THE EFFECTS OF OMITTING ACREAGE QUESTIONS AND MODIFYING THE OPERATION DESCRIPTION SECTION IN HOG SURVEYS

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ABSTRACT

This report summarizes the impact of omitting acreage questions and modifying the operation description section in hog surveys. Results indicated that acreage questions can probably be omitted without significantly affecting the survey estimates and that either version of the operation description section can probably be used.

Key words: Replicates, Average Significance Level, Univariate and Multivariate Analyses of Variance.

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CONTENTS

SUMMARY

An alternate hog list questionnaire was tested in seven states during the 1979 December Multiple Frame Hog Survey. The purpose of this questionnaire was to determine if acreage questions can be removed from the operational questionnaire and if the current operation description section can be modified. The following variables were used to compare the questionnaire versions: the refusal rate, the proportion of zero hog operations, five selected hog survey items and the percentage of partnerships reported by sampled individual operations.

The refusal rate was not significantly different between questionnaire versions in six of the seven states or for the seven states combined when the "acres operated" question was removed from the beginning of the operational questionnaire. However, in Iowa the refusal rate was significantly higher for the test questionnaire.

The proportion of zero hog operations was not significantly different between questionnaire versions in six of the states and the seven states combined. This variable was significiantly higher in Iowa for the test questionnaire.

For the five selected hog survey items there was rarely a significant difference between questionnaire versions in six of the states and the seven states combined from the univariate and multivariate tests. Many significant differences were detected in Kansas.

Finally, Minnesota was the only state where a significantly different percentage of partnerships was reported by sampled individuals in the operation description sections. This variable was significantly higher for the operational version in Minnesota. The combined seven state percentage showed no significant difference between operation description sections.

INTRODUCTION

A study was conducted in seven states during the 1979 December Multiple Frame Hog Survey to determine if the removal of acreage questions from the operational questionnaire and/or a modification in the current operation description section affect(s) the level of the survey estimates. The alternate questionnaire used for testing these objectives will be referred to as the test questionnaire.

The first area of research involved the removal of acreage questions from the test questionnaire. Reference was still made on the test questionnaire to the land operated, but the acres of land operated was not asked. The reason for references to the land in the operation on the questionnaires is that the reporting unit for multiple frame livestock surveys currently is all livestock regardless of ownership on all the land which the respondent operates at the time the questionnare is filled out. There were two reasons for examining a questionnaire which did not ask respondents to report the acreage of the land they operate. The first reason was that it has been hypothesized that the level of the hog and pig estimates would not change significantly if the operator did not report the acres he or she operates. This is not to say that the estimates will be accurate since studies have shown some evidence that a respondent's inclination is to report only his or her livestock regardless of where they are located, which is contrary to the definition of the reporting unit used [1, 6]. The second reason for not asking for acreage was that it is believed that asking the operator to report acreage on a hog questionnaire is a source of irritation to some operations, and could therefore lead to more refusals. If the refusal rate is not significantly higher for the test version, and if there are no significant differences between questionnaire versions for the five selected hog survey items, then the acreage questions can probably be removed from the questionnaire without significantly affecting the estimates.

The second area of research involved a modification of the operation description section. To detect possible duplication in reporting, the operational questionnaire asks the operator if a partnership arrangement is involved in the operation. The test questionnaire allowed the operator to choose one or more of four listed operation arrangements to best describe the farming operation. It has been hypothesized that operations are incorrectly listed as partners on the operational questionnaire, and that the test questionnaire would minimize this misclassification. Which approach is more accurate cannot be determined in this study. However, if a significant difference is detected between questionnaires for the partnerships reported, it is possible that partnership arrangements are not being reported properly on the operational

questionnaire, and further research into the reporting of partnerships would be warranted. If a significant difference is not detected, then either one of the two operation description sections can probably by used in future surveys.

The operational and test questionnaires are shown in the Appendix.

SURVEY DESIGN

The following seven states were involved in this study: Georgia, Indiana, Iowa, Kansas, Minnesota, North Carolina and South Dakota. In each state, the list sample was systematically divided into two groups. One group received the operational questionnaire, and the other group received the test questionnaire. All list strata except the two largest extreme operator strata in each state were included in the analysis. There were two reasons for excluding these two strata in each state from the analysis. First, these strata have very large operations, which could influence test results simply by which treatment or questionnaire version they happen to belong to. Secondly, since the sample sizes are small in these strata, they limit the number or replications that can be used for the analysis. The number of completed reports and the number of positive reports (1 or more hogs) in each state are given in Table 1.

Table 1
Completed and Positive Reports in Each State

State	Completed Reports	Positive Reports
Georgia	1,444	742
Indiana	1,510	584
Iowa	1,857	1,155
Kansas	1,217	384
Minnesota	1,672	626
N. Carolina	1,223	843
S. Dakota	1,497	727
Seven States Comnined	10,420	5,061

ANALYSIS

The analysis will be presented in four sections. The first section will discuss the method of analysis used. The second section will compare the refusal rate between the operational and test questionnaires. Results from statistical tests on the percentage of zero hog operations and on the five selected hog survey items will be presented in the third section. Finally, the fourth section will deal with the results from the analysis on the two approaches used to detect partnership arrangements.

