

**A STUDY OF TWO METHODS  
FOR ASSOCIATING FARM OPERATORS  
WITH AREA SEGMENTS**

by

**Larry Pope**

**Research and Development Branch  
Standards and Research Division  
Statistical Reporting Service**

**May 1971**

## I. Introduction

Past experience has shown that segments selected in residential, industrial or commercial areas to estimate numbers of farms, farm labor, livestock inventories and other economic characteristics are generally difficult to enumerate properly. In the "SRS Land Use Frame" such areas are classified as urban and exclude virtually all land used for agricultural purposes. The small sample used in such areas causes segments to have large expansion factors. Hence, these segments, even when enumerated properly, may contribute significantly to the variance of such estimates as number of farms, livestock inventories and farm labor. In the "Master Sample Frame" no stratum corresponding to that of the "SRS Land Use Frame" exists. Built-up areas are generally included in the nonopen country stratum. This stratum includes incorporated and unincorporated towns. Boundaries for such places are corporate limits as they existed in 1945. These still often include considerable crop or rangeland based on current uses. Sample segments selected in such areas are hard to enumerate because of the large number of occupied dwellings or boundaries that are difficult to identify. Also, for the open country stratum, rapid expansion of urbanization and industrial activities have taken place in areas that were once open country area.

Within concentrated residential or industrial areas, it is difficult to determine the actual presence or absence of farm operators without interviewing someone at each residence. This procedure is very time consuming and costly. Enumerators are reluctant to ask respondents questions pertaining to agriculture in such residential or industrial areas.

These problems were sufficiently difficult to warrant investigation of an alternative procedure for associating farms with sampling units, other than the residence criterion, for residential and industrial areas. One procedure suggested is the weighted residence (or headquarter) technique where a stratum of built-up areas are not allocated segments. Farm operators who reside in these areas are associated with one or more area segments in the other strata on the basis of the portion of their operation (or land) in each segment. For example, suppose a farm operator lives in downtown Des Moines and operates a 160-acre farm in one of the several possible open country strata segments in Marshall County. For this farm, 120 acres was included in sample segment A and 40 acres in sample segment B. His farm headquarters data would be associated only with the open country strata with segment A on the basis of  $120/160$  and segment B on the basis of  $40/160$ . This would give his operation an unbiased expected value. It reduces the variability since very few large operations would be totally included in any individual segment.

This procedure has several operational aspects that need study under regular survey conditions. First, one must be able to identify the exact location of any farm operator's residence in the residential or industrial areas to determine if they are in an area (or the stratum) not sampled. Second, respondents for segments in the sampled strata who are identified as residing in the stratum not sampled must be interviewed to obtain information covering this entire operation as well as that part included in the open country sample segment. Thus, he must be able to define and report information for his entire farming operation (that could be in several locations) as a single unit. This research project studied these problems in several states, using both types of frames discussed, in connection with the June Enumerative Survey. Comparisons of estimating techniques for the June Enumerative Survey (JES) procedure and the weighted residence procedure for the open country strata (called OC in this report) are made for certain items.

## II. Objectives

The purposes of this study were to (1) investigate whether farm operations for operators residing in built-up areas could be associated with open country stratum segments where the actual farmland was located, (2) determine the operational feasibility of this alternative scheme which would require more precise location identification of farm operations and additional survey materials, (3) determine whether or not this alternative scheme is more efficient than the one currently being used, and (4) determine whether the OC procedure tested is workable and will serve as a reasonable replacement for the usual JES procedure.

## III. Survey Procedures

### A. Survey Area

Four states were selected for study (Florida, Ohio, Oregon and Pennsylvania). Some of the criterion considered in choosing these states were:

- (1) The study should be conducted in states where the estimated number of farms seemed to differ between the official Crop Reporting Board and the June Enumerative Survey.
- (2) "Master Sample Frame" states and "SRS Land Use Frame" states should be included.
- (3) States in which both a large and small number of farm operators are expected to live in nonopen country areas should be included.
- (4) As much geographical spread as possible should be included.

