



# Effective forest fire management and policy

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# Definitions

- Forest fire management: The process of planning, preventing and fighting fires to protect people, property and the forest resource. It also involves fire to attain forestry, agriculture, wildlife and land-use objectives (Natural Resources Canada)
- A policy is a set of ideas or plans that is used as a basis for making decisions, especially in politics, economics, or business (Collins English Dictionary). Strategies and actions are defined in order to serve established policies.

## Definitions (2)

- Effective: Producing a decided, decisive, or desired effect (output)
- Effectiveness: The degree to which objectives are achieved and the extent to which targeted problems are solved
- In contrast to efficiency, effectiveness is determined without reference to costs and, whereas efficiency means "doing the thing right," effectiveness means "doing the right thing." (businessdictionary.com)

# The forest fire problem

- Total yearly burned area not decreasing in most countries, in spite of large investments in forest fighting
- Increasing occurrence of extremely large, hard to control and highly destructive forest fires
- Significant number of fatalities, increased property and forest production losses
- Citizens feeling unsafe and suffering adverse health effects
- High fire severities, adverse ecological effects

# Objectives

- Obviously, the **general objective** of forest fire management is to mitigate the forest fire problem
- More specifically:
  - To reduce the annual number of fires and the annually burned areas
  - To reduce fire caused fatalities and damages to properties and the environment, especially at the wildland-urban interface (WUI)
  - To rehabilitate burned areas
- Of great importance:
  - To control the costs in achieving the objectives
  - To achieve minimum disruption to ecosystem & production functions

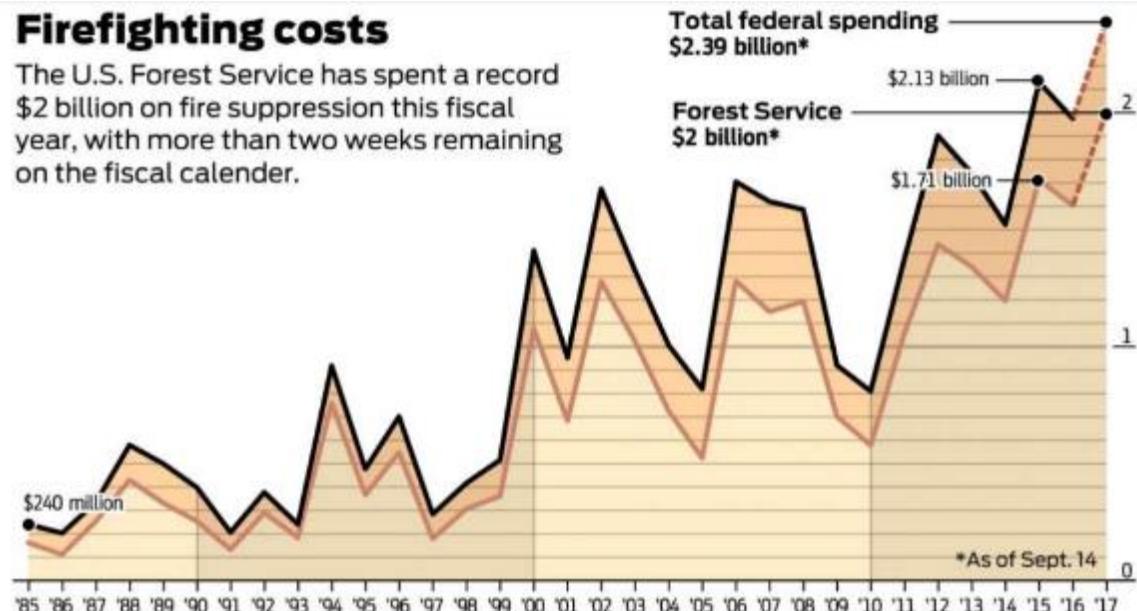
# Is current forest fire management effective?

- In short:
  - Does it achieve its objectives?
  - Has it solved the forest fire problem?
  - What about costs?
- Reflecting on the recurring damages around the world, it is clear that the problem has not been solved.
- On the contrary, it has worsened in many respects, especially in regard to costs.

