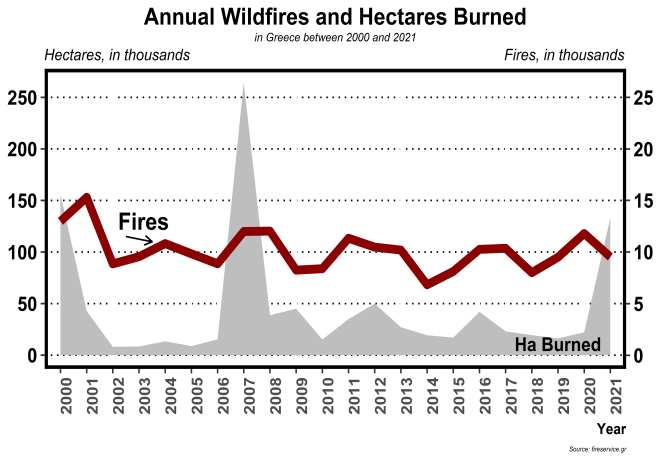
A Short Overview and Analysis of the Forest Fires in Greece since 2000.

Introduction. -Forest fires (the term used below to designate the unwanted fires destroying forests and wild lands; also referred to as 'δασικές πυρκαγιές' by the Greek Fire Service) are a major hazard throughout Greece, producing extensive environmental loss amongst others as well as having a considerable impact on animal and human lives. The repetitive trend of Forest Fires predominantly during summer period and the phenomenon of megafires, which we explain more in the following, has made the task of addressing this problem more and more complex and demanding. One factor intensifying this trend is undoubtedly the global climate change, with the increasing temperature affecting the biomass flammability while the diminish in soil quality and water content are some major consequences too. However, the policy making for addressing the problem of Forest Fires is also critical, and in the following we try to generate some insights into the Greek's State Policies, mainly by pointing out the funding imbalance existing between Fire Suppression and Fire Prevention policies**.-**

We start by sharing some basic facts and indices of the extent and the impact on land loss that Forest Fires have had throughout the last twenty-one years in Greece.



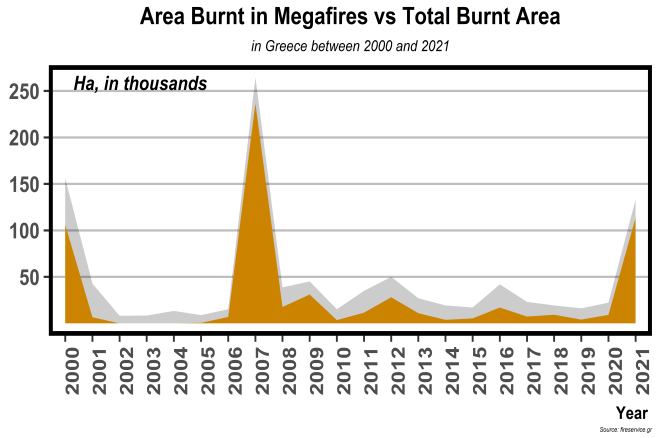
If we sum up the numbers from the graph above, it can be seen that between 2010 and 2021, more than 419,000 hectares were consumed in forest fires. Moreover, on average, during the same years, there were more than 9,500 forest fires. However, a greater number of fires does not immediately signify that more areas of forest are destroyed.

In 2000 alone, more than 150,000 hectares were burnt in contrast to 2001 where the number of fires was greater but the total land damage amounted to less than 50,000 hectares. The same trend, i.e, greater burnt areas whilst number of fires is reduced or remains stable, can be found in the pairs of years (2007,2008), (2011,2012) and (2020,2021).

One important reason for this non-linear relation between the number of fires and the area burnt is the phenomenon of megafires. Megafires are defined by extreme fire behaviour characterised by rapid fire spread, intense burning, long-range fire spotting and unpredictable shifts.

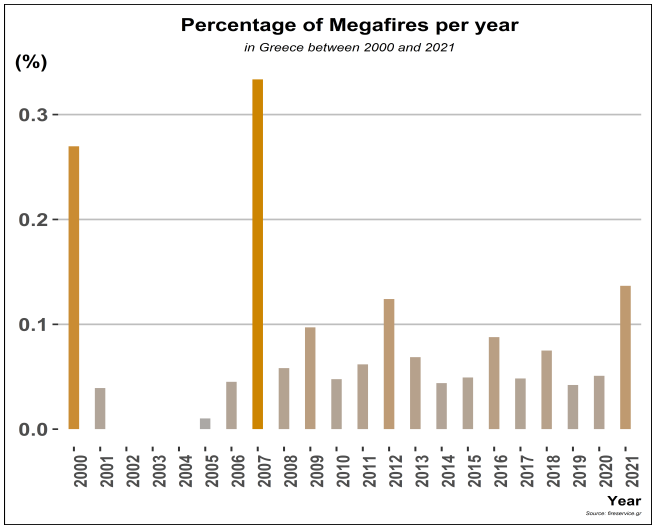
In this investigation, we consider a fire to be a megafire if more than 500 hectares of land area has been burnt.