## B. Survey Cities

Within each state, survey cities were drawn which had built-up areas. The following were considered when selecting the cities:

- (1) Approximately 50 cities were to represent the entire state.
- (2) The number of nonresident farm operators (operators living in residential areas) for the 1964 Census of Agriculture was considered as it related to counties and cities within these areas.
- (3) The magnitudes of the differences, by districts within states, between the number of farms as estimated by the JES and the 1964 Census of Agriculture adjusted for trend.
- (4) The number of sampling units by stratum and substratum for the "SRS Land Use Frame" for counties.
- (5) The number of highly residential, commercial, and industrial cities having 10,000 or more population.

Cities were selected with regard to the "SRS Land Use Frame" or "Master Sample Frame" boundaries. All cities with a population greater than a specified number were chosen. A sample of smaller cities was taken when necessary to fill out the survey city list. Here again, the plan was to select representative cities throughout each state. In the process of delineating well-defined boundaries for these survey cities, many smaller cities were found to be included within the overall boundaries. The following describes the criteria for selection of cities within each state.

- (1) Florida - The Florida survey cities included all cities and unincorporated areas with a population of 10,000 or more as determined by the 1960 Census. The resulting sample consisted of 54 cities.
- (2) Ohio - In Ohio, 46 cities with a 1960 population of 20,000 or more were chosen. In addition, a random sample of 12 cities was drawn from the 68 cities with a population between 10,000 - 19,999. A total of 58 cities were selected in Ohio

- (3) Oregon - The "SRS Land Use Frame" utilizes population characteristics to help classify areas as the agri-urban or residential areas. There were 25 cities of at least 7,500 population (1960 Census) which included the defined commercial and industrial strata. These cities were selected with probability 1, along with nine other cities falling in the 5,000 - 7,499 population category. Considering the total number and sizes of cities in Oregon, only 34 cities were selected to represent the state.
- (4) Pennsylvania - The five cities with population (1960 Census) of 100,000 or more were included in the cities selected. Of the 96 cities falling in the 10,000 to 99,999 population range, 45 were selected. This gave a total of 50 cities. The selection was done by grouping these cities according to SRS JES districts and randomly selecting one-half for the sample.

#### C. Preparation of Materials

Each state was sent a list of their survey cities and requested to get large-scale maps for each. States obtained maps from several sources, such as Chambers of Commerce, banks, utility companies and local governments. The maps sent in by the states varied greatly in size and detail.

The residential, commercial, and industrial areas of a metropolitan area were outlined in green to indicate the desired boundaries for the nonopen country areas (or built-up stratum). In delineating boundaries around the survey cities certain criterion were followed:

- (1) All boundary lines must be placed on features completely identifiable on the ground, like roads, railroads, rivers, and other waterways. City limits and similar unclear lines were used only in extreme cases where well-defined boundaries were not available.
- (2) In "SRS Land Use Frame" the boundaries were to include at least the city stratum as defined by the frame. This insured a comparison of both procedures of estimation for city resident farm operators.
- (3) Lines were to be drawn to exclude all agricultural operations from defined city areas.

- (4) The boundary lines could be extended beyond city limits of the selected cities to include as much contiguous urbanized area as possible while excluding all farming operations. Thus, many smaller cities, unincorporated and corporated urban areas, were included within the city areas.

The fieldwork for this survey was to be carried out in conjunction with the 1968 JES. The following table gives the information that was to be obtained depending on farm operator's residence.

JES		OC	
Operator lives	Obtain information on	Operator lives	Obtain information on
Inside segment	Crops in tract	Inside segment and inside open country stratum	Crops in tract
	Livestock in tract		Livestock in tract
	Acres in total operation		Acres in total operation
	Livestock in total operation		Livestock in total operation
	Farm labor on total operation		Farm labor on total operation
Outside segment	Crops in tract	Outside segment but inside non-open country stratum	Crops in tract
	Livestock in tract		Livestock in tract
			Gather same information as for farm operator living inside segment. Then the total livestock and labor would be prorated back into this segment prior to expansion.