# Trends in suppression cost and burned area in the USA

## Firefighting costs

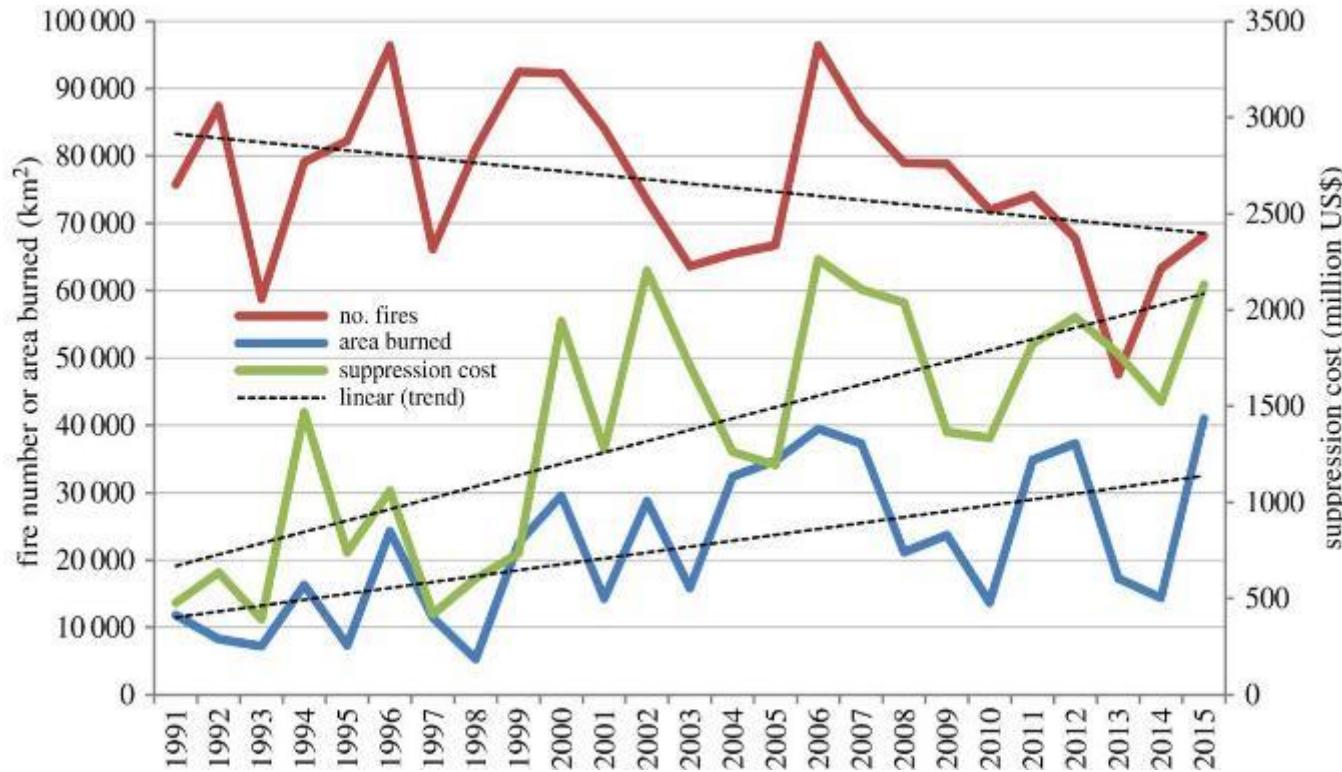
The U.S. Forest Service has spent a record \$2 billion on fire suppression this fiscal year, with more than two weeks remaining on the fiscal calendar.



Note: Total federal spending on fire suppression consists of the expenses of the Forest Service and the Department of the Interior, which includes the Bureau of Indian Affairs, Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service.

