

# Composite estimation of small area means using Fay-Herriot model

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## Abstract

Composite estimators are very popular for estimation of small area means. A composite estimator is obtained by taking a weighted average of a model-based synthetic estimator and a traditional survey estimator or direct estimator. One important model in small area estimation based on area level data is the Fay-Herriot model. Empirical best linear unbiased prediction (EBLUP) method is widely used in developing composite estimators of small area means based on suitable models. EBLUP estimator of a small area mean is obtained by estimating the unknown variance parameters in the BLUP estimator of a small area mean. The BLUP estimator is an optimally weighted average of the synthetic estimator and the direct estimator, the weight attached to the latter is proportional to the model error variance.

In this talk, we will consider small area estimation using EBLUPs as well as other composite estimators based on weights either known or obtained from other consideration. For these estimators we will review various mean squared error results. Based on a composite estimator and an estimated measure of uncertainty in estimating a small area mean, we will construct standard approximate confidence interval for a small area mean and study its coverage bias. The coverage bias will be used to calibrate a standard interval to achieve the target coverage probability to a greater degree of accuracy.