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Title:

Spatial small area estimation: comparison of different approaches

Abstract:

The Australian Bureau of Agricultural and Resource Economics (ABARE) has been conducting farm surveys annually since 1978. The surveys collect detailed financial, physical and socioeconomic information from farm businesses across Australia.

The purpose of our study is how to produce more efficient estimates of means per farm within small regions or domains utilising spatial covariate information. For testing of small area models unit record farm level survey data from the wheat-sheep zone for the survey years 1978-79 to 1994-95 inclusive were used. Synthetic coordinates (longitude, latitude) for each farm were obtained by using pairwise distances between farms. The variable of interest was average Total Cash Receipts (TCR) within small areas.

We compared the performance of several different methods of small area estimation (SAE) such as

empirical best linear unbiased prediction (EBLUP),

spatial empirical best linear unbiased prediction (SEBLUP),

non-parametric empirical best linear unbiased prediction (NEBLUP),

M-quantile (MQ) models,

M-quantile geographically weighted regression (MQGWR) models.

The Root Mean Squared Error (RMSE) was computed as a measure of estimation performance of the predictors.