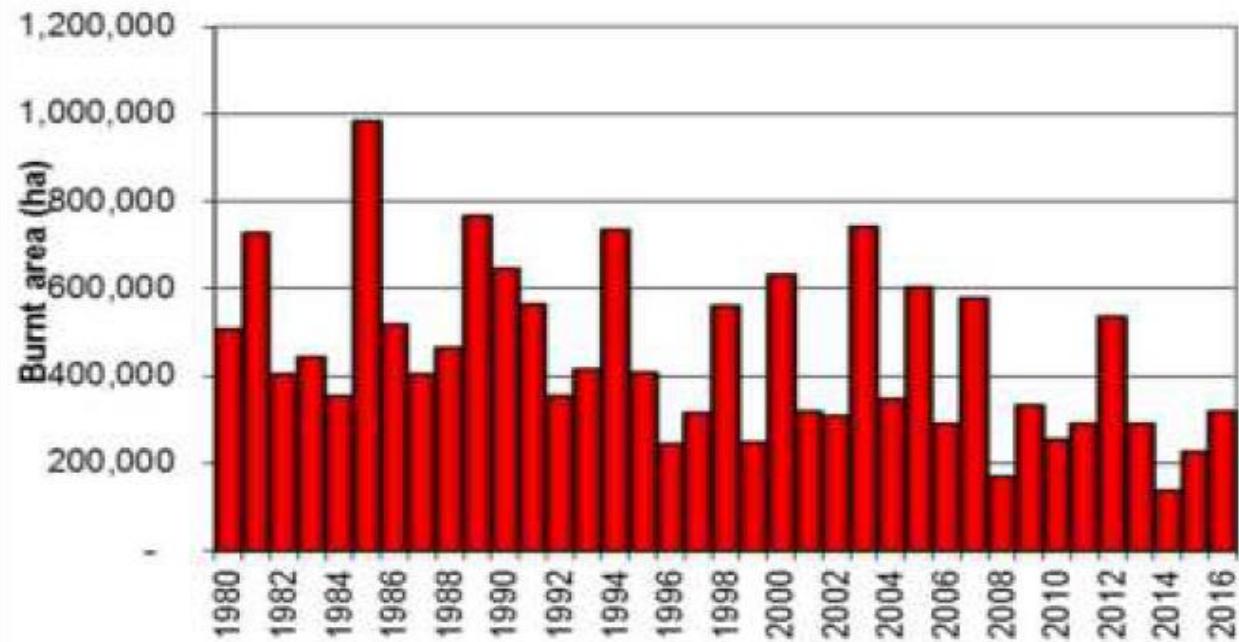
Source: National Interagency Fire Center

John Blanchard / The Chronicle

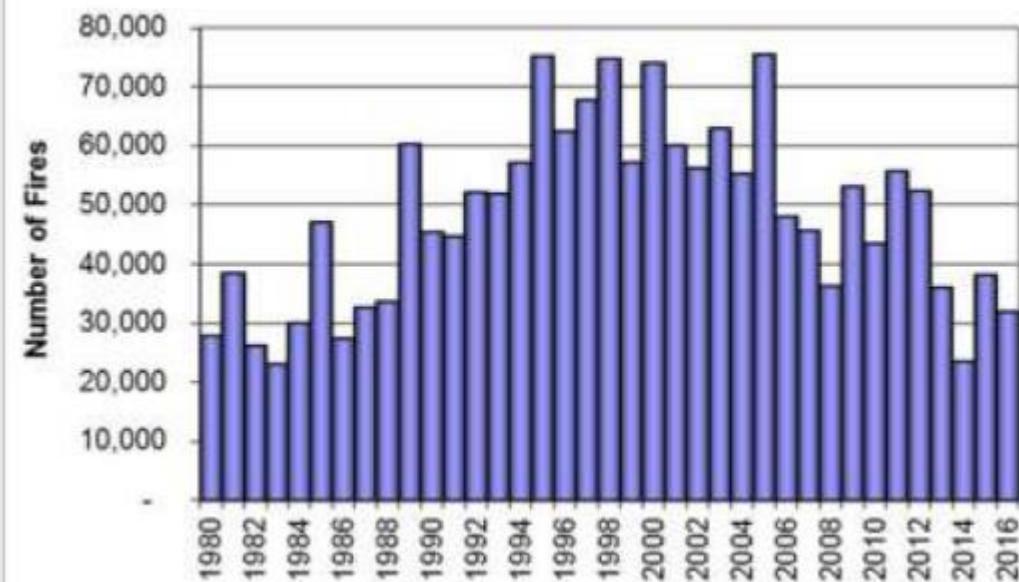


# Forest fire statistics in the Southern Member States of the European Union

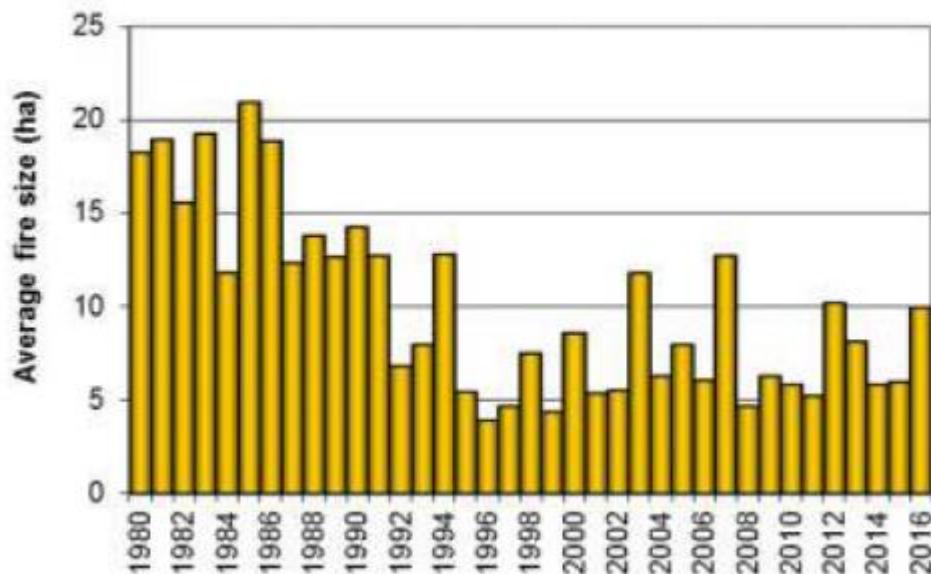
Burnt area in the Southern Member States



