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**JUNE 1990 REINTERVIEW SURVEY: PART I,
EFFECT OF ALTERNATIVE ACREAGE
OPERATED QUESTIONS ON REPORTED
ACREAGES AND NUMBER OF HOGS ON
FARMS**

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ABSTRACT

Significantly lower estimates of land in farms, total cropland, and acreages planted to corn and to soybeans resulted from alternative farm definition questions asking acreages owned and rented rather than a single "acres operated" question. However, the indicated number of all hogs and pigs was larger. These results came from personal reinterviews of a sample of 1990 JAS (June Agricultural Survey) telephone respondents in Indiana and Ohio. The major reasons for the biases in the JAS estimates were the following.

- (1) Telephone survey procedures, as used, were unable to determine consistently if respondents were or were not farm operators. The net JAS bias due to respondents changing from "in business" to "out of business" or vice versa is approximately 50 percent of the total bias for each of the acreage items.
- (2) Landowners who rent all or part of their cropland to others tend to report for all land owned.

The alternative farm definition questions have been added to the operational questionnaire, beginning with the December 1990 Agricultural Survey.

KEY WORDS

Response error, reinterview, farm definition, acreage, hogs and pigs.

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*   necessarily those of NASS or USDA.                   *
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Table of Contents

	Page
SUMMARY	iii
INTRODUCTION	1
METHODOLOGY	3
Sample Size	3
The Sample	4
Questionnaire	5
Expansions	6
Summarization	7
Statistical Tests	7
Extreme Differences	8
RESULTS	9
Acreage - Expanded Totals and Differences	10
"In Business" and "Out of Business"	12
Ownership of Land Operated	15
Extreme Differences	16
Hogs and Pigs	19
CONCLUSIONS	21
RECOMMENDATIONS	24
REFERENCES	26
APPENDIX: Questionnaire	28

Tables

Table 1.	Relative Differences Between JAS and JRS Estimates	iv
Table 2.	Relative Differences Between JES and JAS Estimates	2
Table 3.	Number of Reinterview Sample Units	4
Table 4.	JRS Estimated Acreages and Differences From JAS	11
Figure 1.	JAS Biases for Corn and Soybeans Relative to ASB and JRS	13
Table 5.	Estimates By "In" or "Out of Business"	14
Table 6.	Estimates by Type of Land Tenure	17
Figure 2.	JAS Bias By Type of Operator	18
Table 7.	Distribution of Normalized Relative Differences	18
Table 8.	Expanded (JAS-JRS) Extreme Differences	19
Table 9.	JRS Estimated Hogs and Pigs and Differences from JAS	20
Table 10.	Total Hogs, Before and After Correction	22

SUMMARY

Revised farm definitions based upon acreages owned, rented from others, and rented to others instead of "total acres operated" resulted in lower estimates for the four acreage items in the survey (total land, all cropland, corn and soybeans) but higher estimates for all hogs and pigs. Not all individual differences were statistically different from zero, but a multivariate test of the four acreage items was significant at $\alpha = .10$. These results came from personal reinterviews of a sample of telephone respondents in Indiana and Ohio (list strata 60-80) from the 1990 June Agricultural Survey (JAS). Major reasons for the biases in the JAS estimates were the following.

- (1) Telephone survey procedures, as used, were unable to determine consistently if respondents were or were not farm operators. The net JAS bias due to respondents changing from "in business" to "out of business" or vice versa is approximately 50 percent of the total bias for each of the acreage items.
- (2) Landowners who rent all or part of their cropland to others tend to report for all land owned.

Six percent (30 of 497) of the respondents counted as farm operators on the JAS were landlords only, deceased operators, or individuals involved in various partnerships. These respondents should have been counted as "out of business" (OB). This group included one very large report of 10,000 acres for total land and 1,000 acres of cropland, but only 30 acres of corn and no soybeans. The effect of this one report is shown in Table 1. On the other hand, one-third (35 of 108) of the respondents counted as "out of business" on the JAS did qualify as farmers on the reinterview (JRS). The "in business" (IB) to "out of business" (OB) changes resulted in large decreases in estimated total acreages. These decreases were partially offset by reports changed from OB to IB. These reclassifications accounted for 61 percent of the estimated positive bias in the JAS estimates of total land in farms, 43 percent of the bias for all cropland, 38 percent of the bias for corn, and 68 percent of the bias for soybeans.

Landowners who rented out (some) land to other farmers also made a disproportionately large contribution to over-reporting of acreages from the JAS. These operators accounted for only about 3 percent of the total land in farms in list strata 60-80, but for 33 percent of the total bias for cropland, 11 percent for corn, and over 100 percent for soybeans (since other land tenure categories had a negative bias). These results indicate apparent confusion about the meaning of the "Land operated" question on the JAS and suggest that these operators tend to report for all land owned.

The total number of hogs and pigs reported on the JRS was larger than on the JAS, but the difference was not statistically

significant. The indicated increase was primarily from those farms that changed from OB on the JAS to IB on the JRS. Farms changed from OB to IB averaged twice as many hogs per farm as other farms.

Excluding one very large report, the estimated total land in farms from the JAS was 7.7 percent more than from the JRS, total cropland was 6.4 percent more, acres of corn planted for all purposes was 8.9 percent more, the acreage planted to soybeans was 4.2 percent more, and the total number of hogs and pigs was 4.1 percent less (Table 1). Except for total land in Indiana, none of the differences were significant at the State level. However, a multivariate test of the differences for the four acreage items did show that the differences between the JAS and JRS reports were significantly different from zero ($\alpha = .10$) for the two States combined and for Indiana. While the expanded differences were much smaller in Ohio than in Indiana, the two States were not significantly different.

Table 1. Relative Differences¹ Between JAS and JRS Estimates of Acreages and Numbers of Total Hogs, By States, Including and Excluding One Very Large Report.

Item	Indiana		Ohio		Combined	
	Percent of JRS	Prob. (d=0)	Percent of JRS	Prob. (d=0)	Percent of JRS	Prob. (d=0)

All reports						
Total land	12.7	0.034*	16.5	0.275	14.5	0.057*
Cropland	10.4	.116	2.9	.426	7.3	.079*
Corn	11.9	.138	3.6	.340	9.0	.094*
Soybeans	11.2	.152	-5.9	.127	4.2	.387
Hotelling's T ²		.059*		.071*		.205
All Hogs & Pigs	-7.4	.467	5.3	.529	-4.1	.586
Excluding one very large report						
Total land	12.7	0.034*	1.7	0.606	7.7	0.032*
Cropland	10.4	.116	1.0	.753	6.4	.112
Corn	11.9	.138	3.5	.362	8.9	.096*
Soybeans	11.2	.152	-5.9	.127	4.2	.387
Hotelling's T ²		.059*		.105		.096*
All Hogs & Pigs	-7.0	.467	5.3	.529	-4.1	.586

1_ / (JAS-JRS)/JRS * 100

* - Significant at $\alpha = 0.10$

These results show that the single global question on "acres operated" used on the MF Agricultural Surveys from December 1986 through September 1990 results in the misclassification of a significant minority of reports as "in" or "out" of business. In

turn, this has led to substantial overestimates of total land, total cropland, and acreages planted to corn and soybeans, and underestimates of total hogs and pigs. The single question on "acres operated" also appears to allow respondents to think in terms of total acreage owned, instead of acreage actually operated. Determinations from the Sept. 18-20, 1990 meetings of the NASS Program Planning Committee included the statement that "The Agency should consider direct implementation of the additional acreage questions in December." In fact, the four "acres operated" questions have been used for the Quarterly Agricultural Surveys since December 1990.

Further research should be conducted to decide if the additional acreage questions should come before the current Identification section. That is, should our interviewers determine the size of the respondent's farming operation, if any, before asking if there are crops, various types of livestock, grain storage facilities, and so on? These changes could effectively reduce both the present apparent confusion as to what is meant by "operation," and the total difference between the multiple and area frame acreage estimates. Alternative ways of defining "rented" land and buildings may also help eliminate confusion about the proper reporting unit. For follow on surveys, research should be conducted to evaluate the use of previous responses to the four land operated questions in CATI interviews as a probe for discrepancies in currently reported acreage totals.

**JUNE 1990 REINTERVIEW SURVEY: Part I, Effect of Alternative
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INTRODUCTION

Multiple Frame (MF) Surveys as used by the National Agricultural Statistics Service (NASS) collect data from lists of individuals believed to be farmers (list frame) and from randomly selected segments of land (area frame). Advantages of the list frame are that:

- (1) nearly complete lists can be compiled for many categories of interest,
- (2) data collection, especially by mail or with telephone interviewing, is relatively inexpensive, and
- (3) it can be divided into more homogeneous groups (strata). (The NASS list frame is stratified both by size and type, such as grain storage, specialty crops, general crops, hogs, or other livestock or poultry species).

In contrast, the area frame is complete but does not provide adequate precision, especially for livestock, minor crops and other "rare" items. Therefore the list frame is intended to be the major source of information on the NASS MF surveys, and the area frame provides estimates for farms not included in the list frame. The current NASS system of integrated MF surveys for estimates of crop acreage and production, livestock numbers, and stocks of grain on farms began in December 1986. (Separate MF surveys had been used for hogs and cattle previously). Unfortunately, MF estimates of crop acreages have been consistently and significantly higher than those from the area frame alone (Table 2).

