

## INCREASING THE PRECISION IN TREE CROP EXPERIMENTATION

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Blocking is done to increase the precision of experiments. In tree crop experiments, blocking is done based on visual observation of the properties of the experimental field. Blocking is most effective when the experimental area has a predictable pattern of variability, because only the variation within a block becomes part of experimental error. However, with tree crops, tree to tree variation is very high and blocking alone cannot control the variability.

Nearest neighbour (NN) method is a technique useful in minimizing residual error. In this study the efficiency of four types of NN models were compared with randomized complete block design (RCBD) model using two sets of secondary data of coconut. Secondary data were obtained from Coconut Research Institute (CRI) at Lunuwila. Data and information used were collected from Fertilizer and Progeny trials. The response variable used in both experiments was nut yield per palm per year.

The two sets of data were initially analyzed using the RCBD model. After that data were analyzed considering the neighbouring effects and ignoring the block effect using various neighbour models. The coefficient of variation (CV) was used to compare different models for their efficiency in reducing residual variance in the presence of spatial variation. With the intention of removing spatial effect, palm wise data were adjusted by considering four neighbours.

Results in this study showed that all four models were effective in reducing variation caused by spatial heterogeneity. The precision of experiment is given by the coefficient of variation. The precision being higher when the coefficient of variation is low and vice versa. When data were analyzed for mean yield of plot, all four neighbour models reduced CV. The percentage reduction varied from 5.3% to 92.6%. The lowest CV was obtained, when data were adjusted for the direction of spatial variation.

The NN models could be used as a corrective measure when field blocking alone does not prove effective in removing the effect of field variation. This methodology can be tested for other secondary data on coconut as well as for other tree crop data.