Number of fires in the Southern Member States

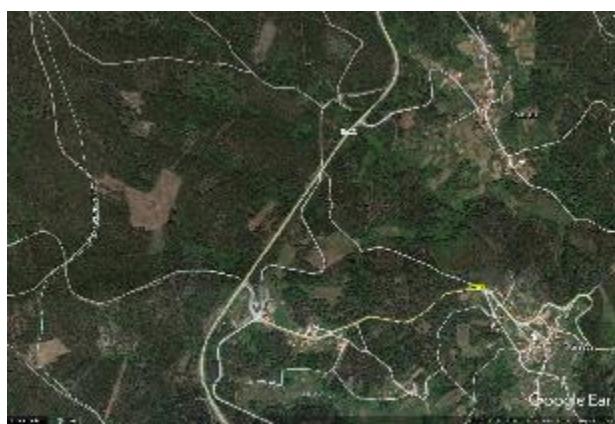


Average fire size in the Southern Member States



# Fire at Pedrogão Grande, Portugal 17-6-2017

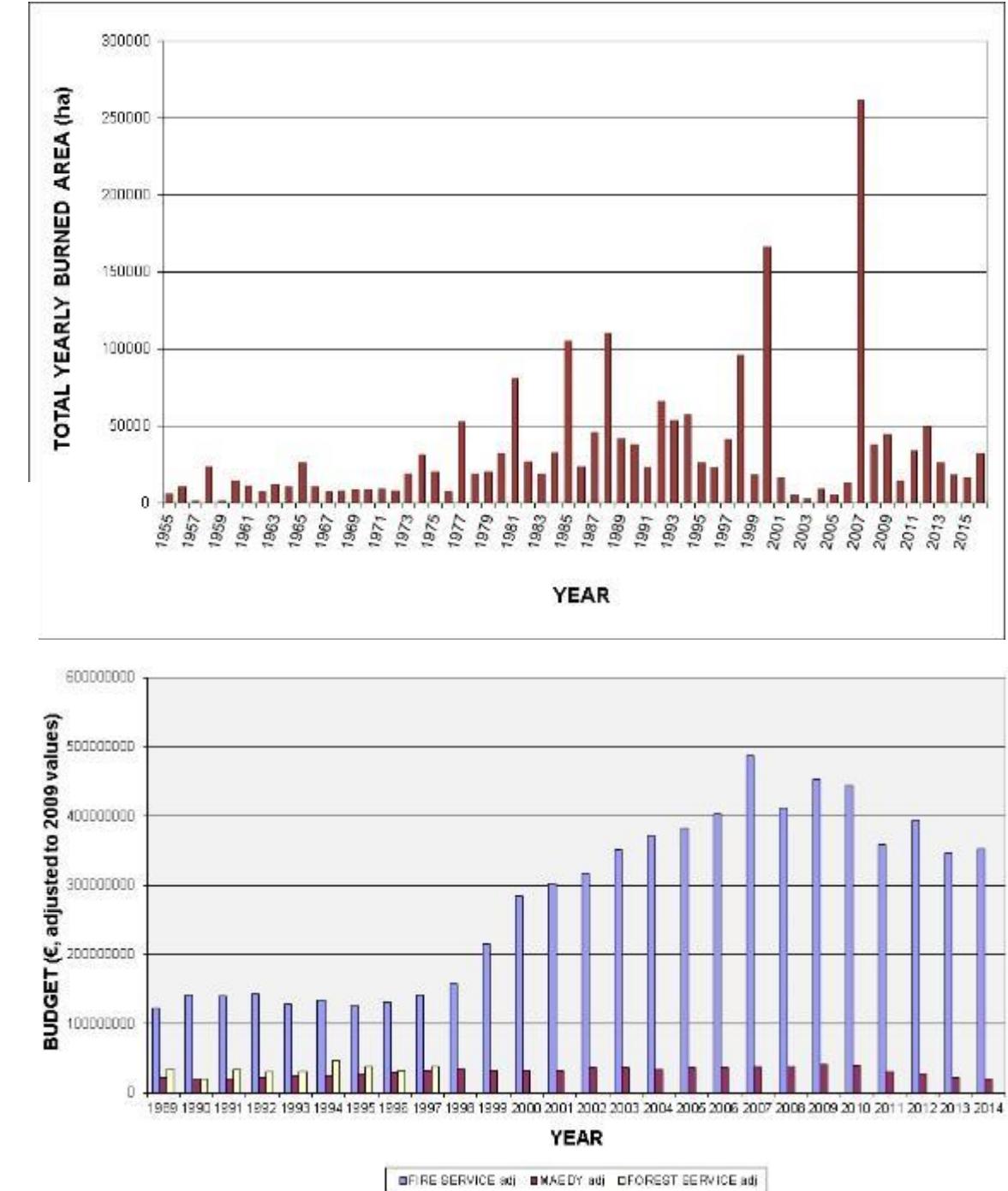
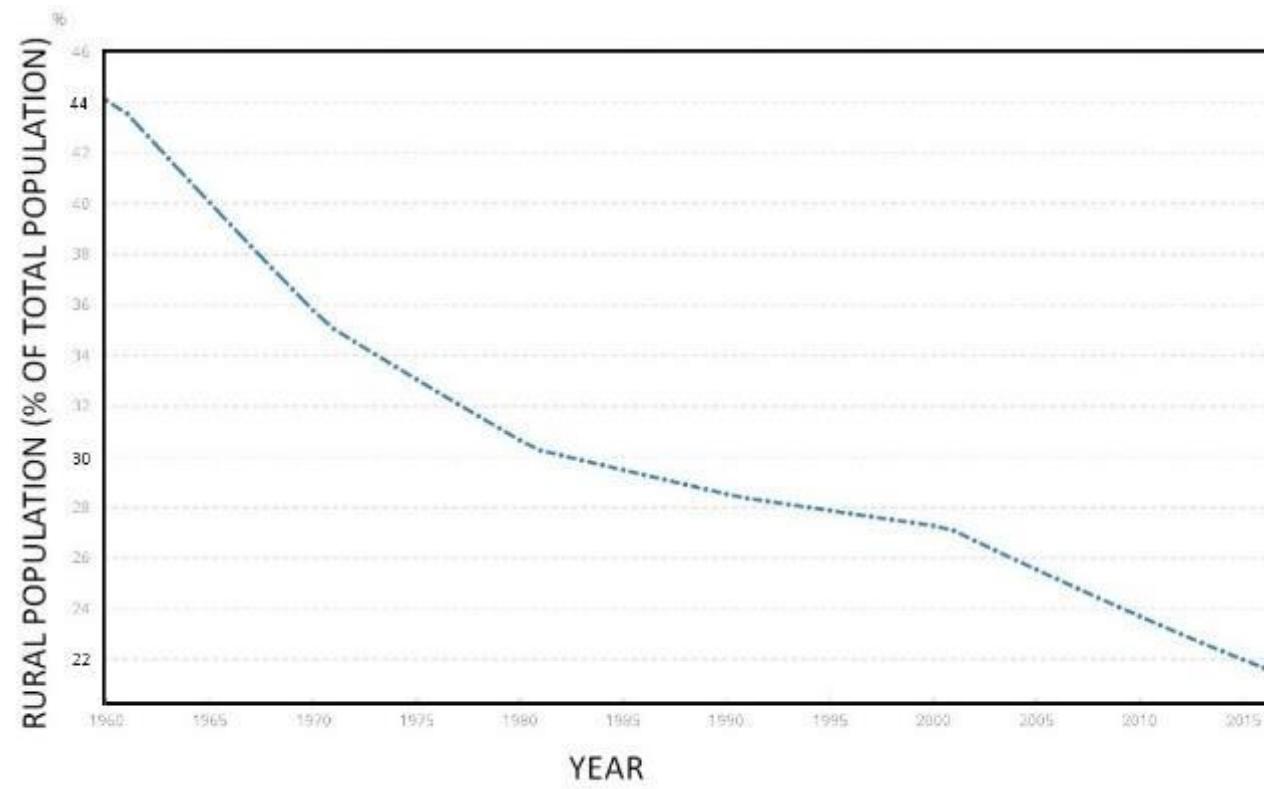
- 64 fatalities, 160 injured, >30.000 ha burned
- Extremely flammable vegetation
- Unprepared communities and citizens
- Inadequate firefighting mechanism for the job



# Greece (Aug 24-27, 2007)



# Burned area, firefighting cost, and population trends in Greece



How can forest fire management effectiveness improve?