The regular JES enumeration procedures were changed slightly for these states so information could be obtained to satisfy the requirements of both surveys (JES and OC). Resident farm operators were interviewed with the same questionnaires in both surveys.

The yellow questionnaires used to interview the nonresident farm operators had an extra instruction box. If a nonresident farm operator lived outside the nonopen country area, the enumerator completed additional questions for the yellow questionnaire. However, if a nonresident farm operator lived within the nonopen country area the enumerator completed a green questionnaire. The green questionnaire was identical to the blue questionnaire except for the color of ink. State office personnel copied acreage and livestock data for these tracts on a yellow schedule for inclusion with the JES analysis. The green questionnaires were retained for the OC analysis.

Two State Statistical Offices (SSO) carried out the procedures as instructed but the other two did not. The Florida SSO did not feel that they could handle the additional work along with the regular JES workload. They agreed to get the names and addresses of the nonresident farm operators during the JES period and do the interviewing at a later date. The dates of their OC fieldwork were mid-July through August. The Oregon SSO rewrote the instructions to enumerators to fit their conception of the fieldwork requirements without consulting R&D personnel to see if they concurred. Oregon was requested to do some further work at a later time to obtain the required survey data. They did what checking they could prior to the December Enumerative Survey and carried out the OC fieldwork after the December Enumerative Survey (DES).

Doing the work at a late date meant data for livestock and labor questions could not be obtained. To help provide data, all farm operators whose address on the yellow questionnaire indicated they might live in a nonopen country area were contacted. Enumerators determined their residence location and their total farm acreage. This acreage did not change much. Operators reported acreages as of June 1 in the event that it had changed. The ratio of land in the tract (inside sample segments in open country) to land in total operation was the proration value used for estimating nonresident farm operators. The ratio was the only datum to be expanded for each questionnaire.

#### D. Check-in and Handling Procedures for Data

All questionnaires and maps were checked in upon arrival at the R&D Branch. Lists of possible city resident tract operators were made from the JES yellow questionnaires for Florida and Oregon. Copies of these lists were sent to the respective states for further checking. The lists were used to record the findings as the information came in from these offices.

The enumerator's plotting of the location of farm operators' residences on the city maps were checked. Any unplotted tract operators were plotted if the address was sufficient. When tract operators could not be plotted and the enumerator said they were inside the boundary, this was assumed to be right. Tract operators' residences falling in the open country area were excluded from the nonopen country area. Any plotted residences located inside the nonopen country area but outside the "SRS Land Use Frame" city stratum boundary were identified and excluded from the OC expansion. This was done so comparisons of the two estimation procedures would be comparable.

In Ohio, the Master Sample State, a different approach was used. Those JES segments which fell within the NOC area were excluded from the JES estimate because they are analogous to the city stratum of the land use frame. Farm operators residing in the nonopen country areas were prorated back to segments in which their operation was located in the open country.

All pertinent information for each tract was listed by segment and district and segment expansions made. District and state totals, SE's and CV's were computed.

### IV. Analysis

#### A. Farm Numbers

The planned analysis was completed for numbers of farms only. Very few farm operators were found to reside in cities for Oregon, Ohio and Pennsylvania. In every case the tract operator residing in the city was classified as a farm operator.

State	Number of open country tract operators residing in city
Florida.....	185
Oregon.....	48
Ohio.....	11
Pennsylvania.....	7

Table 1 shows a comparison by states of the number of segments, estimated number of farms, standard error and CV of these estimates for both the JES and OC procedures. In looking at these tables one sees that in general:

- (1) The OC estimates generally exceed the JES estimate by a small amount.
- (2) The standard errors of the estimates were about the same.
- (3) Differences at the state level are not significant.
- (4) The CV's for the OC procedures were generally less than the JES.