NASS has conducted several reinterview studies to measure biases in the estimates of acreage, grain stocks, and livestock from the list portion of the MF survey. A summary paper by Hanuschak, Atkinson, Iwig, and Tolomeo (1991) describes previous NASS reinterview survey programs and results (1975-1991). However, these studies used the same one question definition of acreage operated and did not examine other ways of asking questions that might reduce the respondent error.

Table 2. Relative Differences Between Area (JES) and Multiple Frame (JAS) Direct Expansion Estimates of Acreages Planted to Corn and Soybeans, United States, 1987-91.

Year	Corn			Soybeans		
	JES	JAS- JES	Percent of JES	JES	JAS- JES	Percent JES
	(000)	(000)	%	(000)	(000)	%
1987	65,890	1,836	2.8	58,613	1,697	2.9
1988	67,556	4,944	7.3	58,874	3,825	6.5
1989	72,570	4,478	6.2	61,401	4,167	6.8
1990	74,629	3,939	5.3	57,574	4,012	7.0
1991	75,680	3,687	4.9	60,205	2,474	4.1

Several hypotheses had been suggested for the cause of the response bias. One is that the respondent does not provide data for the proper operating unit. Under the survey design, the operator is the person who makes the day to day decisions, and the reporting unit is intended to be all land, owned and/or rented, operated by the selected name. The MF questionnaire attempted to define the reporting unit by simply asking the respondent for the total acres operated. Special types of land to be included, such as land rented from others, or excluded, such as land rented to others, are listed separately on the questionnaire and on the Computer Assisted Telephone Interview (CATI) instrument, but are not necessarily read to the respondent. To address this hypothesis, the reinterview questionnaire specifically asked for acres owned, rented to others, rented from others, and then total acreage. This approach was designed to provide a more accurate value for total acres operated and better define the reporting unit for the respondent. Previous studies (Ford, 1975; Bosecker and Kelly, 1975; Hill and Rockwell, 1977; Nealon, 1980a; and Nealon, 1980b) showed that the respondent had difficulty recognizing the total acres operated as the reporting unit for livestock. Instead, some respondents would report livestock owned without regard to their location. Consequently, the total acres operated question was dropped from the MF livestock questionnaire in 1980. Now that the MF survey also includes crops and grain stocks, it was hypothesized that proper definition of the reporting unit is critical.

A second hypothesis was that the respondent could not accurately report the total acreages of farm crops for the entire operation. Therefore more accurate data could be obtained at the parcel or field level. Obtaining parcel and field level data on the operational MF survey by telephone would not be feasible. However, a measure of the amount of bias due to this factor would help interpretation of the MF acreage indications.

A third potential contributor to the bias is the nonresponse imputation procedure. The NASS imputation procedure for crop acreage was implemented in June 1987 and uses list control data in addition to data from previous surveys. Wesley (1991) used data from this survey to find that the imputation procedures did contribute to a significant upward bias in the MF cropland acreage indications.

The June 1990 Reinterview Survey (JRS) was conducted to investigate these three hypotheses. In addition, hog data were also collected to determine if the alternative method for defining the total acres operated had any effect on the number of hogs reported. Two additional probing questions were also used to determine if hogs were being correctly reported for the reporting unit. The study was conducted in Indiana and Ohio because they had participated in previous reinterview surveys and because they were experiencing major differences between the Multiple Frame and Area Frame indications for major crops. The reinterview responses were treated as "truth" in comparisons with the original JAS responses.

This report only examines the first hypothesis and the effect of the alternative acres operated questions on the reported hog data. The second hypothesis will be addressed in a separate report.

METHODOLOGY

SAMPLE SIZE

The Reinterview Survey was planned for a total of 700 reinterviews in each State. These were to include about 400 respondents for whom "complete" reports had been obtained by telephone (Domain I), about 150 people who had refused to answer the telephone inquiry (refusals - Domain II), and about 150 more who could not be reached by telephone (inaccessibles - Domain III). The 400 observations for Domain I were expected to result in smaller sampling errors for the paired (JAS - JRS) differences than for the JAS. Actual sample sizes and response rates are listed in Table 3.

The number of JAS telephone interviews was less than expected. This resulted in less than 400 Domain I reinterviews in each State. The percentage of completed reinterview reports from the Domain I sample was about the same as from the entire JAS for these States. The small number of samples from Domain III in Ohio resulted from a change by the Ohio office in their coding of refusals and inaccessibles. This also affected the response statistics for Domain II in that a portion of the Domain II sample units for Ohio actually were inaccessibles.

Table 3. Number of Reinterview Sample Units,
By Domain and State, June 1990.

State	DOMAIN		
	I	II	III
Indiana	367	150	153
Ohio	383	146	36
----- Total	750	296	189
Good reports - #	607	153	118
%	81	52	62
Refusals- #	34	114	22
%	5	39	12
Inaccessibles - #	109	29	49
%	14	10	26

THE SAMPLE

List sample units from the 1990 June Agricultural Survey (JAS) strata 60-80 were divided into four different domains. Domain I included all sample units where the JAS telephone interview concluded with a complete report. This included respondents who had reported that they were no longer farming. Domain II included all telephone interview sample units where the specified respondent refused to provide the desired information (refusal), and Domain III included all sample units where the intended respondent (or other knowledgeable person) could not be contacted on the JAS (inaccessibles). Domain IV included those JAS sample units that had been contacted either by mail or by a personal interview. Domain IV was not sampled for the Reinterview Study. Extremely large sample units, strata 81-98, also were not sampled. This was to reduce the respondent burden on these operations as they are sampled heavily for other surveys.

The JAS sample consisted of five replications from each stratum. Two replications were expected to provide an adequately large sample for Domain I. Replications 1 and 2 are used for the Monthly Agricultural Yield Surveys, from August through November. Therefore, to better distribute the respondent burden, the Reinterview sample for Domain I was limited to a preselected subsample from the replications 3 and 4. The number of preselected sample units in each strata was proportionate to the number selected for the JAS. Since a portion of the preselected sample units would be refusals or inaccessibles, the total number of preselected sample units in each State was larger than 400.

Reinterview sample units for Domain III were selected from all JAS sample "inaccessibles." Sample units for Domain II "telephone refusals" were selected only from replications 1 through 4. "Refusals" and "inaccessibles" from the JAS are not included in the Monthly Agricultural Yield Surveys, so respondent burden for those list units is not a concern. Also, nearly all JAS "refusal" and "inaccessible" sample units were required to reach an acceptable number of observations for those domains. Domain II and III records were used primarily to address the third hypothesis, concerning potential bias from the data imputation procedures.

Sample units to be reinterviewed were identified during the JAS survey, as additional reports passed the JAS Edit Program. Lists of the newly identified sample units were sent to the State Statistical Offices (SSO) for Indiana and Ohio. The SSO staff then sent reinterview questionnaires to the field enumerators for completion.

Reinterviews were taken from June 8 through June 30. One half of the reinterviews were completed by June 19.

QUESTIONNAIRE

The questionnaire used for the Reinterview (Appendix A) differed from that used for the JAS as follows.

1. The JAS questionnaire begins with a four-part question to find if the respondent raised any crops, cut any hay, had or expected to have any livestock or poultry in 1990, had grain storage facilities or had land in government programs. If not, the interview was ended and the report coded as "not in business".

The Reinterview questionnaire asked for the same information but as a single question. If the answer was "NO," then the enumerator was to ask an eight-part series of questions relating specifically to land with potential for crop production, or to such specialties as broilers, turkeys, or other poultry; horses or ponies; bees or fish; vegetables, melons or berries for sale; fruit or nut trees or grapevines; greenhouse or nursery crops; or any other type of agricultural production or sales. The reinterview was to be concluded at this point only if all answers were "NO." This screening format would reduce respondent burden for most respondents and was examined as an alternative procedure for the MF surveys.

2. The JAS asked for "total acres of land in this operation on June 1". The Reinterview survey asked specifically for acres of land owned, and acreages rented from and to others. Total acres of land in the operation was then calculated as land owned plus land rented from others less any land rented to others. The derived acreage was then verified by the

respondent and was defined as the reporting unit for the remainder of the interview. The remainder of the questionnaire applied only to the acreage and hogs within the reporting unit.

3. The Reinterview survey asked only for acreages planted to corn and to soybeans on the entire farm whereas the JAS also asked for acreages planted to several other crops.
4. The Reinterview questionnaire used for the Domain I respondents (Version 1) included additional questions (Sections 5 and 6) on total acreage, crop land, and acreages planted to corn and to soybeans by individual parcels and by corn and soybean fields within (a subsample) of the parcels. Version 2 of the questionnaire, used for Domain II (JAS refusals) and III (JAS inaccessible), differed from Version 1 only in that it did not ask for acreages by parcels and fields.
5. The "hog" portion of the Reinterview questionnaire was limited to numbers of breeding stock and weight groups of hogs and pigs for market on hand June 1. Two additional questions were to determine if the respondent was properly reporting all hogs on the total acreage operated, and reported only hogs on that acreage.
6. The Reinterview survey did not ask for any information as to the number (if any) of cattle or sheep.

