scenarios can give rise to wildland fires that surpass the capacity of suppression. This is understood not merely in terms of diminishing the effectiveness of tactical operations, but also in terms of the possibility of strategic planning of action, decision-making, managing and governing suppression resources, and establishing proactive strategies. While Spain has longstanding experience in managing wildland fires and a broadly human and material resources for doing so, it is imperative to improve the various organisations' synergies and integration in order to gain in operability.

e. Further knowledge about wildland fires and their impact on ecosystems

Wildfires are complex phenomena due to the host of factors involved and to uncertainties tied to processes of change. This makes research, innovation and development, in addition to the dissemination of knowledge, key to improving our understanding of wildland fires and finding new tools to manage them.

f. Foster society's participation and wildland fire management awareness raising

Wildland fires affect ecosystems but also have a social nature because at their origin is a confluence of social circumstances and their repercussions directly or indirectly affect society. Their proper management thus requires the involvement of citizens at large who must become aware of the phenomenon, its causes and its consequences, and participate co-responsibly in wildfire management. Participation and collaboration mechanisms must therefore be established with other groups indirectly involved in wildland fire management, for instance:

- Owners and those making use of rural areas, represented by different associations.





Funded by
the European Union

- Various land managers including those responsible of protected natural areas, land planning or farming, forestry and grazing.
 - Those in charge of urban planning and infrastructure design in addition to actors that establish, regulate or supervise action impacting self-protection (architects, environmental impact evaluators, urban planners, city councillors, etc.)
- g. Incorporate technological improvements in prevention and suppression of wildland fires.

It is a mandatory objective for the future to progressively incorporate technological improvements arising in prevention, detection, organization and coordination of equipment and suppression resources, communications, investigation of causes, etc.

Forest Defence Groups in Catalonia

a. Historical Background and Evolution

The Forest Defence Groups (ADFs) in Catalonia originated following the devastating Montserrat fire, officially established by an Executive Order on October 6, 1986. Their roots can be traced back to forest owner groups in Central Catalonia during the 1960s. Over the years, ADFs have evolved significantly, extending their activities from rural to urban areas, including the municipalities around Barcelona.

b. Organizational Structure and Mission

ADFs operate under the "Foc Verd" policy program, initiated by the Generalitat of Catalonia's Department of Agriculture, Livestock, and Fisheries. They are community-driven entities composed of local communities, forest owners, agricultural and environmental groupings, and municipalities. This composition highlights their collaborative and inclusive approach to wildfire management. ADFs engage in various activities, including wildfire prevention, surveillance, monitoring smoke columns, initial firefighting, public awareness campaigns, and reforestation.

c. Geographic Coverage and Membership

Currently, Catalonia is home to a network of 307 ADFs, with 10,218 volunteers covering 75% of the territory, managing a forest area of 1,750,879 hectares. This coverage includes about 87% of the region's forest area, with 7,600 members recognized as forest owners.





Funded by
the European Union

d. Capacity Building and Technological Integration

ADFs place a strong emphasis on capacity building, providing specialized training to volunteers in aspects of wildfire prevention, surveillance, and response. They also incorporate modern technological tools for surveillance and communication, enhancing their capability to efficiently address the dynamic challenges posed by wildfires.

e. Public Engagement and Global Outreach

Besides their core firefighting and prevention efforts, ADFs actively participate in public awareness and education campaigns to foster a culture of responsibility and preparedness among the community. Their role extends to the global stage through participation in international collaborations, which facilitates the exchange of knowledge and best practices with counterparts from around the world.

f. Impact and Significance

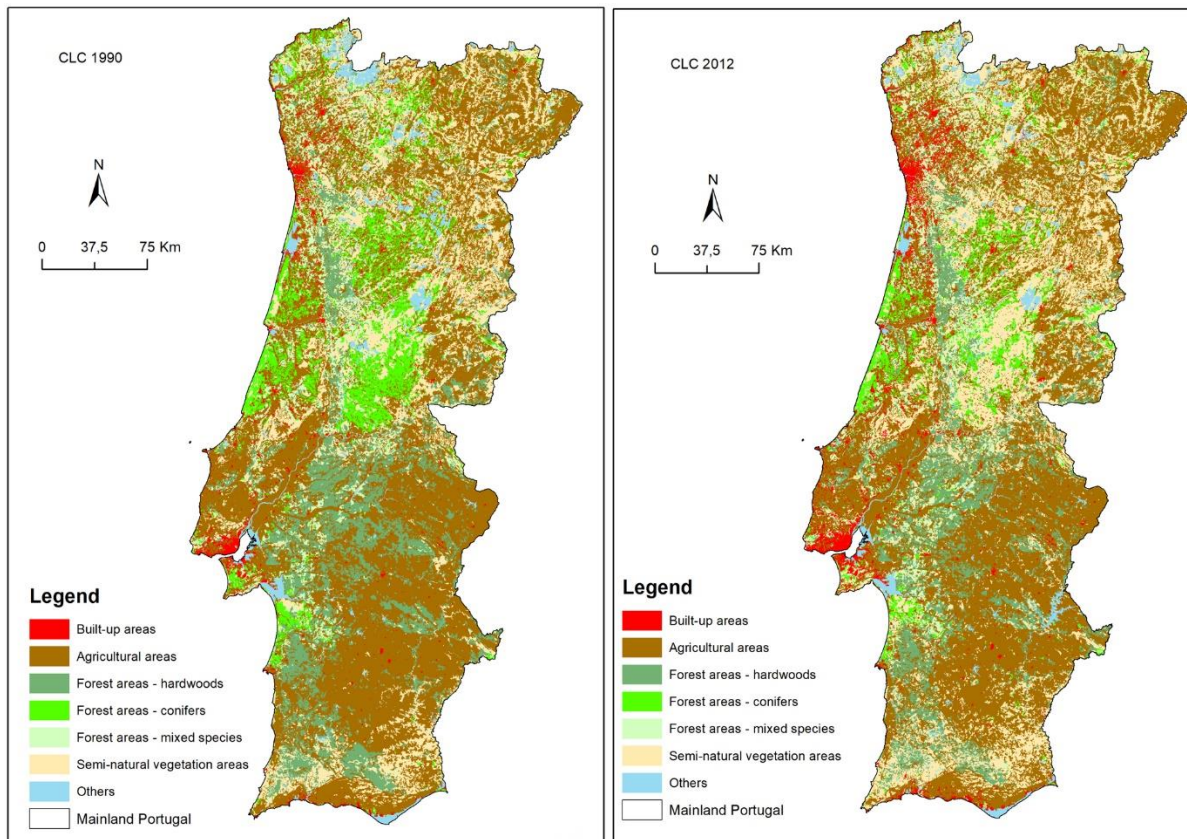
The ADFs in Catalonia represent a dynamic and comprehensive institution adept at addressing the multifaceted challenges of wildfires. Their evolution from local groups to a well-integrated network, their collaborative approach, commitment to volunteer training, technological advancement, and international engagement, underscore their role as a model for effective and sustainable wildfire management.





Funded by
the European Union

PORTUGAL



Source: CLC, 1990 and 2012; DGT.

