STAT 998 (Yield Problem)

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The researchers wish to compare the effects of irrigation and variety on the yields of crop. To measure the effect of irrigation only, on the crop yields, a linear model was fit. This model has a p-value of 0.253 which suggests that the crop yields does not significantly differ between high irrigated fields and low irrigated fields. The second model was fitted between crop yields and variety of crops. The model chosen was a linear model and the p-value for the model was 0.925. This suggests that there is no significant effect of variety of crops on crop yields.

To determine whether the irrigation effect depends on variety or vice versa a third linear model was fitted which included the individual factors (irrigation and variety) and the interaction between irrigation and variety. This model has a p-value of 0.007. Such a small p-value indicates that the effects of irrigation on crop yields do depend on variety of crops. Hence this model should be chosen to predict the crop yields for a given irrigation type and variety of crop.

In order to control for the variation among fields a mixed random effect model was fitted. It was assumed that the variation would be amongst the fields and also the amongst the variety-field pair. The model showed that the both the variations were insignificant and hence should not be included in the model.

Thus, the linear model with interaction effects is the best fit model found so far.