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The Decay of Soil and Water Conservation Structures in southeast Spain increases Connectivity between the Cropland and the Fluvial System.

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Traditional rainfed agriculture in semi arid regions heavily relies on soil and water conservation (SWC) structures to supplement the sparse rainfall. When extensive, such systems prevent any runoff into the fluvial system. The extent to which these dams and terraces resist major events is, however, variable, and earthen dams including the soil retained behind them can be major sediment sources.

From the 1970s onwards, rainfed crops like almonds or olives have expanded rapidly in the marginal areas that were protected by SWC structures. Furthermore, an important land abandonment occurred from 1950 until 1980 in these marginal areas due to an important migration towards the cities and the coast. These large-scale almond and olive plantations with widely spaced trees do not rely on runoff water, but exploit the soil water of a large soil volume of bare soil maintained by regular shallow tillage. The high density of terraces has now become a nuisance to the farmers. The aim of this paper is to i) demonstrate the degradation of SWC structures and the relative importance of the driving forces, ii) demonstrate the implications of the disappearance of SWC structures over the period 1955-2005 for the hydrological connectivity between croplands and the ephemeral rivers system and iii) constrain the effects of SWC structures on hydrological connectivity by assessing their functioning during a heavy storm (return period 8.2 years). The paper describes a case study of the headwaters

of a marl catchment with a contiguous area treated with SWC structures in Murcia region (Spain).

The area had a very high density of step terraces and check dams (159 m ha-1) in 1956, which decreased by 25% until 2005. Apart from this decrease in total length many terraces have not been maintained and flow traces indicate that they no longer retain water. This is particularly true for the check dams in abandoned lands. The spacing between the step terraces has increased over time, making them vulnerable to erosion. The percentage of cropland draining directly on the river system without interference of a check dam has increased from 9% in 1956 to 31% in 2005 and 40 % after the storm in November 2006. The latter has broken dams with a contributing area larger than 0.3 ha. Although croplands had a minor role in connectivity of water and sediment to the river system, the lack of maintenance will gradually increase this connectivity.