Similar data for geographic districts in the states are given in Tables 3 through 6.

Table 1.- Estimated number of farms, standard errors and coefficients of variation for JES and OC procedures by states, June 1968

State	Number of segments	JES procedures			OC procedures		
		Estimate	Standard error	Coefficient of variation	Estimate	Standard error	Coefficient of variation
	Number	Number	Number	Percent	Number	Number	Percent
Florida.....	525	33,695	2,498	7.4	36,817	2,590	7.0
Ohio.....	350	144,009	10,229	7.1	148,293	11,274	7.6
Pennsylvania:	350	89,521	5,550	6.2	89,825	2,553	6.2
Oregon.....	350	32,974	2,982	9.0	32,360	2,854	8.8
Total.....	1,575	300,199	12,271	4.1	307,295	13,145	4.3

However, tests on the differences between the district estimates results in a number of significant differences. The following table shows the results of these tests.

Table 2.- Mean, standard deviation, and t-test of district differences for estimates of number of farms (OC-JES)

State	Number of districts	Mean difference: $\bar{d}$	Standard deviation: $S_{\bar{d}}$	T-test value: $t = \bar{d}/S_{\bar{d}}$	Significance	
					$H_0: \mu_{JES} = \mu_{OC}$ $H_A: \mu_{JES} \neq \mu_{OC}$	$H_0: \mu_{JES} = \mu_{OC}$ $H_A: \mu_{JES} < \mu_{OC}$
Florida.....	19	173	35	4.906	**	**
	1/ 20	156	37	4.167	**	**
Oregon.....	15	75	46	1.608	n.s.	n.s.
	1/ 16	-38	121	-.317	n.s.	n.s.
Pennsylvania:	14	22	11	2.016	n.s.	*
Ohio.....	9	476	413	1.153	n.s.	n.s.

1/ Includes [City Stratum JES - 0 (the corresponding OC district)] in computation.

\* Significant at the 5 percent level.

\*\* Significant at the 1 percent level.

These data indicate the OC procedures did not give significant differences in Oregon, Pennsylvania or Ohio. When one considers the type of agriculture in these states, this conclusion seems logical. Agricultural operations in these states are more general and the operators usually live on or very near their operations. In Florida, evidence seems to point to some improvement using the OC procedure. Agriculture in Florida includes some general farming operations, but has a preponderance of citrus and vegetable operations. These require large inputs of labor and equipment. Many are large corporate operations with the owner and operator living in the city. There are also many small operators who live in the city and contract for their farm labor management.

The results for Florida point the way to make improvements in some of the other important estimates of SRS such as farm labor and livestock inventories by using a similar technique. There has been some question raised as to whether the labor and livestock of operators living in city areas are being located in area segments so they are represented fully in the JES survey results. This problem arises in a few states and localities other than in Florida. The following sections look at the partial data gathered on these items to see how the two survey procedures compare.

## B. Livestock Inventories

The information in this section compares that portion of both procedures which estimates the same population (city residing farm operators). It compares the city strata estimate (excluding any agri-urban strata) of the JES with the farming operations prorated back to the segments in the OC, depending on the location of the operators residence. Proration of livestock and computations of estimates, SE's and CV's were made in the same manner as those for numbers of farms.

Tables 7-10 give the JES and OC estimates by states for the city residing farm operator population. The JES and OC are comparable for Ohio and Pennsylvania. The data for Florida and Oregon are incomplete due to the time lag in data collection.

In Ohio, the four JES segments in the city area having farm operators did not expand to as many farm operators as the 11 farmers having operations prorated back to OC segments. Two of the JES farmers had some livestock which accounted for about one percent of the total estimated cattle, about two percent of the sheep, and about one-half of one percent of the hens and pullets. The two OC farmers prorated back to the open country had fewer livestock.

No farm operators were found in the Pennsylvania JES city strata while the OC farmers prorated back to the open country do show some livestock.