In the most destructive fires since 2000 in Greece, i.e in 2000, 2007 and 2021, the majority of land loss was a result of megafires.



In 2007, for example, almost 90% of the total area burnt was due to megafires, while in 2021 the same index accounted for 85%. At the same time, the number of megafires in these years accounted for only a rather small portion of the aggregate number of fires (0,27%, 0,33% and 0,13% respectively),

indicative of their high impact on forest in terms of land loss and of the difficulty in their suppression.

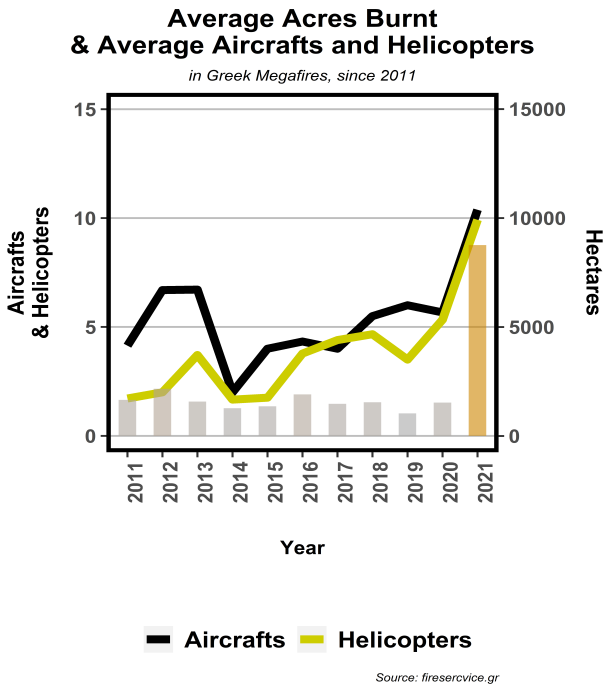


In the same years, it is evident that the greater the ratio of megafires the more land is expected to be burnt; in fact most of the loss of forests is due to megafires. Moreover, oit can be seen that in the years 2012 and 2021 there was almost the same percentage of megafires (around 0,15% of total fires), and in fact exactly 13 megafires in each year. However, the average land area consumed in 2021 megafires was more than four times higher than that in 2012 (2,158.7 ha/megafire in 2012 as opposed to 8,759.8 ha/megafire in 2021).

Thus, the task of suppressing such types of fire has become a central area of interest for the Fire Department. The main two factors determining megafires *are weather conditions and the fire proneness of the forested landscapes*.

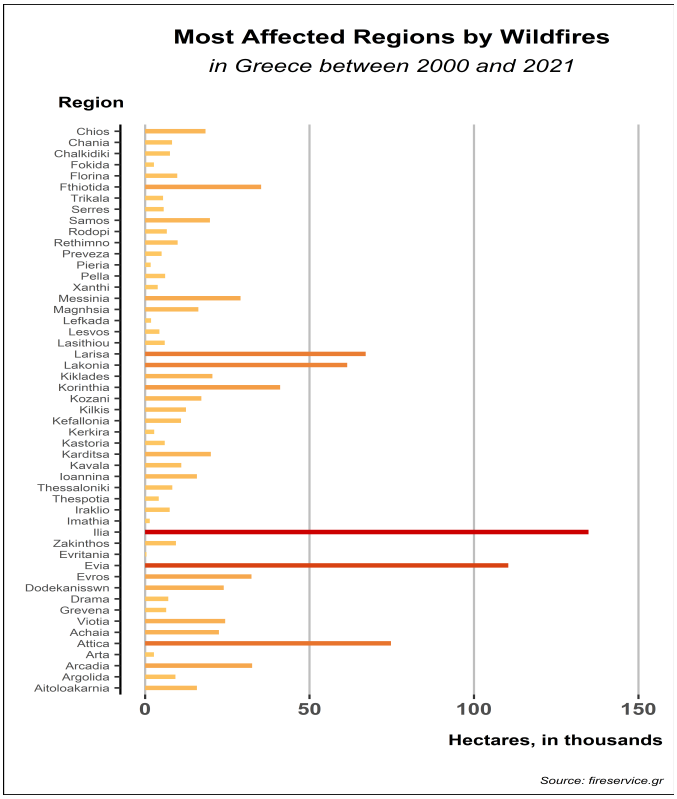
As far as weather conditions are concerned, *the projected increase in drought severity and the associated increase in fuel flammability due to climate change are further intensifying forest fire risk beyond existing fire prone areas. Hence, there is a need to integrate forest fire prevention principles in land and forest management strategies.* As a result, the fuel and forest management are two of the cornerstones of dealing with wildfires, whereas preparedness of local communities and authorities is essential too.