The Reinterview questionnaire did not contain any information from the JAS, and did not include any provisions for reconciling differences between the JAS and Reinterview survey responses.

EXPANSIONS

Expansion factors for the Reinterview sample units in each list frame stratum were computed as $g_h = N_h / n_h$ where:

N_h = the total number of sample units in that list frame stratum,
and

n_h = is the Reinterview Survey number of complete (including "out of business") Domain I reports for that stratum.

This expansion factor was used both for values from the Reinterview Survey and for the JAS reports from the same respondent. A list adjustment factor (LAF) to compensate for duplications in the list frame was also computed for each individual Reinterview report in the same manner as for the JAS.

SUMMARIZATION

Reports from the Reinterview Survey were paired with reports from the same respondents on the JAS. Data from the paired reports were expanded by the Reinterview expansion factors and adjusted by the appropriate LAF. Differences between comparable JAS and Reinterview Survey expanded values were computed for each respondent. Totals of expanded values and of their differences, and variances of each item were computed for each stratum in each State. The finite population correction factor $[(N_h - n_h)/N_h]$ was then applied to each variance before the stratum totals and variances were summed to individual and combined State estimates.

STATISTICAL TESTS

Both univariate and multivariate statistical tests were used to test the null hypothesis of no difference between paired reports of acreages and numbers of hogs from the JAS and JRS against the alternative hypothesis that there was an appreciable difference. The univariate test is most appropriate when the individual variables are not correlated. That is, the values observed for one variable are not related to corresponding values for a second variable. The multivariate test is most powerful when the observed values are correlated. In this analysis, the acreages reported for cropland are constrained by the acreage of total land, and the acreages reported for corn and soybeans are limited to total cropland. Also, nearly all cropland in these two States is planted to either corn or soybeans. However, the relationship between numbers of hogs and acreages of corn and soybeans is much weaker. Therefore the multivariate test (Hotelling's T^2) was used only for the set of the four acreage questions. The univariate test (Student's t) was used for each of the acreage questions and for the numbers of reported hogs.

Student's t is computed as:

$$t = d / s_d$$

where:

$$\begin{aligned} d &= \sum_h g_h \sum_i d_{hi} \\ &= \sum_h g_h \sum_i LAF_{hi} * (x_{hi} - y_{hi}) \end{aligned}$$

h is the subscript for stratum (within State),

i is the subscript for sample unit (within stratum),

g_h (defined above) is the expansion factor for sample units within a stratum.

LAF_{hi} is the List Adjustment Factor for the sample unit,

x_{hi} is the reported value from the JAS,

y_{hi} is the reported value from the Reinterview Survey, and

$$s_d^2 = \sum_h s_{dh}^2$$

$$= \sum_h \left(\frac{N_h - n_h}{N_h} \right) \left(\frac{N_h}{n_h - 1} \right) (g_h^2) \left(\sum_i d_{hi}^2 - (\sum_i d_{hi})^2 / n_h \right)$$

Because the variances are computed for each stratum, the degrees of freedom for Student's t will be $\sum_h (n_h - 1)$.

Hotelling's T^2 statistic is computed as:

$$T^2 = \underline{d} \underline{S}^{-1} \underline{d}'$$

where:

\underline{d} is a row vector. For tests at the combined two State level, the elements d of are the sums of the expanded differences. For testing differences between the two States, \underline{d} is the difference between State level sums of the expanded differences.

\underline{S} is the sum of the variance-covariance matrices of the differences within each stratum.

EXTREME DIFFERENCES

Analysis of "extreme differences" was limited to respondents:

- (a) who were classified as farm operators on both the JAS and JRS, and
- (b) for whom the difference between the JAS and JRS reports for at least one of the four acreage items (total land, cropland, corn, and soybeans) was greater than two (2.0) standard deviations from the mean difference from the entire stratum.

If $d_{hijk} = JAS_{hijk} - JRS_{hijk}$

where:

"h" = State

"i" = stratum

"j" = 1, 2, 3, 4, (total land, cropland, corn, or soybeans)

"k" = 1, ..., n_{hij} , is the total number of respondents in stratum "hi" identified as farm operators on both the JAS and JRS.

Then

$$\bar{x}_{hij} = \sum_k d_{hijk} / n_{hij}$$

$$s_{hij} = \{ [\sum_k d_{hijk}^2 - (\sum_k d_{hijk})^2 / n_{hij}] / n_{hij} \}^{1/2}, \text{ and}$$

d_{hijk} is extreme if $|d_{hijk}| > 2*s_{hij}$, $j = 1, 2, 3$, and/or 4.

RESULTS

This report examines the differences between the original JAS response and the reinterview farm level responses for total acres, total cropland, corn, soybeans, and all hogs and pigs. In all analyses, the reinterview value is taken as the best proxy to "truth" since it was based on a more accurate method of defining the reporting unit. The following tests and evaluations were conducted.

1. Multivariate and univariate tests for significant differences between JAS and Reinterview Survey expansions, for both States combined and for each individual State.
2. Evaluations of the effect of misclassifying reports as "in business (IB)" and "out of business (OB)."
3. Evaluations of the effect of different land tenure combinations.
4. Examination of outliers.
5. Evaluation of the impact of improper reporting of hogs and pigs that:

- (a) were on the land operated by the respondent but owned by others and not reported by the respondent, or
- (b) were owned and reported by the respondent but were not on the land operated.

As stated previously, all Domain I data are from original JAS telephone respondents in list strata 60-80. The results are not to be extrapolated to other respondent types, list strata, or the Non-overlap (NOL) area frame.

ACREAGE - EXPANDED TOTALS AND DIFFERENCES

Relative differences between all reports from the JAS and Reinterview surveys varied from 14.5 percent for total land to 4.2 percent for soybeans (Table 1). For the two States combined, expansions from the paired JAS sample units were:

1. 3,443,000 acres (14.5 percent) higher than the Reinterview survey expansion for total land,
2. 1,383,000 acres (7.3 percent) higher for total crop land,
3. 734,000 acres (9.0 percent) higher for corn planted, and
4. 257,000 acres (4.2 percent) higher for soybeans.

The larger over-expansion for total land resulted from the misclassification, on the JAS telephone interview, of one extremely large landowner in a non-agricultural area as a farm operator. (The respondent, a storekeeper, reported 10,000 acres total land, 1,000 acres cropland, and 30 acres of corn on the telephone interview but told the Reinterview enumerator that he had not farmed in 20 years.) With this one report excluded from the analysis (Table 4), the over-estimate from the JAS for total land is reduced to 1,834,000 acres (7.7 percent), and the over-estimate for total cropland is reduced to 1,218,000 acres (6.4 percent). The JAS estimate for corn was reduced by only 5,000 acres and the JAS soybean acreage was unchanged. This one report has been excluded from all following analyses in this section.

Hotelling's T^2 was used to test the multivariate hypothesis that the total differences of the acreage items were zero. This hypothesis was rejected at the 10 percent level for both States together ($p\{d=0\} = .096$), and for Indiana ($p\{d=0\} = .059$), but not for Ohio ($p\{d=0\} = .105$). The failure to arrive at more highly significant differences could have resulted from a combination of factors. For example:

Table 4. June 1990 Reinterview Survey Domain I Acreage Expansions and Differences From Paired JAS Observations, Excluding One Report.

Item		Expansion	Percent of JRS	S.E.	C.V.	t	P(d=0)
		(000)	%	(000)	%		
Both States combined (582 degrees of freedom)							
Total land	JRS	23,688		1,001	4.2		
	JAS - JRS	1,834	7.7	852		2.15	0.032*
Total cropland	JRS	19,070		871	4.6		
	JAS - JRS	1,218	6.4	765		1.59	0.112
Corn	JRS	8,137		550	6.8		
	JAS - JRS	729	8.9	437		1.67	0.096*
Soybeans	JRS	6,089		323	5.3		
	JAS - JRS	257	4.2	297		0.87	0.387
	Hotelling's T ² statistic					7.88	0.096*
Indiana (256 degrees of freedom)							
Total land	JRS	13,007		808	6.2		
	JAS - JRS	1,647	12.7	772		2.13	0.034*
Total cropland	JRS	10,899		732	6.7		
	JAS - JRS	1,139	10.4	723		1.58	0.116
Corn	JRS	5,304		502	9.5		
	JAS - JRS	630	11.9	423		1.49	0.138
Soybeans	JRS	3,617		261	7.2		
	JAS - JRS	404	11.2	281		1.44	0.152
	Hotelling's T ² statistic					9.10	0.059*
Ohio (326 degrees of freedom)							
Total land	JRS	10,681		592	5.5		
	JAS - JRS	186	1.7	361		0.52	0.606
Total cropland	JRS	8,171		472	5.8		
	JAS - JRS	79	1.0	250		0.32	0.753
Corn	JRS	2,842		225	7.9		
	JAS - JRS	99	3.5	108		0.91	0.362
Soybeans	JRS	2,472		190	7.7		
	JAS - JRS	-147	-5.9	96		-1.53	0.127
	Hotelling's T ² statistic					7.63	0.105

