Chapter V. Statistical Quality Control

ENUMERATION

Although crew leaders conducted a formal review of enumerators' work in earlier censuses of agriculture, notably in 1959, statistical quality control of field work was used in a U.S. agricultural census for the first time in 1964. Crew leaders inspected a sample of items on a sample of questionnaires, tallied errors, and took action regarding the enumerator as a result of the review. Every assignment received a first and final review. If necessary, an assignment received a second review or a second final review.

For first and second reviews, the inspection included some items obtained by observing the enumerator rather than by inspecting A1's. All reviews included a check on the ED map, the A2 listing, nonsample A1 questions, and sample A1 questions. About 130 items were inspected on first review and about 400 on final review.

To simplify the computation of error rates, errors were divided by nonerrors rather than by items inspected. The maximum tolerable error rate decreased with each additional review to take into account the fact that retraining should progressively reduce the errors.

On first review, the enumerator was to be released if the error rate was .15 or more. If the error rate was between .10 and .15, the enumerator was to be scheduled for a second review and told that he had to improve by second review. If the error rate was between .05 and .10, the enumerator was to receive no further review until final review but was to be told that he had to improve before final review. If the error rate was less than .05, the enumerator was to be told that he was doing well and needed no review until final review.

On second review, the enumerator was to be released if his error rate was .10 or more. If the error rate was between .05 and .10, the enumerator was told that he had to improve some more in order to pass final review. If the error rate was below .05, the enumerator was told that he was now doing well.

On final review, there was only one standard of .05. If the enumerator was below that, the assignment was accepted. Otherwise, it was returned to him for correction and given a second final review. On all reviews until the last, enumerators were told what their specific errors were so that they could improve.

Table 5. PROPORTION OF SEGMENTS PUNCHED IN ERROR OR OMITTED AND PROPORTION OF ERROR REMAINING AFTER VERIFICATION

Category	Average	Productive training	Qualifying	Qualified	Disqualified
Number of segments verified	714,315	73,467	56,627	461,597	19,614
Proportion of error in keypunch operation:					
Keypunch error	.038	.071	.051	.038	.069
Omitted segments	.004	.011	.008	.005	.011
Proportion of error remaining after verification (and repunching of rejected EA's):					
Keypunch error	.036	.040	.041	.036	.049
Omitted segments	.003	.003	.001	.004	.003

CARD PUNCHING

The specifications for controlling the quality of the punching of data cards from agriculture census questionnaires allowed a maximum of 6 percent of the records for each section of the questionnaire to be in error and a maximum of one-half of 1 percent of each of the sections to be omitted. Operators unable to attain or maintain the level of quality specified were removed. Cards were repunched for EA's rejected during an operator's qualifying period, and for EA's with a high error rate after an operator was qualified.

The verification procedures, which were on an EA basis, have already been described in general terms in the section on "Card Punching and Card-to-Tape Operations" in chapter III.

There were two checks of the work: a consistency check and a quality check. The consistency check was performed on the production deck before the quality match with the two verification decks. This was a check of tolerances and of the consistency of specific types of data such as identification, control counts, missing or duplicated segment codes, card serial numbers, etc. Error counts were tabulated at the ED and EA levels.