



Collection and storage of runoff from hillslopes in a semi-arid environment: geomorphic and hydrologic aspects of the aljibe system in Almeria Province, Spain

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Water harvesting systems in south-east Spain collect runoff from hillslopes in underground cisterns (aljibes). The characteristics of 51 aljibes were recorded. Aljibe volume increases non-linearly with catchment area ($r^2 = 0.29$; $N = 51$). This relationship becomes even stronger for the water harvesting systems on rocky slopes ($r^2 = 0.56$; $N = 34$). An empirical rainfall/runoff model indicates that the surface characteristics of the catchments are critical in producing sufficient runoff during years with low annual rainfall. The aljibe system is still viable provided the runoff coefficient of the catchments is high (curve number > 90) and the volume of the aljibes is large enough to prevent overflow (volume to catchment area ratio > $60 \text{ m}^3 \text{ ha}^{-1}$).

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Introduction

A variety of systems have been developed to provide supplementary water for rain-fed agriculture in semi-arid and arid regions (e.g. Yair, 1983; Giraldez *et al.*, 1988; Tabor, 1995; Lavee *et al.*, 1997). Water harvesting systems that collect runoff in underground cisterns to provide the needs of families and their livestock are common in Spain (Chapman, 1978; Cara Barrionuevo & Rodríguez López, 1989; Cara Barrionuevo,

