

Research Report on
Updating the Tennessee ASCS List

by

R. Paul Moore

Research and Development Branch
Standards and Research Division
Statistical Reporting Service

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Introduction

List frames used in probability sampling are usually somewhat defective due to incompleteness, duplication, inaccuracy and being out of date. If the extent of frame defects can be determined for units in the sample, then it is sometimes possible to make valid estimates for the desired populations from the sample data. Frames which would not be suitable in single frame sampling may be satisfactory when used jointly with an area frame. The area frame can be used to account for the incompleteness of the list frame. Even with multiple frame sampling, it is usually more efficient if the list frame used is as complete, up-to-date, and accurate as possible.

The Agricultural Stabilization and Conservation Service (ASCS) Farm Record List for Tennessee was used in this study. The purposes of the project were: (1) to gain experience in updating a large list, (2) to determine the costs and problems involved in updating a large list, (3) to test a computerized method of updating lists, (4) to tabulate the amount and kinds of changes occurring and (5) to assess the accuracy of the updating method.

Summary

A computerized updating procedure was developed with the list kept on magnetic tape. This report covers the updating of the Tennessee ASCS List of 175,000 names from February 1966 to March 1969. The List was updated three times during this period. From one-half to one percent of the list units need to be updated each month. The most important kinds of changes are (1) new farms added, (2) old farms deleted, (3) changes in farm operators and (4) changes in addresses. The average updating cost was \$9.92 per 100 changes made to the list. Key punching and computer processing accounted for 92 to 93 percent of the total cost. This ignores the cost of "visually comparing the ADP printout with the current list" in the first update period. The accuracy of the updating procedure was disappointing since a considerable number of changes were missed. It should be noted that many of the missed changes were multiple changes to one record. Some part of this failure may be attributed to the fact that the Tennessee SSO depended on 95 ASCS county offices to voluntarily inform SRS of individual changes in the list.

Procedures

In February, 1966 the Tennessee State Statistical Office (SSO) received a complete listing of the ASCS farm record list. It was in the form of three by five inch cards which had been stamped with the ASCS farm

number, the operator's name and address, the owner's name and address, the acres in the farm and the acres of cropland. The list of approximately 200,000 records was reduced to approximately 175,000 records by excluding all farms smaller than 10 acres. This list, and its associated information, was keypunched and used as the sampling frame for a number of SRS surveys. After the first year and ~~one~~ half, it was apparent that many changes had occurred in the owners and operators of the ASCS farms. It was also evident the list ~~had to be~~ put on magnetic tape to reduce the time required for (1) sorting and collating in maintenance, (2) drawing samples and (3) detecting duplications.

An automated system for updating was developed and computer programs were written to update the master tape file. First, the tape file had to be updated for changes which had been made in the ASCS records from the Spring of 1966 until January of 1968. A current listing of the ASCS addressograph plates was obtained on adding machine tapes in January, 1968. The current listings were compared with the computer printouts of the SRS list and changes in the form of additions and deletions were identified. Addition and deletion cards were keypunched and used to update the master file for changes that occurred during this period.

A sample of 20 counties was initially selected for studying the updating procedure. After the first update was completed, the study was extended to all counties in Tennessee.

Reasons for the changes occurring during the first update period were tabulated for seven counties. Cost records were kept for the updating.

After the first updating, the Tennessee ASCS Committee instructed each of their county offices to submit a record of all changes made in the Farm Record List after January 1, 1968 to the Tennessee SSO. ASCS Form-12 was revised to include a place for the county office to record addressograph impressions of ASCS farms added, deleted or changed on a current basis (See Appendix). Copies of the Form-12's were sent to the Tennessee SSO periodically by each county ASCS office. Information from these forms were used to update the master tape for changes occurring from January 1968 to March 1969.

The updating procedure as finally used consisted of the following steps:

1. County ASCS offices sent changes to State SSO using revised ASCS Form-12. Changes were sent periodically (no set schedule).
2. Add and delete cards were punched using the ASCS Form-12 as the data source.
3. Delete records were matched to the tape file and the matching records were purged from the list.

4. Add records were added to the tape file.
5. The resulting file was the updated list.

An evaluation of the accuracy of the updating procedure was made by comparing the updated list with a current listing of the actual lists kept in the county offices. This was done for a sample of 10 communities in March 1969. An ASCS community is an area (usually a township) within a county.

Analysis

The amount of change in the list can accumulate to a substantial amount **over time**. The number of changes per month in the Tennessee ASCS list varied from one to two percent (See Table 1). This includes both additions and deletions. Since most changes involve the deletion of the old record and the addition to the new record, the units that are changed during a month's time would average from one-half to one percent of the total list.