* - Significant at $\alpha = 0.10$

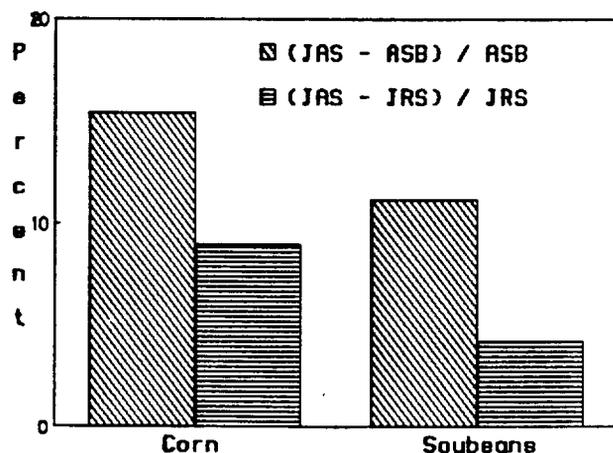
1. The relative differences for the four acreage items were much smaller in Ohio than in Indiana. In Ohio, the relative mean differences varied from 3.5 percent (corn) to -5.9 percent (soybeans). The relative differences for Indiana were larger, from 12.7 percent (total land) to 10.4 percent for total cropland. However the differences between the two States were not statistically significant ($T^2=3.85$, $\text{prob}[d=0]=.28$)
2. Heavy rains during May had delayed the planting of soybeans so that less than half the intended acreage in each State had been planted by June 3. (Normally, from 70 to 75 percent of the intended acreage would be planted by this date). This had no apparent effect on the JAS reported acreages of soybeans in Indiana, but something influenced Ohio farmers to under-report soybean acreages on the JAS. This inconsistency in the differences for soybeans would decrease the power of the test.
3. Several extremely large differences, both positive and negative, between acreages reported on the two surveys, resulted in larger variances and decreased the power of the test.

The two State bias levels of 8.9 percent of the JRS for corn and 4.2 percent for soybeans are compared with actual JAS bias values (15.8 percent for corn and 11.2 percent for soybeans) in Figure 1. These biases are not directly comparable since the JAS to ASB (Agriculture Statistics Board) bias is for the entire population and the JAS to JRS bias is only for list strata 60-80. But these strata do account for over 80 percent of the total JAS estimate for these crops in these States, and the results do indicate that the bias attributed to using the single acres operated question in telephone interviews is a large portion of the total JAS bias for corn and soybeans.

"IN BUSINESS" AND "OUT OF BUSINESS"

The major contributors to the differences between the expanded JAS and Reinterview Survey results (Table 5) were the 30 respondents who reported as farm operators on the JAS but were found to be OB, such as landlords and deceased operators, on the Reinterview Survey (the extremely large "landlord" excluded from the analysis of the previous section is included here to emphasize the necessity for proper determinations of IB or OB for sample list units). The effect of these misclassifications was partially offset by 35 respondents identified as OB on the JAS but found to be IB on the Reinterview Survey. We have no basis for determining why these 35 respondents were classified as OB on the JAS. Sample units changed from OB to IB generally, except for hogs, reported

Figure 1. JAS Biases For Corn and Soybeans Relative to ASB and JRS Estimates, Indiana and Ohio, June 1990.



smaller numbers than those changed from IB to OB. The net effect of the changes for these 65 respondents was to reduce the estimated total land in farms in the two States by 2.1 million acres (7.7 percent), total crop land by 0.6 million acres (2.9 percent), acreage planted to corn and to soybeans by 0.3 and 0.2 million acres (3.2 and 2.8 percent), and to increase the estimated number of all hogs by nearly 0.4 million head (10.0 percent). These changes accounted for about 40 percent of the total bias in the JAS estimate of total cropland and acreages planted to corn, over 60 percent of the total bias in the soybeans and all land, and over 200 percent of the net bias in the JAS estimate of total hogs and pigs.

The biggest reason for changes from IB on the JAS (telephone interview) to OB on the reinterview (personal contact) was that the respondent reported agricultural operations on the initial screening questions of the telephone survey, but none on the reinterview. Although the telephone interview procedure begins with a statement that defines "land operated", 22 respondents in this category apparently understood that they were to report for all the land they owned. Fourteen of the twenty-two simply reported on the reinterview that they were no longer farming. The other 8 respondents reported that the cropland owned by the respondent was farmed by someone else. This category included three reports where the listed operator had died, two where a partnership had dissolved, and one where the selected name was part of a larger partnership. All 22 respondents provided names for the current farm operators.

Of the 35 sample units that changed from OB on the JAS to in business on the reinterview, 32 owned some land, 9 rented out a portion of that land (but kept enough to qualify as a farm), 11

rented additional land, and 3 farmed only rented land. These farms ranged in size from very small (one acre) to moderately large (one with 1,027 acres, and four had more than 500 acres). Thirteen reported at least 100 acres of cropland on the reinterview and nine more had at least 20 acres of cropland. Also, one operation had 3,500 hogs, a second had 1,208 hogs, and four more had at least 400 hogs. The reinterview survey did not try to discover why these operations were reported as OB on the JAS.

Table 5. Estimates By "In Business" (IB) or "Out of Business" (OB) Classification, JAS and JRS Surveys.

Type/Item	Reports	JAS	JRS	JAS - JRS	
	#	(000)	(000)	(000)	Pct. of total JAS
2 State total	605				
Estimated farms		79.8	76.1	3.7	4.6
Land in farms		27,080	23,647	3,433	12.7
Cropland		20,423	19,041	1,383	6.8
Corn		8,871	8,137	734	8.3
Soybeans		6,340	6,083	257	4.1
Total hogs		4,029	4,203	-174	-4.3
IB -- both	467				77.2
Estimated farms		72.5	71.5	1.0	1.2
Land in farms		24,234	22,888	1,346	5.0
Cropland		19,316	18,528	787	3.9
Corn		8,372	7,917	455	5.1
Soybeans		6,033	5,950	83	1.3
Total hogs		3,933	3,735	197	4.9
OB -- JRS	30				5.0
Estimated farms		7.3	0.0	7.3	9.1
Land in farms		2,846	0	2,846	10.5
Cropland		1,108	0	1,108	5.4
Corn		499	0	499	5.6
Soybeans		307	0	307	4.8
Total hogs		97	0	97	2.4
OB -- JAS	35				5.8
Estimated farms		0.0	4.5	-4.5	-5.7
Land in farms		0	759	-759	-2.8
Cropland		0	512	-512	-2.5
Corn		0	220	-220	-2.5
Soybeans		0	133	-133	-2.1
Total hogs		0	468	-468	-11.6
OB -- both	73				12.1

We have no basis for determining how many of these corrections resulted from the less-hurried atmosphere of a face-to-face rather than a telephone interview, and how many resulted from the more detailed questions on land operated. Equivalent results may have been obtained on a telephone interview if the amount of "Land operated" had been specifically defined by the telephone interviewer through the four questions on acreage.

OWNERSHIP OF LAND OPERATED

Sample units classified as farm operators on both the JAS and the JRS were resummarized (Table 6) by the following categories:

1. Landowners who rent some of their land to other farmers.
2. Landowners who farm all the land they own and do not rent any land from others.
3. Landowners who also rent land from others.
4. Non-landowners who rent all the land they operate.

This was to determine if the tendency to over-report acreages on the JAS varied according to degree of land ownership.

The reinterview results show that about 44 percent of the farm operators in these two States are landowners who rent additional land from others. This is the largest land tenure group and accounts for approximately 50 percent of the differences between the JAS and JRS estimates of corn and soybean acreages, and over 80 percent of the difference for total hogs. About 40 percent of the total land operated is owned by the operator and 60 percent is rented.

The largest JAS biases in expanded acreages, relative to the JRS, were in that category of (semi-retired?) farm operators who rented a portion of their land to others. These percentage biases were highest for total cropland (58.3%), soybeans (60.9%), and corn (36.2%). These operators accounted for only about 3 percent of the total land in farms, but for 33 percent of the total bias for cropland, 11 percent for corn, and over 100 percent for soybeans (some other land tenure categories showed a negative bias for soybeans). The combined corn and soybean acreage data for this group shows a percentage bias, relative to the JRS, of about 50 percent. This group also accounted for about 27 of the total bias for corn and soybeans. Figure 2 emphasizes that even though the "Landowner, rents out" group represent a very small portion of the total corn and soybean acreage, it also represents a large portion of the total bias, and has a large bias relative to the JRS. On the other hand, the "Owns land, rents more" group represents over 70 percent of the total corn and soybean acreage with about a two percent bias, and consequently accounts for about 43 percent of the

total bias for corn and soybeans. The category of farm operators with the second largest percentage reductions in total cropland and corn and soybean acreage were those who did not own any land (only farmed rented land).

