

CASE  
STUDIES

# LOCAL WILDFIRE PREVENTION

Innovative cases in  
the Mediterranean



Diputació  
Barcelona

# LOCAL WILDFIRE PREVENTION

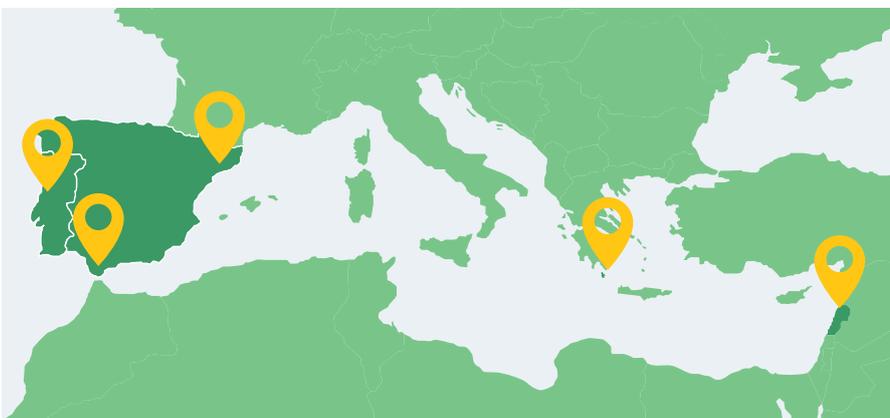
## Innovative cases in the Mediterranean

**While wildfires are a natural part of ecosystem function, they are also a major environmental and socio-economic threat globally, especially in the context of climate change, and are devastating for local communities. Suppression efforts when a big wildfire occurs inevitably receive great attention, and as a result wildfire management historically has focused on suppression.**

However, prevention is increasingly considered the most important approach to wildfire management. Prevention of wildfires includes a multitude of efforts across different scales including policymaking, forest management, education and training. These efforts share the same goal of reducing probability of fire ignition and managing the growth and force of fire events.

Yet it is local prevention practice that can really make a difference for communities at risk from wildfire. Five cases from around the Mediterranean highlight innovative wildfire prevention initiatives, and in particular how engaging with local communities in prevention efforts is critical for success.

### Five fire prevention innovations from around the Mediterranean



**Case A – Catalonia, Spain:** Managing fire risk in the wildland-urban interface

**Case B – West Bekaa, Lebanon:** Building fire resilient communities

**Case C – Portugal:** Forest Intervention Zones for fire protection and sustainable management

**Case D – Kythira Island, Greece:** Mobilising local citizens for fire prevention

**Case E – Andalusia, Spain:** Preventive livestock grazing (RAPCA programme)

# MANAGING FIRE RISK IN THE WILDLAND-URBAN INTERFACE

Wildfire prevention programme of the Barcelona government aims to **reduce vulnerability of high-risk interface areas.**



Wildland-urban interface in Barcelona. Image by Alina Chereches from Pixabay.

## LOCATION

Catalonia, Spain



## ACTORS

Diputació de Barcelona,  
Municipalities



## CHALLENGE

The Mediterranean Basin is especially vulnerable to climate change, which is causing seasons to become warmer and drier, thus increasing the risk of wildfires.

This is a problem as a growing number of people live in the so-called wildland-urban interface, where high fire ignition risk is coupled with communities' high vulnerability to wildfires.

## BACKGROUND

**Wildland-urban interface (WUI):** where the built environment is in contact and interacts with forest areas.

WUI fires are an increasing problem in Europe and beyond as urban populations grow and cities expand towards forested areas. WUI areas are a challenge for multiple reasons: human settlement increases the chance of wildfires due to human ignitions; WUI fires pose a greater challenge to lives and homes as they are more difficult to suppress; and allowing natural fires to occur in these areas is not an option. There are two types of WUI: rural settlements mixing with forests and urban housing extending towards forested areas.

**Approximately 1.1 million ha of WUI areas are located in Spain with Catalonia being among the biggest fire-prone areas in the Mediterranean basin.**

In Catalonia, an average of 650 fires burns 11.5 thousand ha annually, while a small number of large-scale fire events account for most of the area burnt. Dangerous wildfire events are an increasing risk for Catalan communities, and the problem is pronounced in the interface areas.