Table 2 shows the reasons for the changes during the first update period for a sample of seven counties. About 30 percent of the changes were new units added to the list and old units being deleted. The first three of four types of changes listed in Table 2 are probably the most critical from the standpoint of maintaining a fairly complete, accurate and up-to-date list of farm operators. The other types of changes listed, if not kept up with, would reduce the sampling efficiency but not the list completeness. Except for the first two kinds of changes listed in Table 2, multiple changes were counted as one. That is, a change in an existing Farm Record might include changes in the farm operator's name, address and zip code.

Table 3 gives the total costs incurred over the three update periods. Data processing and sorting costs required 53.4 percent of the total money spent. Data processing costs included mostly production runs and a minor amount of program testing on the **NDPC** computer. Several sort sequences were tried during the first update period. These were extra sorts in alphabetic order within counties and in alphabetic order over the entire state. These "developmental" costs are included in the ADP and sorting total costs. For an operational program, the percent of the total cost attributable to ADP and sorting would probably be less.

About 39.5 percent of the total cost was for keypunching the change cards. Initially, the changes were keypunched after the ADP listing was compared with the current listing printed on adding machine tape. After the first update, changes were punched directly from ASCS Form-12. The initial

sample of 20 counties was keypunched by the Data Services Branch in Washington, D.C. The balance of the changes were keypunched by the Tennessee SSO. The Washington keypunching charges were slightly higher due to the inclusion of machine use costs with the labor costs. Tennessee keypunching costs reflect only labor charges.

The accuracy attained in updating the list from February 1966 through March 1969 was investigated. A sample of 10 counties was selected; one community was selected within each sample county. Current listings of the Farm Record List were obtained from the county ASCS offices. These were compared with the updated list kept by SRS. Any differences in the two lists were recorded as an error made in the updating process. Table 4 shows the number and frequency of various kinds of errors which occurred during the 37 month period the list was updated. About three percent of the records on the current ASCS office list were not on the SRS list. Either the county offices neglected to inform SRS of the addition of these units to the list or SRS failed to add them to the list. Nearly six percent of the records on the SRS updated list should have been deleted but were still present. There was a problem in the procedure for deleting records because a particular farm might change hands more than once during an updating period. For example, suppose a farm changed hands 3 times, so individuals A, B, C, and D operated the farm during the updating period.

Three delete cards should be punched for that farm and added to the file. As soon as the first delete card purged the farm from the file, the remaining delete cards had nothing to delete, thus served no function. Next, three add cards are added to the file. One will replace the purged farm and the other two are added to the file. The result is two duplicates of the farm are now on the file. A coding system, for the date the records were added, was partially successful in arranging the list so that the oldest records were first.

Deletions based upon part of the last name in addition to the farm number identification were not always successful due to many family transfers.

The card format was also a problem since it was designed for an EAM system rather than a computer system. This caused some problems and extra programming time. About 6 percent of the records had the name or address of the operator listed incorrectly. The total (Table 4) showing 22.6 percent of the records containing some kind of error is probably an over-estimate since multiple errors on the same record were counted when only part of the records were in error.

Certainly the accuracy of the updating job done was poor. In an operational program, the accuracy might be improved somewhat with additional efforts. However, the procedure that was used depended upon the county ASCS offices to inform SRS about changes in the list.

Table 5 shows that if the list was used with no updating, there would be about two times as many deficiencies in the list after three years time, compared with the updating scheme used in this project. The most serious deficiency with no updating would be in not keeping up with changes in the names and addresses of the farm operators. The data in Table 5 were estimated from the basic information in Table 2 and 4 for comparative purposes.

Table 1.--Number of changes in the Tennessee ASCS List, by update periods

Update period	Records on: list at beginning of period	Records: added	Records: deleted	Records on: list at end of period	Total changes: per month	Monthly changes as percent of total list
	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Number</u>	<u>Percent</u>
Feb. 1, 1966 to Jan. 1, 1968 (23 mos.)	172,254	36,743	38,549	170,448	3,274	1.9
Jan. 1, 1968 to Sept. 1, 1968 (8 mos.)	170,448	7,171	8,094	169,525	1,908	1.1
Sept. 1, 1968 to March 1, 1969 (6 mos.)	169,525	12,034	9,189	172,370	3,537	2.1

Table 2.--Kinds of changes occurring in the Tennessee ASCS List, February 1, 1966 to January 1, 1968, 7 counties

