Estimation of Rice Yields by Sampling.

THE estimation of yields of crops from field experiments by means of random sampling of the plots, instead of harvesting them whole is becoming increasingly popular in England. Studies enunciated by Clapham[1] and further developed by Kalamkar,[2] Clapham[3] and Yates and Zacopanay[4] have done much to popularise as well as to standardise the mode and apparatus of conducting analysis by the sampling technique. In America, Immer[5] has utilised sampling methods in studying sugar content of sugar-beets. Prior to the development of the random sampling method, Hubback[6] determined yield of rice by sampling on a very extensive scale in Bihar and Orissa. As there are possibilities of the random method becoming popular in India we considered it of interest to report briefly our studies in rice.

In the season of 1936 a number of rice fields in the vicinity of Karjat were sampled. For sampling, plots of 33′ × 33′ (1/40th of an acre) were first marked out in the rice fields. Each plot was further sub-divided, north to south, in 3 sub-plots and from each sub-plot 3 samples were taken at random. There were therefore 9 samples from each plot. The sampling unit was 3′ × 3′. The number of bunches and number of ears in the unit area were also recorded. After sampling, the remaining plot was harvested and yield of grain and straw of the whole plot determined. Altogether 41 plots were sampled, but data on 39 plots only were available, as yields of two plots were mixed up inadvertantly.

The analysis of yields of the plots indicated that in a few cases the division into sub-plots was advantageous, while in most cases the variance between sub-plots (D.F. 2) was smaller than within sub-plots (D.F. 6). The pooled estimate of variance is shown in Table I.

TABLE I.

Analysis of variance of sampling yields.

Due to	D.F.	Variance
Plots	38	482·84
Sub-plots	78	31·81
Samples	234	44·07

It will be seen that the variance due to "between plots" is much greater than that "between sub-plots" or to that "between samples", indicating great soil variability from plot to plot. The plot error per sampling unit is 21·97 or 63·30 per cent. of the mean and for the mean of 9 such sampling units the plot error is 21·10 per cent. The sampling error per sampling unit is 6·33 or 19·14 per cent. and for the 9 samples it is 6·38 per cent.

The "non-sampling" error, *i.e.*, the error if the whole area had been sampled, comes to 20·20 per cent. of the mean while the actual, as obtained from the actual yields of the whole plots, is 23·06 per cent. Thus the agreement between the two is good.

The mean yield per sampling unit was 34·69 quarter ounces as compared to 34·38 calculated from the total harvest. The correlation between the sampling yield per plot and that obtained by total harvest is 0·866. The sampling technique used by us furnished 92 per cent. of the total information. The detailed account of the experiment and its significance will appear elsewhere.*

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[1] Clapham, *Jour. Agric. Sci.*, 1929, **19**, 214.

[2] Kalamkar, *Jour. Agric. Sci.*, 1932, **22**, 783.

[3] Clapham, *Jour. Agric. Sci.*, 1931, **21**, 366; 376.

[4] Yates and Zacopanay, *Jour. Agric. Sci.*, 1935, **25**, 545.

[5] Immer, *Jour. Agric. Res.*, 1932, **44**, 633.

[6] Hubback, *Agric. Res. Inst. Pusa Bulletin*, 1927, No. 166.

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