Forest Intervention Zones (FIZ) in Portugal

a) Background and Introduction of FIZ

Portugal has been facing severe and frequent forest fires, exacerbated by the extensive private forest ownership involving over 500,000 small-scale landowners. In response, the Forest Intervention Zones (ZIF) were introduced in 2005 as a strategic initiative to foster collaborative management among these landowners, promoting sustainable forest practices and mitigating wildfire risks. The ZIF framework mandates that designated areas must cover a minimum of 750 hectares, involve at least 50 owners, and predominantly consist of forested land.

b) Challenges Leading to the Establishment of ZIFs

The ZIF initiative primarily addresses the challenges posed by fragmented forest ownership which hampers effective management on a larger scale. The urgency for such measures was further highlighted by the 2017 wildfires, which occurred outside the typical fire-prone summer season, underscoring the need for proactive interventions. These extreme events, similar to





Funded by
the European Union

those in other Mediterranean countries, are driven by climate change and socio-demographic shifts in rural areas, impacting agricultural practices, land use, and fuel management, leading to the accumulation of combustible materials.

c) Integration into National Framework and Strategic Goals

ZIFs are integrated seamlessly into Portugal's legal and institutional framework for forest management and fire prevention. These zones, which include private, common, and public lands, are primarily dedicated to forestry. The strategy behind ZIFs aims to enhance sustainable forest management by addressing land structure and size limitations, implementing structural fire protection measures, and fostering collaboration between local and central government efforts. Each ZIF is managed by a designated ZIF management company, which coordinates the various activities and compliance with the legal framework.

d) Implementation Process and Role of ICNF

The establishment of ZIFs involves a three-stage process: legal procedures, planning, and implementation. During the planning phase, a 25-year forest management plan and a five-year executive intervention plan are formulated. These plans are subject to approval and supervision by the Institute for Nature Conservation and Forests (ICNF). Despite facing challenges such as cost constraints and the complexities of uniting multiple landowners, the number of ZIFs has steadily increased since 2006, now covering 31% of Portugal's forest land.

e) Financial Structure and Stakeholder Engagement

ICNF plays a crucial role as the governing body, ensuring compliance and overseeing the timely implementation of ZIF plans. Financially, each ZIF establishes a common fund for its creation and the execution of planned actions, which may draw contributions from owners, proceeds from forestry activities, and both national and European funds. The success of the ZIFs relies heavily on continuous engagement with forest owners and collaboration with external stakeholders, including forestry companies and insurance providers.

f) Conclusion and Outlook

The ZIF initiative in Portugal serves as a strategic response to the pressing challenges posed by widespread private forest ownership, fostering cooperation for sustainable management and effective wildfire prevention. Despite existing hurdles, the increasing number of ZIFs indicates





Funded by
the European Union

significant progress towards comprehensive landscape-level intervention and a coordinated vision for managing rural areas effectively

AGIF - Agency for the Integrated Management of Rural Fires

a. Institutional Reforms Following the 2017 Wildfires

In the aftermath of the devastating wildfires of 2017, Portugal embarked on a series of transformative institutional reforms aimed at enhancing its wildfire management capabilities. The primary objective of these reforms was to establish a resilient system capable of protecting the public, individual assets, and the environment from the increasing threat of wildfires.

b. Establishment of AGIF

A significant outcome of these initiatives was the creation of the Agency for the Integrated Management of Rural Fires (AGIF, Agência para a Gestão Integrada de Fogos Rurais). AGIF was established with a holistic vision to serve as a unifying entity that brings together various stakeholders involved in wildfire management, including conservation officials, police forces, the armed services, and private forestry firms. This collaborative setup was designed to streamline preventive measures and firefighting efforts, ensuring a coordinated and effective response to the complex challenges of wildfire management.

c. Legal Measures and Strategic Coordination

Alongside the establishment of AGIF, Portugal implemented crucial legal measures to strengthen this integrated approach. In 2021, Decree-Law No. 82 was enacted on October 13, creating the Integrated Management System for Rural Fires (SGIFR). This system forms a structured collaboration among all relevant entities engaged in wildfire management. AGIF plays a central role within the SGIFR, responsible for ensuring strategic coordination and enhancing the effectiveness of the overall wildfire management system.

d. The National Plan for Integrated Management of Rural Fires

A cornerstone of Portugal's strategy in combating wildfires is the National Plan for the Integrated Management of Rural Fires (PNGIFR). Drafted by AGIF and officially ratified through Council of Ministers Resolution No. 45-A/2020, the PNGIFR lays out a comprehensive strategy for managing rural fires and enhancing rural fire protection. This strategic document





Funded by
the European Union

serves as a blueprint, aligning the actions of various entities involved in wildfire management to effectively address both immediate and long-term challenges.

e. Impact and Reflection on Portugal's Approach

Portugal's concerted efforts through the establishment of AGIF, the enactment of strategic legal frameworks, and the formulation of comprehensive plans like the PNGIFR highlight the nation's firm commitment to mitigating the impacts of wildfires. These measures signify a pivotal shift towards a more collaborative and efficient wildfire management approach, reflecting Portugal's proactive and adaptive stance in response to evolving environmental challenges.

The National Plan for Integrated Rural Fire Management

Portugal adopted a new strategy to improve wildfire risk management following the devastating rural fires of 2017. Adopted in 2020, the National Plan for Integrated Rural Fire Management introduced a novel risk governance architecture, elucidated the roles of several entities involved in managing wildfire risk, and identified strategic goals and actions to be carried out. The primary objectives outlined in the National Plan are to save human life; decrease the proportion of fires that leave more than 500 hectares of burned land; and bring the total amount of burned land from 2020 to 2030 down to fewer than 600,000 hectares.

The Plan encourages increased efficacy and efficiency of the risk management measures with an emphasis on preventive and an extensive vegetation management program. The Plan is backed by an Action Program that was approved in 2021 and identifies 28 programs and 97 projects for the years up to 2030. It also implements the Plan's strategic guidelines and particular objectives. The strategic guidelines center on the following: implementing certified forest management and landscape reorganization; guaranteeing proper fuel management; creating educational practices and increasing public awareness; improving system efficiency and outcomes; and strengthening stakeholder capacity.

Successful Initiatives for Wildfire Risk Awareness in Portugal

a) Climate Portal for Risk Awareness





Funded by
the European Union

The Portuguese Institute for the Sea and the Atmosphere, in collaboration with the University of Lisbon, developed the Climate Portal, an online platform designed to enhance public awareness of climate-related risks across mainland Portugal. This portal provides easily accessible information on climate change, featuring historical data and future projections based on various climate scenarios, such as RCP 4.5 and RCP 8.5. It includes forecasts for the number of days with different wildfire risk levels for the periods 2011-2040, 2041-2070, and 2071-2100. Additionally, the portal offers observed and projected data on critical factors like temperature, rainfall, wind speed, drought conditions, and relative humidity, all crucial for understanding and preparing for wildfire risks.

b) Portugal Chama Campaign

The Portugal Chama campaign is a significant initiative aimed at reducing the risk of wildfires at the local level. It targets both private and public stakeholders with the primary objective of raising awareness about preventive measures to mitigate the risk and impact of wildfires. For example, the campaign advises on the safe storage of firewood away from buildings and the installation of non-flammable flooring to create protective buffer zones. With an annual investment of EUR 8 million and support from private companies, the campaign is extensively promoted through major media channels, motorway billboards, and digital screens.

c) Aldeia Segura Pessoas Seguras Program

The "Aldeia Segura Pessoas Seguras" (Safe Village Safe People) initiative focuses on promoting best practices to minimize wildfire hazards and exposure in fire-prone areas. This program discourages risky behaviors, such as using fire during wildfire seasons, and encourages proactive interventions for wildfire prevention, emergency preparedness, and response. Primarily aimed at local communities in rural areas, it employs various communication tools like information posters, videos, training programs, and informational events to achieve its goals.

d) Emerging Programmes for Active Wildland Management

The Condomínio de Aldeia program enhances the resilience of settlements in the wildland-urban interface by promoting active fuel management practices, such as reducing fuel density around exposed areas. It also advocates for resilient changes in land use and encourages