METHOD OF ANALYSIS:

The sample was ordered by state, questionnaire version and stratum, and each observation was randomly assigned to one of ten replicates for analysis. Some advantages to this approach are: (1) the analysis is simplified, (2) the distributions for the variables analyzed are fairly normal and (3) unbiased estimates of the variance are produced even though a systematic sample was originally selected. This approach was recently used by Hall [3, 4] and Hall and Ford [5] to analyze data from the September, 1978 Multiple Frame Hog Survey in seven states.

Estimates for the variables of interest were computed for each of the ten replicates for each questionnaire version in a state. Therefore, within a state there were ten replicates times two questionnaire versions or 20 replicate estimates used in the analyses of variance at the state level. Since there were seven states in the study, there were 20 x 7 or 140 replicate estimates used in the analyses of variance at the seven-state level. The formulae used to compute means and standard errors are given in Appendix B of the three reports referenced in the previous paragraph [3, 4, 5].

It was mentioned earlier that each sample observation was randomly assigned to one of the ten replicates. To protect against the effect of the random assignment, the random assignment process was done five times. The analyses of variance were then generated for each of the five random assignments to replicates. Significance levels discussed later are the average significance levels from the five random replicate assignments. Average significance level was defined simply as the average or mean of the five significance levels. Average significance levels less than or equal to .10 were considered significant.

As in all surveys, some operators refused to participate. Therefore, it must be kept in mind that statistical inferences made in this report for all variables except refusal rate pertain only to the population of respondents.

The analyses of variance in this report assume that the questionnaire version was the only factor affecting the level of the various estimates. Other factors or effects such as enumerator effects or data collection effects (mail, telephone or personal interview) can affect the reported data. Instructions to the seven states involved in the study stated that other factors or effects should be treated the same for the two questionnaire versions. Therefore, to the extent possible, other effects have been controlled.

EFFECT ON REFUSAL RATE:

The first issue to be addressed is whether the refusal rate was significantly different between the questionnaire versions. If an operator refused to provide any data or did not supply enough data so that the report was usable, the operator was considered a refusal. It was assumed that this test measured the reaction of the operators to the removal of the "acres in operation" question asked prior to the hog and pig inventory questions. Changes in the operation description section should not have influenced the refusal rate, because this section was completed after inventory data was obtained. The effect on refusal rate is of great concern because a significantly higher refusal rate for the test version would justify continued usage of the operational version.

The refusal rate for a state was defined as $\sum_h r_h \frac{N_h}{N}$ where r_h is the number of mail, telephone and personal interview refusals divided by the total number of interviews and N_h/N is the stratum weight. Inaccessibles were not included in the calculation of the refusal rate since these operators neither responded nor refused, but were simply not found. Known zero operations were not included in the calculation since they were precoded and therefore not given an opportunity to use one of the questionnaire versions.

A univariate analysis of variance was run using each of the five replicate assignments within each state and across all seven states to determine if the refusal rate was significantly different between questionnaire versions. The refusal rate is presented for each questionaire version by state and for the seven states combined in Table 2. Also shown in this table is the average significance level from the five random assignments of observations to the replicates for each state and the seven states combined.

Table 2

Refusal Rate by Questionnaire Version and Average Significance Level for Each State and the Seven States Combined [1/]

State	Refusal Rate (%)		Average Significance Level
	Operational	Test	
Georgia	1.34	1.90	.338
Indiana	5.61	3.83	.154
Iowa	8.09	11.73	.014*
Kansas	5.94	6.61	.643
Minnesota	6.94	5.95	.470
N. Carolina	0.90	1.01	.858
S. Dakota	11.59	12.25	.664
Seven States Combined	6.44	6.91	.397

[1/] Average significance level $\leq$ .100 was considered significant. The symbol, *, was used to denote significance.

At the seven state level, the refusal rate was not significantly different. The refusal rate was, however, slightly higher for the test version. For the seven states, the refusal rate was significantly different only in Iowa with the test questionnaire having a significantly higher rate. It was decided to conduct additional analysis in Iowa to see if effects other than the questionnaire effect could be causing the significant difference in refusal rate.

First of all, an estimate of the number of refusals in each stratum was computed for each questionnaire version to see if most of the difference in refusals between versions was isolated to one or two strata. This was not the case. In eight of the nine strata analyzed in Iowa the estimate of the number of refusals for the test version was equal to or greater than the estimate for the operational version.

Secondly, the percentage of interviews conducted by mail, telephone and personal interview was computed for each stratum in Iowa for each of the questionnaire versions. If, for example, a much larger percentage of the interviews were conducted by telephone for the test version and refusal rate by telephone was much higher for the test version, then the method of data collection may be contributing to the significant difference in the refusal rate in Iowa. Inspection of the strata estimates showed that the percentage of interviews done by mail, telephone and personal interview generally did not vary greatly between questionnaire versions. Thus, data collection method did not appear to contribute to the significant difference in the refusal rate.

