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Impact of check-dams and land use changes on river morphology: study case of La Rogativa catchment (Murcia, Spain)

C. Boix-Fayos, G. González-Barberá, G., M. Martínez-Mena, V. Castillo., J. Albaladejo.

Soil and Water Conservation Department, CEBAS, Spanish Research Council PO BOX 164, 30100 Campus de Espinardo, Murcia, Spain (rn002@cebas.csic.es/Phone: +00 968396264)

Land use changes and hydrological correction works carried out in catchments have consequences in their fluvial dynamic, as it can be seen from the morphological evolution of river beds.

An analysis of the consequences of the hydrological correction and reforestation that took place in the 70's in a catchment (La Rogativa, 48 km^2) in Murcia (Southeast Spain) has been preliminary assessed. The methods used focussed at four scales of analysis: catchment, river bed, river ridges and next areas upstream and downstream check-dams. A land use change detection analysis of the catchment and mapping of river bed morphology at three dates 1956, 1981 and 1997 was performed. Furthermore morphological field mapping of river ridges, characterization of the areas upstream/downstream check-dams and monitoring of aggradation and degradation processes was also carried out.

Vegetation cover (especially forest) has increased notably in the catchment since the 50's, due to reforestation campaigns carried out by the Spanish Government and the abandonment of agricultural activities. 72 % of the check-dams constructed in the catchment are silted and 81 % of them show erosion features downstream. The active river bed has become narrower and many of the lateral bars have been colonized by vegetation. A displacement of the active river-bed to the East is also observed. The hypothesis maintained is that the parameters that control sediment transport are disturbed, water flow has been released of part of its sediment load due to the increase of infiltration capacity of the slopes, and the sediments retained upstream check-dams.

Erosion downstream check-dams started, as well as erosion of the river bed, until armouring of river bed appeared, then the stream started to migrate slowly due to bank erosion.

Nowadays check-dams within the catchment have lost much of their trap efficiency, erosion of the sedimentary areas upstream dams start to occur, degrading the structure of the dams and mobilizing the sediments retained during thirty years.