Improved Estimation from Ranked Set Sampling

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Ranked set sampling (RSS) was introduced by McIntyre (1952) to esti-
mate the mean pasture and forage yield. The RSS is used when precise mea-
surement of the variable of interest is difficult or expensive but the variable
can be ranked easily without measuring the actual variable by an inexpensive
method such as visual perception, judgment and auxiliary information. In a
ranked set sampling, instead of selecting a single sample of size m, we select
m-sets of samples each of size m. In each of the sets all the elements are
ranked but only one is measured. The sample mean based on the RSS is
unbiased for the population mean regardless of the errors of ranking. The
RSS mean is at least as precise as the sample mean of the simple random
sampling with replacement (SRSWR) sampling scheme of the same size. In
this paper we have proposed few alternative estimators for the ranked set
sampling. Efficiencies of the proposed estimators are compared theoretically
and numerically with the live data. Some of the proposed estimators per-
formed better than the existing estimators. Numerical computation shows
that the proposed estimators bring substantial gain in efficiency.