Finally, the refusal rate for the three methods of data collection was calculated for each stratum in Iowa for the test and operational versions. The refusal rates for personal and mail interviews were not consistently higher for either version. However, in all strata, except strata 88 and 93, the telephone refusal rate was higher for the test version as shown in Table 3. Why the refusal rate was higher on the test version when interviewing by telephone is not known. Whatever the reason or reasons, the higher telephone refusal rate for the test version appears to have contributed some to the significantly different refusal rate in Iowa.

Table 3

Telephone Refusal Rate by Questionnaire Version for Each Stratum in Iowa

	Telephone Refusal Rate	
Stratum	Operational	Test
81	5.0	9.2
82	4.4	5.2
83	10.0	20.2
84	16.0	19.2
85	16.7	32.5
86	27.3	33.9
87	22.6	38.0
88	40.0	30.8
93	25.0	20.0

In summary, the refusal rate was not significantly different between questionnaire versions at the seven-state level or in six of the seven states.

EFFECT ON PERCENTAGE OF ZERO HOG OPERATIONS AND ON SURVEY ITEMS:

Since the estimates for the percentage of zero hog operations and for the survey items such as hog inventory could be affected not only by the removal of the acreage question prior to inventory questions but also by the changes in the operation description section, statistical tests made on these variables were considered as tests between the entire operational and test questionnaire.

Before analyzing survey items that come directly from the questionnaire, the variable, proportion of operations with zero hogs, was examined. If the questionnaire versions tend to yield a significantly different number of zero hog operations, then it is possible that the omission of the acreage question and/or the changes in the operation description section affected the number of times operators reported that they had no hogs.

A univariate analysis of variance was run using each of the five replicate assignments within each state and across the seven states. Known zero operators were excluded from the analysis since these operators were never given one of the questionnaires. In Table 4 the percentage of operations with zero hogs is given by questionnaire version and the average significance level is stated for each state and the seven states combined. The percentages shown in Table 4 are the expanded or weighted percentages of zero hog operations on the list.

At the seven state level, the proportion of zero hog operations was not significantly different between questionnaire versions. Of the seven states Iowa was the only state where there was a significant difference. The proportion of zero hog operations for the test version was significantly higher than the operational version in Iowa.

Table 4

Percentage of Operations with Zero Hogs by Questionnaire Version and Average Significance Level for Each State and the Seven States Combined [1/]

State	Percentage of Zero Hog Operations		Average Significance Level
	Operational	Test	
Georgia	70.18	68.75	.550
Indiana	77.04	79.95	.173
Iowa	53.74	58.23	.040*
Kansas	85.25	84.41	.547
Minnesota	76.67	77.33	.776
N. Carolina	37.26	36.69	.844
S. Dakota	71.25	69.51	.344
Seven States Combined	69.60	70.96	.119

[1/] Average significance level $\leq$ .100 was considered significant. The symbol, *, was used to denote significance.

Why was the percentage of zero hog operations significantly higher for the test version in Iowa? It was shown in the last section that the refusal rate was significantly higher for the test version in Iowa. Earlier research by Crank [2] has shown that most operators, who refuse to provide their inventories, have hogs and pigs. Therefore, the significantly higher refusal rate for the test version in Iowa might very well result in proportionately more zero hog operations for the test version in Iowa. This reason might explain why the percentage of zero hog operations was significantly higher for the test version in Iowa.

In summary, the percentage of zero hog operations was not significantly different at the seven-state level or in six of the seven states.

The next step in the analysis was to examine the effect of the questionnaire versions on selected survey items. The five survey items analyzed were:

1) Hog inventory
2) Farrowing intentions for the first quarter (December, January and February)
3) Farrowing intentions for the second quarter (March, April and May)
4) Farrowings during the previous first quarter (September, October and November)
5) Farrowings during the previous second quarter (June, July and August)

A univariate analysis of variance was run on each of the five survey items for each state and the seven states combined for each of the five replicate assignments. In addition, a multivariate analysis of variance using all five survey items was run for each state and the seven states combined. The Wilk's criterion for judging significance was used for the multivariate tests.

The above analyses were done on three data sets. The first data set, which will be called data set 1, consisted of all completed reports except known zero reports. Data set 2 was identical to data set 1 except that outlier reports were excluded. Data set 3 was the same as data set 2 except that zero hog operations were deleted.

Data set 2 was analyzed because sometimes several very large reports or outliers can dictate the test results in a state. It is helpful to conduct the analysis with and without the outliers in order to see their effect. An outlier was defined in this study as any report having a value for one or more of the five survey items that was more than eight standard deviations away from the mean. This definition was decided upon because only 56 observations out of 10,405 were then classified as outliers. Of the 56 outliers, Georgia and Indiana had ten each, Iowa had nine, Kansas and Minnesota each had eight, South Dakota had six and North Carolina five. Of the 56 outliers, 37 were either in the no livestock stratum or the no hog stratum. The 56

outliers were distributed somewhat evenly among the five survey items. Analysis will be done at a later date to determine the optimum outlier definition.