# Developing a better understanding of the forest fire problem and its complexity

- ... and communicating it to the decision makers and the public
- Often the message conveyed to decision-makers and the public presents a very simple picture of a complex situation (Moore et al 2003):
  - Forest fires are caused by extreme weather (not necessarily true);
  - All forest fires are harmful (not true);
  - All fires need to be prevented and extinguished (not true);
  - Forest fires are periodic events best dealt with when they occur (definitely not true).
- Overly simplistic explanations of forest fires tend to encourage decision-makers to the view that fire fighting is the main solution to harmful forest fires.
- Firefighting has some immediate results, a comprehensive policy requires long-term commitment

# What we have learned through forest fire research

- Realization that an ever increasing cost has to be devoted to fire suppression under the fire management approach of the last few decades.
- Recognition of the importance of fire prevention in managing fires.
- Realization of the futility of trying to manage fuels over all of the landscape through fuel reduction projects (USA example).
- Wildfires are part of a Coupled Human and Natural System(CHNS) but the human component is neglected when trying to cope with them (Tedim et al. 2016).
- Realization of the need to involve the public (education, motivation, use of the territory and its biomass, vulnerability reduction etc.).
- Increasing recognition of fire's traditional use as a tool for managing the territory.

# Towards a more effective and efficient forest fire management (Calling things by their name)

- A strong firefighting capacity is needed, but it has to be carefully gauged and planned in order to be both effective and efficient.
- We must recognize publicly that even the best firefighting organization cannot cope with 100% of all fires (all fire statistics analyses conclude that a very small percentage of fires create most of the damage).
- We must realize that trying to strengthen the firefighting organization towards the 100% worst case, the cost grows exponentially. At the same time, this reduces the funds available for prevention (various studies have shown that 1 euro devoted to prevention may reduce damages plus firefighting costs by 30-50 euros).
- We need to really believe in fire prevention and work on it methodically. A central objective is to reduce the overall load falling on the firefighting organization, especially in regard to extremes.

# Fire suppression objectives

- Minimization of burned area
- Safe operations
- Resistance to collapse in extreme conditions and quick recovery in case of such an event
  - Streamlined cooperation of Forest Service and Urban Firefighting agency
  - Availability of backup resources (Army, Air Force, Volunteers, Municipalities, Communities, Police, etc.)
  - Cooperation between countries
- Effectiveness and efficiency of operations

# Fire suppression considerations

- Aerial resources
  - Extremely useful but very costly
  - Need to be selected very carefully (according to conditions) and utilized wisely (maximum attention to dispatching)
  - Must work in good cooperation with ground forces
- Ground forces
  - High standards for personnel (physical and mental capacity, training, motivation)
  - Prepared for direct and indirect attack (including use of backfire)
  - Ability to work independently of aerial resources support
  - Good organization structure, with strength at local level and quick delivery of reinforcements.

# Fire prevention

- Threefold effort
  - Avoidance of fire starts (Fire danger prediction, mobilization, fire detection)
  - Fuel reduction (fuel management projects, territory use by the population)
  - Preparation of the citizens
    - Message: Fire is unavoidable; there is no guaranteed protection
    - Learn what to do to prepare and to act
    - WUI preparation from municipality to individual citizen level, to reduce damages
- Year round effort is needed (Appropriate agency, personnel, funds, innovative and clever legislation, appropriate approach for the task)
- Specialists from different relevant fields should contribute (sociology, criminology, educators, advertisers, etc.)