Funded by
the European Union

community engagement to boost the profitability of private lands and promote tourism. Financed through the Environmental Fund, the program currently includes 42 projects.

e) Emparcelar para Ordenar and Landscape Planning and Management Programs

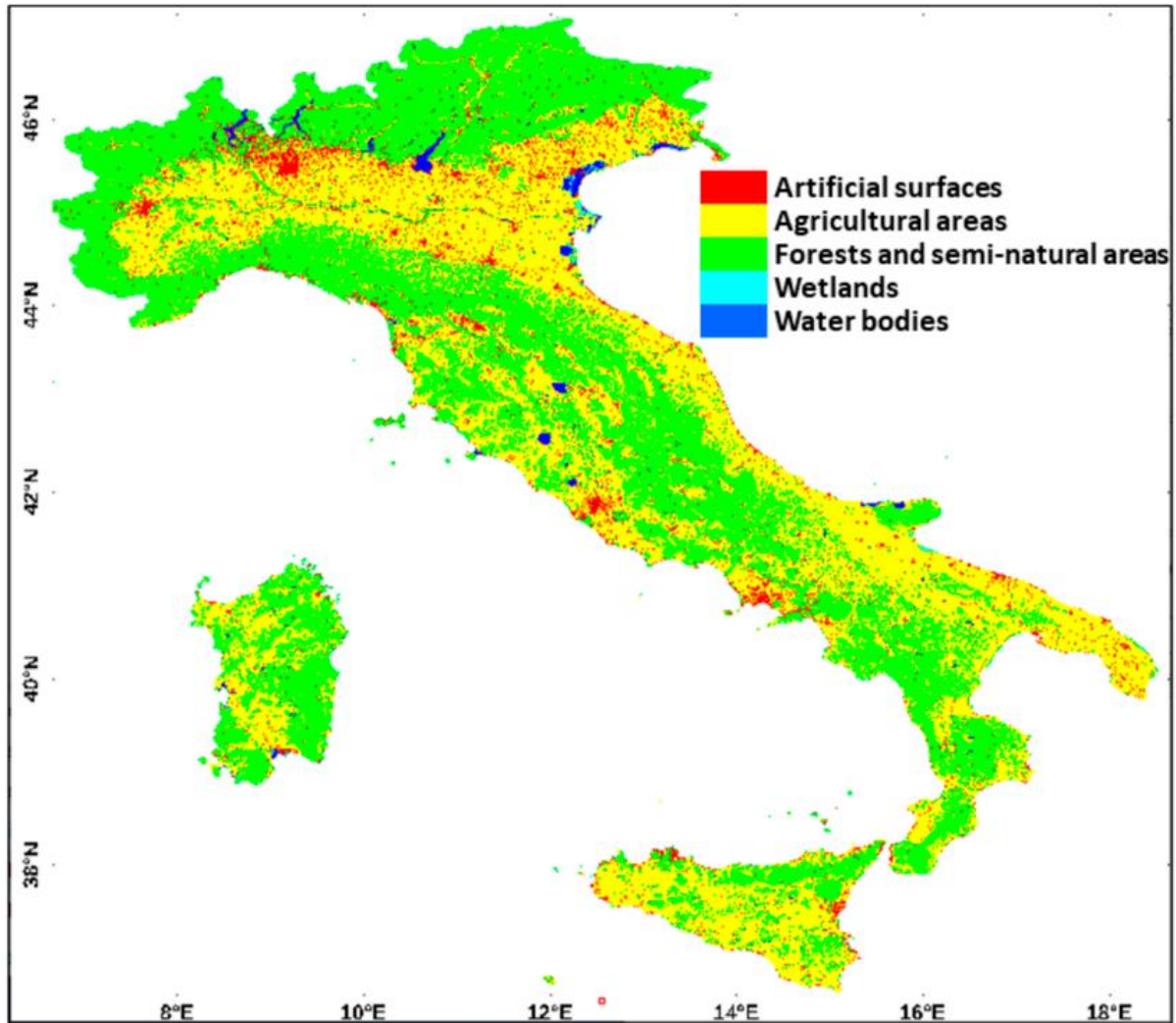
"Emparcelar para Ordenar" is a support program for rural property owners aimed at increasing property size to enhance the profitability of active land management, thereby improving rural land resilience to wildfire risk. This program is funded through the Recovery and Resilience Plan and the Forest Permanent Fund. Additionally, the Landscape Planning and Management Programs (PRGP) under the broader Landscape Transformation Programme aim to improve landscape-level resilience to wildfires. These programs focus on enlarging rural land ownership and promoting the active management of small land parcels, with revenues generated used to finance payment-for-ecosystem-services schemes. Among the twenty planned PRGPs by 2024, one is currently operational, three are pending approval, and six others are in the developmental stage.





Funded by
the European Union

ITALY



Source: CLC

Unified Aerial Operations Centre (COAU) and Forest Fire Management in Italy

a. Legislative Framework and Regional Responsibilities

In Italy, the management of forest fires is governed by Law No. 353, dated November 21, 2000, which delegates the responsibility for predicting, preventing, and actively combating forest fires to the individual Regions. The State supports these efforts by providing aerial firefighting resources from the State's fleet. Regions are required to establish operational centers to deploy teams that include regional personnel, volunteers, firefighters, and potentially civil protection units for ground fire suppression and the utilization of regional aerial assets. Additionally, the Regions are responsible for formulating and annually updating regional plans that cover prediction, prevention, and intervention strategies.





Funded by
the European Union

b. Prediction and Forecasting Activities

Forecasting activities in Italy involve identifying areas and periods at risk of forest fires using indicators based on weather and forest conditions. The Department of Civil Protection manages the national warning system, issuing daily bulletins that assess forest fire risk across the country. These bulletins, which classify risk levels as low, medium, or high for each province, guide response strategies based on weather, climate, vegetation, land use, and terrain characteristics. Regional centers with active alert systems can issue localized fire risk bulletins to tailor responses to specific territorial needs.

c. Prevention Strategies

Prevention activities in Italy are focused on reducing the causes and potential ignition sources of forest fires and minimizing the damage they cause. These activities include:

Preventive Actions for the Forest: Sustainable forest management, including tourism regulation and infrastructure maintenance, reduction of biomass fuel, clearing of deadwood, creation of mixed and structured forest stands, planting of fire-resistant species, and establishment of firebreaks.

Preventive Actions for People: Monitoring human activities, continuous education campaigns to raise awareness about forest fire risks, and targeted information dissemination in schools to promote forest protection and responsible behaviour.

d. Active Firefighting Efforts (Intervention)

Active firefighting in Italy involves a range of ground and aerial strategies:

Surveillance and Alerting: This includes reconnaissance by aircraft and ground teams, especially during high-risk periods, and intensive surveillance through fixed systems and lookout networks.

Land-Based Firefighting Intervention: Deploying specialized teams according to regional plans, with direct communication between ground teams and operational centers to support reconnaissance and surveillance.





Funded by
the European Union

Air-Based Firefighting: Coordinated by the State Forestry Corps for vegetation and environmental protection and by the National Fire Fighters for civil and industrial safety. In cases of interface fires affecting both forest and urban areas, operations are coordinated through unified operating rooms.

Coordination and Planning: Regional firefighting activities are organized through regional plans and coordinated with State structures through permanent unified operations rooms (Soup). The Civil Protection Department coordinates aerial firefighting activities through the COAU, with operational guidelines issued annually by the Prime Minister.

e. Impact

The integrated approach to forest fire management in Italy has significantly enhanced the effectiveness of response and prevention measures. The collaboration between regional and national entities, supported by the COAU, ensures a swift and coordinated response to wildfires, minimizing damage and improving the resilience of vulnerable areas. The ongoing efforts in prediction, prevention, and active firefighting have proven crucial in reducing the frequency and severity of forest fires, thereby safeguarding communities, the environment, and economic assets from the devastating impact of wildfires.

