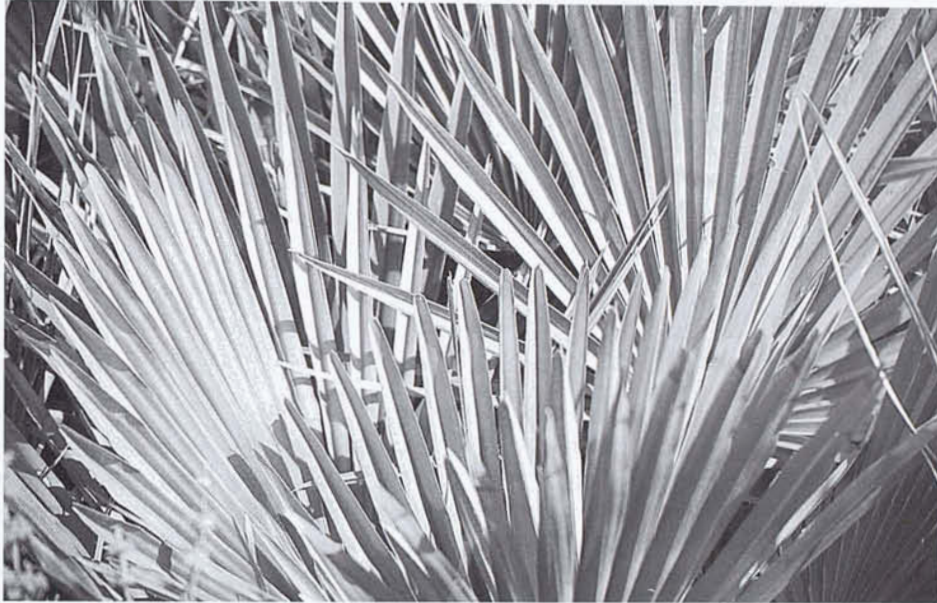


FOREST FIRES, EROSION AND AQUIFER CONTAMINATION IN THE PAÍS VALENCIÀ



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OVER THE LAST TWENTY YEARS, THE PAÍS VALENCIÀ, ALONG WITH OTHER MEDITERRANEAN AREAS, HAS SUFFERED AN AGGRAVATION OF ITS SPECIFIC ENVIRONMENTAL PROBLEMS, WHOSE ORIGIN IS CLIMATIC AND ANTHROPIC. HOWEVER, THREE OF THESE PROBLEMS HAVE LOCALLY BECOME MORE SERIOUS THAN IN NEIGHBOURING AREAS AND ARE HARDLY REVERSIBLE ON A HUMAN TIME SCALE. THESE PROBLEMS ARE FOREST FIRES, SOIL EROSION AND CONTAMINATION AND EXHAUSTION OF AQUIFERS.

XAVIER PUJOL GELI MEMBER OF ACCIÓ ECOLOGISTA AGRÓ, ASSOCIATION FOR THE DEFENCE AND STUDY OF NATURE IN THE PAÍS VALENCIÀ

Forest fires have been a centre of attention for the media on account of their spectacular nature and the toll they so often take in human lives. The geographical conditions of the País Valencià allow for the existence of a considerable tree coverage, except in

the south. The annual rainfall over most of the area is sufficient (between 350 and 600 mm), but subject to the marked seasonal differences typical of Mediterranean climates: a harsh drought in summer followed by heavy downpours in autumn.

Forest fires, of course, are a characteristic of this sort of climate. However, in the last fifteen years the figures for fires and surface area burnt have shot up far above the natural capacity for regeneration. It is therefore important to stress that today's fires are by no means a *nat-*



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ural occurrence. Since 1978, an average of 30,000 hectares have been burnt every year. On the basis of the conservative estimate that 50% are in woodland areas (the rest being areas of scrub and bushes) and bearing in mind that at present 13% of the Valencian territory (which has a total of 23,000 square kilometres) is still covered by woods, we can see that in a similar space of time the tree cover will have disappeared almost completely.

