

Restoring the sustainability and fire resilience of a forest - a landscape planning approach

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Abstract

Over the last century and particularly since the 1950s, the Portuguese traditional "agro-silvo-pastoral" systems have been subject to disruption leading to the homogenization and degradation of the landscape. Rural depopulation and the consequent abandonment of land management, in addition to systematic afforestation campaigns, converted these traditional systems into continuous monospecific forests, constituted by species with high flammability, such as *Pinus pinaster* and *Eucalyptus globulus*, which culminated in the increase of forest fires that ravage the territory every year.

Besides the drastic consequences of habitat and property destruction, the loss of landscape values has been an accelerator of land abandonment and neglect of natural resources, resulting in a landscape highly vulnerable to rural fires.

The presented case study aims to propose a long-term Landscape Plan for Curvachia do Cabeço do Vento (Curvachia), combining the objectives of fire resilience and ecological sustainability. This work is being developed in the scope of two research projects, SCAPEFIRE and LANDGI-Nexus, both aiming at a sustainable landscape transformation through an integrated approach combining ecological, cultural, and socio-economical components of the landscape (Magalhães et al, 2021). The proposed Landscape Plan integrates fire behaviour and ecological suitability concepts applied to spatial planning, together with close-to-nature forestry and permaculture design framework.

Curvachia is a 75 ha rural property located in Leiria municipality, 150 km from Lisbon city region. This property has a high suitability to silviculture in which some of the original *Quercus suber* and *Quercus faginea* forests remain. On the Ribeiro da Curvachia valley bottom, the more fertile soils were cultivated with horticultural crops, orchards, and vineyards. The cycle of organic matter was completed using the material resulting from pruning and thinning for cattle-bedding and manure production.

Pinus pinaster trees were planted in the beginning of the 20th century, along with alignments of eucalyptus trees, corresponding to the firebreaks. The area of eucalyptus expanded during the 1960s, replacing the agricultural plots which were eventually abandoned, thus eliminating the existing discontinuities in the combustible material. The largest fires occurred in 1985, 1995, and 2005 and a smaller one in 2021.

The proposed Landscape Plan ensures the ecological restoration of Curvachia along with its economic and social viability, namely by promoting Quercus forest's natural regeneration, native broadleaf trees new plantations, edging and swale design, creating a very diverse and resilient landscape with high ecological, cultural and aesthetic value.

Keywords: rural sustainable landscape, land-use planning, landscape transformation, resilient forest

References

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