COMPARATIVE ASSESSMENT OF STATISTICAL TOOLS FOR HANDLING CATEGORICAL RESPONSE VARIABLES FROM FARMER PARTICIPATORY TRIALS

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This paper looks at responses from participatory on-farm farmer participatory trials that are often measured as ratings (farmers score each given treatment on a scale that is ordered but arbitrary) or rankings (where farmers arrange the treatments in order from most preferred to least preferred). Ranking and rating data are often used in a trial to assist the researcher in ascertaining the reasons that may lead a farmer to adopt/ not adopt a particular variety. This paper will identify, describe and contrast simple methods of analyzing ranking and rating data. Methods such as the preference statistic that uses the proportion of responses where treatment A is preferred to B, Kruskal-Wallis test which is a one way analysis of variance by ranks and the Friedman test that is a two way analysis of variance by ranks are described and the shortcomings related to these methods that use linear model based analyses of ranking and rating data are outlined. Suggestions on practical approaches on the ordinal regression for rates have also been made. Further the paper will explore and implement the Bradley-Terry model in statistical software.
Logistic regression has been identified as the standard approach of analyzing binary and ordered categorical outcome data given that regression coefficients from logistic models have simple interpretation in terms of odds ratios that are easily understood. To analyze ranks, the Bradley-Terry model for ranks which is a logit model for paired comparisons shall be used to fit models. The cumulative logit model has been given as the appropriate model for analyzing rating data and models will be fitted to the data. The data is from experiments done by International Center for Research in Agroforestry (ICRAF) in Malawi to test the effect of Gliricidia and Sesbania in improving soil fertility.