The “Forest Fire Project” - Using cartographic data to fight forest fires in Italian national parks

The Italian Ministry of the Environment, Land, and Sea Protection has introduced the "Forest Fire Project" on the Italian National cartographic portal. Developed in collaboration with multiple research institutes, this initiative builds upon previous projects and is designed to assist in the formulation of forest fire fighting plans for national protected areas. The cartographic data, accessible through a user-friendly online viewer application, offers a wealth of detailed spatial information related to fire risks. This includes comprehensive details on general fire risks during both summer and winter, fuel composition, priority habitats with elevated risks, and historical records of forest fire suppression activities. While its primary audience consists of relevant authorities and support services, the information is versatile and can be beneficial for various stakeholders such as researchers and land planning managers. The National cartographic portal provides users with the ability to overlay diverse cartographic information and base maps that support the objectives of the "Forest Fire Project." Additionally, users can incorporate layers from external sources. These customizable overlays, which can be saved





Funded by
the European Union

locally, empower users to conduct in-depth analyses and draw conclusions tailored to specific goals in territorial planning and management.

Twinnings Between Regions to Fight Forest Fires

During the summer season, the Italian National Civil Protection Department (ICDP) promotes the twinnings between regions to enhance the collective effort in combating forest fires. This initiative aims to ensure a broader pool of resources for extinguishing wildfires, with northern regions being prepared to assist their southern counterparts facing higher wildfire risks. In 2022, a dedicated steering committee, comprising the ICPD, fire brigades, Carabinieri Forestali, and regional delegations, was formed to facilitate inter-regional partnerships. This committee oversees the coordination of the wildfire campaign, optimizes fire patrolling efforts by managing resources collaboratively, and addresses various related issues.

Annually, the Prime Minister issues operational recommendations, officially declaring the wildfire campaign period and providing general instructions for all national and local entities involved in wildfire management. Before the summer season, the ICPD convenes a comprehensive plenary meeting with key public stakeholders engaged in wildfire management. Participants include various ministries, fire brigades, Carabinieri, national government air fleet operators, Regions, the national association of municipalities, and volunteer representatives. The purpose of this meeting is to share information about system readiness, exchange best practices, and discuss the primary challenges in wildfire management.

Summer Camps for Youth

The Italian Civil Protection Department, in collaboration with Regions and national/local voluntary associations, arranges summer camps named "Anch'io sono la protezione civile" for youths aged 10 to 16. These camps aim to foster the safeguarding of forests and natural heritage sites, actively participate in risk prevention, raise awareness about the responsibilities of the Civil Protection National Service, and instil an understanding of the significance of civil protection plans among the younger generation. Additionally, there are plans to launch the information awareness campaign "Io non rischio" specifically addressing wildfire risks.

Fire Prevention for Wood Supply Chains (Pre-Feu) Project in the Susa Valley

a. Project Overview and Collaboration





Funded by
the European Union

The PRe-FEu project, initiated in the Susa Valley, Italy, aims to integrate economic sustainability into wildfire prevention strategies. This initiative involves collaboration between the Forest Consortium of Upper Susa Valley, the University of Turin, La Foresta (a private forestry company), and the Unione Montana Valle Susa. The project's primary goal is to mitigate major fire risks through an integrated approach that balances ecosystem services, firefighting support, and economic viability.

b. Challenges and Objectives

The Upper Susa Valley is characterized by a high wildfire risk, largely due to the abandonment of private forest plots and extreme fragmentation. To counter these challenges, the PRe-FEu project focuses on creating an integrated fire prevention plan that also revitalizes the local timber supply chain, aiming to manage forest fuel sustainably.

c. Sustainable Management and Economic Integration

Launched in 2020, the project manages forest fuel by valorizing wood derived from preventive silvicultural treatments. This wood is processed into high-value products and bioenergy, fostering economic, social, and environmental sustainability. By integrating short value chains, the project not only reduces wildfire risks but also boosts the local economy.

d. Implementation and Infrastructure

The PRe-FEu project encompasses a forested area of 26,300 hectares in the Upper Susa Valley and a pilot area of 1,000 hectares in the Lower Susa Valley. It features preventive infrastructures such as shaded fuel breaks and strategic fuel management areas, which are designed to enhance the forest's resistance to wildfires. The plan also includes collaborative efforts with both private and public stakeholders to promote joint forest management and sustainable local wood supply chains.

e. Impact and Future Plans

The success of the PRe-FEu project is attributed to its comprehensive integration of economic sustainability, leveraging the expertise of the Forest Consortium, and employing innovative silvicultural practices. The initiative fosters collaboration among various stakeholders, ensuring





Funded by
the European Union

a multifaceted approach to wildfire prevention. Currently being tested in the Upper Susa Valley, the plan is scheduled for replication in other areas of the Piedmont Region by 2023.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ

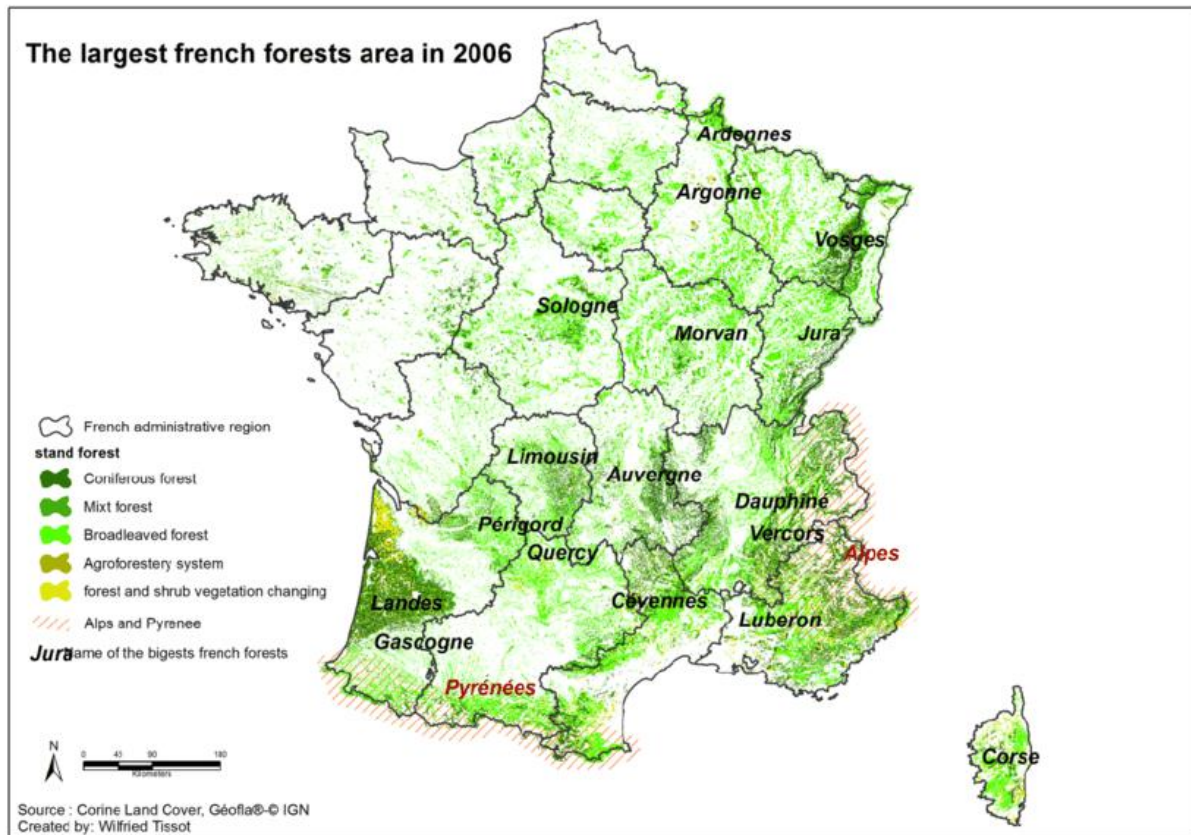


KEAN
ΚΥΤΤΑΡΟ ΕΝΔΕΛΚΤΙΚΩΝ
ΑΝΑΖΗΤΗΣΕΩΝ ΝΕΓΩΝ



Funded by
the European Union

FRANCE



Wildfire Prevention Campaign in France

The active participation of local entities in France is notable, as they consistently implement preventative measures. Specifically targeting noteworthy behaviours, the Ministry for an Ecological and Inclusive Transition, in collaboration with the Ministry of the Interior and the Ministry of Agriculture and Food, initiated a national campaign on forest fire awareness and prevention in 2019, continuing for the third consecutive year.

In 2020, the campaign expanded its coverage to encompass all of mainland France, addressing not only forest fires but also various types of vegetation fires, such as those in fallow land, roadsides, railway embankments, fields, moors, ferns, etc. The campaign aims to disseminate guidance and recommendations for responding to forest or vegetation fires, discouraging the initiation of fires and providing advice on self-protection in the event of a fire outbreak.

Group of Tools for Fire Fighting and Land Use Planning (GOLIAT) Project in Corsica

a. Project Overview





Funded by
the European Union

The GOLIAT Project is a comprehensive research initiative focused on addressing vegetation fire issues in Corsica, France. It encompasses a broad spectrum of activities, from firefighting strategies to community engagement and education, aiming to enhance both awareness and active participation in fire prevention and sustainable land use planning.

b. Community Engagement and Awareness Campaigns

A cornerstone of the GOLIAT Project is its targeted awareness campaigns, designed to reach a diverse audience, including school children, the general public, and local authorities. These campaigns are critical in raising awareness about the risks associated with vegetation fires and the importance of proactive prevention measures.

c. Educational Initiatives

The project places a strong emphasis on education, particularly among the youth. It integrates fire prevention topics into school curricula through specialized projects and interventions. These educational activities are supplemented with creative outlets like drawing competitions, which encourage students to express their understanding of fire-related issues and foster environmental consciousness from a young age.

d. Technological Integration in Media

Embracing modern technology, the GOLIAT Project utilizes audio podcasts and radio broadcasts to disseminate information widely. This approach ensures that valuable content about fire prevention and sustainable practices reaches a broad audience, leveraging contemporary communication channels for maximum impact.

e. Resource Distribution

Educational kits distributed to teachers and students provide essential resources for integrating fire safety into educational programs. These kits are part of a holistic approach to education, empowering students with knowledge and tools to contribute effectively to fire prevention efforts.

f. Interactive and Visual Public Engagement

The project has established ongoing exhibits focusing on wildfires, offering visual and interactive experiences that help the public understand the impact and complexities of





Funded by
the European Union

vegetation fires. These exhibits serve as dynamic tools for engaging the community, stimulating discussion, and promoting a deeper comprehension of wildfire dynamics.

g. Traditional and Community-Centric Methods

In addition to modern educational methods, the GOLIAT Project employs traditional outreach techniques such as distributing leaflets and calendars, which ensure accessibility of information to a wide demographic. Thematic events and regular newsletters to communities, town halls, and associations help to foster a collective commitment to fire prevention and enhance community cohesion around land use planning.

h. Impact

The GOLIAT Project in Corsica goes beyond conventional firefighting strategies by actively involving various segments of the community in its efforts. Through a range of innovative and traditional initiatives, it builds a resilient, informed community that is actively engaged in preventing vegetation fires and implementing sustainable land use practices. This comprehensive approach not only addresses immediate fire concerns but also contributes to long-term ecological and community resilience in Corsica.

ZAL (Zone d'Appui à la Lutte)

In Corsica, France, the Zone d'Appui à la Lutte (ZAL) plays a crucial role in wildfire prevention. These fuelbreaks are strategically established with a width of 100 meters, a dimension carefully determined by the technical expertise of specialists in the field. The ZALs serve as critical firebreaks, acting as barriers that help control and mitigate the spread of wildfires.

As of now, Corsica boasts a total of 2150 hectares dedicated to ZALs, demonstrating a proactive and comprehensive approach to fire prevention. The creation of these zones involves collaborative efforts with municipalities or municipal communities, highlighting the importance of a coordinated approach to wildfire management. The engagement of prevention and control services further strengthens the effectiveness of ZALs in safeguarding the Corsican landscape.

An essential aspect of sustaining the effectiveness of ZALs is their regular maintenance, a responsibility overseen by the Corsican community. Maintenance involves activities such as vegetation clearing, ensuring that the designated 100-meter width remains effective in minimizing the risk of wildfires reaching uncontrollable proportions.





Funded by
the European Union

The establishment and upkeep of ZALs underscore Corsica's commitment to proactive fire prevention, reflecting a region-wide initiative that recognizes the significance of creating resilient landscapes in the face of potential wildfire threats. The collaborative approach involving local communities, municipalities, and prevention services ensures a holistic and effective strategy to protect Corsica's natural environment from the devastating impact of wildfires.

ONF's Integrated Fire Risk Management Strategy for the Fontainebleau Massif

a. Overview of the Fontainebleau Massif

The Fontainebleau massif, located in the Seine-et-Marne department, France, spans 23,000 hectares and is a state-owned forest managed by the Ile-de-France–Est territorial agency of the National Forest Office (ONF). The forest attracts 15 million visitors annually and faces significant wildfire risks due to flammable species like eagle fern and heather.

b. Integrated Fire Management Plan

The ONF has devised an integrated fire management plan structured around four main pillars:

Regular Fire Risk Information: The ONF utilizes platforms like the "Forêt de Fontainebleau" Facebook group, which has over 10,500 members, to communicate fire risk information to the public during high wildfire risk periods.

Ground and Aerial Patrols: From April to November, ground patrols are carried out by the Fontainebleau territorial unit staff, supplemented by aerial patrols using drones equipped with thermal cameras to detect hotspots and unauthorized campfires.

Adapting Forest Infrastructure: Infrastructure enhancements include the installation of five 30 m³ underground firefighting water tanks and upgrades to forest roads to improve access for firefighting equipment. There is also a collaborative agreement for fire engine water restocking along the waterway supplying drinking water to Paris.

Collaboration with Fire Protection Agencies: The plan involves a close partnership with the Forest Fire Protection Agency (DFCI) and regular interaction with the Departmental Fire and Rescue Service (SDIS), enhancing mutual understanding and operational efficiency.

c. Operational Enhancements





Funded by
the European Union

Since 2023, the ONF has equipped a team with pickup trucks fitted with removable kits containing a 600 L water tank, motor-driven pump, and hose reel for patrols. This team maintains radio communication with the fire brigade, ensuring prompt response and coordination.

d. Funding and Resources

The ONF covers some operational costs through the French Ministry of Agriculture's general interest mission, with additional external funding secured for specific actions, such as acquiring drones and thermal cameras through sponsorship programs, and installing water tanks with regional and departmental funding.

e. Environmental and Educational Initiatives

The ONF is addressing the risk of tree dieback by planting species adapted to water deficits. Annual updates of internal procedures keep staff informed, while media campaigns educate forest users on best practices. Training programs include fire monitoring, drone piloting, and firefighting equipment usage, and may soon expand to include fire cause investigation.

f. Impact

The integrated fire management plan for the Fontainebleau massif by the ONF is a comprehensive approach that serves as a model for other regions in northern France facing similar wildfire risks. Through technological innovation, strategic collaboration, and robust community engagement, this plan significantly enhances the capability to manage and mitigate wildfires in one of the country's most visited natural areas.