The importance of fire prevention can be also outlined by examining the relation of the size and the cost of the flying firefighting fleet and land loss in megafires. A fact that stands out is that, in 2021 average aircrafts and helicopters operating in megafires were almost twice as many as in the previous years on average, however, the toll of average areas destroyed due to megafires reached unprecedented levels (>8,000 ha per megafire). Futhermore, the cost of leasing aircrafts and helicopters used for fire suppression in 2021, came to 40,800,000€ which accounted for more than 46% of the aggregate budget for the Fire Departments' procurement in the same year.

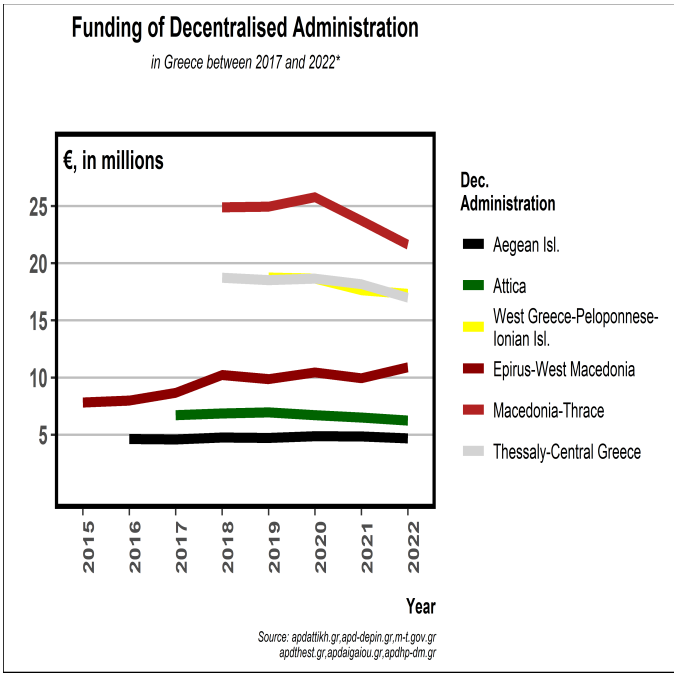


This fact raises concerns about the capability of rapidly and effectively controlling a megafire, by using more temporary and instantaneous solutions such as the employment of leasehold aircrafts and helicopters.

At the same time, as different regions vary in their vulnerability in the fire seasons, an adjusted fire prevention scheme for each region and an effective collaboration between decentralised and general authorities is required.

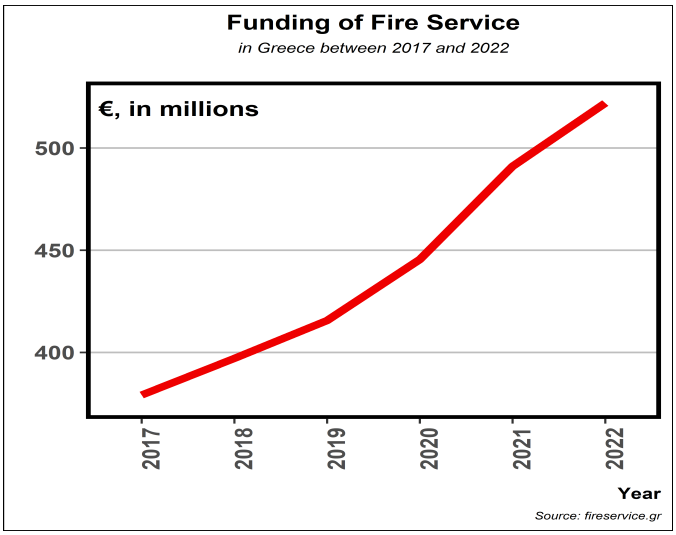


Since 2000, the regions facing the greatest forest loss are Ilia , Evia and Attiki. The Forest and Fuel Management in these areas is also a responsibility of the regional Decentralised Administration's Forest Directorate.



