EPILOGUE

In the preceding chapters of this thesis different versions of the problem of optimum allocation in multivariate stratified random sampling and the problem of optimum choice of sampling unit (cluster) have been formulated as mathematical programming problems and their solutions are discussed either using dynamic programming technique with some modifications or using classical Lagrange multipliers technique.

A few problems arising in univariate as well as in multivariate sampling designs may be solved by using classical optimization techniques based on differential calculus or using Cauchy-Schwarz inequality while these techniques fail to solve numerous other problems. This attracted researchers to use mathematical programming techniques to provide answers to more and more problems and as a result new special purpose mathematical programming algorithms are coming up day by day.

In the following some other problems in the area of sampling are indicated that can be formulated as mathematical programming problems and may be attempted to solve by using suitably chosen or specially developed mathematical programming techniques.

(i) The multiobjective formulation of the problem of optimum allocation in multivariate stratified random sampling, that is minimizing the variances of the estimates of all characteristics simultaneously for a fixed budget or sample size.
(ii) The problems of determining the stratum boundaries in univariate and multivariate stratified random sampling in the presence of a single stratification variable and in case where a multivariate auxiliary information is available.

(iii) The problem of optimum allocation in multivariate stratified sampling when double sampling is used for stratification.

(iv) The problem of optimum allocation in multistage multivariate stratified sampling.

(v) The problem of determining optimum 'matched' and 'unmatched' portions of the samples at various occasions and optimum weights in multioccasion sampling with multiple characteristics.

(vi) The choice of sampling and subsampling fractions and optimum selection probabilities in multivariate multistage sampling.

(vii) Problems related to:

(a) Minimization of the effect of non-response in various sampling designs.

(b) The nonlinear estimators in complex surveys.

And many other optimization problems that can not be listed here for want of space.