Compulsory Brush Clearing Mapping Initiative in France

a. Overview and Legal Framework

The initiative focuses on the mapping of Compulsory Brush Clearing areas across France, particularly targeting regions susceptible to wildfires. Governed by French Forest Law, property owners are mandated to clear vegetation around their buildings as a preventive measure against the spread of wildfires. The online mapping tool, OÙDÉBROUSSAILLER.FR, has been developed to assist landowners in identifying whether their properties fall within the Compulsory Brush Clearing zones and to delineate the precise limits of their obligations.

b. Objective and Implementation Challenges





Funded by
the European Union

The primary objective of this project is to facilitate compliance with the legal requirement for property owners in high-risk wildfire departments to undertake brush clearing activities by July 1st each year. This involves the reduction of various forms of biomass, such as grass, branches, bushes, and trees, to disrupt both vertical and horizontal fuel continuity, thereby reducing the intensity and potential spread of fires. Property owners and town councils often face significant challenges in spatially identifying areas subject to Compulsory Brush Clearing. These challenges stem from varying implementation rules across departments, which can lead to confusion among landowners about their specific obligations.

c. Technical Solution and Platform Capabilities

The solution to these challenges is provided through OÙDÉBROUSSAILLER.FR, an online mapping tool that uses vectorial layers to represent buildings, cadastral plots, and forest areas. This tool delineates areas affected by Compulsory Brush Clearing based on current prefectural decrees and orders, serving a dual purpose:

Landowner Support: It aids landowners in fulfilling their legal obligations by providing a clear visual representation of the areas requiring brush clearing.

Municipal Monitoring: It enables town councils to monitor the implementation of Compulsory Brush Clearing within their jurisdictions effectively.

The website is designed for accessibility on various devices, including laptops, tablets, and smartphones. If a device has GPS functionality, it can further pinpoint the user's location on the map. Detailed information displayed includes the mandatory 50-meter clearing strip, the total surface area to be treated, and a 100-meter strip, giving property owners comprehensive data on their clearing responsibilities.

d. Collaboration and Information Integration

The project involves collaboration with Géoportail, a French government web mapping service. Géoportail enhances OÙDÉBROUSSAILLER.FR by integrating an Informative Zoning of Compulsory Brush Clearing layer, which links to current departmental technical brushing criteria, ensuring that users have access to accurate and legally relevant information. While the French Forest Law sets the technical brushing criteria for some departments, others may have their own specific criteria. Géoportail addresses these variations by providing users with access to either national or departmental technical criteria, as applicable.





Funded by
the European Union

e. Impact and Future Potential

This mapping project not only simplifies legal compliance for property owners but also enhances proactive management and monitoring of Compulsory Brush Clearing. This contributes significantly to wildfire risk planning and prevention efforts, proving crucial for the Mediterranean region and potentially other wildfire-prone areas in France and beyond.

BEST PRACTICES FROM OTHER EU MEMBER COUNTRIES

This section highlights various effective wildfire management strategies implemented across Europe, including Ireland's 'Be Summer Ready' campaign, Slovenia's automated daily wildfire risk forecast system, Croatia's use of video surveillance for fire monitoring, Greece's mobilization of local citizens for fire prevention, and Sweden's Fire Danger Rating System.





Funded by
the European Union

Be Summer Ready Campaign in Ireland

The Be Summer Ready campaign, spearheaded by the Government of Ireland, stands as a comprehensive initiative aimed at equipping the general public with vital information to navigate the various challenges posed during the summer months. Among the multifaceted topics covered, a dedicated section is devoted to wildfire awareness, offering invaluable insights into the associated risks, preventative measures, and essential behavioral practices.

In an era where environmental concerns are at the forefront of public discourse, the campaign underscores the importance of understanding and mitigating the threat of wildfires. The online platform serves as a hub of knowledge, providing easily accessible information to empower individuals with the tools needed to safeguard themselves and their communities.

Beyond the digital realm, the campaign extends its reach through a meticulously curated booklet, ensuring that the wealth of information is available in both virtual and tangible formats. This strategic approach reflects the campaign's commitment to inclusivity, recognizing diverse preferences in how people consume information.

Recognizing the crucial role of the Department of Agriculture, Food and the Marine in managing and mitigating wildfires, a specialized document on fire management has been made available to the public. This document delves into the intricacies of wildfire prevention, presenting a practice code on prescribed burning. By disseminating this knowledge, the government aims to foster a collective responsibility in the community, encouraging proactive measures to reduce the incidence and impact of wildfires.

As the Be Summer Ready campaign unfolds, it serves not only as a source of information but as a call to action for citizens to engage actively in promoting a safer and more resilient environment. By embracing the wealth of knowledge provided through online resources, booklets, and specialized documents, individuals can play an instrumental role in fortifying their communities against the potential challenges of the summer season.

Automated daily wildfire risk forecast system in Slovenia

In Slovenia, an automated daily system for forecasting forest fire risk has been established, featuring a user-friendly web application. This system utilizes the Canadian Meteorological Fire Hazard Indicator to predict fire risk, employing the ALADIN and INCA meteorological models to provide forecasts up to three days in advance. The Canadian Meteorological Fire Hazard





Funded by
the European Union

Indicator employs four meteorological variables - air temperature ($^{\circ}\text{C}$), relative humidity (%), wind speed (km/h), and precipitation (mm) - to calculate three indicators of fuel humidity.

These indicators include the Fine Fuel Moisture Code, reflecting the moisture content of fine fuel on the forest floor, such as foliage, needles, and other plant residues. The Medium Moisture Code represents the moisture content of the soil horizon with partially decomposed plant residues, while the Drought Code serves as a humidity indicator for deep soil layers. The efficacy of the Canadian Forest Fire Weather Index System was tested in southwest Slovenia, demonstrating a satisfactory level of accuracy in predicting fire risk.

To enhance this system, future endeavours will incorporate established machine learning techniques and integrate models into the Geographic Information Systems of fire protection agencies. The outcomes generated by the model are accessible to the public on the Slovenia Forest Institute website. Various stakeholders utilize this model for multiple purposes, including (1) computing fire risk and aiding fire management, (2) devising firefighting exercises, and (3) providing support in planning during fire incidents.

Utilizing Video Surveillance for Forest Fire Monitoring and Prevention in Croatia

In Croatia, where geographical diversity prevails, the use of video surveillance has become integral in the proactive prevention and response to forest fires. Situated in Southeast Europe, the country boasts a landscape that encompasses low mountains and highlands along the Adriatic coastline, flat plains bordering Hungary, and a multitude of islands, with the coastal regions experiencing a Mediterranean climate. Summers witness soaring temperatures of up to 39°C , coupled with meager monthly precipitation ranging from 25-50 mm, making Croatian forests highly susceptible to fires, especially given climate change and the influx of tourists in the coastal areas.

With a recorded annual occurrence of 200 to 500 fires, the vulnerability of Croatian forests is accentuated by human behavior or negligence, contributing to 82% of fires in coastal regions, according to the Croatian Ministry of the Interior. To address this issue, the country has embraced video surveillance as a pivotal tool for both prevention and operational control of forest fires. This shift began in 2003, prompted by a challenging fire season, through an EU scientific research project named HOLISTIC initiated by the Faculty of Electrical Engineering, Mechanical Engineering, and Naval Architecture at the University of Split.





