

# The forest fires in the Mediterranean from a policy point of view

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## 1. Introduction

Fires constitute today the most serious enemy of Mediterranean forests, since they can entirely ravage big areas of forest vegetation in a minimum period of time. Fires constitute a constant problem for forests in all Mediterranean countries. Year after year, the number of forest fires presents significant fluctuations, which are due to the differences in climatic conditions (humidity, atmospheric temperature). However, during the last twenty years, a rather upward trend in the number of forest fires and the forest area burnt is observed in most Mediterranean countries (Spain, Morocco, Albania, Greece, Portugal and Turkey) (Figure 1). As many as 50,000 forest fires take place annually in the Mediterranean basin and burn up 700,000 - 1,000,000 ha of woodlands leading to enormous ecologic and economic losses (WWF 2001). As we have learned from statistics and from our experience as well, man remains ineffectual in the fight against big forest fires (Proulx 1990) all the more so when 9/10 of the areas covered with Mediterranean forests and woodlands are burnt by some, rarely big, fires (Seigue 1990).

Indeed, fires exist in all terrestrial ecosystems as an ecological disorder (Komarek 1973) and play a significant part in the distribution, organization and evolution of the

## Abstract

Forest fires constitute a persisting problem for most Mediterranean countries presenting a rather upward trend during the last twenty years, even though these countries have been investing more funds in methods to prevent and mainly suppress them. In order to make the most efficient use of these funds, one should first look for the real causes generating forest fires. The causes are related with a plethora of socio-economic parameters and changes taking place in the Mediterranean countries and have led to an uncontrollable increase in fuels. The policy aiming at the "total extinction of all fires" within the framework of forest protection should be reevaluated (revised). The traditional confrontation with forest fires should be combined with the use of financial measures supporting agriculture, stock-breeding and eco-tourism, as well as with forestry measures, which will reduce the flammability of the Mediterranean terrestrial ecosystems. The socialization of the danger of forest fires in urban areas enhances the problem of the confrontation of fires, thus leading the State to assigning fire fighting to the (urban) Fire Fighting Forces.

