

A STUDY ON STATISTICAL ANALYSIS OF DATA
FROM INTERCROPPING EXPERIMENTS

by

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ABSTRACT

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Experimental data from 21 intercropping trials involving two crops were used to (i) evaluate the possibility and usefulness of applying a bivariate analysis of variance to analyze yield data of both crops as intercrop; and (ii) examine the validity of the assumptions underlying the analysis of variance for Land Equivalent Ratio (LER).

For intercrop yields, the assumption of additivity was violated in 11 out of 21 trials examined (or 52%). The assumption of homogeneity of variance was not violated in 5 out of 21 trials (or 24%), two of which has the assumption of additivity violated. The two assumptions, normality, and the homogeneity of correlation coefficients, on the other hand, were not violated in any of the 21 trials examined.

Since there is no evidence of heterogeneity of correlation coefficients in intercrop yield data, the use of bivariate analysis of variance seems possible.

Three different types of sole crop yield used in computing LER were examined: (i) sole crop yield as the yield of the crop under the optimum condition coming from the same replication; (ii) sole crop yield as the average over all treatments within the same replication; and (iii) sole crop yield as the grand mean (i.e. average yield from all sole crop plots -- over all replications and treatments).

Results indicated that departure from the assumption of additivity was about twice more frequent for the first two methods compared to the third method. A logarithmic transformation was found to be effective in removing the non-additivity.

No violation of the assumption of normality was detected in any trial, irrespective of the methods used. Hence, the advantage of the use of a constant sole crop yield as the divisor of LER (i.e. the 3rd method) to avoid "non-normality" has not been demonstrated.

The assumption of homogeneity of variance was violated in only two trials in the first method and one trial each in the second and third method.

Thus, the usual way of computing LER (1st method) does not have problem as anticipated and the analysis of variance on LER should be possible.