**Catalonia has developed a pioneering approach to establish a security buffer zone around buildings and settlements located in the WUI by reducing the surrounding fuel load caused by unmanaged vegetation.**

## INNOVATIVE APPROACH

### Legal requirement for security buffer zone

A law for the protection of WUI areas against wildfires, introduced in 2003 in Catalonia, makes it obligatory for communities to establish and maintain a security buffer zone of vegetation as well as carrying out security actions in unbuilt interior areas. Communities must also adopt a self-protection plan, take care of appropriate hydrant network in the area, clear dry vegetation from the buffer and interior zone, and keep roads and ditches free of vegetation. Non-compliance may be sanctioned.

### DIBA support

Most of this work is carried out by local authorities, which often lack appropriate technical and financial resources. DIBA, the Provincial Deputation of Barcelona, has established a **PPU programme** to support communities to establish and maintain these protective zones in high-risk areas.

Support is provided for first interventions to help with implementation and encourage residents in maintenance of the WUI.

From 2004 → 2021



### Wildfire prevention programme for residential areas and towns

Since 2004, DIBA's PPU programme has provided technical assistance and financial aid to hundreds of residential areas and towns. This ongoing effort may increase resilience of the communities living in the WUI.

### PPU Programme

**Programa de Prevenció d'Incendis Forestals en urbanitzacions i nuclis de població**

**Wildfire prevention programme for residential areas and towns**

More information of the programme (in Spanish and Catalan):

► [www.diba.cat/en/web/incendis/ppu](http://www.diba.cat/en/web/incendis/ppu)



Reducing vegetation around buildings will help prevent fire risk in the wildland-urban interface. Photo: DIBA

#### PROS +

Local inhabitants may pay part of the operational costs.

Could easily be replicated elsewhere.

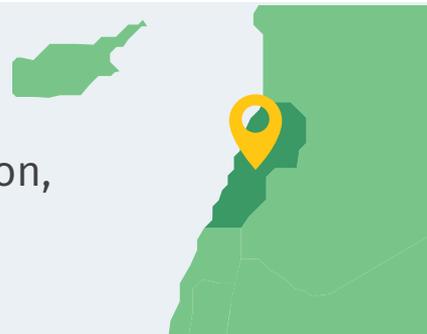
#### CONS -

Responsibility is assumed mainly by public authorities.



# FIRE RESILIENT COMMUNITIES

The Association for Forests, Development and Conservation (AFDC), a Lebanese non-profit and non-governmental organisation, is **helping vulnerable communities to build resilience against wildfires.**



Qaraoun valley in West Bekaa, Lebanon. Photo: AFDC team.

## LOCATION

West Bekaa, Lebanon

## ACTORS

Local community and civil defence members, local authorities, AFDC

## CHALLENGE

**High risk of forest fires in many villages of the West Bekaa district in Lebanon, coupled with low prevention and response capacities at the local level, make this region highly vulnerable to wildfires.**

Although a national strategy for forest fire management exists in Lebanon, support for communities to improve fire management capacities at local scale is needed.

## BACKGROUND

West Bekaa is a district situated in the southern part of the Bekaa valley in Lebanon, with a population of more than 65,000 people. Large areas of the region are occupied by forests and other diverse natural and cultural landscapes.

**The West Bekaa region is highly vulnerable to wildfires. This is caused by weak management of forests coupled with ignitions caused mainly by negligent or intensive human activities.**

In West Bekaa, a big percentage of the population lives under the poverty line. The region also hosts a significant number of Syrian refugees, who often reside in informal settlements near agricultural lands, and depend heavily on forest resources, such as firewood for heating and cooking. This means that while local communities increase pressure on forest resources, they are also more vulnerable to the effects of major fire events.

**Against this background it is alarming that an increasing number of fires and longer fire seasons are expected in Lebanon in the future.**



**The Association for Forests, Development and Conservation (AFDC), a Lebanese non-profit and non-governmental organisation, intends to increase community resilience against forest fires in West Bekaa district by improving local level fire management capacities.**

## INNOVATIVE APPROACH

### Reforestation builds good relations

**AFDC** has a long history and expertise in forest fire management in Lebanon, including risk assessments and mapping, training, awareness raising and participatory strategic planning with local community stakeholders. In the past two years, AFDC has implemented a reforestation and forest management project in the West Bekaa region which has helped the team to collect important data from the area to identify villages with most important forest fire risk and to create good relations with the targeted communities.

