

GRINFOMED+MEDIFIRE, A PROJECT FOR THE PREVENTION OF GREAT FOREST FIRES IN THE MEDITERRANEAN

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Abstract: Large forest fires are catastrophic events that are occurring more frequently in recent years in the Southern European countries. Various causes are appointed for this situation, among them climate change and the abandonment of agricultural activities are at the head of the list.

As part of the environment conservation and rural development policies, the European Union is developing a group of strategies at local, regional and trans-national levels for the management of forest fires risk. The project GRINFOMED+MEDIFIRE, covering regions of Spain, Portugal, France and Italy, is acting under the Community initiative INTERREG III B MEDOCC.

The project is focused on improving the work of administrators and local agents in regard to forest fire prevention through three lines of action:

Line 1: Fire risk assessment systems and prediction systems for large forest fires

Line 2: Territorial planning for large forest areas

Line 3: Satellite and vegetation

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1. Introduction

Forest fires, despite of the huge efforts made to prevent them, continue to severely affect forest resources in countries of the Mediterranean basin and constitute, in the recent years, one of the main causes of environmental degradation over extensive areas. High population density, progressive abandonment of rural areas and a particularly unfavourable meteorological situation due to climate change, vegetation structure, and territorial management are the principal triggers for forest fires that are very difficult to control. The resulting ecological, social, and economic losses are very high.

Methods of fire prevention and fighting used in each territory are similar on certain points but differ on others. For this reason there is no common language that allows the in-depth description of the methods used in the different territories and subsequent use of the combined knowledge to carry out more effective prevention.

2. Project presentation

The GRINFOMED+MEDIFIRE project “Preparation and implementation of a common programme between the local agents of the western Mediterranean regions on forest fire prediction and prevention + systems and procedures of territorial evaluation aimed at the comprehensive fighting of forest fires” is part of the Community initiative INTERREG III B MEDOCC. The project is leaded by the region of Catalonia in Spain (Department of the Environment and Housing of the Government of Catalonia) in partnership with the regions of Liguria and Tuscany (Italy) and Algarve (Portugal). The Agency for the Protection of the Environment and Technical Services (APAT, Italy) and the Interdepartmental ENTENTE for protection of the forest from fires (region PACA and Languedoc-Rousillon, France) are also partners in this project. The total budget is 1,9 M€, funded by the European Union through FEDER in 1 M€.

In order to manage forest fires, it is necessary to analyse the core elements and determine where to intervene with new and more effective strategies. The forest fire phenomenon has specific aspects that once understood, are possible to develop a preventative approach. The project GRINFOMED+MEDIFIRE expounds a comprehensive forest fire prevention program that allows to improve innovate preventative actions in forest fires control in the Mediterranean regions.

3. Objectives

The GRINFOMED+MEDIFIRE project describes a forest fire prevention program based on the system of evaluation and monitoring the general forest fire risk and alerts in critical situations for the occurrence of large forest fires. Its objective is to:

- Intensify risk monitoring and improve the prediction of adverse circumstances to balance the use of fire fighting resources during this period;

- Carry out specific, proactive pre-suppression management in large forest areas, which due to the continuous vegetation cover can feed large fires;
- Analyse satellite images to monitor fires, drought, land use, and also for territorial management and control.

To achieve those goals, the project is structured in three lines of action:

Line 1: Fire danger assessment systems and large forest fire danger prediction systems

Line 2: Territorial planning for forest areas

Line 3: Satellite and vegetation

4. Description of the lines of action

The methodology employed in the project focuses on establishing a common language in terms of fire risk and hazard and integrating the knowledge from forest management prototypes for the regions covered in the project. The aim is to achieve a comprehensive management model and generalise the application of suitable common terms and techniques for the comparison of data and the exchange of experience.

LINE 1: FIRE RISK ASSESSMENT SYSTEMS AND LARGE FOREST FIRE PREDICTION SYSTEMS

This action line is divided into two sub-action. Both contribute to improve the understanding of the forest fire risk.

A. Risk Assessment Systems

The type of information that is required to run the system and that is available is limited. Often relevant information is lacking because there is not “sufficient” detail at a territorial level, in particular for information of meteorology, vegetation (structural and dynamic variables), topography and fire history.