EXTREME DIFFERENCES

As on previous reinterview surveys (Pallesen, 1991; Tolomeo and McClung, 1990; McClung, Tolomeo, and Pafford, 1990), the distribution of the relative differences [$d = (JAS - \text{Reinterview}) / \text{Reinterview}$] between the Reinterview Survey and JAS reported acreages was both more peaked and with wider tails than would be expected if sampling from a normal distribution (Table 7). This has the effect both of reducing the ability of the test statistics to positively identify any bias, and the precision of the estimated bias.

Over 45 percent of the normalized relative differences between the JAS and Reinterview Survey values are within 0.25 standard deviations of the mean. This is more than two and one-half times the expected percentage. Having so many respondents give essentially the same answers to the two surveys is reassuring. On the other hand, the proportion of differences greater than ± 2.75 standard deviations is six to eight times larger than expected. With a normal distribution, fewer than one percent of the differences should have been that large. The distribution of differences for total hogs was similar but not as peaked and the tails were not as wide. The differences were highly correlated, ($p[r=0] < .0001$) across the crop items (total land, total cropland, corn planted, and soybeans planted). This indicates that a large difference for one acreage item would be accompanied by similar large differences for the other items. The differences for total hogs were less consistent, but still had significant correlation with those for total land ($p[r=0] = .02$) and total cropland ($p[r=0] = .055$).

Reports from 55 farms where at least one of the four acreage questions was in error by at least 2.0 standard deviations are summarized in Table 8. Twenty-seven respondents reported significantly higher (more than 2.0 standard deviations) values for at least one acreage question on the JRS and twenty-nine reported significantly lower acreages. (One respondent was high for one item and low for another.) Because these extreme reporting errors were almost equally divided between under and over reporting, the overall biases were not significantly different from zero. Therefore the major effect of these extreme reporting errors may be to inflate the variance of the JAS estimated total acreages.

Table 6. Estimates By Type of Land Tenure, Respondents Classed as Farm Operators on Both the JAS and Reinterview Surveys, Indiana and Ohio, 1990.

Type/Item	Reports	JAS	JRS		JAS	- JRS	
		Acres	Acres	Pct. of Region	Acres	Pct. of JRS	Bias
	#	(000)	(000)	%	(000)	%	%
2 State total	467						
Estimated farms		72.5	71.5	.	1.0	1.3	.
Land in farms		24,234	22,888	.	1,346	5.9	.
Cropland		19,316	18,528	.	787	4.2	.
Corn		8,372	7,917	.	455	5.7	.
Soybeans		6,033	5,950	.	83	1.4	.
Total hogs		3,933	3,735	.	197	5.3	.
Land rented out	29			6.2			
Estimated farms		4.9	4.9	6.9	0.0	0.0	.
Land in farms		865	703	3.1	161	22.9	20.5
Cropland		704	444	2.4	259	58.3	32.9
Corn		192	141	1.8	51	36.2	11.2
Soybeans		254	158	2.7	96	60.9	115.7
Total hogs		317	300	8.0	17	5.6	8.6
No land rented	147			31.5			
Estimated farms		30.1	30.1	42.0	0.0	0.1	0.0
Land in farms		4,997	4,836	21.1	161	3.3	20.5
Cropland		3,135	3,015	16.3	119	3.9	26.2
Corn		952	897	11.3	54	6.1	11.9
Soybeans		679	682	11.5	-3	-0.5	-3.6
Total hogs		600	617	16.5	-16	-2.7	-8.1
Rents add'l land	256			54.8			
Estimated farms		32.1	31.1	43.5	0.9	3.0	95.0
Land in farms		16,406	15,597	68.1	809	5.2	60.1
Acreage owned			6,485	41.6			
Acreage rented			9,112	58.4			
Cropland		13,785	13,511	72.9	274	2.0	34.8
Corn		6,331	6,061	76.5	271	4.5	59.6
Soybeans		4,604	4,642	78.0	-38	-0.8	-45.8
Total hogs		2,572	2,408	64.5	164	6.8	83.2
Only rents land	35			7.5			
Estimated farms		5.4	5.4	7.6	0.0	0.0	0.0
Land in farms		1,967	1,752	7.7	215	12.3	16.0
Cropland		1,693	1,557	8.4	135	8.7	17.2
Corn		898	818	10.3	79	9.7	17.4
Soybeans		496	468	7.9	28	6.0	33.7
Total hogs		444	411	11.0	33	8.0	16.8

Figure 2. JRS Corn and Soybean Acreages and JAS Bias, By Type of Operator, Indiana and Ohio, June 1990.

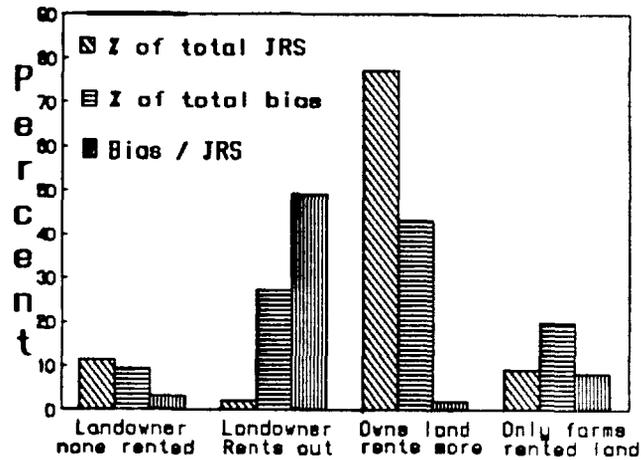


Table 7. Frequency Distribution of Normalized¹ Relative Differences (Excluding Reports of Zero Acreage), By 1/2 Standard Deviation Intervals.

Mid-Point	Total land Freq.	Total land %	Cropland Freq.	Cropland %	Corn Freq.	Corn %	Soybeans Freq.	Soybeans %	Expected %
7.0					1	0.3			
6.5					-				
6.0			1	0.2	-				
5.5	1	0.2	-		-				
5.0	-		-		-				
4.5	-		1	0.2	1	0.3			
4.0	6	1.3	2	0.4	-				.01
3.5	1	0.2	-		-		2	0.6	.06
3.0	4	0.9	3	0.7	1	0.3	2	0.6	0.2
2.5	4	0.9	5	1.1	6	1.6	6	1.8	0.9
2.0	3	0.6	6	1.3	2	0.5	6	1.8	2.8
1.5	8	1.7	11	2.4	9	2.4	9	2.8	6.6
1.0	15	3.2	14	3.1	12	3.2	12	3.7	12.1
0.5	72	15.4	76	16.9	55	14.9	58	17.8	17.5
0	231	49.5	222	49.4	209	56.5	147	45.1	19.7
-0.5	82	17.6	66	14.7	45	12.2	45	13.8	17.5
-1.0	14	3.0	16	3.6	8	2.2	12	3.7	12.1
-1.5	12	2.6	8	1.8	4	1.1	15	4.6	6.6
-2.0	6	1.3	4	0.9	3	0.8	3	0.9	2.8
-2.5	1	0.2	3	0.7	6	1.6	2	0.6	0.9
-3.0	2	0.4	5	1.1	3	0.8	4	1.2	0.2
-3.5	2	0.4	3	0.7	1	0.3	2	0.6	.06
-4.0	3	0.6	2	0.4	4	1.1	1	0.3	.01
-4.5			1	0.2					

¹ $z_{hi} = (d_{hi} - \bar{d}_h) / s_h$, $h = \text{strata}$, $d_{hi} = \text{JAS}_{hi} - \text{JRS}_{hi}$, $i = \text{sample unit}$

Of the 27 respondents who reported significantly larger acreages on the JRS, 17 apparently did not (fully) report rented land on the JAS, and 7 more apparently reported corn and/or soybean acreages planted to date on the JAS, excluding intentions. The other 3 respondents in this category may have under-reported cropland, non-cropland, or even land that was owned, on the JAS telephone interview.

Fourteen of these 29 respondents who reported significantly smaller acreages on the JRS apparently over reported total land and/or cropland on the JAS. Eleven more respondents either over reported acreages planted to corn and/or soybeans. (This may have happened because the respondents included intentions for acreages yet to be planted on the JAS interview but not on the JRS.) Four more respondents included land rented to others on the JAS report.

Table 8. Expanded JRS Values and (JAS-JRS) Differences For Respondents With Extreme Reporting Errors.

Item	JRS	JAS - JRS		Student's t
	(000)	(000)	% of JRS	Ho: $\bar{d} = 0$
Land in farms	3,916	378.1	1.7	0.94
Cropland	3,123	-35.6	-0.2	-0.12
Corn	1,274	-49.6	-0.6	-0.31
Soybeans	933	3.8	.06	0.03

HOGS AND PIGS

The survey expanded total number of hogs and pigs from the JAS was 7.0 percent (225,000 head) less than reported on the JRS in Indiana, and 5.3 percent (51,000 head) more than in Ohio (Table 9). Neither difference was significantly different from zero. These results differ from an earlier study by Tolomeo and McClung that found significant amounts of under reporting of hog numbers.

