



Analysis of the influence of check dams on riparian vegetation cover through field measurements and remote sensing

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In-situ measurements of the Leaf Area Index (LAI) were used to detect the variability of riparian vegetation in a stream of Northern Puglia (Southern Italy), characterized by the presence of intact and destroyed check dams. The measures of LAI conducted in the Cammarota stream using a Plant Canopy Analyzer along fifty-three riverbed transects gave observed values ranging from 0.26 to 5.71. The lower ones were found in those reaches where destroyed or strongly damaged check dams, no longer effective in counteracting the riverbed erosive processes, are located. The higher LAI values were instead detected in the reaches with a higher geomorphological stability and the presence of intact or slightly damaged check dams. The analysis of a nearby stream, named Vallone della Madonna, with intact check dams and sound riparian vegetation, confirmed these results. Here the observed values of LAI ranged between 4.08 and 5.93, which do not differ greatly from those found in the Cammarota reaches with similar geomorphological conditions. LAI measurement were then conducted for two control plots in the surrounding areas, to compare the LAI values of riparian vegetation with those of wheat fields and deciduous forest, characterized by a homogeneous type of vegetation.

LAI values from both streams and from the control plots were also retrieved from Landsat 8 satellite images. Three equations for deriving LAI values from the corrected Normalized Difference Vegetation Index (NDVIC) were used and their statistical performance was evaluated. The Lambert-Beer equation better predicted LAI within Cammarota reaches with denser vegetation, in the Vallone della Madonna stream and in the deciduous forest, while the Caroux-Garson equation showed a good performance for winter wheat. Further developments of this study will be related to the evaluation of the performance of satellite images with higher spatial and spectral resolution, like the Sentinel-2, provided by the Copernicus mission of the European Space Agency (ESA).