### Focus on local level capacities

**AFDC** has designed a project taking place in the West Bekaa district to increase local level capacities to wildfire management. The project objective, developed in collaboration with two Unions of Municipalities, Qaraoun Lake and Al Sahel, is to draft a local level fire management plan for the Bekaa governorate and provide local communities with the knowledge and resources to implement the plan.

### Engaging locals in fire management

Distinctive to the national fire management strategy, the local plan will directly involve local authorities and local stakeholders in a forest fire risk committee, which will be responsible for the implementation and monitoring of the fire plan. **AFDC**, together with international stakeholders, intends to hold capacity building sessions for the local committee members to develop a local forest fire management plan compatible with the national strategy. It is hoped that the local and participatory approach will increase sustainability of the project and durability of its results.

**“ Improving local readiness to forest fires is imperative for successful national fire management programs. ”**

– **AFDC** management team

### About AFDC

The **Association for Forests, Development and Conservation (AFDC)** was established in 1993 to achieve sustainable conservation of natural resources, raise awareness and build capacities to contribute to the national efforts for better environmental management.



FAO, with the help of local organisations (including AFDC) is enhancing biodiversity, managing combustible vegetation and maintaining seedlings in Anjar, Bekaa Valley, in an effort to support displaced Syrians and vulnerable Lebanese. Photo: FAO



# FOREST INTERVENTION ZONES FOR FIRE PROTECTION AND SUSTAINABLE MANAGEMENT

Portugal has introduced a joint forest management model for small-scale forest owners to **promote sustainable forest management and protection against extreme fire events.**



Most forests in Portugal are owned by small-scale private owners.

## LOCATION

Portugal



## ACTORS

Associations of Agro-Forestry Producers, Public Administration, Environmental NGOs, Local Entities, Industry, Academy



## CHALLENGE

**Rural abandonment and the resulting fuel accumulation, caused by lack of forest management together with climate change, are increasing the risk of extreme wildfire events in Portugal.**

Forest fuel management in the country is challenging, as most forests are owned by small-scale private owners.

## BACKGROUND

**Extreme wildfires in Portugal in 2003 burned a total of 425,839 ha of land, representing the worst wildfire season ever on record; only to follow fires of similar or worse magnitude in 2005, and again in 2017.**

Wildfires are a frequent phenomenon in Portugal, a growing threat to people, property, and natural resources. What made the 2017 fires exceptional was that they occurred outside of the official fire-prone summer season. Similar to other Mediterranean countries, extreme fire events in Portugal are driven by climatic changes and socio-demographic developments in rural areas, such as changes in farming, land use and fuel management practices leading to fuel accumulation.

**In Portugal, rural depopulation and ageing have greatly increased the area occupied by forests (from 7% to 35%) since the 19th century.**

This has caused fuel accumulation which, with proper management, could potentially be controlled. However, there are over 500,000 forest owners in Portugal, with more than 75% of forests owned by small-scale private owners. This small-scale ownership, coupled with landowner absenteeism, causes constraints to forest management.



**Forest Intervention Zones are a tool to manage the challenging situation of fragmented forest ownership and resulting difficulty for controlled management of forests at larger spatial scales.**

## INNOVATIVE APPROACH

### Legal and institutional framework

Forest Intervention Zones first emerged in 2003 as a promising tool to manage the challenging situation of fragmented forest ownership and resulting difficulty for controlled management of forests at larger spatial scales. The approach, defined by law in 2005, brings together small-scale forest owners to identify and implement a joint forest management and protection system. **ZIF** is integrated in the Portuguese legal and institutional framework for forest management and forest fire protection.

### What makes a ZIF?

#### ZIF requirements:



### The ZIF approach

**ZIF** are bounded areas with forestry as the main land use, and may include both private, common, and public lands. In private forests, ZIF need to cover a minimum of 750 ha of land, include at least 50 forest owners or producers and a minimum of 100 properties. The objective of the ZIF approach is to increase sustainable management of forests, overcome intervention constraints caused by land structure and size, protect forests against fires through structural measures and help integrate local and central management efforts. Land is managed by a single entity, the ZIF management entity. The ZIF founding process has three stages: legal procedures; planning; and implementation. The founding group needs to own at least 5% of the area inside the ZIF.

### About ZIF

#### Zona de Intervenção Florestal

#### Forest Intervention Zones

Between 2005 – 2012, a total of 162 ZIF were constituted representing 845.000 ha of land. Up until 2021 the number of ZIF has risen to 263, with largest areas in central and southern parts of Portugal.

