



Vegetation interaction with runoff and flash floods; implications for restoration of drylands

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Much of the degradation in desertified landscapes is due to water erosion processes and there is now growing evidence that vegetation may be one way to mitigate this impact. Previous research has indicated that vegetation planted or encouraged to grow in flow pathways can reduce erosion and increase sedimentation, thus decreasing the downstream sediment flux and connectivity. In order to select suitable plants, however, the conditions for growth and survival need to be assessed. This includes the ability of plants to withstand large flows of water, generated in flash floods. Thresholds for damage and destruction need to be quantified.

The response of vegetation to a range of flows and conditions within ephemeral channels of the drylands of SE Spain has been measured over a period of > 15 years, enabling impacts, thresholds and rates of recovery to be identified. The results indicate that most herb species are easily removed, even in relatively low flows. Many shrub and tree species are well adapted to the conditions and are not easily destroyed, even by high flows and strong forces on the plants. However, an extreme event in September 2012 did damage large woody vegetation in one channel. Comparison of sites and events show that effects on vegetation are influenced not only by the peak height and duration of the flood but also by channel substrate, sediment load and morphology and by the position of the vegetation within the valley floor. Different species vary in their susceptibility and resistance to these factors. The implications of the findings are discussed in relation to vegetation strategies and selection of species suitable for land restoration in dry regions and for soil erosion and flood control.