

437. **Samra, J.S., Rajput, R.K. and Katyal, V. 1992.** Structured heterogeneity of soil pH and grain yield of rice and wheat grown in a sodic soil. *Agron. J.*, 84:877-881.

Conventional statistical methods that assume independent random variation are inadequate when dealing with spatially dependent heterogeneity. Structural analysis of heterogeneity was performed for soil pH and grain yields of rice (*Oryza sativa* L.) and wheat (*Triticum aestivum* L.) grown under uniform management in a sodic soil (Natric Haplustalf). Relative efficiencies of field sampling designs and methods of analysis were computed. The coefficients of variation (CV) for the yield of rice and a subsequent wheat crop were 16 and 54%, respectively. The two-way trend variation in soil pH was 21% of variance before rice planting and 28% after wheat harvest. The same parameter for the grain yield of rice and wheat was 12 and 28%, respectively. Variogram analysis revealed that locally structures variation of soil pH was 30 and 48% of variance before rice planting and after wheat harvest, respectively. Structured heterogeneity for grain yield was 16% in rice and 59% in wheat. Soil pH heterogeneity effects on rice were of lower magnitude than with wheat. The relative efficiency of Wilkinson's nearest neighbor analysis as compared to a randomized block design varied from 623 to 1682% depending on size and shape of the plot. This indicates that a substantial improvement in experimental precision is possible by taking account of positional effects of observation plots.