## Résumé

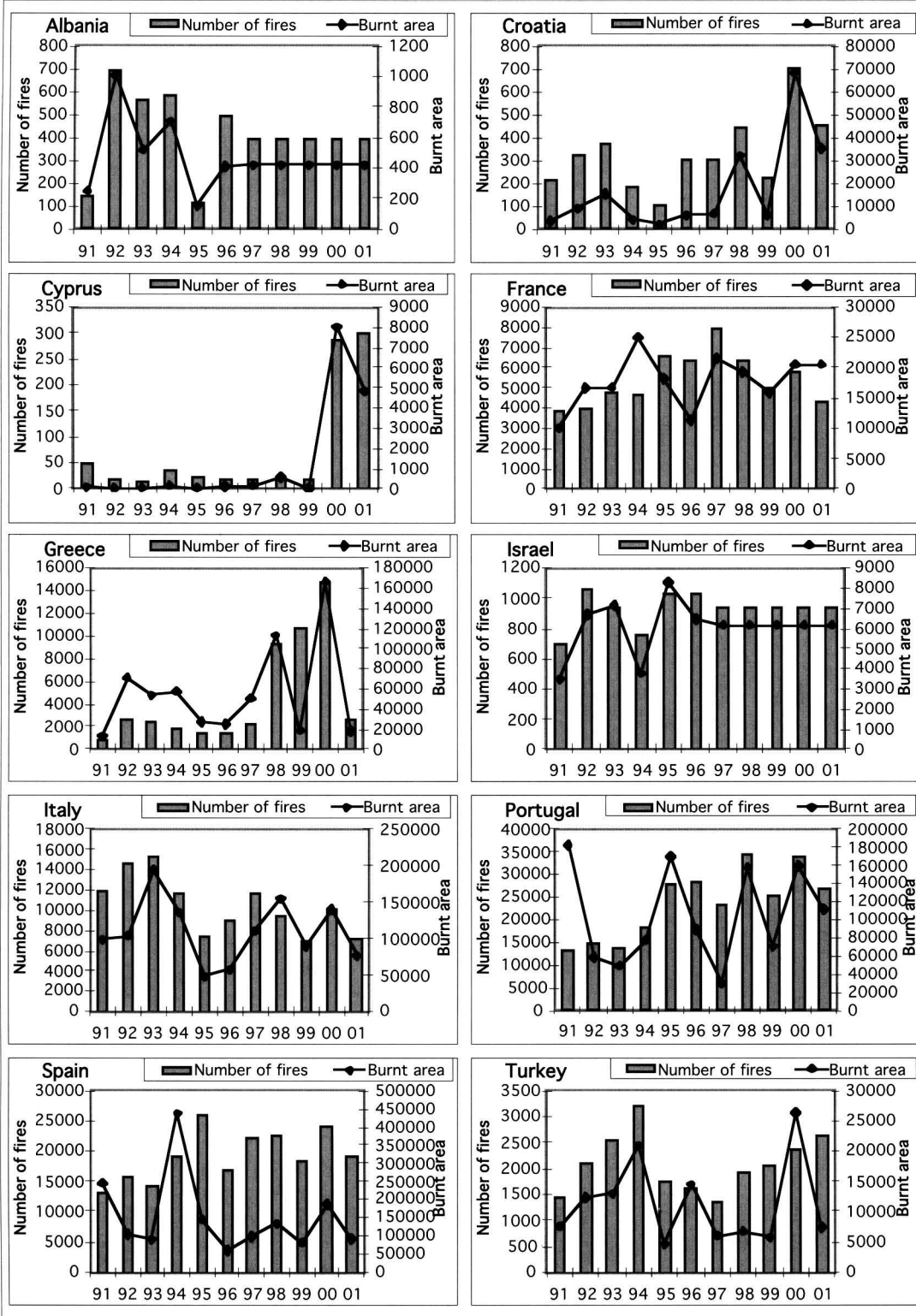
*Les incendies de forêts constituent un problème persistant dans la plupart des pays méditerranéens, qui présentent une tendance à la hausse pendant les vingt dernières années, malgré le fait que ces pays ont investi de fonds supplémentaires dans des méthodes de prévention et surtout de suppression de ce phénomène. Afin d'utiliser ces fonds de manière efficace, les vraies causes qui provoquent des incendies de forêts devraient être cherchées. Les causes sont liées à plusieurs paramètres socio-économiques et à des changements qui ont lieu dans des pays méditerranéens et qui ont amené à une augmentation incontrôlée des combustibles. La politique qui vise à l'extinction totale de toute incendie dans le cadre de la protection de forêts devrait être réévaluée (révisée). La lutte traditionnelle contre les incendies de forêts devrait être combinée avec la prise de mesures financières soutenant l'agriculture, l'élevage de bétail et l'écotourisme, ainsi qu'avec des mesures forestières qui réduiront l'inflammabilité des écosystèmes terrestres méditerranéens. La socialisation du danger des incendies de forêts dans les régions urbaines contribue à la solution du problème de lutte contre l'incendie, ce qui amène l'Etat à déléguer l'extinction d'incendies aux Services (urbains) Incendie.*

Mediterranean ecosystems (Trabaud 1980). The preservation of flame is important for biocommunities, which depend on fire in order to remain in a natural environment (Day et. al. 1990 and Miller 2000). Natural fires appear in almost regular time periods. Notwithstanding, when the percentage of accumulated fuel is bigger than that recycled, then we have an increase in fires (Kalabokidis et. al. 2002). When fires are regularly repeated and, particularly, when they are followed by grazing, their impact is even more disastrous. In the last few years, even though various countries allocate a big part of their annual funds in an attempt to reduce the areas destroyed by fire, they become more frequent and more catastrophic (Riera and Mogas 2002).

