H. F. Huddleston, Data Collection & Analysis

The first paper in this session, Satellite Agricultural Surveys--Contributions of H. O. Hartley, by Cecil Hallum and Raj Chhikara, summarize many ideas put forth by H. O. Hartley in consulting with NASA. Many of the suggestions were modified to fit the operating mode of NASA and resulted in the sacrifice of some rigor in the statistical procedures and theory. Most of the ideas were contributions to the LACIE project presented in progress reports by Dr. Hartley.

Examples of ideas presented which were modified to fit NASA operations are:

(1) The sampling unit size was dictated by conveniences and practical considerations even though the size-shape configuration was impractical for sampling because of a lack of natural boundaries in all countries except possibly the U.S.

(2) The sampling frame units were defined to consist of areas with 5 percent or more agriculture, but agriculture was not defined.

(3) The sample design employed strata derived largely based on historical, political, and agricultural conditions in individual countries and especially the USSR.

(4) A bias correction is discussed because of the need to adjust for selecting the sampling units from a modified frame due to engineering constraints.

(5) No unbiased estimation method was derived or seriously considered due to deviations from rigorous sampling procedures.

(6) The yield prediction models were based on historical environmental type auxiliary variables which are related to derived yield data obtained from aggregated published acreage and production data. For the current year, the yields are based on sampled meteorological variables used as predictor variables in regression equations by strata.

The ideas set forth in these consulting activities point out the great ability which H. O. Hartley had as a "bootstrap" modeler to meet or attempt to satisfy limiting constraints. It is hoped, at least by me, that as a part of Dr. Hartley's statistical legacy that students or statisticians will be found who will improve the rigor of the statistical methodology used by NASA.

The second paper in this session, Incorporating Partially Classified Sample Segments Into NASA Acreage Estimation Procedures, by Robert L. Sielken, Jr., presents a restricted solution to this problem. There appears to be technical difficulties with the paper which need attention as follows:

(1) Since this paper is a special case of the incomplete data vector in the missing value problem reported earlier by R. R. Hocking and others, it would be helpful to relate this work to the missing value problem, and under what condition unbiased estimators would exist.

(2) The unrealistic assumption that all sample segments (units) be the same is unnecessary.

(3) Of the alternative weighting schemes which are discussed in section 2 of the paper, one should be given for the unequal sample segment size.

(4) The question of the existence of an unbiased estimator and its dependence on a random subset of partially classified segments needs to be addressed.

(5) The use of repeated observations on the same units over time is employed but how this type of information improves or restricts the theoretical nature of the model is not clear when the same number of repeated observations is not available for all units.

The ideas set forth in this paper do not appear to have been directly attributed to H. O. Hartley, but were part of the same NASA project described in the first paper. Undoubtedly, Dr. Hartley had some input into this type of approach.

It is quite clear that H. O. Hartley had considerable input into the NASA effort. The great ability and experience which Dr. Hartley had to find solutions in uncharted areas is evident. His efforts as a consultant and motivator will be missed by statisticians and the many users he worked with. Also, his contributions to discussions at technical meetings will be missed. His manner was mild, but his influence was profound.