There has been a spectacular increase in preventive and fire-fighting measures. Financial investment and human resources have been multiplied by twenty, which has not avoided disheartening results. The surface area burnt in 1994 broke all records.

To make prevention effective it is essential that we find the causes of fires. It seems obvious that, without discounting other causes, the great majority have an involuntary anthropic origin. Depopulation of the countryside makes it more difficult to detect fires and extinguish them in the first moments, when specialized equipment can stop them short. Overgrown farmland makes it easier for the fire to leap from one patch of trees to another, so that small focuses of fire become a wall of flame tens of kilometres long. Furthermore, a growing number of city-dwellers go out into the countryside in search of leisure areas that are not to be found in the cities. Ignorance and in-

civility have catastrophic consequences. The frequent public awareness campaigns have not managed to eliminate carelessness, although they have managed to spread a vague concern for our natural surroundings amongst the public. Finally, the progressive substitution of fire-resistant species by other more pyrophoric (resinous) species so as to obtain an illusory commercial profit has left our forests extraordinarily combustible and fragile.

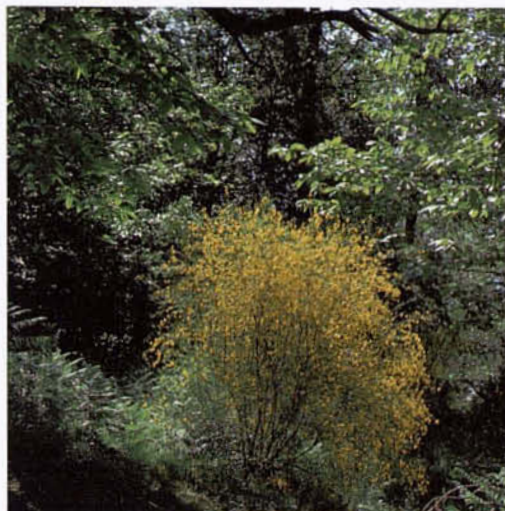
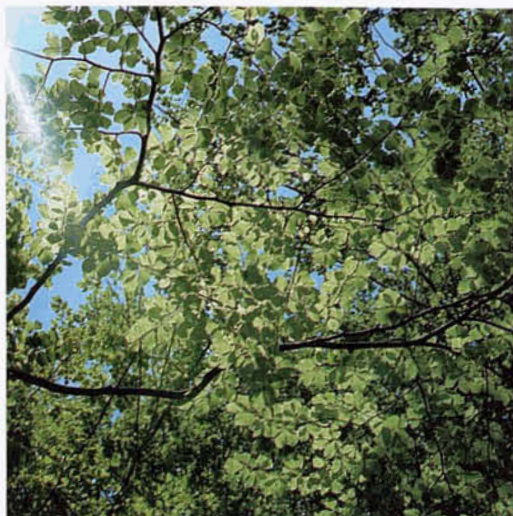
Public opinion, shaken by the impact of the fires, is inclined to applaud drastic interventions directed at preventing fires and regenerating the countryside. But we have reached such a state of fragility that the last thing we need are impetuous short-term interventions. Cleaning the undergrowth or opening fire-breaks, for example, has little effect in preventing the flames from spreading, and on the other hand it seriously damages the vegetation it is supposed to protect. The only rational form of prevention is to try and avoid the causes of fires; and as the majority are of human origin, there is room to hope that we can stop the process.

In particular, cleaning the undergrowth should be discarded out of hand, as it reduces the wealth and diversity of ecosystems. The same goes for opening new paths for wheeled transport (remember that most fires grow from an initial

roadside spark). On the other hand, the wealth of a wood –measured in diversity– automatically reduces likelihood of its burning. Fire-breaks not only fail to prevent a blaze from spreading, they also spoil the look of the countryside and favour erosion.

