



Hydro-morphological dynamics of traditional shifting agriculture in the Spanish Pyrenees

ESTELA NADAL ROMERO (1), Teodoro Lasanta (2), and Pili Serrano (2)

(1) University of Zaragoza, Geography and Land Management, Zaragoza, Spain (estelanr@unizar.es), (2) Instituto Pirenaico de Ecología (CSIC). Procesos Geoambientales y Cambio Global, Zaragoza, Spain

Shifting agriculture is still a traditional practice in many countries worldwide. In Mediterranean mountains, shifting agriculture was used for cereal crops until the middle of the 20th century, in times of high population pressure. Very steep slopes far from the villages and with poor soils were plowed. In the Central Spanish Pyrenees, shifting agriculture accounted on average 22.8% of the total cultivated area, representing about 4% of the territory. In order to know the hydro-morphological consequences and the effects in the landscape, cereal crops were reproduced in experimental plots during 20 years (1992-2011). Specifically, 4 plots were selected: (i) fertilized cereal (barley), (ii) shifting cereal (barley), (iii) abandoned field after shifting cereal and (iv) dense scrub. Results show that shifting agriculture produces the highest runoff coefficients (mean value of 19.5%), while runoff coefficient in the fertilized cereal is 13.5% and in the dense scrub cover the mean value is 4.6%. Soil losses are also higher in the shifting agriculture (1356 kg/ha/year) than in the fertilized cereal (858 kg/ha/year) and in the dense scrub cover (166 kg/ha/year). Abandonment after shifting agriculture involves a fast herbaceous growing (100% after 6 years) and a slow scrub growing (40% after 16 years). The increase in vegetation cover represents a slow decrease in runoff coefficient and a more pronounced decrease in soil erosion rates. However, in old shifting system cultivated slopes, severe erosion processes can be observed after decades of abandonment, which explains the landscape degradation and the occurrence of shallow landslides, and the frequent presence of stone pavement.