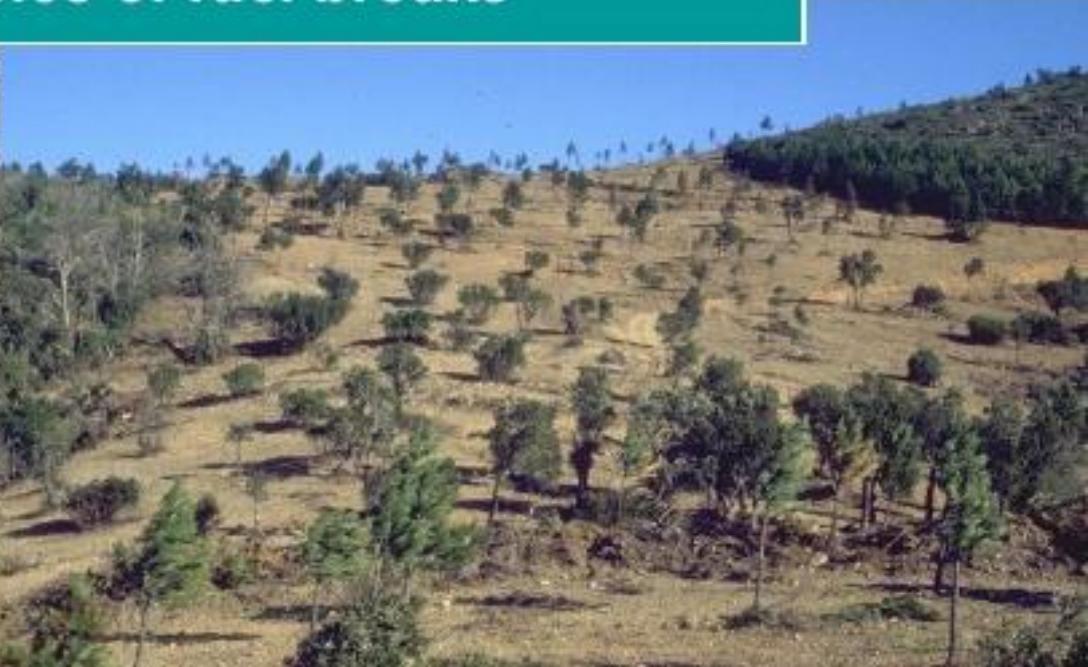
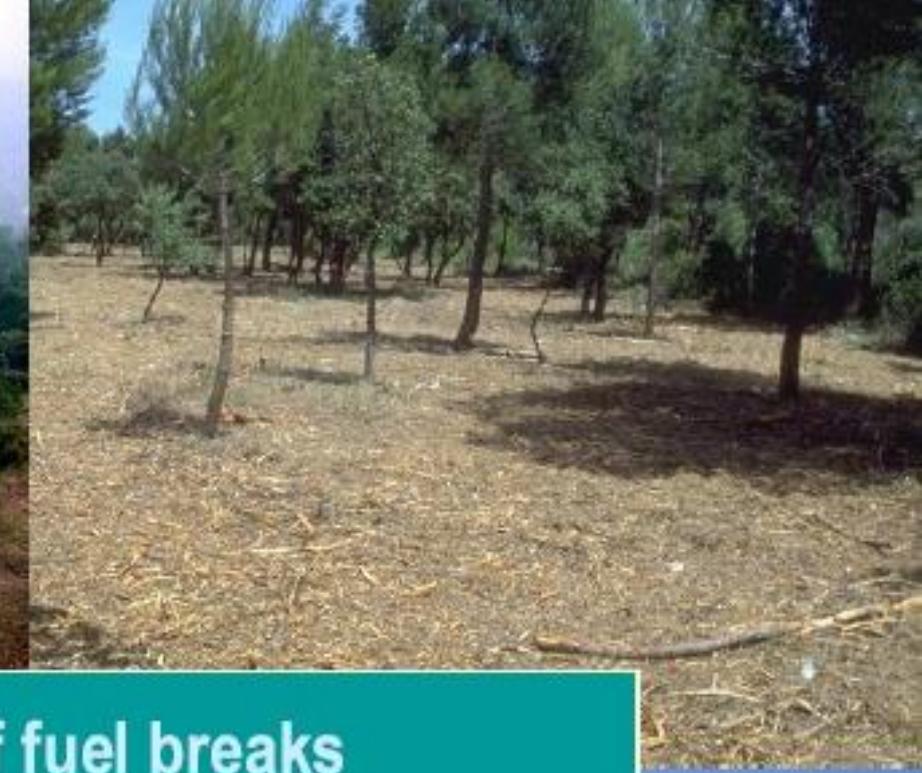
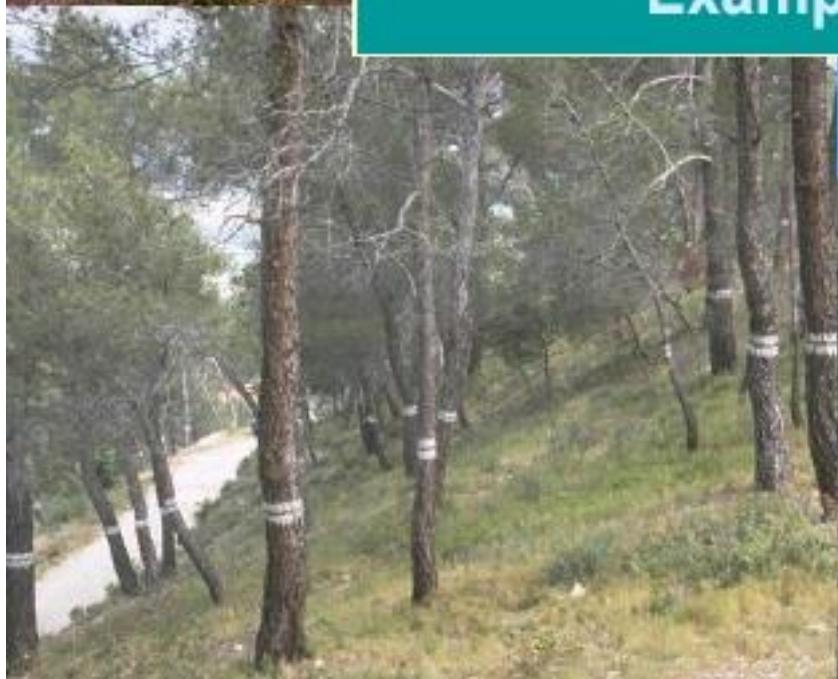
# Prescribed burning in Corsica for firebreak maintenance (June 1999)