What is needed is a tightly woven on-the-spot surveillance network, covering the countryside and forming the first step in the rapid intervention teams. Initiatives of this sort have been put into operation with the collaboration of volunteers and have had quite encouraging results. The financial cost is not exorbitant. Modern methods of extinction and the professional firefighting equipment available is far from ideal. In spite of the increased budget allowances, there are still serious shortages and when fires proliferate it's clear that they are not enough. Ecologist groups have asked over and over again (so far without results) for a rigorous reckoning of all the means of prevention and extinction, in view of their obvious inefficacy as demonstrated in recent years.

Even so, long-term measures are the only hope of avoiding being permanently subjected to the dangers of fire, and even more so if forecasts of climatic change are confirmed. We need varied and far-reaching public awareness campaigns, starting in schools and getting to all the rural sectors. Development policies in



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country areas must in some way *reward* conservation and improvement of the biomass. Inhabitants of these areas must be the first to benefit from forest maintenance—in every sense, including an immediate financial return. The work of protection and regeneration—non-aggressive, approached from the point of view of the territory as a whole and without electoralist haste—provides ample opportunities for job creation.

The most serious long-term effect of fires is undoubtedly the loss of soil. The concentration of rainfall in heavy autumn downpours—after the summer fires—leads to large quantities of surface soil being washed away. The fertile layer in which the vegetation takes root disappears. Since the slopes are steep over a large part of the territory and the soil is not compacted, losses are very high. Bare landscapes crossed by deep furrows and gullies are becoming more and more common. In many places, abandoned farmland of no further use for farming quickly deteriorates and adds to soil loss. In 1975, the FAO included almost the whole of the País Valencià amongst areas of very high risk of desertification. In part, that risk has now become a reality. Today, 29% of the territory of Valencia shows a level of soil erosion that is high, very high or extreme; 26%, moderate, and 5%, slight. Unlike the case of fires, recovery is impossible once sur-

face erosion has taken place. In fact, fire prevention policies and the fight against erosion are two sides to the same coin. Erosion and the loss of plant cover make it more difficult for aquifers to build up again, as they increase the surface flow and reduce filtration.

Intensive agriculture—with irrigation—and tourism play a large part in the economy of the País Valencià. Both these sectors are intense water consumers. When the possibilities offered by surface water courses became exhausted, some years ago now, many regions had to resort to underground water. Intensive irrigated agriculture makes excessive use of nitrogenous fertilizers, with the result that, due to percolation, the underground aquifers are contaminated by nitrates. Where watering makes use of underground water, which already contains large amounts of nitrates, there is an accumulated contamination. Many towns which a few years ago drew good-quality drinking water from local wells now have to go further and further afield in their search for supplies, since the aquifers have been exhausted or the quality of the water is so low that it is not fit for human consumption. Even so, in many places the shortage means that water has to be supplied via the public system with intolerably high levels of nitrates. Almost 100 towns use water with a nitrate content of more than 50mg/litre, well above the re-

commendations of the WHO. Much market garden produce (frequent elements in the local diet) show concentrations of up to 1,000 parts per million.

Changing deeply rooted farming habits and techniques is obviously difficult. Nevertheless, Valencia has traditionally been at the forefront of technical advances and shows a very considerable ability to adapt to the requirements of the market. The new demands of consumers as regards healthier food could have a positive influence in reducing the use of chemical products. Similarly, accepting the objective limits to the growth of the tourist sector could in future ease the pressure on water resources, without forgetting a more realistic price policy than the current one, which fails to penalize excess consumption.

In certain coastal areas, the drop in the water-table as a result of overconsumption has led to the intrusion of sea water. Both chemical contamination and salinization require periods of tens of years before the aquifers can recover, assuming a stop is put to current abuse, something which shows no signs of taking place yet. When things get as serious as the state of affairs facing us now, the problems become interwoven and the situation is aggravated. Only through a global approach to land management and by fitting *uses* to *possibilities* and *available resources* can this trend be inverted. ■