The rationale for studying data set 3 was that operators with no hogs were probably influenced to a much smaller extent by the questionnaire versions than were operators with hogs. Also, it was possible that one of the questionnaire versions might have received many more zero hog operations due to the random assignment of the sample to the questionnaires, and this fact might be dictating the results for data sets 1 and 2.

In Table 5 the average significance level for the univariate tests on each of the five variables and the multivariate test for the five variables combined is given for each state and the seven states combined for each of the three data sets. The mean value for each of the five variables for each state and the seven states combined is given in Table 6 for each data set.

For the seven states combined, the multivariate test was not significant for any of the data sets. The univariate tests were not significant in all instances except one. The single instance of significance occurred with data set 2 for farrowing intentions during the second quarter.

For six of the seven states, the multivariate test was not significant for any of the data sets. In Georgia, the multivariate test was only significant for data set 2. The univariate tests rarely produced significant differences in six of the seven states. The only state where significant differences occurred often for the univariate tests was Kansas. The mean value for each survey item was higher using the test version in Kansas (see Table 6).

The stratum estimates for each of the five survey items for each questionnaire version were computed in Kansas to see if one or two strata appeared to contribute most to the significance of the univariate tests. In all strata, except stratum 81, the five survey items each had higher means for the test version. Therefore, all but one stratum contributed to the significant differences between the questionnaire versions.

Table 5

Average Significance Level for Each Variable and the Five Variables Combined for Each State and the Seven States Combined by Data Set. [1/]

State	Data Set [2/]	Hog Inventory	Farrowing Intentions Dec., Jan., Feb.	Farrowing Intentions March, April, May	Previous Farrowings Sept., Oct., Nov.	Previous Farrowings June, July, Aug.	Five Variables Combined
Georgia	1	.185	.815	.974	.930	.826	.451
	2	.724	.150	.669	.241	.675	.088*
	3	.780	.149	.547	.186	.505	.103
Indiana	1	.173	.320	.305	.421	.215	.761
	2	.452	.874	.375	.769	.486	.671
	3	.541	.212	.834	.457	.639	.563
Iowa	1	.239	.751	.350	.493	.569	.782
	2	.179	.192	.063*	.106	.180	.413
	3	.383	.889	.816	.868	.842	.748
Kansas	1	.065*	.023*	.157	.032*	.075*	.196
	2	.057*	.020*	.045*	.030*	.092*	.204
	3	.204	.090*	.105	.075*	.227	.397
Minnesota	1	.745	.742	.313	.191	.921	.146
	2	.601	.746	.182	.213	.674	.194
	3	.457	.736	.169	.215	.707	.188
N. Carolina	1	.240	.138	.102	.055*	.345	.469
	2	.368	.201	.153	.123	.433	.640
	3	.445	.222	.166	.093*	.400	.546
S. Dakota	1	.534	.299	.360	.592	.614	.439
	2	.160	.861	.527	.806	.271	.432
	3	.019*	.514	.792	.455	.129	.137
Seven States Combined	1	.540	.786	.377	.502	.782	.688
	2	.359	.419	.073*	.119	.170	.304
	3	.299	.399	.746	.762	.752	.666

[1/] Average significance level $\leq$ .100 was considered significant. The symbol, *, was used to denote significance.

[2/] Data Set 1: All completed reports except known zero reports.
Data Set 2: All completed reports except known zero and outlier reports.
Data Set 3: All positive hog reports except outlier reports.

Table 6

Mean Value of Each Variable for Each State and the Seven States Combined by Data Set for Each Questionnaire Version