In Oregon, the two JES farmers found in the city expanded to many more farm operators than the 15 farmers prorated back to the OC estimate. Here again, no livestock were found in the JES city stratum, while some were located by the OC procedure.

In Florida, the JES procedure found no farm operators or livestock for the 10 sample segments. On the other hand, the OC estimate represents 10 percent of the state total estimates for cows and heifers, and total cattle represent 5.7 percent and 5.6 percent of the estimated state total, respectively.

These tables indicate the procedure does find more farm operators. These operators are more apt to have livestock, and often have larger actual numbers. The OC estimates are not drastically influenced by small changes in actual livestock found in the survey. The OC livestock estimate for city residing farm operators then has a broader base and might be expected to be more stable than the JES city stratum estimates.

Unfortunately, insufficient labor data were gathered in Florida to warrant analysis.

Table 3.- Expanded number of farms, standard errors and coefficients of variation for JES and OC procedures, Florida, June 1968

Districts	Number of segments	JES procedure			OC procedure		
		Estimate	Standard error	Coefficient of variation	Estimate	Standard error	Coefficient of variation
	Number	Number	Number	Percent	Number	Number	Percent
03.....	60	1,565	524	33.5	1,913	525	27.5
05.....	10	1,667	943	56.5	1,668	942	56.5
06.....	02	-	-	-	-	-	-
10.....	84	6,787	598	8.8	6,928	604	8.7
15.....	65	4,154	549	13.2	4,164	550	13.2
20.....	50	4,092	541	13.2	4,239	579	13.7
25.....	15	1,684	480	28.5	1,946	487	25.0
30.....	20	4,192	811	19.3	4,742	867	18.3
35.....	15	303	143	47.2	498	206	41.4
40.....	14	1,815	560	30.8	2,125	551	25.9
45.....	20	333	195	58.7	414	240	57.9
70.....	7	768	768	100.0	768	768	100.0
71.....	10	973	417	42.8	1,048	404	38.6
72.....	25	599	224	37.4	902	261	28.9
73.....	8	927	713	76.9	927	713	76.9
74.....	20	1,599	461	28.8	1,812	541	29.9
75.....	10	223	170	76.1	405	230	56.8
76.....	20	722	393	54.5	1,086	433	39.9
77.....	40	378	261	69.0	484	264	54.5
91.....	20	748	285	38.0	748	285	38.0
92.....	10	164	164	100.0	-	-	-
<b>State total</b>	<b>525</b>	<b>33,695</b>	<b>2,498</b>	<b>7.4</b>	<b>36,817</b>	<b>2,590</b>	<b>7.0</b>

Table 4.- Expanded number of farms, standard errors and coefficients of variation for JES and OC procedures, Ohio, June 1968

Districts:	Number of segments	JES procedure			OC procedure		
		Estimate	Standard error	Coefficient of variation	Estimate	Standard error	Coefficient of variation
	Number	Number	Number	Percent	Number	Number	Percent
10.....	48	21,472	2,592	12.1	23,929	3,712	15.5
20.....	41	14,370	1,633	11.4	14,494	1,653	11.4
30.....	42	23,168	3,153	13.6	22,811	3,196	14.0
40.....	46	14,555	1,758	12.1	14,555	1,758	12.1
50.....	50	13,846	1,686	12.2	14,400	1,712	11.9
60.....	27	8,116	1,223	15.1	8,116	1,223	15.1
70.....	37	14,428	1,859	12.9	13,350	1,829	13.7
80.....	30	18,361	8,204	44.7	18,361	8,204	44.7
90.....	29	15,694	2,666	17.0	18,278	3,392	18.6
State total	350	144,009	10,229	7.1	148,293	11,274	7.6

Table 5.- Expanded number of farms, standard errors and coefficients of variation for JES and OC procedures, Pennsylvania, June 1968