Once assessed the information is used to select the coverage to incorporate in the risk assessment system, the model for risk designation, the weights to the cover: objective and subjective designation, choice of calculation and representation units

Finally, an assessment of the reliability of the model is made through the validation of the model by experts and by the analysis of the behaviour in historical situations

B. Vegetation Sampling

The direct observation of the vegetation is one of the requisites to the definition of fire risk. This observation of the vegetation has two main objectives, which are to avoid the situation where the estimation of risk has no real adherence in the territory (and can diverge excessively from reality) and to improve the understanding of the behaviour of vegetation in case of forest fire (favoring propagation or delaying it).

Sampling plots have been established in various regions, to undertake vegetation monitoring, for those species that are considered to be indicators in each area in the assessment of forest fire risk.

Periodic samples are made in the field and prepared in laboratory, using a common protocol adjusted to the specifics of each region.

LINE 2: TERRITORIAL PLANNING FOR FOREST AREAS

The aim of planning for forest areas is to devise a model for large forest areas with the objective of reduce their vulnerability to forest fires. In the Mediterranean, forest planning is carried out based on the definition of priority protection perimeters (PPP).

The prototype of PPP is defined through a common protocol that includes a study of a forest area potentially threatened by large fires in each country, and based on this study the criteria for area management will be defined, such as:

- Infrastructure management specific to the area (work plans and maintenance of the areas)
- Study of the various possibilities of fire development according to fire starting points, the state of the vegetation, meteorological conditions, and prevention mechanisms.

The work will be carried out in 3 phases:

Phase 1: Inventory

The objective is to collect information for the description of the current situation throughout the territory. This data collection consists of fieldwork, based on the following aspects:

- Road network
- Water points
- Fuel and fire breaks
- Landfills
- Power lines
- Other infrastructures
- Housing developments
- Regeneration forests
- Protected habitats
- Sites of cultural and archaeological interest

The information collected in the field, is complemented by the information on specialised maps and previous plans available in municipal prevention plans, and the information contained in the forest fire statistics database.

Specifically, the use of the information from specialised maps, fire data and structural risk is being considered.

Phase 2: Analysis of the information

This involves the undertaking of an analysis of the statistics of fires and their causes, determining the principal causes as well as the possible preventative measures to apply (all fires).

The weather conditions are studied for those fires where perimeter data is available and the synoptic meteorological patterns in which they develop, as well as the surface meteorological data to calculate the necessary parameters to carry out simulations.

The fragmentation of territories is proposed, using fire safety clearings of low combustibility preferably supported by the track network and taking into account in determining their path the topography and location typical of large fires. Their efficiency is determined through simulators using the parameters of the most common meteorological conditions and those of large fires.

Phase 3: Proposal for action

In the PPP different actions are proposed that cover the following:

1. Incorporation of the inventoried location in the emergency maps.
2. Proposals for action to diminish the risk of fire: surveillance, deterrence, detection
3. Proposals for investment in passive protection measures: (track network, establishment and maintenance costs). Defining the firebreak clearings and areas of low fuel density, changes to the network of water points, both changes to existing water points and the construction of new ones, and work on the network of primary and secondary tracks.

LINE 3: SATELLITE Y VEGETATION

The use of satellites in this project for measuring vegetation cover has the aim of gaining knowledge of and in particular defining common methodologies and procedures for the evaluation and control of the determining factors that influence the phenomenon of fires, using systems and methods such as GIS and remote detection. At the same time, through the harmonisation of techniques and indices used in the estimation of the state of the vegetation, the models defined in all Mediterranean countries can be generalized.

The main objective of this line of action is the definition of models for the analysis and management of the problems, developed on a regional scale and adaptable to a Mediterranean scale. In particular the definition of the procedures for the creation of some elements involved in the fight against forest fires, such as:

- Inventory of the fire area
- Innovative models for fire management

- Creation of and experimentation with methodology for the assessment of fire danger relative to structural factors, and the evaluation of damage levels using GIS and remote detection.
- Determination of the state of the vegetation with the use of high-resolution satellite images.

5. Results of the project

The GRINFOMED+MEDIFIRE project, through joint analysis of the work done, aims to produce the following results:

Line 1: Fire danger assessment systems and large forest fire danger prediction systems:

- Risk assessment system
- Common methodology for vegetation sampling

Line 2: Territorial planning for forest areas

- General planning model for areas applicable to the Mediterranean forests, with examples in the different regions involved: Drawing up of a project model of planning for forest areas.

Line 3: Satellite and vegetation

- Definition of standards and indices for the production and interpretation of satellite imagery and definition of methods.

One of the main components of the project is information dissemination, both to foresters and to the public. The dissemination of the results of the project is made through the internet (<http://www.grinfomed+medifire.org>) and also by the publication of a book and several technical papers.