State	Data Set[1/]	Hog Inventory		Farrowing Intentions Dec., Jan., Feb.		Farrowing Intentions March, April, May		Previous Farrowings Sept., Oct., Nov.		Previous Farrowings June, July, Aug.	
		Oper.	Test	Oper.	Test	Oper.	Test	Oper.	Test	Oper.	Test
Georgia	1	35.26	41.03	2.39	2.46	2.22	2.20	2.08	2.03	2.29	2.36
	2	33.98	34.67	2.31	2.04	2.14	2.02	2.07	1.74	2.18	2.11
	3	114.44	111.58	7.77	6.56	7.19	6.48	6.91	5.61	7.26	6.80
Indiana	1	44.49	36.39	2.41	2.15	2.32	2.03	2.00	1.80	2.64	2.25
	2	37.68	35.01	2.08	2.13	2.15	1.93	1.79	1.74	2.38	2.21
	3	166.79	175.85	9.18	10.64	9.54	9.69	7.93	8.64	10.46	10.96
Iowa	1	131.07	123.40	6.54	6.31	7.80	7.29	6.77	6.41	7.47	7.08
	2	125.79	118.45	6.35	5.65	7.72	6.83	6.68	5.94	7.29	6.52
	3	273.32	284.64	13.77	13.56	16.76	16.41	14.49	14.27	15.82	15.66
Kansas	1	17.41	26.04	0.76	1.15	0.99	1.28	0.94	1.41	0.91	1.61
	2	16.69	20.89	0.72	1.06	0.83	1.14	0.84	1.18	0.89	1.15
	3	113.68	137.04	4.91	6.80	5.66	7.41	5.75	7.69	6.05	7.43
Minnesota	1	33.71	35.36	2.07	2.18	2.22	1.91	1.94	1.50	2.25	2.26
	2	30.90	32.97	1.91	1.83	2.02	1.69	1.58	1.31	2.05	1.97
	3	133.33	148.38	8.24	8.22	8.74	7.59	6.82	5.89	8.69	8.69
N. Carolina	1	54.15	59.66	3.58	4.21	3.31	4.00	2.91	3.59	3.41	3.76
	2	52.82	56.84	3.48	3.97	3.20	3.76	2.84	3.33	3.31	3.58
	3	84.21	89.93	5.55	6.29	5.11	5.95	4.47	5.26	5.19	5.64
S. Dakota	1	46.14	43.74	2.07	2.44	2.94	3.16	2.38	2.49	2.61	2.44
	2	44.84	40.27	2.07	2.00	2.89	3.00	2.31	2.22	2.53	2.23
	3	156.93	133.64	7.24	6.59	10.11	9.95	8.02	7.33	8.77	7.39
Seven States Combined	1	58.23	56.99	3.09	3.13	3.47	3.32	3.02	2.92	3.43	3.38
	2	54.68	54.41	2.93	2.81	3.34	3.09	2.86	2.66	3.27	3.07
	3	181.04	185.35	9.67	9.71	11.04	10.71	9.44	9.22	10.78	10.59

[1/] Data Set 1: All completed reports except known zero reports.
Data Set 2: All completed reports except known zero and outlier reports.
Data Set 3: All positive hog reports except outlier reports.

In summary, results of almost all of the tests indicated no significant difference between questionnaire versions in six of the seven states and the seven states combined. Kansas, however, did exhibit many significant differences between questionnaire versions.

EFFECT ON PARTNERSHIPS:

A different approach was used on the test questionnaire in the operation description section to detect partnership arrangements. As mentioned in the Introduction, it has been hypothesized that operations other than partnerships are possibly being reported as partnership arrangements on the operational questionnaire. Therefore, under this hypothesis the test version is expected to detect fewer partnership operations.

The variable selected to compare the detection of partnerships between questionnaire versions was partnership arrangements reported by operations sampled as individual operations. A univariate analysis of variance was run on partnerships reported by sampled individuals as a percentage of all positive hog operations for each of the five replicate assignments. Analysis was limited to positive hog operations for two reasons. The first reason was that on the test questionnaire if an operator reported no hogs the flow of the questionnaire looped the operator or enumerator around the operation description section. Therefore, this section was often not completed. Secondly, if the operator has no hogs, a change in the operation type does not affect the estimate.

The percentage of the positive reports for each questionnare version where partnerships were reported by sampled individuals and the average significance level for each state and the seven states combined are given in Table 7. At the seven-state level there was no significant difference between operation description sections. The percentage for the operational version was higher than the test version.

Minnesota was the only state where the operation description sections produced significantly different percentages. The percentage of partnerships reported by sampled individuals for the operational version was significantly higher than the test version. In two of the seven states, the percentage was higher but not significantly higher for the test version, which was contrary to the hypothesis stated earlier.

Table 7

Percentage of Positive Hog Operations Where Partnership Arrangements Were Reported by Individual Operations by Questionnaire Version and the Average Significance Level for Each State and the Seven States Combined [1/]

State	Partnerships Reported by Individuals as a Percentage of Positive Hog Operations		Average Significance Level
	Operational	Test	
Georgia	6.77	5.58	.614
Indiana	8.29	10.80	.503
Iowa	7.75	7.69	.903
Kansas	3.82	9.74	.125
Minnesota	9.50	2.62	.010*
N. Carolina	0.67	0.22	.545
S. Dakota	6.63	3.29	.122
Seven States Combined	6.92	5.91	.584

[1/] Average significance level $\leq$ .100 was considered significant. The symbol, *, was used to denote significance.

Since the major focus of this analysis was on partnerships reported by sampled individuals, it was decided to analyze the data again but look just at sampled individuals with positive operations rather than all positive operations. The results from the analyses of variance are shown in Table 8.

Again, Minnesota was the only state exhibiting a significant difference between operation description sections. Three of the states had a higher but not significantly higher percentage for the test version. Since Minnesota was the only state where a significant difference occurred, further analysis was done to determine if this significant difference was caused by one or two strata.

Stratum estimates were computed in Minnesota for the percentage of partnerships reported by sampled individuals for each version of the operation description section. In 11 of the 12 strata in Minnesota the percentage for the test version was less than or equal to that of the operational version. Therefore, the significant difference was not isolated to one or two strata.