Districts:	Number of segments	JES procedure			OC procedure		
		Estimate	Standard error	Coefficient of variation	Estimate	Standard error	Coefficient of variation
	Number	Number	Number	Percent	Number	Number	Percent
01.....	7	6,711	3,492	52.0	6,711	3,492	52.0
06.....	3	170	170	100.0	170	170	100.0
10.....	81	20,756	1,701	8.2	20,786	1,696	8.2
15.....	11	3,693	715	19.4	3,693	715	19.4
20.....	13	2,959	747	25.2	2,959	747	25.2
25.....	20	5,288	730	13.8	5,433	729	13.4
30.....	25	9,807	1,503	15.3	9,852	1,505	15.3
35.....	113	25,681	1,453	5.7	25,735	1,451	5.6
70.....	14	3,560	1,009	28.3	3,592	1,016	28.3
71.....	14	3,524	771	21.9	3,524	771	21.9
72.....	12	1,063	298	28.0	1,063	298	28.0
73.....	17	3,519	1,511	42.9	3,519	1,511	42.9
74.....	10	1,488	507	34.1	1,488	507	34.1
75.....	10	1,302	431	33.1	1,302	431	33.1
State total	350	89,521	5,550	6.2	89,825	5,553	6.2

Table 6.- Expanded number of farms, standard errors and coefficients of variation for JES and OC procedures, Oregon, June 1968

Districts	JES procedure				OC procedure		
	Number of segments	Estimate	Standard error	Coefficient of variation	Estimate	Standard error	Coefficient of variation
	Number	Number	Number	Percent	Number	Number	Percent
02.....	7	132	85	64.6	132	85	64.6
06.....	3	-	-	-	-	-	-
04.....	3	504	504	100.0	504	504	100.0
10.....	16	3,070	537	17.5	3,150	525	16.7
15.....	78	16,222	1,741	10.7	16,927	1,828	10.8
20.....	48	2,900	454	15.7	3,058	464	15.2
25.....	17	1,217	277	22.7	1,254	269	21.4
30.....	65	1,273	283	22.2	1,303	284	21.8
35.....	6	1,159	96	8.2	1,159	96	8.2
70.....	3	550	550	100.0	550	550	100.0
71.....	16	2,327	795	34.2	2,380	790	33.2
72.....	36	801	414	51.7	845	433	51.2
73.....	14	256	98	38.3	261	99	37.9
74.....	12	136	105	77.4	141	105	74.8
75.....	14	483	274	56.6	485	273	56.4
91.....	4	212	212	100.0	212	212	100.0
92.....	2	-	-	-	-	-	-
95.....	2	1,733	20	1.2	-	-	-
<b>State total</b>	<b>350</b>	<b>32,974</b>	<b>2,982</b>	<b>9.0</b>	<b>32,360</b>	<b>2,854</b>	<b>8.8</b>

Table 7.- JES total open segment expansion and city stratum expansion: OC city resident farm operator expansion with standard errors and coefficients of variation, Ohio

Item	JES open segment expansion			JES city stratum			OC estimates for city resident farm operators		
	State estimate	S.E.	C.V.	Stratum estimate	S.E.	C.V.	OC estimate	S.E.	C.V.
	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Number of farms.....	144,009	10,229	7.1	2,183	1,057	48.4	6,467	2,460	38.0
All hogs & pigs.....	2,550,155	348,459	13.7	0	0	0	0	0	0
Cows & heifers 2+....	909,141	122,264	13.4	6,604	4,596	69.6	649	445	68.6
All cattle & calves..	2,396,078	422,456	17.6	25,527	18,387	72.0	1,820	1,237	68.0
Milk cows.....	504,554	87,566	17.4	2,327	2,327	100.0	0	0	0
All sheep.....	1,067,844	188,824	17.7	22,890	19,451	85.0	0	0	0
Hens & pullets of laying age.....	11,819,230	2,959,200	25.0	46,540	46,540	100.0	18,123	13,528	74.6

Table 8.- JES total open segment expansion and city stratum expansion: OC city resident farm operator expansion with standard errors and coefficients of variation, Florida

