Video 48: 2-way setup through agricultural example

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Suppose we have number of varieties of crop available and we wish to study their yield. Suppose we have 24 plots of land which are as identical as possible and 3 varieties of crops, then we select 8 plots for cultivation of crop of variety 1, again select 8 plots randomly for cultivation of crop of variety 2 and crops of variety 3 are cultivated in remaining 8 plots. Figure 1 shows a random
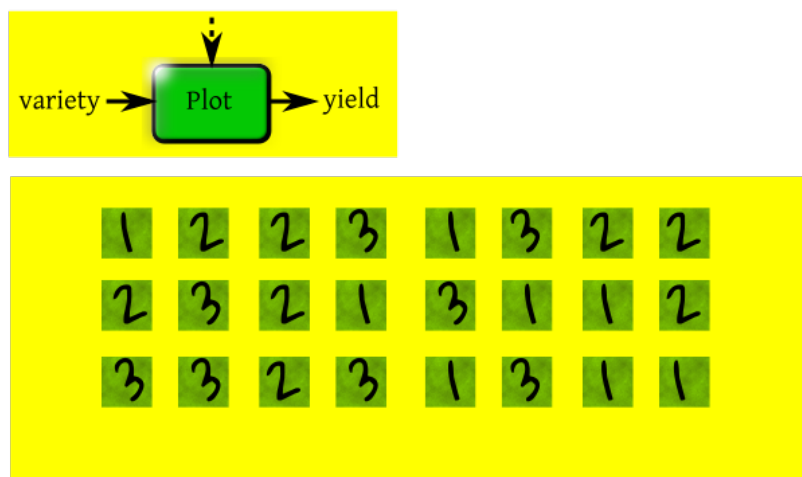

Figure 1: Black box diagram and a random selection of plots

distribution of plots among 3 groups and a black box diagram corresponding to the described experiment.

However, finding 24 identical plots is a difficult task. In a hilly region, it might happen that some of the plots are on the plain and remaining have some slope. Some crops like tea grow better on hillside whereas some crops like paddy grow better on plains. Hence, the slope of the land might have some effect on yield
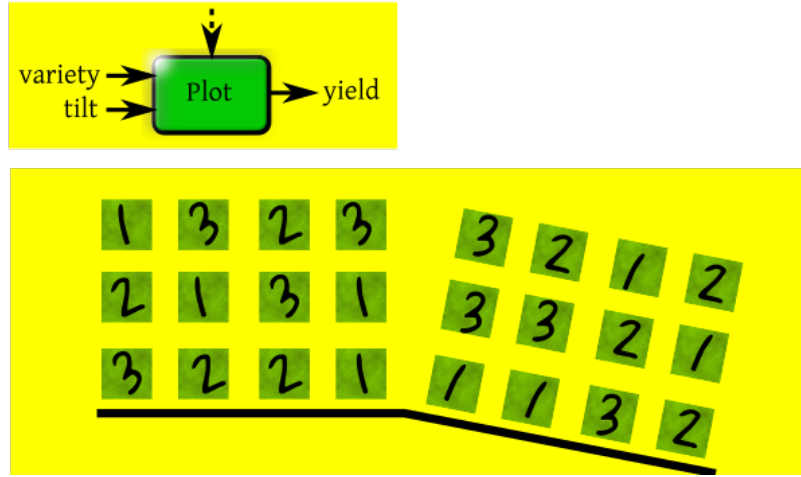
Figure 2: Black box diagram and a random selection of plots when some plots are on plain and remaining have slope

of the crop. Hence, the difference between slopes of the plots is not random. Hence, now we consider one more factor 'tilt'.

Here, variety is a treatment and tilt is the control factor. The output of the experiment is yield of the crop. Now, suppose we have 12 plots which are on the plain and other 12 plots have slope. Now, we cannot repeat the same procedure that we performed in last experiment for selection of 8 plots for cultivation of crop of variety 1. If we select 8 plots randomly out of 24 plots, it might happen that majority of the selected plots are on the plain or majority of the selected plots have slope. If majority of the selected plots have slope and the corresponding variety shows low yield then we cannot differentiate between the possibilities that the corresponding variety is not good or low yield is an effect of slope of the plot. Hence, a different procedure need to be used for selection of plots.

Hence, we select 4 plots randomly out of 12 plots which are on the plain and select another 4 plots randomly out of 12 plots with slope for cultivation of crop of variety 1. We select 8 plots using this procedure out of remaining plots for cultivation of crop of variety 2. Cultivation of crop of variety 3 is carried out in remaining 8 plots. In this procedure, random allocation is carried out separately when the plots are on plain and when the plots have slope. In this experiment, we 'control' for the yield. Figure 2 shows a selection of plots using the procedure described above and a black box diagram corresponding to this

experiment.