The large difference in Indiana resulted because seven sample units had been counted as "out of business" on the JAS but were found to have hogs on the Reinterview. These seven operations contributed 414,000 head (13.3 percent of the JRS expansion) to the total estimate from the Reinterview Survey. (NOTE: Over half of this number came from one feeder pig operation.) This increase was partially offset by a 3.8 percent reduction in the number of hogs found in sample units that were "in business" on both surveys, and a 2.5 percent reduction from units counted as "in business" on the JAS but were found to be "out of business" on the Reinterview.

Table 9. June 1990 Reinterview Survey Domain I All Hogs and Pigs Expansions and Differences From Paired JAS Observations.

Item	Expansion (000)	Percent JRS %	S.E. (000)	C.V. %	t	P(d=0)

Indiana (Student's t has 256 degrees of freedom)						
JRS	3,233		363	11.2		
JRS - JAS	225	7.0	309		0.73	0.467
Ohio (Student's t has 326 degrees of freedom)						
JRS	970		119	12.3		
JRS - JAS	-51	-5.3	81		-0.63	0.529
Both States combined (Student's t has 582 degrees of freedom)						
JRS	4,203		382	9.1		
JRS - JAS	174	4.1	319		0.55	0.586

In Ohio, the contribution from sample units that changed from "out of business" on the JAS to "in business" on the Reinterview Survey was much smaller than in Indiana. Therefore the net change was downward.

One possible reason for the under reporting found on earlier studies is that respondents tend to report only those hogs owned by the respondent rather than all hogs located on the actual reporting unit. One objective of the reinterview study was to reexamine how well the respondent provided hog data for the proper reporting unit. Two special questions on the Reinterview Survey were intended to discover if:

- a. the farm operator actually reported all hogs and pigs on the farm, regardless of ownership, and
- b. any hogs and pigs owned by the operator but located on someone else's land were excluded from the report.

The analysis of these two questions does not depend upon responses from the JAS. Therefore all "in business" reports from the Reinterview Survey are included in the following discussion, even though the sample units may have been "OB", "Inaccessible" (Domain II) or a "Refusal" (Domain III) on the JAS.

The first question, asked only of those farm operators who had reported any hogs or pigs, was "Do you own any hogs or pigs that are not located on these _____ acres?" If YES, the respondent was then asked if those hogs were included in the total number already reported. If YES, the enumerator was to transfer the total number of hogs and pigs already reported to a special answer box and to

correct the original entries to exclude those hogs and pigs that were not located on the net acres operated.

Of the 275 sample units that reported having any hogs, only 4 operators (1.4 percent) reported having any hogs or pigs not on the net acreage operated (Table 10). Three of these reports had incorrectly included these hogs in the original reinterview response. The net effect of correcting the original reinterview reports for the hogs and pigs housed elsewhere was to decrease the original expansion by 0.55 percent. Comments by the enumerators indicated that at least three of these operators housed hogs in facilities owned by others.

A second question asked all farm operators was, "Does anyone else own any hogs or pigs that are located on these _____ acres?" If YES, and if these hogs or pigs were not included in the total number already reported, the enumerator was to transfer the total number of hogs and pigs already reported to a special answer box and to correct the original entries to include those hogs and pigs owned by others.

Thirteen respondents reported that hogs belonging to others were on their premises. Only 5 of the 13 correctly included these hogs in their original totals. Enumerators' comments indicated that some of these 13 respondents fed hogs on contract. Others appeared to involve hog partnerships that were separate from the cropping partnerships. The net effect of correcting the 8 reports was to increase the overall estimate by 0.25 percent (11,143 head, Table 10).

In conclusion, three reports included hogs owned but not located on the reporting unit acreage and eight reports excluded hogs physically located on the reporting unit but owned by someone else. These 11 reports represent 4.0 percent of the total sample units reporting hogs in Domains I, II, and III. The net bias resulting from these reporting errors is about 0.30 percent of total hogs. The situations involved with these reporting errors included the use of facilities (possibly rented buildings) on someone else's land, contract hogs, and multiple operators. In such cases, it would be even more difficult for the telephone enumerator to adequately communicate the proper reporting unit to the respondent.

CONCLUSIONS

Specific questions on acres owned, acres rented from others, and acres rented to others in reinterviews of a sample of telephone respondents from the 1990 JAS resulted in statistically smaller estimates ($\alpha=.10$) for the four JAS acreage questions (total land, cropland, corn planted and soybeans planted), but higher estimates for total hogs and pigs.

Table 10. Total Hogs, Before and After Correction, and Amount of Correction Due To Hogs Located Off-Farm and Hogs Owned By Others (Domains I, II, and III).

	Expansion	Non-zero reports
Both States		
Total hogs, as corrected	4,367,891	275
Total hogs, before correction	4,380,669	
Hogs located off-farm	-23,922	4
Add'l Hogs owned by other, on farm	11,143	13
Indiana		
Total hogs, as corrected	3,208,627	157
Total hogs, before correction	3,197,670	
Hogs located off-farm	*	2
Add'l Hogs owned by other, on farm	10,958	9
Ohio		
Total hogs, as corrected	1,159,264	118
Total hogs, before correction	1,183,000	
Hogs located off-farm	-23,922	2
Add'l Hogs owned by other, on farm	185	4

* One individual reported hogs off-farm and also failed to include hogs owned by others. The net difference is included in "Add'l Hogs owned by others." The second person reported correctly.

For the two States combined, the JAS estimates of corn were 9.0 percent too high and soybeans were 4.2 percent too high. Major reasons for the biases in the JAS estimates were the following.

1. Telephone survey procedures, as used, were unable to determine consistently if respondents were or were not farm operators. In particular:
 - a. Non-farming landowners who reported on the JAS as though they were farm operators were the largest single cause of this difference. This category contained about six percent of the respondents who reported as farm operators on the JAS, and accounted for over two-thirds of the net difference between the JAS and JRS survey estimates for corn and soybean acreages.

- b. Some farmers "slipped through" the JAS by informing the telephone interviewers that they were not farming (had no crops or hay, no grain storage, no hogs, and no cattle, sheep, other livestock or poultry). This category accounted for about six percent of the JAS respondents and partially offset the bias from the non-farming landlords who reported as farmers. Farmers in this category included several specialized hog producers and had, on the average, twice as many hogs and pigs as those respondents who reported as farm operators on the JAS.
2. Farmers (semi-retired?) who rented some or all of their cropland to other farmers accounted for only 3 percent of land in farms, but were responsible for 33 percent of the bias in total cropland, 11 percent of the bias in corn acreage, and over 100 percent of the bias in the JAS estimate of soybean acreage.

Twelve percent of the respondents classified as farm operators on both the JAS and JRS showed differences of at least 2.0 standard deviations on at least one of the four acreage questions (total land, cropland, corn planted and soybeans planted). These differences were about equally divided between positive and negative so the net bias was not significantly different from zero. However, these reporting errors on the JAS probably added to the variance of the JAS acreage estimates.

Even in personal interviews, enumerators had difficulty in adequately communicating the concept of "total hogs on acres operated" to the respondent. This difficulty would be even more acute in telephone interviews.

All the above errors in the JAS seem to stem from a single problem of semantics, definitional concepts, and cognitive aspects of surveys. NASS wants to collect information from people who are actively engaged in the daily management of agricultural enterprises. This concept is referred to indirectly in Section 1, "Identification," of the JAS questionnaire, but is not stated. Further, the questionnaire asks for information in terms of farm, ranch, or operation. A landowner whose farm, or a portion of the cropland, is rented to others may still be accustomed to thinking of the entire acreage as his or her "farm", and would automatically report for the entire acreage. Related problems with "rented" land are (a) whether the landowner receives cash rent, a specified portion of the crop, or contracts with someone else to do the land preparation, planting, and harvesting at so much an acre, and (b) farm buildings and non-crop acreage used by others (particularly by part-time hog producers). Also a farmer who both owns and rents land may be accustomed to thinking of only the "owned" land, or even the particular tract he lives on, as his farm, and may assume that NASS is asking only for information from the owned land. Again, farm operators tend to think of livestock owned as part of

their farm or ranch, regardless of where they are located. This problem will continue until the questionnaire can be changed so the respondent understands what we mean by "farm" and "operation."

Experience with the Reinterview Survey indicates that asking the respondent to determine total acres operated from acres owned, rented to others, and rented from others is:

1. Feasible.
2. Useful in screening out non-farm operators.
3. Useful in limiting the size of the reporting unit for farm operators who rent out a portion of their land.
4. Useful in properly defining the size of the reporting unit for farm operators who rent additional land from others.

RECOMMENDATIONS

1. As a result of preliminary results from the JRS, the single question "How many total acres of land were in this operation on June 1?" was replaced, beginning with the 1990 December Agricultural Survey, with the three specific questions (acres of land owned, rented to others, and rented from others) used on this Reinterview study. This change should be continued as it helps to clarify the definition of acres operated. In addition, a strong and continued emphasis must be placed on these concepts at national, regional, and State training schools.
2. The additional questions tested for Hogs and Pigs resulted, aside from associated problems in definitions of farm operators, in very small changes. Therefore we have no recommended changes for the Hogs and Pigs portion of the questionnaire at this time.
3. Future research should be directed toward bringing the respondent to an immediate understanding of the desired reporting unit. Possible areas of future research could be to evaluate:
 - a. the desirability of interchanging Sections 1 and 2, Identification and Acres Operated, of the present questionnaire;
 - b. alternative ways of defining "rented" land and buildings to the respondents; and

- c. the use of previous responses to the four land operated questions in CATI interviews as a probe for discrepancies in currently reported acreage totals.