The interdependence between man, fire and forest is complex and is the object of innumerable studies and reports, since fire constitutes a paradox: on the one hand, it can be extremely beneficial and a source of forest renaissance as well as of nutritive recycling or even contribute in the reduction of an illness within the forest, while, on the other, under extreme weather conditions, it can prove catastrophic for the forests. In this study, we will analyse the phenomenon of forest fires from the viewpoint of forest policy and we will describe the influence of various social groups of the Mediterranean countries on forest fires, as they change in the course of time.

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Figure 1. Number of fires and burnt area in ten Mediterranean countries (ECE/FAO 2002)



## 2. Social changes in the Mediterranean countries and forest fires

The Mediterranean basin was colonized thousands of years ago. The presence of man has shaped an anthropogenic forest land-

scape, where forest fires are frequently a result of the pressure exercised by man on the environment by using fire as his most important tool to clean woodlands in the easiest, quickest and cheapest way (Viegas 1991). The progressive increase in the destruction of forests can only be stopped and inverted through the quest of the real causes generating them. These causes should be sought in the changes taking place within society and are related to a plethora of socio-economic parameters and changes that have led to an uncontrollable increase in fuels which, following, facilitates the proliferation of big forest fires (Badia et al. 2002).

The activities of persons living in or near forests and woodlands (farmers, stock breeders, forest workers, bee keepers, resin collectors, Christmas tree and aromatic plant cultivators, people engaged in tourist activities, etc) or of those involved with the forest environment as tourists or visitors, have positive as well as negative effects in the confrontation of the problem of forest fires.

In regard to agriculture, the use of farming machines and the adoption of technologically advanced production methods increase profits and release manpower. The change of the traditional use of land has transformed the population's way of living and has led to the abandonment of marginally cultivable lands. However, this change has contributed towards two dominating directions: the influx toward big urban centres and the concentration of land in a smaller number of owners,

both of which lead to the rural exodus (migration). However, in the North African countries and the countries of the Middle East, even though they also present the phenomenon of urbanization, the size of the rural population remains stable or even increases. One can even notice :

decrease in the number of forest fires, which is probably attributable to the reduction of forest coverage due to excessive utilization (WWF 2001).

The desolation of rural areas and the abandonment of rural lands was the cause (the source) of the recent increase of forest fires in Greece as well as throughout South Europe. The population that has stayed behind is old in age and very often, in order to clean the land, puts fires without being able to control them. In Spain, the current trend to burn the fields is increasing (Velez 1992).

Farmers and stock-breeders abandon mountain areas, where highly flammable fuel is concentrating at a slow pace (Jaber et. al. 2001). The rural exodus of people who were engaged in other activities within the forests, such as resin collectors, lumberjacks, etc, also contribute to the concentration of fuel in the Mediterranean forests (Rego 1992) and therefore increase the risk of fire (Alexandrian and Esnault 1998, Perez et. al. 2003).

The reduction of the resin collection activity has exposed the Greek forests to a broad range of dangers (Koutsirimpa 1993). In the long run, the increase of fires reduces resin production and that reduction increases burnt areas. Thus we should find the means to differentiate the existing trend in order to avoid a reduction of the rural populations (Moreira da Silva 1990). Bee keeping is probably the only rural activity that still attracts young people as opposed to several farming and stock breeding sectors, despite of the strong competition from other sectors, such as tourism or tertiary employment (Tselios 1992).

In the Mediterranean countries there are still several traditional silvopastoral - agrosilvopastoral production systems (Blondel and Aronson 1995). However, uncontrollable grazing constitutes one of the most important inhibitory factors in the development of forestry, not only by impeding the natural regeneration of forests, but also by degrading and exhausting the forest soil (Challot 1990). Forestry is trying to restrict stock breeding, while stock breeding is fighting to keep its position or even to benefit at the expense of developing forestry (Pantekis 1959). Yet, the relations between forests and grassland are not always conflicting but can be of complementary nature. Grazing can play a major role against forest fires, since it can reduce the fuel of the understory within the forest stands and on the fire brakes (Challot 1990).

