45. **Study of Effect of Weather on Response of Sorghum to Long-term Fertilizer Application through Cluster Analysis**

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Response of sorghum to 18 fertilizer treatments applied over a period of 13 years from 1979-80 to 1991-92 was analysed to study the extent of variation due to weather. For this purpose years were classified into homogeneous groups using cluster analysis. Six weather variables at four stages of crop growth were used. Weights were applied to differences in variables according to their importance for calculating distances between years. Method of complete linkage was used to combine years. 13 years could be classified into 5 homogeneous clusters. Mean yields of these clusters were significantly different from each other for all treatments and control. Variation in responses due to cluster was examined by regressing responses over clusters. It was found that the quadratic equations were good fit and accounted for more than 80% variation in the responses. It was observed that the differences in responses of different treatments were not high in favourable weather years. $P_2O_5$ was found to be essential nutrient in the absence of which other nutrients $N$ and $K_2O$ failed to increase the response above control in both favourable and unfavourable years. Application of $K_2O$ tend to increase the yield in unfavourable years whereas an additional dose of $P_2O_5$ instead of application of $K_2O$ increased the response in favourable weather years.

46. **Estimation of Harvest Index in Groundnut**

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Harvest Index (H) is computed as the ratio of podweight $Y$ to biomass $X$ by groundnut breeders and physiologists. The scatter plots of $(Y,X)$ in an irrigated ICRISAT groundnut trial showed a linear relationship between $Y$ and $X$. Also, fitting of the linear regression model $Y_i = A + HX_i + e_i$ consistently delivered a highly non-significant estimate of the intercept $A$ for all genotypes. This was in conformity with the nature of the crop that the podweight $Y$ must be $0$ when the biomass $X = 0$. This suggested the possibility to get LS estimate of $H$ from the no-intercept linear regression model $Y_i = HX_i + e_i$. The paper exemplifies and discusses this possibility using data of a genotype.