Table 8

Percentage of Individual Operations Reporting Partnership Arrangments by Questionnaire Version and the Average Significance Level for Each State and the Seven States Combined.

State	Partnerships Reported by Individuals as a Percentage of Individual Operations		Average Significance Level
	Operational	Test	
Georgia	7.40	6.12	.609
Indiana	8.58	11.54	.457
Iowa	8.16	8.35	.849
Kansas	4.06	10.43	.126
Minnesota	10.12	2.78	.009*
N. Carolina	7.31	2.47	.551
S. Dakota	7.47	3.69	.133
Seven States Combined	7.37	6.40	.618

1/ Average significance level $\leq$ .100 was considered significant. The symbol, *, was used to denote significance.

In summary, the operation description sections did not detect a significantly difference percentage of partnerships reported by sampled individuals at the seven-state level or in six of the seven states. However, in some states the test percentage was higher than the operational percentage which was not anticipated. In Minnesota, the test version yielded significantly fewer partnerships reported by sampled individuals than the operational version.

CONCLUSIONS AND RECOMMENDATIONS

At the seven state level, the refusal rate, the proportion of zero hog operations and the percentage of partnerships reported by sampled individuals were not significantly different between questionnaire versions. For the five selected survey items, there was only one instance when a significant difference occurred for the univariate and multivariate tests at the seven state level.

At the individual state level, the refusal rate and the proportion of zero hog operations were significantly different only in Iowa with the test version being significantly higher for both variables. For the five selected survey items, Kansas was the only state that exhibited many significant differences between questionnaire versions. For the percentage of partnerships reported by sampled individuals, Minnesota was the only state that showed a significantly higher percentage reported by the operational version.

A significance level of .10 was used for each of the tests. Using a significance level of .10 for each state means that there is a 52 percent chance that at least one of the seven states will be significant when there is really no significance in any state. Therefore, random fluctuations may be causing the significant difference in Iowa for the refusal rate and the proportion of zero hog operations, in Kansas for the selected survey items and in Minnesota for the percentage of partnerships reported by sampled individuals. Thus, significance in a single state probably does not provide enough evidence to consider the questionnaire versions significantly different in general. Therefore, the acreage questions can probably be removed from the questionnaire and the modified operation description section implemented without affecting the survey estimates. This statement implies only that the estimates should not change significantly and not that the estimates are accurate. As mentioned in the Introduction, the accuracy of the estimates depends on the proper use of the reporting unit. Therefore, the concept that the operator report all hogs REGARDLESS OF OWNERSHIP on the land he or she operates must continue to be emphasized.

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3/ Hall, K.B., "The Effect of Telephone Enumerators and Evaluating a New Operation Description," Economics, Statistics, and Cooperatives Service, USDA, 1979, Washington, D.C.

4/ Hall, K.B., "Detecting a Rotational Bias on Multiple Frame Surveys," Economics, Statistics, and Cooperatives Service, USDA, 1979, Washington, D.C.

5/ Hall, K.B., and Ford, B., "The Effects of Data Collection Methods," Economics, Statistics, and Cooperatives Service, USDA, 1979, Washington, D.C.

6/ Hill, George W. and Rockwell, Dwight A., "Associating a Reporting Unit With a List Frame Sampling Unit in Multiple Frame Sampling - Ohio and Wisconsin," Statistical Reporting Service, USDA, 1977, Washington, D.C.

APPENDIX

(Operational and Test Questionnaires)

OPERATIONAL

Crop Reporting Board

Economics, Statistics, & Cooperatives Service

U.S. Department of Agriculture

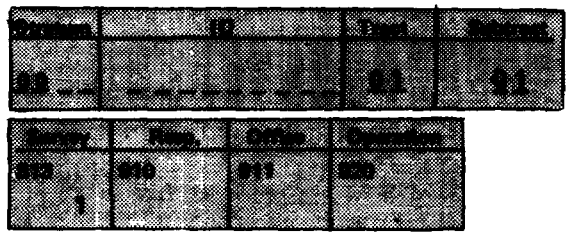
Hog and Pig Survey

DECEMBER 1, 1979

Form Approved
O.M.B. Number 40-R3774
Approval Expires 3-31-81

C.E. 11-0087

M



Dear Reporter

Your **HELP** is needed to **MAKE HOG** and **PIG ESTIMATES** as **ACCURATE** as possible.

Your name was selected in a small sample of farmers in the State and a report is needed even if you have no hogs and pigs or only a few. Questions refer to hogs and pigs on all the land you operate. Facts about your operation will be kept confidential and used only in combination with similar reports from other producers.

Response to this survey is voluntary and not required by law. However, your cooperation is very important to insure timely and accurate estimates.

Please help reduce survey costs by completing this inquiry and returning it as soon as possible. Should your report be delayed in reaching us, one of our interviewers may request your assistance by phone or in person. The enclosed envelope requires no stamp. Thank you.

