Indices for measuring location impact in Bayesian spatial models for agricultural field trials

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Researchers working with agricultural field trials conducted at multiple farm sites often request an assessment of the validity the data at each location. Traditionally, the coefficients of variation within the locations have been used, but alternate measures of validity based on statistics derived from frequentist linear models have been proposed by Bowman and Rawlings (1995), Bowman and Watson (1997), and Beckman, Nachtsheim, and Cook (1987). A method for assessing the impact of each location on each parameter in a Bayesian model with spatial correlation among the locations will be proposed. The method involves graphical comparisons and numerical summaries of posterior distributions from Markov Chain Monte Carlo samples obtained by using the full data set and then omitting sets of locations. The BRugs function in R is used to repeatedly call WinBUGS software to obtain the estimates for the posterior distributions. The procedure will be illustrated with an example from a hybrid comparison trial as facilitated using Darwine software on a Mac OS X operating system.

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