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Spatial Time Series Models for Rice and Cassava Yields Based on Bayesian Linear Mixed Models

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Abstract : This paper proposes a linear mixed model (LMM) with spatial effects to forecast rice and cassava yields in Thailand at the same time. A multivariate conditional autoregressive (MCAR) model is assumed to present the spatial effects. A Bayesian method is used for parameter estimation via Gibbs sampling Markov Chain Monte Carlo (MCMC). The model is applied to the rice and cassava yields monthly data which have been extracted from the Office of Agricultural Economics, Ministry of Agriculture and Cooperatives of Thailand. The results show that the proposed model has better performance in most provinces in both fitting part and validation part compared to the simple exponential smoothing and conditional auto regressive models (CAR) from our previous study.

Keywords : Bayesian method, linear mixed model, multivariate conditional autoregressive model, spatial time series
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