Respectfully,

John W. Kirkbride

John W. Kirkbride, Chairman
Crop Reporting Board

Please make corrections in name, address and Zip Code, if necessary.

Is your operation known by another name, than printed above?

☐ NO

☐ YES *Enter name* _____

LAND OPERATED NOW

The following questions refer to the hogs and pigs on all the land you operate. Therefore, we first must determine the total acres you operate. Please make any necessary corrections when acres operated are entered below. Include cropland, pastureland, woodland and wasteland.

1. How many **ACRES** are now in **YOUR ENTIRE FARM** or **RANCH**? . . . . . 900 .0

(Include *all land owned, rented or managed, but* **exclude** *land rented to or managed by others.)*

(Please turn to page 2.)

M

HOG AND PIG INVENTORY

Please report below all **HOGS** *and* **PIGS** *on the land you operate regardless of ownership. Include hogs and pigs purchased and still on hand.*

3. **HOG and PIGS for BREEDING**

a. **Sows, gilts** and **young gilts** bred and to be bred. 301

b. **Boars** and **young males** for breeding. 302

c. **Sows** and **boars** no longer used for breeding. 303

4. **HOG and PIGS FOR MARKET and HOME USE**

(Exclude breeding hogs already reported in Item 3.)

a. Under 60 lbs. *(Include pigs not yet weaned.)* 311

b. 60 — 119 lbs. 312

c. 120 — 179 lbs. 313

d. 180 lbs. and over *(Exclude hogs no longer used for breeding)* 314

5. **TOTAL number of HOGS and PIGS** - - *[add 3a through 4d]* 300

FARROWING INTENTIONS 499

6. **SOWS and GILTS** *(reported in Item 3a)* **EXPECTED TO FARROW:**

a. From now through December 1979, January and February 1980? 331

b. During March, April and May, 1980? 332

PREVIOUS SIX MONTHS FARROWINGS

7. **SOWS** and **GILTS FARROWED** during June, July and August 1979?. 322

8. **PIGS** from these *(Item 7)* litters:

a. Now on hand 323

b. Already sold or slaughtered 324

9. **SOWS** and **GILTS FARROWED** during September, October and November **1979** until now? 326

10. **PIGS** from these *(Item 9)* litters:

a. Now on hand 327

b. Already sold. 328

M

PURCHASES

11. **HOGS** and **PIGS PURCHASED** since June 1, 1979 now on hand? *(Include feeder pigs purchased)* 317

If Item 11 is zero, skip to Item 13.

12. **FEEDER PIGS** purchased during November, 1979? 340

a. Average **PRICE PER HEAD** . . . . . **Dollars and Cents** 341 . ——

b. Average **WEIGHT PER HEAD** . . . . . **Pounds** 342

DEATHS AFTER WEANING

13. **WEANED PIGS** and **OLDER HOGS** that died during September, October and November 1979? 335

OPERATION DESCRIPTION OF LAND

Additional information is needed on your operation to assist in detecting possible duplication in reporting. (Please make any necessary corrections when operation description information has been entered below.)

18. Do you *(the individual or operation listed on the face page)* operate **AGRICULTURAL LAND** in a partnership or joint operating arrangement? *(Exclude landlord-tenant, cash rent or share crop arrangements.)*
(Check One) ☐ **YES** - *continue.* ☐ **NO** - *turn to page 4.*

19. Who are the persons in this partnership or joint land arrangement with you? 921

a. Name _____ Telephone No. _____
(Last) (First (Middle)

b. Address _____
(Route or Street) (City) (State) (Zip)

c. Partnership or Operation Name _____

a. Name _____ Telephone No. _____
(Last) (First (Middle)

b. Address _____
(Route or Street) (City) (State) (Zip)

c. Partnership or Operation Name _____

20. How many acres of land are in this partnership or joint operating arrangement? . . . . . **Acres**

a. How many of these acres **were included** in Item 1, page 1? . . . . . **Acres**

21. How many hogs and pigs are now on the Item 20 acres? . . . . . **Number**

a. How many of these hogs and pigs **were included** in Item 5, page 2? . . . . . **Number**

(Please turn to page 4.)

M

22. The results of this survey will be released December 21, 1979. Would you like to receive a copy?

☐ YES = 1

☐ NO = 2

099

COMMENTS

Please comment on any unusual death loss, average gains, or farrowing problems affecting your answers.

Any comments on problems or factors affecting hog production in your area will be appreciated.

That completes the survey. Another hog survey will be conducted in about three months and we may need to contact you again. Thank you for your help.

Reported by _____ Date _____

Telephone Number _____ _____
(Area Code) *(Number)*

Crop Reporting Board

Economics, Statistics, & Cooperatives Service

U.S. Department of Agriculture

TEST

Hog and Pig Survey

DECEMBER 1, 1979

Form Approved
O.M.B. Number 40-R3774
Approval Expires 3-31-81

C.E. 11-0088b

I-1

System	ID	Test	Subject
98		01	01

Survey	Regn.	Office	Operation	Tel. Int.	Research
013 1	010	011	020	7 TR 8 IR 0 Insp.	021 1

Please make corrections in name, address, and Zip Code, if necessary.

