SCOPE FOR FUTURE WORK

The thrust in the present thesis is to improve upon the existing formulation of crop loss, based on the premise that every plot, whether controlled or not, is de jure a mixture of healthy and diseased plants and to develop apt estimation methods. In the case of a sample of fixed size as drawn from a finite population the basic method of simple random sampling is assumed for selecting a sample of plants from a plot. A modification considered is augmented sampling, allowing a broader sample base for estimation of sensitive parameters. An alternative discussed in detail is inverse sampling ensuring prescribed minimum number of plants from each group. A different viewpoint developed is one of drawing samples from an infinite population by associating a mixture model as the framework. In the above set up the case of single disease affecting plants but with several levels of severity and also the case of two diseases have been dealt with. All these provide an array of methods and the investigator has to make a choice from among them depending on his objectives of the study or possibly as directed by circumstances in which he is placed. In these methods developed in the present study, cost implications have not received any consideration, partly because the methodology is more or less straightforward. But still one may
develop appropriate cost models and thereby formulate guidelines to make a choice among the available methods. We may recognise different types of costs, like cost of classifying a plant as healthy or diseased ($C_1$) or cost of harvesting, i.e., measuring the yield from a plant ($C_2$). Then under augmented sampling, we may have a simple cost model of the form $C = C_0 + C_1 n + C_2 n'$. The cost models for other designs may be similarly formulated. Out of all the procedures of sample selection and estimation the one that may be preferred is that which gives the highest precision for a given cost (actual or expected) of the survey or the minimum cost for a specified level of precision.

If there were to be a stratification, like stratification of the agricultural area in a village by plots and simple random samples are drawn from each stratum then the result of this thesis would still apply for getting overall estimates, provided appropriate aggregation is made over the strata.

The results obtained in this study refer to a situation in which sampling is done from a simple plot, which is considered as the defining population. But extension of these results to other situations only involves additional straightforward derivations. For example, if several plots are selected using any conventional method
such as cluster sampling, multistage sampling leading ultimately to plots of specified size from which SRSWOR is carried out. These results can now be extended to such schemes; only the results obtained in this thesis refer now to a randomly selected plot; and proceed backward in building up the estimation as in multistage sampling.

Another line of approach is to apply more convenient methods of sample selections like systematic sampling in the setup of a finite population. For example, the plants are serially ordered in some manner beginning with a random start between 1 and k. This will ensure in a more even spread of plants in the sample over the plot. The relevant theory is fairly straightforward.

There is enough scope for extending this work further particularly in respect of:

(i) Examining the variance estimators.

(ii) Other distributional forms in case of mixture distributions.

(iii) For developing suitable techniques for testing the hypothesis and determining whether the crop loss is significant or not.

(iv) In experimental design where several plots are involved receiving different treatments, in such case, data may be amenable for ANOVA technique, involving random number of observations, as observed in section 9.8. The expected values of MSS become conditional on these random observations. Further research may be required here for developing suitable F ratios for testing hypothesis for treatment effects.