Funded by
the European Union

Initially, a few surveillance cameras were connected to a research center, sounding alarms at nearby fire stations upon detection. Over time, the system has evolved significantly, now boasting dozens of strategically placed cameras capable of automatically detecting smoke and fires within a 10 km radius. These cameras are linked to operational centers in Zagreb and Split, equipped with image processing systems and fire propagation prediction software. This technological synergy enables rapid coordination, troop deployment, and georeferencing of fires based on the data received and analyzed by the system.

The impact of this initiative has been tangible, with a notable reduction in deliberate fires and successful identification of offenders. The fire count plummeted from 1,167 in 2017 to 165 in 2018. This success underscores the efficacy of video surveillance not only in detecting and responding promptly to fires but also in acting as a psychological deterrent. As potential offenders are aware of the constant monitoring and subsequent sanctions, the system plays a crucial role in mitigating the risk of forest fires. As this technology matures, its expanded and systematic use holds the promise of further enhancing efficiency in forest fire prevention and management in Croatia.

Mobilising Local Citizens for Fire Prevention in Greece

Kythira Island, situated south of the Peloponnese peninsula in Greece, faced a critical challenge due to its poor connections to the mainland and a history of notable forest fires. The devastating fire in August 2017, consuming nearly 10% of the island, triggered a proactive response from local authorities and state agencies. The Hellenic Society for the Protection of Nature (HSPN) and the Institute of Mediterranean and Forest Ecosystems (IMFE) of the Hellenic Agricultural Organization "Demeter" played pivotal roles in addressing the island's fire-related vulnerabilities.

In a unique and innovative approach, HSPN and IMFE seized the "window of opportunity" presented by the 2017 wildfire to enhance local fire prevention capabilities. The project focused on evaluating the local fire risk and mobilizing residents for cooperative efforts.

The initiative prioritized social components of fire management, emphasizing the involvement of local residents in volunteer activities and awareness campaigns. A comprehensive understanding of fire risk on Kythira was achieved through the analysis of fire statistics and the creation of a forest fuels map.





Funded by
the European Union

The project, spanning specific settlements and the entire island, utilized fire modeling and a volunteer-led vulnerability assessment of 610 structures for prevention planning. Homeowners, after receiving risk assessment forms with recommendations, exhibited an impressive 87% agreement rate. Localized talks, workshops, and awareness campaigns, encompassing fuel management and forest rehabilitation, were conducted for residents, including schools. Various communication materials like brochures, videos, articles, and radio interviews were employed to address fire prevention.

Crucially, the project's success stemmed from its tailored approach for the local population, fostering a joint effort by experts and residents rather than a top-down management style. The engagement of motivated individuals in prevention activities showcased the potential for long-term impacts, even with limited funding. Recognizing the significance of a local volunteer network, the project demonstrated its effectiveness in addressing weaknesses and enhancing outcomes. The overarching lesson emphasized the need for prevention programs to be context-specific, considering the distinctive circumstances of each locality.

Fire Danger Rating System in Sweden

Sweden's approach to forest fire management serves as a noteworthy example of effective practices. The utilization of the modified East-German fire danger rating system (WBKZ) demonstrates a systematic method to assess and categorize wildfire risk across the country. With approximately 20 sections, this categorization enables a targeted response based on specific risk levels.

Local authorities, particularly fire chiefs, play a pivotal role in the system by having the authority to impose bans on open burning activities during periods of elevated danger. This localized decision-making empowers communities to respond swiftly to changing fire risks, ensuring a proactive and context-specific approach.

In times of heightened risk, Sweden activates an aerial fire detection system using light private airplanes. Although the crew is not compensated, the state covers airplane expenses, providing pilots with free flying hours. This strategy enhances early detection and monitoring, showcasing a commitment to leveraging technology for effective wildfire surveillance.

Overall, Sweden's forest fire management practices emphasize a comprehensive and adaptive strategy, incorporating technology, local empowerment, and a decentralized approach. These





Funded by
the European Union

elements collectively contribute to a robust and context-sensitive framework for addressing the challenges posed by forest fires.



ΔΗΜΟΣ
ΡΑΦΗΝΑΣ
ΠΙΚΕΡΜΙΟΥ



ΚΥΤΤΑΡΟ ΕΝΔΕΛΚΤΙΚΩΝ
ΑΝΑΖΗΤΗΣΕΩΝ ΝΕΓΩΝ



Funded by
the European Union

Insights and Recommendations for Pozantı Municipality

Insights

Community engagement is crucial for effective wildfire management. EU countries emphasize involving local communities through education and awareness campaigns. Pozantı can benefit by fostering a culture of shared responsibility and preparedness among its residents.

The use of advanced technologies such as remote sensing and satellite monitoring has proven invaluable. These technologies enhance wildfire detection and response capabilities, which Pozantı should consider adopting.

Collaborative efforts between various stakeholders, including governmental bodies, local authorities, and community groups, are essential. Joint initiatives and cooperative frameworks in countries like Spain and Portugal can serve as models for Pozantı.

Establishing and maintaining firebreaks and other preventive infrastructure is critical. Strategies from regions like Catalonia and Andalusia, such as creating buffer zones and using targeted grazing to reduce biomass, offer practical solutions for Pozantı.

Strong policy frameworks and legislative measures support effective wildfire management. Legal mandates and structured management plans in Italy and Portugal enhance resilience. Pozantı should strengthen its policy framework for long-term wildfire prevention and management.

Recommendations

Pozantı should develop community-based programs to raise awareness about wildfire risks and prevention measures. Organizing workshops and training sessions on emergency preparedness and fire safety, as well as establishing volunteer groups for surveillance and initial firefighting efforts, will be beneficial.

Investing in remote sensing and satellite monitoring systems will improve early detection and real-time monitoring of wildfires. Utilizing thermal imagery for active fire management will enhance response strategies.

Fostering partnerships between local authorities, environmental organizations, and community groups is necessary for a coordinated wildfire management plan. Encouraging knowledge





Funded by
the European Union

exchange and best practice sharing through town-twinning and other collaborative initiatives with experienced EU municipalities will be advantageous.

Creating and maintaining buffer zones around vulnerable areas to reduce the risk of fire spread is essential. Implementing targeted grazing and other biomass reduction techniques in high-risk areas, and regularly updating and maintaining firefighting equipment and infrastructure, including water tanks and access roads, will strengthen fire prevention efforts.

Developing and enforcing local legislation that mandates fire prevention measures, such as compulsory brush clearing and the maintenance of firebreaks, is crucial. Creating a detailed wildfire management plan that includes risk assessment, prevention strategies, and emergency response protocols will enhance resilience. Additionally, advocating for regional and national support to secure funding and resources necessary for effective wildfire management will be beneficial.





Funded by
the European Union

CONCLUSION

The management and mitigation of forest fires in the European Union and its member states represent a complex and multifaceted challenge that demands a coordinated, innovative, and comprehensive approach. Throughout this report, we have explored various good practices, projects, and strategic plans implemented by the EU, as well as individual member states such as France, Spain, Portugal, Italy, and others. These initiatives showcase a commitment to safeguarding ecosystems, protecting communities, and enhancing overall resilience in the face of escalating wildfire threats.

The European Union has established a robust framework for monitoring wildfires, leveraging cutting-edge technology like remote sensing and relying on entities such as the Joint Research Centre and the European Forest Fire Information System (EFFIS). These initiatives enable real-time data collection, analysis, and dissemination, providing a crucial foundation for informed decision-making.