Mr. _____ , I am _____

from _____ . We are now conducting the December 1 Hog and Pig Survey and your name was selected in a sample of farmers in this State. Response to this survey is voluntary and not required by law. However, your cooperation is very important to insure timely and accurate estimates. Your report is confidential and used only in combination with reports from other producers to arrive at State estimates.

Is your operation known by any name other than _____ ? (Read above name to respondent)

☐ NO ☐ YES → Enter name _____

2. Are there now any **hogs** or **pigs** regardless of ownership, on the land you now operate?

☐ YES

☐ NO

2a. Have there been any **HOGS** or **PIGS** on the land you now operate since September 1, 1979?

YES ☐ *Skip to Item 7, page 2.*

NO ☐ *Skip to Item 22, page 4.*

(Please continue on page 2.)

HOG AND PIG INVENTORY

Now I want to ask you about the hogs and pigs on the land you operate, regardless of ownership. Include hogs and pigs purchased and still on hand.
First I would like to ask about **HOGS** and **PIGS KEPT FOR BREEDING.**

3. How many are:
   a. **Sows, gilts, and young gilts bred and to be bred?** 301
   b. **Boars and young males** for breeding? 302
   c. **Sows** and **boars** no longer used for breeding? 303

Now let's talk about the **HOGS** and **PIGS** for **MARKET** and **HOME USE** on the land you operate. *(Exclude breeding hogs already reported in Item 3)*

4. How many are:
   a. Under 60 pounds? *(Include pigs not yet weaned.)* 311
   b. 60 — 119 pounds? 312
   c. 120 — 179 pounds? 313
   d. 180 pounds and over? *(Exclude hogs no longer used for breeding.)* 314

5. *Add Items 3a through 4d:* Then the **total hogs** and **pigs** now on the land you operate is 300
   Is that correct?

   YES ☐ *Continue* NO ☐ *Correct answers in 3, 4, and 5.*

499

FARROWING INTENTIONS

6. How many of the _____ **SOWS** and **GILTS** are **EXPECTED TO FARROW:**
   (Item 3a)
   a. From now through December 1979, January and February 1980? 331
   b. During March, April and May, 1980? 332

PREVIOUS SIX MONTHS FARROWINGS

7. How many **SOWS** and **GILTS FARROWED** during June, July and August 1979? 322

8. How many **PIGS** from these *(Item 7)* litters are:
   a. Now on hand? 323
   b. Already sold? 324

9. How many **SOWS** and **GILTS FARROWED** during September, October and November, until now? 326

10. How many **PIGS** from these *(Item 9)* litters are:
    a. Now on hand? 327
    b. Already sold? 328

PURCHASES

11. How many **HOGS and PIGS PURCHASED** since June 1, 1979 are now on hand? *(Include feeder pigs purchased)* 317

If Item 11 is zero, skip to Item 13.

12. How many **FEEDER PIGS** were purchased during November, 1979? 340

a. What was the average **PRICE PER HEAD?** ..... Dollars and Cents 341 .— —

b. What was the average **WEIGHT PER HEAD?** ..... Pounds 342

DEATHS AFTER WEANING

13. How many **WEANED PIGS and OLDER HOGS** died during September, October and November 1979? 335

OPERATION DESCRIPTION OF LAND

Additional information is needed on your operation to assist in detecting possible duplication in reporting.

18. Which of the following best describes your farming operation? *(Check only one unless you, the individual or operation listed on the face page, have more than one operating arrangement).*

☐ = 1 Individually operated land

☐ = 2 Partners jointly operate land and share in decision making.

☐ = 3 Hired manager of land owned by someone else.

☐ = 4 Other *(Specify)* _____ 921

Complete Items 19 and 21 only if Partnership is checked. Please make any corrections when operation description information is entered.

19. Who are the persons in this partnership or joint land arrangement with you?

a. Name _____ Telephone No. _____
(Last) (First (Middle)

b. Address _____
(Route or Street) (City) (State) (Zip)

c. Partnership or Operation Name _____

a. Name _____ Telephone No. _____
(Last) (First (Middle)

b. Address _____
(Route or Street) (City) (State) (Zip)

c. Partnership or Operation Name _____

(Please turn to page 4)

21. How many hogs and pigs are now on this partnership or joint land? . . . . . Number ☐

    a. How many of these hogs and pigs were included in Item 5, page 2? . . . . . Number ☐

22. The results of this survey will be released December 21, 1979. Would you like to receive a copy?

    ☐ YES = 1

    ☐ NO = 2 ☐ 099

ENUMERATOR COMMENTS

That completes the survey. Another hog survey will be conducted in about three months and we may need to contact you again. Thank you for your help.

Reported by _____ Enumerator _____

Telephone Number _____ _____ Date _____
(Area Code) *(Number)*