Item	JES open segment expansion			JES city stratum			OC estimates for city resident farm operators 1/		
	State estimate	S.E.	C.V.	Stratum estimate	S.E.	C.V.	OC estimate	S.E.	C.V.
	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Number of farms.....	33,695	2,295	6.8	-	-	-	3,357	358	10.7
All hogs & pigs.....	336,010	41,249	12.3	-	-	-	1,551	1,089	70.2
Cows & heifers 2+....	927,524	104,560	11.3	-	-	-	53,106	17,638	33.2
All cattle & calves..	1,654,834	172,720	10.4	-	-	-	92,823	31,337	33.8
Milk cows.....	220,712	57,110	25.9	-	-	-	471	356	75.6
All sheep.....	1,890	835	44.2	-	-	-	0	0	0
Hens & pullets of laying age.....	9,813,984	2,280,887	23.2	-	-	-	0	0	0

1/ The livestock estimates are based on data from only part of the questionnaires.

Table 9.- JES total open segment expansion and city stratum expansion: OC city resident farm operator expansion with standard errors and coefficients of variation, Pennsylvania

Item	JES open segment expansion			JES city stratum			OC estimates for city resident farm operators		
	State estimate	S.E.	C.V.	Stratum estimate	S.E.	C.V.	OC estimate	S.E.	C.V.
	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Number of farms.....	89,521	5,051	5.6	-	-	-	534	153	28.7
All hogs & pigs.....	365,325	48,156	13.2	-	-	-	0	0	0
Cows & heifers 2+...	777,530	59,921	7.7	-	-	-	7,316	4,582	62.6
All cattle & calves..	1,481,413	99,332	6.7	-	-	-	12,189	6,860	56.3
Milk cows.....	635,226	55,833	8.8	-	-	-	0	0	0
All sheep.....	274,947	64,839	23.6	-	-	-	0	0	0
Hens & pullets of laying age.....	13,713,820	3,116,920	22.7	-	-	-	0	0	0

Table 10.- JES and OC estimates for city resident farm operators and livestock with standard errors and coefficients of variation, Oregon

Item	JES open segment expansion			JES city stratum			OC estimates for city resident farm operators 1/		
	State estimate	S.E.	C.V.	Stratum estimate	S.E.	C.V.	OC estimate	S.E.	C.V.
	Number	Number	Percent	Number	Number	Percent	Number	Number	Percent
Number of farms.....	32,976	2,295	7.0	1,733	1,001	57.7	355	141	39.8
All hogs & pigs.....	95,864	20,739	21.6	0	0	0	5	5	100.0
Cows & heifers 2+....	786,778	81,740	10.4	0	0	0	3,289	1,536	46.7
All cattle & calves..	2,082,453	310,618	14.9	0	0	0	9,876	4,224	42.8
Milk cows.....	81,384	18,307	22.5	0	0	0	702	478	68.1
All sheep.....	299,614	65,425	21.8	0	0	0	3,057	3,056	100.0
Hens & pullets of laying age.....	2,589,247	638,977	24.7	0	0	0	0	0	0

1/ Livestock estimates are based on data from only part of the questionnaires.

## V. Summary

Farm operators residing in city areas can have their operations associated with the open country segments where the operations are physically located. This OC procedure requires more effort and coordination on the part of the State Statistical Offices. This additional task does provide the State Supervisor with an opportunity to supervise certain parts of the enumeration more directly. It also requires some additional enumerator time and travel to complete the questionnaires; however, the costs of not having to enumerate and draw segments in the built-up areas would be saved. This project did not provide the necessary comparative cost data to determine the cost advantage or disadvantage of the new procedure.

It was found that in some states estimates will not be affected significantly. But in some states such as Florida, where a large number of farm operators live in the city, more reliable estimates may be obtained by using the OC procedure rather than the JES procedure.

Additional research as a pilot study would be appropriate to determine the effectiveness of this technique in terms of costs and variances.