

Climate change can lead to less rainfall. As a result of the ensuing drought, the risk of forest fires increases. **Cathelijne Stoof**, who is soil expert and PhD student at the chair group Land Degradation and Development, is studying the effect of fire on soils and hydrology. For the investigation, a Portuguese shrub catchment of 10 hectares was completely burned by controlled fire, the first experiment on this scale.

"Before, during and after the fire we took various measurements, such as precipitation, run-off, soil moisture and temperature. During the fire, the flames were 900 °C, the soil surface was 100 °C and the soil at a depth of 1 cm was only 25 °C. Because the soil remained relatively cool, the impact of the fire on the soil was only minor. However, fire does have a large effect on the vegetation. It often burns away completely, which can have a considerable impact on the hydrological cycle. In unburned situation, shrubs intercept a large part of the rainwater. With the vegetation removed by fire, suddenly a lot more water needs to find its way to the water courses, either above- or belowground. In addition, soils can become water repellent during the fire (because of the heat) or after the fire, because of increased soil drying after vegetation removal. As a consequence, surface runoff occurs that causes a rapid spike in the river flow. This can lead to possible flooding."



"For the study I used Divers® by Schlumberger Water Services in order to measure the water levels in streams. I also used a small arable land auger a lot to determine soil water repellency in depth and to measure soil depth in the catchment. During my fieldwork in Portugal I had frequent contact with Eijkelpamp. After a while they knew exactly who I was and what I was doing."

Ultimately Cathelijne Stoof hopes that her research will provide insight into which strategies are the most suitable for preventing flooding and erosion after forest fires: "Our experimental fire took place in the winter. As the soil and the litter were still quite moist, the impact on the soil was only slight. Fire can considerably degrade the soil when soil temperatures are high (such as in summer fires), but our research shows that even if the soil is not damaged, fire can have considerable hydrological impact because of vegetation removal. So, after a fire it is important that plant cover returns as quickly as possible."

*Photo: C. Stoof*

