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Soil Erosion in agro-industrially used Landscapes between High and Anti-Atlas

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The Souss basin is characterised by high population dynamics and changing land use. Extensive plantations of citrus fruits, bananas and vegetables in monocropping, mainly for the European market, replace the traditional mixed agriculture with small-area olive orchards and cereal fields. A precipitation of around 200 mm enforces the irrigation of cultivation by deep wells. The spatial vicinity of highly engineered irrigation areas, which are often created by land-levelling measures, and housing estates with highly active gully systems and rapid badland development presents a risk to both the agro-industrial land use and the population settlements. It is investigated whether the levelling measures influence surface runoff and soil erosion and thereby affect the further gully development. The influences of surface characteristics on runoff and soil erosion are analysed. Therefore 91 rainfall simulation experiments using a small portable rainfall simulator and 33 infiltrations by means of a single ring infiltrometer are carried out on seven test sites nearby the city of Taroudant.

The rainfall simulations (30 minutes, 40 mm h^{-1}) show an average runoff coefficient of between 54 and 59 % on test sites with land-levelling measures and average runoff coefficients ranging between 36 and 48 % on mostly non-levelled test sites. The average of soil erosion lies on levelled test sites between 52.1 and 81.8 g m^{-2}, on non-levelled test-sites between 13.2 und 23.2 g m^{-2} per 30 minutes. Accordingly, all the test sites have a rather low infiltration capacity. This can also be confirmed by the low average infiltration depth of only 15.5 cm on levelled test sites. There is often a clear borderline at horizons with a high bulk density caused by compaction. In contrast, on non-levelled test sites, the average infiltration depth reaches 22.2 cm. Reinforcing factors for runoff and soil erosion are slope and soil crusts. Vegetation cover has a reducing influence on surface process activity. Medium rock fragment cover shows high rates of runoff and soil erosion.

Hitherto collected data show an explicit difference between levelled and non-levelled test sites. Land-levelling measures clearly influence the generation of surface runoff and soil erosion and consequently, advance the further gully development.