

Wildfire hazard and social vulnerability on evacuation decision: Methodological proposal applied to municipalities of Central Portugal

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Abstract

The development of prevention and adaptation actions is extremely important in a forest fire scenario, in order to minimise the loss of goods and people. Several professionals argue that the safest action that residents can take when threatened by a forest fire is evacuation. Thus, evacuation risk assessment may be decisive in saving human lives and preventing injuries, since it provides civil protection agents with important tools and data for the development of effective evacuation strategies. For instance, it allows considering the different social groups that may be more or less vulnerable and, on the other hand, positioning the combat means in areas more or less susceptible to fire.

This study aims, based on (i) the evaluation of the fire hazard, obtained from biophysical variables, and (ii) the social vulnerability, determined from socio-demographic variables, (iii) to identify the villages with a higher risk of evacuation and rescue in the municipalities of Lousã and Sertã (Central Portugal). The analysis of social vulnerability to evacuation is based on 4 distinct approaches: i) population and structure, ii) differentiated access to resources iii) population with special evacuation needs, and iv) all the previous components.

The results obtained show that more than 70% of the two municipalities present a high and very high fire hazard. Regarding social vulnerability, the results enable the identification of the settlements considered most vulnerable to evacuation. In the case of Lousã municipality, it includes the populations located to the southwest, in the parishes of Gândaras and the parish union of Lousã and Vilarinho, while in Sertã, the most vulnerable settlements appear in a scattered way throughout the municipal territory. When assessing the evacuation risk, resulting from the product of Hazard X Social Vulnerability, the model identified the most problematic settlements, located in physical spaces highly susceptible to the occurrence of forest fires (surrounded by highly combustible species) and with the prevalence of an aging population.

Keywords: Wildfire, vulnerability, susceptibility, evacuation, Central Portugal

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