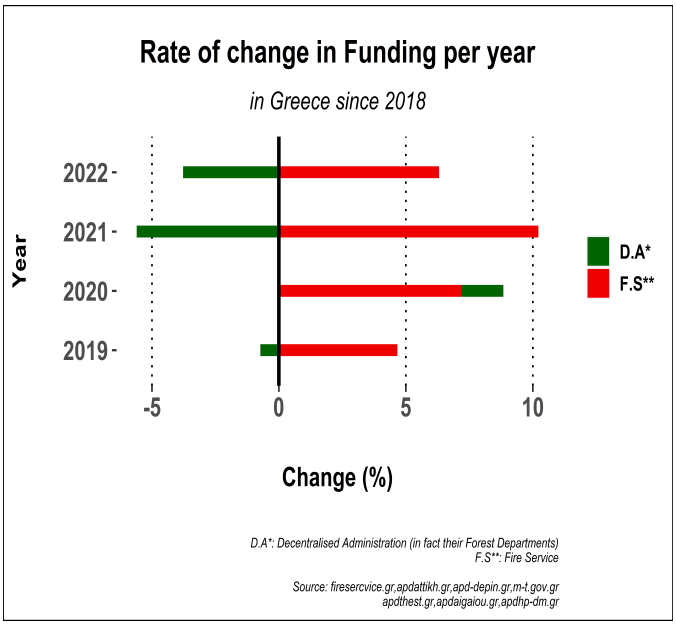
In particular, the forest management of Ilia is under the control of West Greece-Peloponnese-Ionian Isl. Decentralised Administration, Evia is under Thessaly-Central Greece direction and Attica under Decentralised Administration of Attica. In all cases, we observe a slight decrease in the funding for Forest and Fuel Management.

In the meantime, the aggregate funding of Forest Service has been increasing rapidly since 2017, and as we have already stated a great part of the increase from 2020 to 2021 was from the leaseholding of firefighting aircrafts and helicopters.



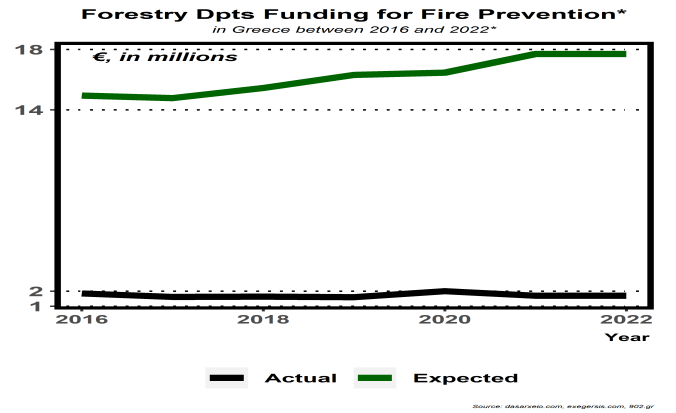
This fact does not immediately imply wrong decision making in Fire management but, as EU's Booklet for Fire Mangement Policies states "*currently, fire prevention forms are part of the fire management policy in all southern European countries,however, there is no enough focus on fire prevention strategies and ways of funding does not receive the necessary emphasis and funding compared to fire suppression planning.*"

In Greece, this imbalance in funding is evident and can be seen in the following graph, in which the rates of change in funding Prevention and Suppression Policies since 2018 are recorded.



In the above, it can be seen that with only exception of 2020 which registered a small increase in the funding of Forest Offices of Decentralised Authorities compared to 2019, from 2018 onwards there has been a constant trend of decrease in funding. For instance, in 2021 the Forest Departments had an over 5% decrease in their budgets compared to 2020, whereas during the same years, the funding of Fire Service increased by over 10%.

Another example showing that State funding in Greece is not meeting the needs and the demands of Local Forest Directorates is shown in the following figure. In this instance, from 2016 onwards, local authorities have published a detailed account of the funding needed for specific fire prevention initiatives, and finally the funding that they have actually received.



Conclusion.-As this quick survey is being written, new Wildfires and Megafires across Greece are occurring and once more, are creating a great damage in terms of both environmental loss and human life degradation. Hence, it is more important than ever for all policy makers to use all the available information about Forest Fires for improving Fire Protection, balancing between Suppression and Prevention and providing the adequate funding. Finally, it must be stated, even though quite outside of this surveys context, that a general plan towards climate crisis is needed, that is going to put peoples lives and nature preservation first, independently of the difficulty in cost management or in the socioeconomical initiatives that have to be implemented. If this general green plan serves this role, a more holistic, consistent and accessible to all fire protection scheme is possible too.-

Note: All text in *italics* is extracted from EU's Booklet *Sparking and Firesmart Policies in the EU*

Stavros Alfieris, August 2022