Examples of  
fuel breaks  
from France  
(Eric Rigolot)



Examples of fuel breaks



# Fuelbreak maintenance through grazing in France



# Understory removal across roads on Parnis mountain, Greece



# Silvicultural treatments combining fire protection on Tenerife island, Spain



# Chipping of treated fuels on Tenerife island, Spain



# Post-fire rehabilitation

- Application of measures only where needed, based on objective scientific criteria:
  - Erosion prevention measures
  - Dead standing timber removal
  - Natural regeneration protection
  - Reforestation
- Musts:
  - Effort to improve resilience of future stands, taking climate change into consideration (e.g. Species selection)
  - Avoidance of creation of fuel continuum

Some notable policy and prevention  
shortcomings & failures

# Forestry

- Declining forestry across most of Europe
- Forestry has felt strongly the effects of the financial crisis of this decade
  - Suffering forest organizations
  - Suffering forest management
  - Poor funding reducing silvicultural measures that could be used for fire hazard reduction
- Forest fire research has been going downhill in regard to funding in the last decade or so

# Forestry involvement in forest fire protection declining (FF considered a civil protection issue)

- In many cases forestry agencies have been pushed-out of forest fire protection
- Disbanding of the Corpo Forestale dello Stato in Italy since 1-1-2017
- Questions about sharply reducing the number of sapadores florestais – forest sappers in Portugal (before the disaster of 2017)



# Agricultural policy & economics

- Agricultural policy measures that make life difficult or complicated for the rural population
  - Financial well-doing not guaranteed
  - Restrictions in selection of what to cultivate
- Example 1:
  - Quotas in creating large vineyards or new olive groves
  - Cleared vineyards and olive groves can function as fuel breaks
- Example 2:
  - Subsidies not used for supporting fire prevention
  - Resin collectors, a major prevention force in Greece had not been receiving subsidies for many years

# Well prepared vineyards and olive groves contribution to fire prevention



# Contribution of forest workers and resin tappers in reducing fire risk



# Poor population preparation

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Portugal in mourning as battle continues to control fires

Death toll rises to 63, with many trapped in their homes or killed trying to flee in cars

© Mori, Jun 19, 2017, 19:33

Guy Hedgecoe in Madrid



A burned car stands on the side of the road near Castanheira de Pera, in Lamego district, Portugal. Photograph: Pablo Blazquez Dominguez/Getty Images



In pictures: Portugal fires

“

The cars were crashing into each other as they tried to escape

Pedrógão Grande saw harrowing scenes on Saturday and Sunday as many people were trapped by flames in or near their homes, while many others died in their cars as they attempted to flee.



# Conclusions

- In the last four decades we have seen an increasing forest fire problem in Mediterranean countries, mainly in regard to damages.
- The cost of forest fire protection has steeply increased but effectiveness is still inadequate (objective not achieved).
- We know that abandonment of rural areas and development of WUI & RUI areas are at the root of the problem.
- We need to change the fire suppression centered paradigm that forms the basis of current fire management policies.

# Proposal

- Improve on fire suppression through better organization, high quality personnel, judicious use of aerial resources and of new technologies
- Carry-out threat analysis and focus on specific areas for fuel management (cannot be applied everywhere) and other measures
- Promote involvement of all relevant players and the public
- Put emphasis on fire smart forest and general territory management and on fire prevention (Tedim et al. 2016)
- Promote *Community Based Fire Management*
- Re-introduce the judicious use of fire as a tool for land management, prevention and suppression

THANK YOU