

## ABSTRACT

Sampling survey is perhaps the oldest statistical procedure to determine the accurate and useful estimates under prevailing constraints of time and money. The regression and ratio methods of estimation are two strongest pillars of sampling survey. In ratio and regression estimation many interventions in terms of estimators with different structural and functional form have been made. Two phase and multiphase sampling are the concepts associated in estimation of population mean from finite population under different cases of availability or non-availability of auxiliary information. In the recent study we have proposed new dimension of sampling survey of estimations by proposing six generalized p-phase estimators for estimating population mean. Our estimators are extended p-phased versions of many existing estimators. Two regression estimators with single auxiliary and two auxiliary variables are the generalized p-phase cases of Hanif et al (2015) and Hanif(2007) respectively. Four different ratio –type-exponential estimators are motivated from Bahl and Tuteja (1991) Singh and Vishwakarma (2007) respectively. All the estimator from which we took motivation are now special cases of our proposed estimators. For population mean in multiphase sampling, we have derived unbiasedness, expression of Mean Square Errors, expression of biases for each. Our proposed estimators are p-phased generalized so the families of each estimator are also constructed. We have derived expression of MSE and bias in such a way that these expressions can be used to obtain results for every phase we desire. By conducting empirical study on proposed estimators we have shown many situations in which MSE can be reduced by increasing number of phases. The mathematical and empirical analytical comparisons among the proposed estimators enable us to determine the best and worse estimators. Hence, our study will open new horizon in the field of multiphase sampling where a lot of challenges are waiting to be resolved by proposing new estimators for phases above 2<sup>nd</sup> phase.