The decrease of the rural population has allowed the forest to expand on abandoned grasslands and fields. As a result, uniform scrub forests, characterized by high vulnerability, have occurred (Challot 1990). Demographic changes aging rural populations have affected the evolution of ecosystems of animal grazing. While the system of domestic breeding and, more importantly, the pastoral system, decrease in terms of space, they increase in terms of animal numbers. Thus, animal pressure is increasing and concentrating in an ever decreasing area, since old people can cover only short distances. As a result, grasslands or forests located near villages or stockyards are overgrazed, while many remote areas are under grazed or not grazed at all, since the nomadic system is decreasing and tends to complete extinction. The spatial decrease of the pastoral land use finally leads to an overall accumulation of biomass and results to large catastrophic fires (Ispikoudis 1995).

The cultivation of Christmas trees, aromatic and pharmaceutical plants in marginally cultivable lands and their collection form na-

ture can be an extra income for the forest neighbouring populations. State policies should promote such activities since beekeepers, resin collectors, lumberjacks, etc, can become volunteer fire wardens, protecting the forest which is the source of their income, even though, in some cases they cause fires by negligence.

Fires can create new working positions, such as the employment of seasonal workers for wardening and fire suppression, reforestation works, etc. (Leone 1990, Bilgili 1998). A research in Italy showed that poor and secluded areas face similar problems with fires (Leone et al. 1989).

Since burnt wood is not directly degraded and is suitable for technical uses, on the condition that its collection is not delayed, arsons for the exploitation of wood are considered possible (Triantafyllidis 1959).

The most important reason for the failure to prevent forest fires is related with the fact that communities are not affected by the financial and ecological losses caused by forest fires (Kumar 2002). The protection of an area against fires should be based on an arrangement combining the classic protection of forests against fire on the one hand and forestry, agriculture, stock-breeding, the development of financial and tourist activities, on the other (Renaud et. al. 1990).

The best way to protect forests, especially against fire, is to increase the value of forests as perceived by society (Dreyfus 1990). This has been indeed achieved to a big extend through the pro-forest propaganda. Thus, civilized man has protected forests against fire by creating a new ecologic balance between existing species. The target to reduce forest fires has been a result of our civilized desire to save the forests (Komarek 1983). This resulted to more intensified forest fires than in the past. (Pyne 1997, Malamud et. al. 1998). The biggest and more catastrophic fires seem to be related with the choice made towards the total extinction of fires prevailing in the past decades (Caldararo 2002). The policy applied in the USA after 1972, according to which some fires, caused by lightning in parks and natural forests, must be left open (Brown 1990) should set us thinking. It is important not only to allocate more funds as a society for the protection of our forests against fires but also to manage them in the most efficient way. Greece, for example, currently has the third biggest number of air fire extinguishing means leveling the world, but how do they exactly contribute to the development of the country's mountain areas?

### 3. Urban, tourist areas and forest fires

Properties located in areas with beautiful landscapes of trees and plants (vegetation) present higher demand than those located in bare landscapes (Papastavrou and Goupos 1996). For this reason, people, during the demographic development in many European and USA areas, built their first or second residence near or within scrub forests or forests (Tokle 1987). Thus, we have a progressive socialization of fire risk in periurban areas because of the accessibility of forests due to the expansion of the forest network and the development of coastal tourism (Lescourgues 1990). The increase in the number of people living in those areas has also increased the number of forest fires, their intensity as well as the difficulty in their extinguishing (Minnish 1992); as a result, we suffer losses in

houses as well as casualties in lives. What is more, the existence, mainly in coastal forests, of the incompatibility of biomass accumulation and the existence of population, which is stable or increases in number, worsens the aforementioned situation.

Furthermore, the tendency of people to live within or near forests or woodlands not only increases the risk of fire but also alters priorities in the appropriation of fire extinguishing means (Jaber et al. 2001 and McKinney 2004) thus constituting a serious problem for the fire fighting forces (Lindeckert - Alexandrian 1990). The State recognizes necessity to protect houses built within a forest environment and counterbalancing the political cost, has proceeded in some Mediterranean countries (South France, Portugal, Greece) in entrusting the extinguishing of forest fires to the Fire Fighting Forces, thus giving away its priorities as well (Tampakis et. al. 2003). The aforementioned forces characteristically work with mechanical equipment and usually do not have any experience in the use of specific fire extinguishing techniques (personnel, instruments, attack systems, etc) (Velez 1998).