#### PROS +

- Encourages small-scale private forest owners for collective action
- Responds to the need for mitigating fire risk
- Could potentially increase profitability of managed areas

#### CONS -

- Insufficient public funding
- Complexity in assembling many actors together
- Absence of effective results



# MOBILISING LOCAL CITIZENS FOR FIRE PREVENTION

Hellenic Society for the Protection of Nature (HSPN) and the Institute of Mediterranean and Forest Ecosystems (IMFE) in Greece mobilised local citizens of Kythira island to prevent, and better respond to, future wildfires.



Kythira is an island south of Greece with a population of nearly 4000 people.

## BACKGROUND

Kythira is an island located south of the Peloponnese peninsula in Greece, with a population of nearly 4000 people. It has poor connections to the mainland by boat or air, and has experienced many remarkable forest fires in the past.

**A fire in August 2017 burned almost 10% of Kythira island, lasting approximately 18 days before being declared extinguished.**

This fire event sparked action among the local authorities and state agencies, with the aim to improve prevention and suppression efforts, and reduce probability and severity of future fires. Efforts included improvement of flood protection work and prevention infrastructure.

**A novel approach was taken by the Hellenic Society for the Protection of Nature (HSPN) together with the Institute of Mediterranean and Forest Ecosystems (IMFE). A project to improve local fire prevention capacities evaluates local fire risk and mobilises local citizens for cooperation using the “window of opportunity” provided by the disastrous wildfire in 2017.**



### LOCATION

Kythira Island, Greece



### ACTORS

Hellenic Society for the Protection of Nature (HSPN), Institute of Mediterranean and Forest Ecosystems (IMFE) of the Hellenic Agricultural “Demeter” Organization



### CHALLENGE

Greece has over 200 inhabited islands with limited firefighting capacities. Often located at long distances from the mainland, it takes time for reinforcements to arrive and fires have a greater potential to grow, threatening people, property and the environment. Thus, it is important for these islands to improve fire prevention capacities.



## INNOVATIVE APPROACH

### Assessing fire risk in Kythira

The novel project, coordinated by HSPN and IMFE, focused on social components of fire management, and especially on mobilising local people for fire prevention through volunteer work and awareness raising. Emphasis was also placed on understanding fire risk in Kythira, specifically as a foundation for efforts in preparedness and pre-suppression.

Understanding fire risk in Kythira involved analysis of the island's fire statistics and preparation of a forest fuels map.

### Mobilising and informing local citizens

The project focused on certain settlements in Kythira but also included actions covering the whole island. Prevention planning for at-risk settlements was made with the help of fire modelling and volunteer-led vulnerability assessment of 610 structures. The owners of these structures received an informative risk assessment form with recommendations. Talks and workshops on fire prevention were carried out for locals (including schools) to raise awareness and improve local capacities, encouraging people in fuel management and forest rehabilitation work. Communications materials included brochures, videos, articles and radio interviews addressing fire prevention.

**87%** of homeowners agreed with fire risk assessments and planned to implement suggested changes

**More information of the project (in Greek):**

[http://www.fria.gr/kithira\\_info.html](http://www.fria.gr/kithira_info.html)

#### Main reference:

Xanthopoulos, G., Athanasiou, M., Nikiforaki, A., Kaoukis, K., Mantakas, G., Xanthopoulos, P., Papoutsakis, C., Christopoulou, A., Sofronas, S., Gletsos, C. & Varela, V. (2022). Innovative Action for Forest Fire Prevention in Kythira Island, Greece, through Mobilization and Cooperation of the Population: Methodology and Challenges. *Sustainability*, 14(2), 594. <https://doi.org/10.3390/su14020594>

## Lessons learned

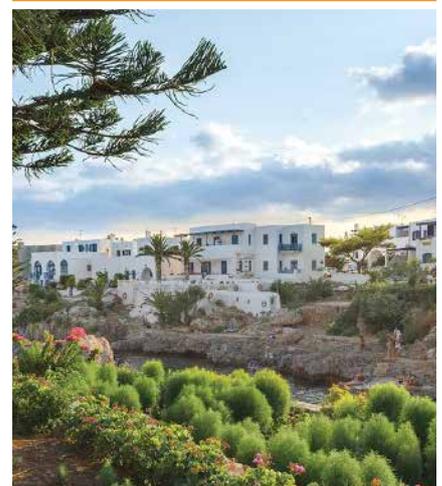
The project in Kythira was designed specifically for the local population.