Kinds of changes	Changes from February 1966 to January 1968		Changes per year	Yearly changes as percent of total list
	Number	Percent		
New farm number added	852	18	445	2.6
Old farm number deleted	606	13	316	1.8
Operator changed	976	20	509	3.0
Address changed	667	14	348	2.0
Zip Code changed	129	3	67	.4
Acres in farm changed	989	21	516	3.0
Cropland acres changed	544	11	284	1.6
All changes	4763	100	2485	14.4
Total number on list, 1966 -----				17,426

Table 3.--Cost of updating the Tennessee ASCS List from Feb. 1, 1966 to March 1, 1969

Item	Cost	cost per 100 changes*	Percent of total cost
	<u>Dollars</u>	<u>Dollars</u>	<u>Percent</u>
Keypunching changes	4380	3.92	39.5
(Tennessee office)	(3446)	(3.87)	
(Washington DCB)	(934)	(4.11)	
Visual verification	782	.70	7.1
ADP and sorting	5927	5.30	53.4
ALL ITEMS	11,089	9.92	100.0
**Comparing ADP printout with current list.	4000	5.31	

* 111,780 changes were made to the Tennessee ASCS List during the period, Feb. 1, 1966 to March 1, 1969.

** This step was discontinued after 1st update. Cost is not included in the preceding items.

Table 4.--Errors in updated Tennessee ASCS List, 10 communities
March 1, 1969

Type of error	Number of errors	Percent of total names on list <u>1/</u>
	<u>Number</u>	<u>Percent</u>
<u>Entire record in error:</u>		
New record missing (should be present)	47	3.0
Old record present (should not be present)	92	5.8
<u>Part of record in error:</u>		
Name incorrect	52	3.3
Address incorrect	48	3.0
Zip Code incorrect	16	1.0
Cropland incorrect	59	3.7
Farmland incorrect	45	2.8
<u>All errors</u>	359	22.6

1/ Total names on list for 10 community samples 1,585

Table 5.--Estimated frequency of errors in Tennessee ASCS List after 36 months, no updating vs. updating method used

Type of error	Error rate - percent of total list	
	With updating method used	With no updating
	<u>Percent</u>	<u>Percent</u>
<u>Entire record in error:</u>		
New record missing (should be present)	2.9	7.8
Old record present (should not be present)	5.6	5.4
Total	8.5	13.2
<u>Part of record in error:</u>		
Name of operator	3.2	9.0
Address	2.9	6.0
Sub total	6.1	15.0
Zip Code	1.0	1.2
Cropland acres	3.6	4.8
Farmland acres	2.7	9.0
Sub total	7.3	13.8
Total	13.4	28.8
<u>All errors</u>	21.9	42.0

REQUEST FOR CHANGE OF COUNTY ASCS RECORDS

CURRENT INFORMATION ON CSS-156

CHANGE RECORDS TO:

 County

OPERATOR _____

Address _____

IRS Identifying No. _____

OWNER _____

Address _____

IRS Identifying No. _____

I request change(s) as shown above be made on the county office records for the following reason(s): _____

 Signature of person making request Operator Owner _____ Other capacity _____ Date

OTHER FARMS
 (This section to be executed
 by county office)

Farm Numbers of other farms owned or operated:
 Owner _____
 Operated _____

APPROVAL TO CHANGE APPLICABLE
 RECORDS SHOWN BELOW

<u>Records</u>	<u>Initials of Clerk</u>		Date	**	<u>Signature of Office Manager</u>		Date
	<u>Initials of Clerk</u>	<u>Date</u>			<u>Initials of Clerk</u>	<u>Date</u>	
Address Plate	_____	_____	_____	**	ACP	_____	_____
Form 12 to SRS	_____	_____	_____	**	CR	_____	_____
CSS-156	_____	_____	_____	**	Comp. Env.	_____	_____
Visible Index	_____	_____	_____	**	Aerial Photos	_____	_____
				**	Other -----	_____	_____

Appropriate records changed and form approved for filing _____
 Initials of OM Date

INSTRUCTIONS FOR EXECUTING TENN. FORM NO. 12

CURRENT INFORMATION ON CSS-156

Use Addressograph

-- Imprint operator and owner plate.

CHANGE RECORDS TO:

Enter name and address of operator or owner or both as applicable.

OTHER FARMS

Obtain information from farmer on other farms owned or operated and record farm numbers of same in appropriate space.

ADDRESSOGRAPH PLATES

Imprint below, the old and new plate(s)

Old Plate(s)

New Plate(s)