

Assessment of Dimensions and Gully Recovery With GPS Receiver and RPA (Drone)

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Abstract : Currently, one of the most important environmental problems is soil degradation. This wear is the result of inadequate agricultural practices, with water erosion as the main agent. As the runoff water is concentrated in certain points, it can reach a more advanced stage, which are the gullies. In view of this, the objective of this work was to evaluate which methodology is most suitable for the purpose of elaborating a project for the recovery of a gully, relating work time, data reliability, and the final cost. The work was carried out on a rural road in Monte Alto - SP, where there is 0.30 hectares of area under the influence of a gully. For the evaluation, an aerophotogrammetric survey was used with RPA, with georeferenced points, and with a GNSS L1/L2 receiver. To assess the importance of georeferenced points, there was a comparison of altimetric data using the support points with altimetric data using only the aircraft's internal GPS. Another method used was the survey by conventional topography, where coordinates were collected by total station and L1/L2 Geodetic GPS receiver. Statistical analysis was performed using analysis of variance (ANOVA) using the F test ($p < 0.05$), and the means between treatments were compared using the Tukey test ($p < 0.05$). The results showed that the surveys carried out by aerial photogrammetry and by conventional topography showed no significant difference for the analyzed parameters. Considering the data presented, it is possible to conclude that, when comparing the parameters of accuracy, the final volume of the gully, and cost, for the purpose of elaborating a project for the recovery of a gully, the methodologies of aerial photogrammetric survey and conventional topography do not differ significantly. However, when working time, use of labor, and project detail are compared, the aerial photogrammetric survey proves to be more viable.

Keywords : drones, erosion, soil conservation, technology in agriculture

Conference Title : ICAEE 2023 : International Conference on Agriculture, Ecosystems and Environment

Conference Location : Rome, Italy

Conference Dates : March 06-07, 2023