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The effect of land-use changes on actual geomorphodynamics

Manuel Seeger (1), Johannes B. Ries (2), and Irene Marzolff (3)

(1) Land Degradation and Development, Wagenigen UR, Netherlands (manuel.seeger@wur.nl), (2) Dep. of Physical Geography, Trier University, Germany, (3) Dep. of Physical Geography, University of Frankfurt/M., Germany

Land-use changes are the cause of severe impacts on the earth's surface characteristics. Intensification commonly leads to a reduction of plant cover and to the destruction of soil's organic matter, whereas the extensification is understood to reduce disturbance on the soil's surface. The economic situation in agriculture is leading on one hand to an intensification of agricultural production, e.g. the expansion of irrigation, on the other hand to a parallel extensification by abandonment of dry-land farming practices and expansion of extensive or occasional grazing.
The semi-arid north east of the Iberian Peninsula has been affected during the last decade by an increase of fallow land of around 20 %. The process has lead on one side to a slow increase of vegetation cover, but at the same time also to an increment of geomorphodynamics. This, apparently, contradictory behaviour of the areas is caused by an increase of the process' complexity. It is true that the vegetation cover tends to reduce the splash and sheet erosion, but its patchy development causes a runoff concentration and a subsequent strong increase of rill erosion processes. These are considered to be highly productive sediment sources, which stay active due to self reinforcing processes.
A combination of experimental methods and monitoring techniques have proved that there is an increase of sediment production following the abandonment of agricultural practices. After some years it may decrease, but the runoff generation maintains high. This leads to a shift in process interactions and intensities, leading to increasing linear erosion (rills, gullies) and enhancing the downward coupling of runoff and erosion processes. Additionally, the coupling is enhanced by man-made structures like trails, ditches, terrace rims and animal paths.
The results show clearly that land-use and land-use changes are the cause of high dynamics on the earth's surface. Even the reduction of disturbance leads to a change in process interaction which may cause a severe increase of erosion processes an the consequent damages on-site and off-site.