Community participation was a joint effort by experts and local citizens, rather than managed top-down by official agencies.

Involving motivated individuals in prevention activities can have long-term impacts and work with limited funding.

A network for local volunteers could help resolve weaknesses and improve outcomes.

Any prevention programme should consider the particular situation and address people locally.



Volunteers assessed the risk of destruction of 610 buildings in three settlements in Kythira. Volunteers received training to carry out these tasks.



# PREVENTIVE LIVESTOCK GRAZING (RAPCA PROGRAMME)

Goat and sheep farmers are rewarded for helping with biomass reduction in fire-prone landscapes.



Sheep grazing in Spain.

## BACKGROUND

**Fuel breaks:** eliminating fuel continuity by establishing vegetation structure and characteristics that improve capacity to manage wildfires.

Fuel treatments through biomass reduction are of key importance to wildfire prevention efforts. These include pruning, thinning, prescribed burns and grazing. However, mechanical clearings are expensive and sometimes difficult to implement in challenging landscapes.

**Livestock grazing has become an option for many European countries, including Spain, to make landscapes more fire resilient.**

Previously grazing has had a negative image in many Mediterranean countries due to overgrazing and use of fire for pasture renewals, leading to desertification. However, the role of grazing is important for wildfire prevention, and controlled grazing is also seen to have many positive effects, both socially and environmentally, such as economic savings, and improved land-use effectiveness. It is also said to be an ecologically sound technique compared to other fuel treatment methods.



**In Andalusia, a successful example of payments for preventive livestock grazing provides sheep and goat farmers with additional income.**

### LOCATION

Andalusia



### ACTORS



Local shepherds and their herds, Spanish Research Council CSIC, Regional Department of the Environment, Public Agency of Environment and Water (AMAYA)

### CHALLENGE



**Forests occupy more than half of the territory in Andalusia in southern Spain: 4.6 million hectares.**

**Wildfires pose a very significant threat to the biodiversity of the region's natural environment.** As with many other Mediterranean regions, rural abandonment together with effective fire suppression efforts have led to fuel build-up in Andalusia, increasing the risk of future fires.

## INNOVATIVE APPROACH

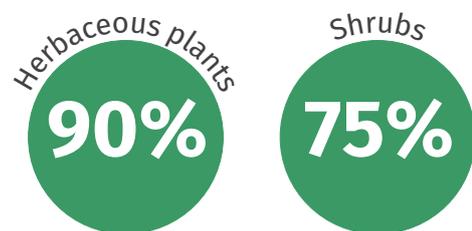
### Monetary rewards for biomass control and fuel break maintenance

The **RAPCA programme** in Andalusia is a payment scheme that rewards shepherds for services of biomass control and fuel break maintenance on public forest land at high risk of wildfires. The reward is dependent on the size of the area, success, and difficulty of the effort. Testing for the programme began in 2003, but the official scheme was launched in 2005.

### What's the deal?

Graziers are required to consume a certain amount of vegetation growth annually, namely 90 % of herbaceous plants and 75% of shrubs. Contracts are made with the local environment and water agency, who also assess fuel breaks suitable for the programme, and the results of the grazing, leading to payments. Monitoring is done once a year.

### Annual consumption



By 2016 there have been **223 shepherds** with more than **6100 ha** of grazed land.

### Success factors

By 2016, 223 shepherds with more than 6100 ha of grazed land had received payments as part of the RAPCA scheme.

Success factors include:

- + Extensive groundwork by researchers at CSIC (Granada), including pilot testing and provision of support for programme expansion
- + Strong political commitment
- + Programme embedded in the wider wildfire prevention plan (INFOCA)
- + Positive relationship between the environmental administration and farmers

### RAPCA programme

*Red de Áreas  
Pasto-Cortafuegos de  
Andalucía*

*Network of  
Pasture-Firebreak  
Areas of Andalusia*

The RAPCA programme is directed by the General Directorate of Management of the Natural Environment and is executed through the Environment and Water Agency, as a continuation of the collaboration and scientific advice of the Group of Pastures and Mediterranean Silvopastoral Systems of the Superior Council of Scientific Research (CSIC).

**More information of the programme** (in Spanish):

- ▶ [www.juntadeandalucia.es/medioambiente/portal/](http://www.juntadeandalucia.es/medioambiente/portal/)



Sheep and goat herds can reach vegetation in terrains that would be otherwise difficult to manage.

