Small area estimation: Some potential applications

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The necessity of more precise and accurate estimates of unknown population parameters is increasing in both public and private sectors. Precise and accurate estimates can be obtained through a 100% error free census. Due to obvious reasons it is not possible to conduct a census every year. Censuses usually give estimates for national level or larger areas which are not suitable for small domains of population. Although surveys are good alternatives to predict parameters for small domain, due to coverage errors these may give inaccurate results with low precision. Coverage error means that none or very few units of a small area/domain are covered by the sample. Due to this factor the corresponding variance of estimates are either very large or they do not exist. Small area estimation (SAE) which usually combines both census (auxiliary information) and survey data, provides a good alternative to obtain precise estimates of parameters at small domain level.

In Sri Lankan context, less attention has been given to predict the parameters by using SAE techniques. The error components model and a multivariate extension of it can be used to estimate parameters in small areas. Using this approach it is shown how to obtain precise estimates for 'number of households with toilet facilities within the unit' at district secretariat (DS) level. Prediction of election results for a given party at polling division level is also discussed. How to improve these estimates by careful selection of suitable auxiliary variables and using a multivariate approach possibly in the presence of missing values, is also discussed. Limitations and underlying theoretical assumptions are also discussed.