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# Slow emergency stabilization: limitations for the recovery of burned areas in Portuguese forests

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## Abstract

Portugal is one of the European countries most affected by wildfires, together with Italy, Greece, France, and Spain (EUMED5), with extraordinary negative environmental, social and economic impacts, such as soil damage, disruption of the hydrological cycle, biodiversity loss, and loss of income at local and regional levels. Emergency stabilization is the first stage of burned area restoration after damage assessment and intends to stabilise the area and protect the soil in the shortest possible time, to avoid degradation processes. Emergency treatments should be implemented in the first four months after the fire, when most of the ashes and soil are lost. Public funding is available for post fire emergency stabilization through specific calls that are based on emergency stabilization reports, following large wildfires. The calls are the mechanism through which land managers can access the funding to execute the respective treatments. This is a relevant factor since the Portuguese forest area is mostly owned by private landowners (around 97%) and the majority of forest properties are smaller than 5 ha and 10 ha (85% and 93%, respectively). All these factors limit postfire emergency treatments since restoration is unlikely to be implemented by small-scale owners unless funding is readily available. The present study aims to improve understanding on the factors responsible for losses in efficiency of post-fire emergency stabilization in Portuguese forests, by analyzing administrative, technical, and financial factors related with the funding process. We analyze the process of implementation of public funding related with postfire emergency stabilization in Portugal for the period 2009-2018 using data from: (i) 134 emergency stabilization reports (ESR); (ii) 12 calls resulting from these reports, and (iii) 517 approved projects subsidized by the calls. We show that postfire emergency stabilization in Portugal is not effective due to limitations associated with the funding process and the implementations of treatments. The main limitation is not the lack of funding, but instead the difficulty to apply these funds within an acceptable time frame and the attractiveness of the funding programs. Additionally, we compare the results found for Portugal with successful case studies in similar forest ecosystems and present suggestions to improve the process of public funding and the efficiency of postfire

emergency stabilization in Portugal.

**Keywords:** Postfire restoration; Public subsidies; Cost effectiveness analysis; Portugal; Restoration strategy; Evaluation and monitoring; Governance and Policy

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