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National Agricultural Statistics Service

U.S. Department of Agriculture

AGRICULTURAL SURVEY
JUNE 1, 1990
REINTERVIEW FORM

Form Approved
O.M.B. Number 0535-0213
Approval Expires 1/31/93
Project Code 119

IN, OH
V1

[Introduce yourself and ask for the operator.
Rephrase in your own words.]

I am working on a survey for the (State)
Agricultural Statistics Service. As part of a research
study to measure the quality of our survey data, we
are recontacting a few of the people interviewed for
our June Agricultural Survey. I would like to ask you
for some of the same information you gave in the
original survey. However, the questions will be
worded differently to see what effect the different
wording may have on your answers.

Facts about your operation are confidential, and
response is voluntary.

SECTION 1 - INTRODUCTION

Enumerator Note: If the name on the label is an individual name or combination of individual names,
start with Item 1. If the name is a farm or ranch name, start with Item 2.

1. Do you (name on label) raise any crops, cut any hay, raise livestock or
poultry, have grain storage facilities or land in government programs?

- YES - Go to Item 3
NO - Go to Section 8 on page 10.

2. Does (farm or ranch name on label) raise any crops, cut any hay, raise
livestock or poultry, have grain storage facilities or land in government programs?

- YES - Go to Item 3
NO - Go to Section 8 on page 10.

3. Are the day-to-day operating decisions for this farm or ranch made by:

- You Individually?
You in Partnership with others? (Enter number of partners, including self)
A Hired Manager?

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821

Continue On Next Page

SECTION 2 - ACRES OPERATED

1. To help describe your farm or ranch, we need to identify the number of acres involved.

	ACRES	
a. On June 1, how many acres did this farm or ranch OWN ?	801	+
b. How many acres were RENTED FROM OTHERS ?	803	+
c. How many acres were RENTED TO OTHERS ?	804	-
d. Then the TOTAL acres in this farm or ranch is (a + b - c):	800	

Does this include the farmstead, all cropland, pasture, woodland, waste and idle land, and government program land?

YES - Continue with Item 2.

NO - Make corrections to the acres above, then continue with Item 2.

2. For the rest of this survey I will be asking for information on the corn and soybeans planted, and hogs and pigs on these (Item 1d) _____ acres.

3. Of these (Item 1d) _____ acres, how many would be considered cropland, including land in hay, government programs, and idle cropland?

	798
--	-----

4. Of these (Item 1d) _____ acres, how many are in government programs such as CRP, ACR, set aside, etc.?

	799
--	-----

SECTION 3 - CROPS AND LAND USE

1. Of the (Section 2, Item 1d) _____ acres in your farm or ranch, how many acres were planted, or will be planted, to **CORN** for all purposes? (exclude popcorn and sweet corn)

	130
--	-----

2. How many acres were planted, or will be planted, to **single crop SOYBEANS** for all purposes

	100
--	-----

3. How many acres were planted, or will be planted, to **double crop SOYBEANS** for all purposes

	101
--	-----

Continue On Next Page

SECTION 4 - HOGS AND PIGS

1. On June 1, were any **HOGS** or **PIGS**, regardless of ownership, on these (Section 2, Item 1d) _____ acres?

YES **NO** → 1a. *GO TO Item 6 below.*



2. Of the **HOGS** and **PIGS** for **BREEDING** on hand June 1, how many were:

a. **SOWS, GILTS** and **YOUNG GILTS** bred and to be bred?

401	★
-----	---

b. How many were **BOARS** and **YOUNG MALES** for breeding?

402	★
-----	---

c. How many were **SOWS** and **BOARS** no longer used for breeding?

403	★
-----	---

3. Of the **HOGS** and **PIGS FOR MARKET** and **HOME USE**, how many were in each of the following four weight groups? (Exclude breeding hogs reported in Item 2.)

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

404	★
-----	---

b. 60 - 119 lbs.

405	★
-----	---

c. 120 - 179 lbs.

406	★
-----	---

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

407	★
-----	---

4. Then the **TOTAL** number of **HOGS** and **PIGS** on hand June 1 was:
(Add ★ Items 2a through 3d)

400

399

5. Do you own any hogs or pigs that are not located on these (Section 2, Item 1d) _____ acres?

NO **YES**



5a. Were these hogs or pigs included in the above total?

NO - Continue with Item 6

YES - Exclude these hogs from the above totals, then continue with Item 6.

Office Use
694

6. Does anyone else own any hogs or pigs that are located on these (Section 2, Item 1d) _____ acres?

NO - GO TO Section 5 on next page. **YES**

6a. Were these hogs or pigs included in the above totals?

NO - Include these hogs in the above totals, then go to Section 5 on next page

YES - GO TO Section 5 on next page.

Office Use
695

SECTION 5 - CROPS BY PARCEL

Office Use
699

1. Now I need to account for the acres of **CORN** and **SOYBEANS** by separate parcels of land that make up the total _____ acres in your farm or ranch.
(Section 2, Item 1d)

700

2. How many separate parcels of land make up your operation?

To help in reporting separate parcels, please help me complete a sketch of your operating parcels. (Use grid on page 12.)

3. Now I need to record acreage information for each of the (Item 2) parcels. Please report acres of **CORN** and **SOYBEANS** planted and to be planted for the **1990 CROP YEAR**. First, let's start with Parcel 1.

PARCEL NUMBER	01	02	03
a. Total acres in parcel	228 .	228 .	228 .
b. CROPLAND ACRES	202 .	202 .	202 .
c. CORN acres for all purposes (exclude popcorn and sweet corn)	230 .	230 .	230 .
d. SOYBEANS, single cropped, acres for all purposes	200 .	200 .	200 .
e. SOYBEANS, double cropped, acres for all purposes (following another crop)	201 .	201 .	201 .

PARCEL NUMBER	04	05	06
a. Total acres in parcel	228 .	228 .	228 .
b. CROPLAND ACRES	202 .	202 .	202 .
c. CORN acres for all purposes (exclude popcorn and sweet corn)	230 .	230 .	230 .
d. SOYBEANS, single cropped, acres for all purposes	200 .	200 .	200 .
e. SOYBEANS, double cropped, acres for all purposes (following another crop)	201 .	201 .	201 .

Sum Of All Parcel Acreages
740 .

Continue On Next Page

SECTION 5 - CROPS BY PARCEL (continued)

PARCEL NUMBER	07	08	09
a. Total acres in parcel	228 .	228 .	228 .
b. CROPLAND ACRES	202 .	202 .	202 .
c. CORN acres for all purposes (exclude popcorn and sweet corn)	230 .	230 .	230 .
d. SOYBEANS, single cropped, acres for all purposes	200 .	200 .	200 .
e. SOYBEANS, double cropped, acres for all purposes (following another crop)	201 .	201 .	201 .

PARCEL NUMBER	10	11	12
a. Total acres in parcel	228 .	228 .	228 .
b. CROPLAND ACRES	202 .	202 .	202 .
c. CORN acres for all purposes (exclude popcorn and sweet corn)	230 .	230 .	230 .
d. SOYBEANS, single cropped, acres for all purposes	200 .	200 .	200 .
e. SOYBEANS, double cropped, acres for all purposes (following another crop)	201 .	201 .	201 .

PARCEL NUMBER	13	14	15
a. Total acres in parcel	228 .	228 .	228 .
b. CROPLAND ACRES	202 .	202 .	202 .
c. CORN acres for all purposes (exclude popcorn and sweet corn)	230 .	230 .	230 .
d. SOYBEANS, single cropped, acres for all purposes	200 .	200 .	200 .
e. SOYBEANS, double cropped, acres for all purposes (following another crop)	201 .	201 .	201 .

Continue On Next Page

SECTION 6 - CORN AND SOYBEANS BY FIELD WITHIN A PARCEL

Office Use
698

Enumerator Note: A block in Section 6 must be completed for each sampled parcel. If the operation includes more than 500 acres of cropland (Section 2, Item 3) and more than 5 parcels with corn or soybeans, sample parcels according to Enumerator Manual instructions. Otherwise, enumerate all parcels. Enter the number of the first parcel with corn or soybeans in Item A and account for the corn and soybean acreage in that parcel.

A. Parcel Number (from Section 5, Item 3).....

__ __ 00

How many separate fields of **CORN** are in this parcel?.....

396

__ __ 00

How many separate fields of **SOYBEANS** are in this parcel?.....

395

Now I would like to ask about each field of corn and soybeans planted, and to be planted, within this parcel during the 1990 crop year.

