

Science for Environment Policy

Protecting against erosion after wildfire

Soil erosion after wildfire can be substantially reduced by using a combination of sowing grass seeds and protecting the soil with a layer of straw, a Spanish study suggests. The authors of the research found that, although seeding alone made little difference, the combination of straw mulch and seeding reduced soil erosion by 93%.

The European countries that are worst affected by wildfires are Spain, Portugal, France, Italy and Greece. Every year, fires in these five countries burn about 400 000 hectares of forest, although yearly totals vary widely¹.

In Spain, where this study was conducted, the authority responsible for preventing and intervening in forest fires spent nearly €79 million on these activities in 2013². The Food and Agriculture Organization's working group on Forest Fires warns that the threats posed by forest fires are increasing due to climate change³.

Besides directly destroying biodiversity, wildfires expose the soil, making it susceptible to erosion. Grass seeding after fire is widely used to stabilise soil and control erosion, although there is limited evidence that it is effective.

However, the warm, rainy conditions in northwestern Spain — a region that is particularly vulnerable to erosion — may make it more suitable for this approach, since grass becomes established very quickly here. Other methods used to stabilise the soil include covering it in mulch.

The study's authors compared stabilisation by seeding alone with stabilisation by combined seeding and mulching. They carried out their research on a 350-hectare area of shrubland in Ourense, northwestern Spain, that was destroyed by wildfire.

Immediately after the wildfire in 2009, the researchers established 15 plots on a slope in the study area, each measuring 22 x 5 m. They sowed grass seeds on five plots, sowed grass seeds and applied straw mulch on another five plots, and left another five untreated to act as controls. They monitored the plots for two years, recording rainfall, erosion and plant cover.

Straw mulching plus seeding reduced erosion by 93%, compared with control plots. However, seeding alone was no better than simply leaving the burned ground untreated. In all cases, vegetation started to become established about six months after the fire. After six months, plant cover increased most rapidly on the combined straw mulching and seeding plots, reaching 96% by the end of the study. A third of the coverage was grass. By contrast, only 77% of the ground was covered on plots that were only seeded, and about a quarter was grass.

The researchers suggest that mulching combined with seeding better protects the ground from rain and limits the flow of water compared with seeding alone. They also suggest that when seeds were sown without mulch, they were probably washed away with rain and eroded soil. They say their results support the use of mulching as a feasible and efficient option for stabilising burned hillslopes in similar climates.



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