The dense forest road network greatly endangers forests, and especially those located near urban and summer holiday centres (Lescourgues 1990). Fires breaking out because of the use of the forest as a recreation place are due to negligence or inattention (Velez 1992). The construction of forest roads constitutes now days one of the most important factors of the current forest fire problem. While a dense forest road network facilitates the timely detection and extinguishing of forest fires, it can lead to an increase in the number of visitors and subsequently to an increase in the number of forest fires (Luce et McArthur 1978). The contrary view has been set out, namely that the opening up of roads in forests does not increase the number of forest fires in general (Izard 1973).

Forest areas located near urban centers are also used for the deposition of garbage, since these areas are better available and the transportation of waste is cheaper. Because of their improper management, many forest fires break out from such places. These forest fires spread rapidly are difficult to extinguish and burn, in general, vast areas. The problem of garbage management becomes more acute in tourist areas, where the volume of domestic garbage redoubles during the tourist season (Xenakis 1993).

The vague determination in regard to the limits for the use of land as well as to those of property in some Mediterranean countries (Greece and Turkey) has created a property expansion trend to the public areas detriment (Biglili 1997), the instrument usually used is fire.

#### 4. Conclusions - Proposals

Forest fires constitute an integral part of the Mediterranean forests. In the last few decades, however, they have been causing serious ecological and financial losses. In order to revert this situation, one should look for the underlying causes, which are related to a plethora of socio economic parameters.

The increase in the number of forest fires and of the area burnt is mainly due to the rural abandonment and consequently due the accumulation of fuel in forest ecosystems. The irregularity of the age pyramid of people engaged in agriculture and stock breeding contributed to this situation. The remaining population that culti-

vates the land is old in age and causes negligence fires more frequently, due to the inability to control fires from prescribed burning of fields. In addition, the depopulation of rural areas and the abandonment of farm lands led to an expansion of forests over grasslands and abandoned fields, thus resulting in vast unified scrub forests with a high risk of fire.

In order to prevent and invert the escape of young people to urban centers, a strategy based on the amelioration of the quality of life as well as of infrastructures in each country's provincial areas must be developed. The support of agriculture and stock breeding combined with the development of tourism as well as other activities will contribute towards that direction. The prevention of fuel accumulation through forest cultivation constitutes a very important measure in the prevention and prediction of forest fires. There is a need to redistribute funds in the underprivileged areas in order for them to be developed in a short period of time.

There are, however, more reasons that aggravate the problem, such as the increase of the population, the increase in the numbers of tourists, the density of the road network as well as of the number of cars, the pressure to find lands around urban and tourist areas. The usual methods applied by most governments, such as the purchase of equipment, the employment of staff for the protection against fire, the awareness of the public, can contribute more in the future, but their influence does not seem especially effective. Consequently, the increase in the number of forest fires should be expected.

The information of the public on the prevention and the control of forest fires should be intensified in the Mediterranean countries, in order to decrease of forest fires caused by negligence, as well as to increase the volunteer activation of citizens in the prevention and control of forest fires.

The penetration of houses in forests and woodlands has created different facts as regards the priorities that should be determined in regards to the fighting of forest fires. The lives of civilians as well as their properties need to be directly protected with the consequent development of the fire fighting forces around them. However, the absence of a strategy (a line of defence) for the fighting of fires leads to fire being left to move uncontrollably to other residences or woodlands.

The mass media have created two categories of forest fires, those threatening houses and lives of civilians and those that simply burn forests. The political importance of the first has led numerous states into assigning the extinguishing of forest fires to the (urban) fire fighting forces. Unfortunately, even if big funds are allocated in order for the aforementioned policy to be supported, it will still be impasse since it leads to big forest fires that no system, no matter how developed, can fight.

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