PARCEL / FIELD NUMBER	__ __ 01	__ __ 02	__ __ 03	__ __ 04	__ __ 05
1. Total acres in field	328 .	328 .	328 .	328 .	328 .
2. Woods, roads, ditches, waterways, waste, etc.	369 .	369 .	369 .	369 .	369 .
3. CORN acres planted for all purposes	330 .	330 .	330 .	330 .	330 .
4. SOYBEANS , single cropped, acres planted for all purposes	500 .	500 .	500 .	500 .	500 .
5. SOYBEANS , double cropped, acres planted for all purposes following another crop	501 .	501 .	501 .	501 .	501 .
6. Other crops Acres planted or in use	748 .	748 .	748 .	748 .	748 .

PARCEL / FIELD NUMBER	__ __ 06	__ __ 07	__ __ 08	__ __ 09	__ __ 10
1. Total acres in field	328 .	328 .	328 .	328 .	328 .
2. Woods, roads, ditches, waterways, waste, etc.	369 .	369 .	369 .	369 .	369 .
3. CORN acres planted for all purposes	330 .	330 .	330 .	330 .	330 .
4. SOYBEANS , single cropped, acres planted for all purposes	500 .	500 .	500 .	500 .	500 .
5. SOYBEANS , double cropped, acres planted for all purposes following another crop	501 .	501 .	501 .	501 .	501 .
6. Other crops Acres planted or in use	748 .	748 .	748 .	748 .	748 .

Enumerator Note: For each field listed above, verify that the sum of Items 2-6 equals Item 1. Verify number of corn and soybean fields in Item A above. If more than one parcel, go to the next page. If there are no more parcels, go to Section 7 on page 9.

SECTION 6 - CORN AND SOYBEANS BY FIELD WITHIN A PARCEL (Continued)

Enumerator Note: A block in Section 6 must be completed for each sampled parcel. Enter the number of the second parcel with corn or soybeans in Item B and account for the corn and soybean acreage in that parcel.

B. Parcel Number (from Section 5, Item 3)

00

How many separate fields of CORN are in this parcel?

00

How many separate fields of SOYBEANS are in this parcel?

Now I would like to ask about each field of corn and soybeans planted, and to be planted, within this parcel during the 1990 crop year.

PARCEL / FIELD NUMBER	01	02	03	04	05
1. Total acres in field	328	328	328	328	328
2. Woods, roads, ditches, waterways, waste, etc.	369	369	369	369	369
3. CORN acres planted for all purposes	330	330	330	330	330
4. SOYBEANS, single cropped, acres planted for all purposes	500	500	500	500	500
5. SOYBEANS, double cropped, acres planted for all purposes following another crop	501	501	501	501	501
6. Other crops Acres planted or in use	748	748	748	748	748

PARCEL / FIELD NUMBER	06	07	08	09	10
1. Total acres in field	328	328	328	328	328
2. Woods, roads, ditches, waterways, waste, etc.	369	369	369	369	369
3. CORN acres planted for all purposes	330	330	330	330	330
4. SOYBEANS, single cropped, acres planted for all purposes	500	500	500	500	500
5. SOYBEANS, double cropped, acres planted for all purposes following another crop	501	501	501	501	501
6. Other crops Acres planted or in use	748	748	748	748	748

Enumerator Note: For each field listed above, verify that the sum of Items 2-6 equals Item 1. Verify number of corn and soybean fields in Item B above. If more than two parcels, go to the next page. If there are no more parcels, go to Section 7 on page 9.

SECTION 6 - CORN AND SOYBEANS BY FIELD WITHIN A PARCEL (Continued)

Enumerator Note: A block in Section 6 must be completed for each sampled parcel. Enter the number of the third parcel with corn or soybeans in Item C and account for the corn and soybean acreage in that parcel.

C. Parcel Number (from Section 5, Item 3).....

__ 00

How many separate fields of CORN are in this parcel?.....

__ 00

How many separate fields of SOYBEANS are in this parcel?.....

Now I would like to ask about each field of corn and soybeans planted, and to be planted, within this parcel during the 1990 crop year.

PARCEL / FIELD NUMBER	__ 01	__ 02	__ 03	__ 04	__ 05
1. Total acres in field	328	328	328	328	328
2. Woods, roads, ditches, waterways, waste, etc.	369	369	369	369	369
3. CORN acres planted for all purposes	330	330	330	330	330
4. SOYBEANS, single cropped, acres planted for all purposes	500	500	500	500	500
5. SOYBEANS, double cropped, acres planted for all purposes following another crop	501	501	501	501	501
6. Other crops Acres planted or in use	748	748	748	748	748

PARCEL / FIELD NUMBER	__ 06	__ 07	__ 08	__ 09	__ 10
1. Total acres in field	328	328	328	328	328
2. Woods, roads, ditches, waterways, waste, etc.	369	369	369	369	369
3. CORN acres planted for all purposes	330	330	330	330	330
4. SOYBEANS, single cropped, acres planted for all purposes	500	500	500	500	500
5. SOYBEANS, double cropped, acres planted for all purposes following another crop	501	501	501	501	501
6. Other crops Acres planted or in use	748	748	748	748	748

Enumerator Note: For each field listed above, verify that the sum of Items 2-6 equals Item 1. Verify number of corn and soybean fields in Item C above. If more than three parcels, use a supplemental page for additional parcels. If there are no more parcels, go to Section 7 on page 9.

SECTION 7 - PARTNER NAMES

1. Is partnership checked in Section 1, Item 3, on Face Page?

- YES - Continue with Item 2. NO - GO TO Section 9 on page 11.

2. Is a combination of individual names listed on the address label?

- YES - Continue with Item 3. NO - GO TO Item 4 below.

3. Is/are (read partners names from address label) still involved in making day to day operating decisions for this farm or ranch?

- YES - GO TO Section 9 on page 11.
 NO - Please explain the change.
(List the partners now involved in the operation in Item 4 below.)

4. I need to list the names and addresses of the partners involved in this partnership to make sure that we do not duplicate the information you have reported. Could you give me that information?

Name _____ (First) (Middle) (Last)	Phone _____	825
Address _____ (Rt. or St.) (City) (State) (Zip)		
Name _____ (First) (Middle) (Last)	Phone _____	826
Address _____ (Rt. or St.) (City) (State) (Zip)		
Name _____ (First) (Middle) (Last)	Phone _____	827
Address _____ (Rt. or St.) (City) (State) (Zip)		
Name _____ (First) (Middle) (Last)	Phone _____	828
Address _____ (Rt. or St.) (City) (State) (Zip)		

Go To Section 9 On Page 11

SECTION 8 - CHANGE IN OPERATOR

Enumerator Note: *This section should only be completed if the respondent has said that the farm or ranch does NOT raise any crops, cut any hay, raise livestock or poultry, or have grain storage facilities ("No" to Item 1 or 2 on the Face Page).*

1. Do you:

- Have any idle pasture, woods, or crop land that has potential for agricultural production? NO YES - Specify _____
- Raise any broilers, turkeys, or other poultry? NO YES - Specify _____
- Raise horses or ponies? NO YES - Specify _____
- Have any animal specialties such as bees or fish? NO YES - Specify _____
- Raise any vegetables, melons, or berries for sale? NO YES - Specify _____
- Have fruit, nut, or citrus trees or grapevines? NO YES - Specify _____
- Grow greenhouse or nursery crops? NO YES - Specify _____
- Have any other type of agricultural production or sales? NO YES - Specify _____

Office Use
697

Enumerator Note: *If the respondent indicates that some item(s) of interest are on the acres operated, correct Item 1 or 2 on the Face Page and continue the interview with Item 3 on the Face Page.*

Otherwise, continue with Item 2 below.

2. Has this farm or ranch (name on label) been sold or turned over to someone else (day to day operating decisions are now made by someone other than the name on the label)?

- No - CONCLUDE INTERVIEW.
- YES - Who is now making the operating decisions for this land?

Name _____

Address _____ Phone _____

City _____ State _____ Zip _____

When did this change occur? Date _____

CONCLUDE INTERVIEW

SECTION 9 - CONCLUSION

1. **Enumerator Note:** *Is the name on the label an individual name?*

YES - Continue. NO - Skip to Item 2.

Do you make day-to-day operating decisions for another farm or ranch, either individually or in partnership with others?

YES - List other operation(s).

NO

2. **Verify spelling of name(s) and address on label.**

3. Does this farm or ranch do business under any name(s) other than (name listed on label)?

YES - List _____

Do you want this name to appear on the label? YES NO

4. Could anyone else (*other than you or any partners listed in Section 7*) report for these (*Section 2, Item 1d*) _____ acres? (*Exclude spouse and hired workers.*)

NO YES - List names and relationship to operator.

Office Use
696

This completes the survey Thank you for your help.

Reported by _____ Date _____

Telephone(Area Code) _____ (Number) _____

Respondent		Response Code		J/Date	Enum.	Eval.
1-Op	001	3-Int	810	094	097	099
2-Sp		4-Est				
3-Oth		8-IR				
4-Est R		9-Inac				
5-Est NR						
S/E. N.						

Complete a sketch of separate parcels that make up the total (Section 2, Item 1d) _____ acres
in your farm or ranch. Identify each parcel by number -- 1, 2, 3, etc.



Farmstead