The European Civil Protection and Humanitarian Aid Operations play a vital role in coordinating responses to wildfires, emphasizing the importance of international collaboration and solidarity in times of crisis. The Wildfire Prevention Action Plan underscores the EU's proactive stance, incorporating both preventative measures and emergency response strategies to address the evolving wildfire landscape.

Turning our attention to specific member states, Spain has implemented noteworthy programs such as the PPU Programme and RAPCA Programme, showcasing a commitment to grassroots prevention efforts and the creation of firebreak areas. Strategic Guidelines for Wildland Fire Management in Spain further underscore the importance of a holistic approach, combining prevention, preparedness, and response measures.

Portugal, faced with the recurring challenge of wildfires, has implemented Forest Intervention Zones (FIZ) and established AGIF, emphasizing integrated fire management. The National Plan for Integrated Rural Fire Management and various awareness campaigns demonstrate a concerted effort to engage communities and foster a sense of responsibility in wildfire-prone areas.

In Italy, the COAU and the "Forest Fire Project" demonstrate an innovative use of technology and cartographic data to combat forest fires. The emphasis on interregional twinning, youth





Funded by
the European Union

engagement through summer camps, and specialized projects like the Fire Prevention for Wood Supply Chains (Pre-Feu) Project reflect a comprehensive strategy addressing various aspects of fire prevention and management.

France has developed a multifaceted approach, encompassing public awareness campaigns, advanced tools like the GOLIAT Project, and an Integrated Fire Risk Management Strategy by the National Forestry Office (ONF). Compulsory brush clearing and the Zone d'Appui à la Lutte (ZAL) contribute to a proactive stance in minimizing fire risks.

Other EU countries, such as Ireland, Slovenia, Croatia, and Sweden, have implemented diverse strategies, ranging from public awareness campaigns (Be Summer Ready in Ireland) to advanced technological solutions like automated wildfire risk forecast systems (Slovenia) and video surveillance (Croatia). Mobilizing local citizens (Greece) and implementing fire danger rating systems (Sweden) underscore the importance of community involvement and proactive risk assessment.

In conclusion, the European Union and its member states have demonstrated a collective commitment to addressing the increasing threat of forest fires through a combination of advanced technology, strategic planning, community engagement, and international cooperation. The diverse range of initiatives highlighted in this report provides a blueprint for comprehensive and adaptive approaches to forest fire management, laying the foundation for a more resilient and sustainable future in the face of evolving wildfire challenges.





Funded by
the European Union

REFERENCES

1. Beighley, M., & Hyde, A. C. Portugal Wildfire Management in a New Era Assessing Fire Risks, Resources and Reforms. https://www.isa.ulisboa.pt/files/cef/pub/articles/2018-04/2018_Portugal_Wildfire_Management_in_a_New_Era_English.pdf
2. Bento-Gonçalves, A., Vieira, A., Da Vinha, L., & Safa'Hamada, N. (2018). Changes in mainland Portuguese forest areas since the last decade of the XXth century. Méditerranée/Méditerranée, 130. <https://doi.org/10.4000/mediterranee.10025>
3. Casartelli V, Mysiak J (2023). Union Civil Protection Mechanism - Peer Review Programme for disaster risk management: Wildfire Peer Review Assessment Framework (Wildfire PRAF).
4. EFFIS (European Forest Fire Information System) (accessed at <http://effis.jrc.ec.europa.eu/>)
5. European Commission Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO) (2022, November 30). Wildfire Prevention Action Plan call for practices. Available at: Union Civil Protection Knowledge Network: <https://civil-protection-knowledge-network.europa.eu/news/wildfire-prevention-action-plan-call-practices>
6. European Commission, Directorate-General for Environment, Nuijten, D., Onida, M., Lelouvier, R., Land-based wildfire prevention – Principles and experiences on managing landscapes, forests and woodlands for safety and resilience in Europe, Nuijten, D.(editor), Onida, M.(editor), Lelouvier, R.(editor), Publications Office of the European Union, 2021, <https://data.europa.eu/doi/10.2779/695867>
7. European Commission, Directorate-General for Research and Innovation, Vallejo Calzada, V., Faivre, N., Cardoso Castro Rego, F. et al., Forest fires – Sparking firesmart policies in the EU, Faivre, N.(editor), Publications Office, 2018, <https://data.europa.eu/doi/10.2777/181450>
8. European Environment Agency. <https://www.eea.europa.eu/data-and-maps/figures/land-cover-changes/spain>
9. E-STAG, Evolving Risk of Wildfires in Europe - The changing nature of wildfire risk calls for a shift in policy focus from suppression to prevention. Available at: <http://https://www.undrr.org/media/47703/download?startDownload=true>
10. Goliat, Groupement d'Outils pour la Lutte Incendie et l'Aménagement du Territoire. Available: <https://goliat.universita.corsica/?lang=en>
11. Mauri, E., Jankavić, M. 2024. Wildfire risk planning and prevention - Innovations in the Mediterranean and beyond. European Forest Institute. Available at: <https://efi.int/publications-bank/wildfire-risk-planning-and-prevention-innovations-mediterranean-and-beyond>
12. Ministry For The Ecological Transition And The Demographic Challenge. Strategic Guidelines For Wildland Fire Management In Spain. Available at: https://www.miteco.gob.es/content/dam/miteco/es/biodiversidad/temas/incendios-forestales/strategic_guidelines_wildland_fire_management_2022_tcm30-522093.pdf
13. OECD (2023), "Taming wildfires in the context of climate change: The case of Portugal", OECD Environment Policy Papers, No. 37, OECD Publishing, Paris, <https://doi.org/10.1787/859bb47a-en>.
14. OECD, 'Taming Wildfires in the Context of Climate Change', 2023. Available: <https://www.oecd-ilibrary.org/sites/dd00c367-en/index.html?itemId=/content/publication/dd00c367-en>
15. Presidency of the Council of Ministers - Civil Protection Department (2022, November 30). Activities - Forest fire risk. <https://rischi.protezionecivile.gov.it/en/fire/activities/>
16. Pulvirenti, L., Squicciarino, G., Fiori, E., Fiorucci, P., Ferraris, L., Negro, D., Gollini, A., Severino, M., & Puca, S.





Funded by
the European Union

- (2020). An automatic processing chain for near Real-Time mapping of burned forest areas using Sentinel-2 data. *Remote Sensing*, 12(4), 674. <https://doi.org/10.3390/rs12040674>
15. San-Miguel-Ayanz, J., Costa, H., De Rigo, D., Liberta', G., Artes Vivancos, T., Durrant Houston, T., Nuijten, D., Löffler, P. and Moore, P., Basic criteria to assess wildfire risk at the pan-European level, EUR 29500 EN, Publications Office of the European Union, Luxembourg, 2018, ISBN 978-92-79-98200-2. Available at: <https://publications.jrc.ec.europa.eu/repository/handle/JRC113923>
 16. Tissot, W. & Y. Kohler 2013. Integration of Nature Protection in Forest Policy in France. INTEGRATE Country Report. EFICENT-OEF, Freiburg.
 17. Union Civil Protection Mechanism (UCPM), 'Wildfire prevention action plan – Looking for good practices on wildfire risk awareness in Europe', 2022.
 18. Wildfire Prevention | European Forest Institute. "LOCAL WILDFIRE PREVENTION: Innovative cases in the Mediterranean" Available at: <https://efi.int/wildfire-prevention>
 19. Wildland-Urban-Interface Fire Touristic Infrastructures Protection Solutions –WUITIPS. <https://wuitips.org/>

