EFFECT OF SELECTED PROCEDURES ON MAIL QUESTIONNAIRE RESPONSE BY FARM OPERATORS

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by

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INTRODUCTION

A basic method of data collection in SRS continues to be the questionnaire sent through the mail to be completed and returned by the farm operator. The agency has always been vitally interested in methods and procedures that would increase the number of questionnaires returned through the mail. The need to improve mail response has been stimulated by probability surveys which require that those not responding to mail inquiries be contacted by the more expensive telephone or personal interview.

Several procedures are being tried. For example, some States send a letter with the survey questionnaire followed by a reminder card. Some send brochures before the questionnaires, while others include brochures with the questionnaires. These are only a few of the different combinations of efforts used to increase mail returns. However, there is little or no quantitative evidence from these efforts to determine which has the most influence, if any, on mail response.

To properly measure the effect of various procedures on mail returns, it is necessary to replicate or subdivide the sample for a given survey and randomly assign different procedures to each portion of the sample. Only then can a comparison be made to determine, for example, if a pre-survey letter elicits better response than, a brochure or if either has any effect.

PROCEDURES

The Wisconsin SSO participated in a study to compare mail responses from different mail contact procedures used for their 1974 June Hog Multiple Frame Survey. They tested five alternative procedures:

1. Brochure[1/] sent with the questionnaire
2. Letter[2/] sent with the questionnaire
3. Brochure sent before questionnaire
4. Letter sent before questionnaire
5. Control group, no brochure or letter sent.

The letter and the brochure used in the study are shown in the Appendix.

Wisconsin used a systematic process to select their sample and then randomly assigned the five treatments to this sample. The test was done on the list frame sample excluding the extreme operator strata. These strata were not included because many of these sample units are preselected for special handling. Wisconsin had drawn a new multiple frame sample for this survey. A new sample was desirable because this would minimize effects of actions taken during prior surveys.

Pre-survey letters and brochures were sent on May 15, 1974 followed by the questionnaires on May 20. The letters and brochures sent with the questionnaires were mailed on May 20. The questionnaires for the control group were also sent on May 20. All treatments received reminder cards sent May 23.

RESULTS

The mail returns by treatments are shown in Table 1. The letter sent before the questionnaire seemed to have the most impact. Table A in the Appendix shows the mail returns by treatment separately for each stratum. To test the hypothesis that there was no difference in mail returns between the five treatments, a Chi-square statistic was computed over the totals of each treatment. This test indicates there was a significant difference between treatments. The difference in mail returns between treatments is larger than can be attributed to sampling variation. The letter mailed before the questionnaire was the only treatment contributing to the difference.

A Chi-square statistic was also computed for each stratum. At the stratum level, none of the treatments differed enough to reject the hypothesis. Each stratum represents a smaller part of the total sample making it more difficult to detect any but large differences. It was also possible to determine if the treatment effects were independent of strata. In other words, did a treatment have a different effect on Stratum 1 than it did on Stratum 7. The analysis showed that operators in the small size groups did not respond any differently to the treatments than did operators of larger operations.

1/ The Information Staff worked with Wisconsin SSO designing the brochure.

2/ The letter format and the content prepared by the Wisconsin SSO.

Table 1: Mail Returns by Treatments Used to Improve Response to the Hog and Pig Multiple Frame Survey, Wisconsin, June 1974

TREATMENT	NUMBER MAILED	NUMBER RETURNED BY MAIL	PERCENTAGE RETURNED BY MAIL
Brochure with Questionnaire (BW/Q)	348	145	41.6
Letter with Questionnaire (LW/Q)	347	152	43.8
Brochure Before Questionnaire (BB/Q)	347	157	45.2
Letter Before Questionnaire (LB/Q)	347	195	56.2
Control (C)	347	142	40.9
	1736	791	45.6

The analysis so far compared the mail returns resulting from the various treatments. It is also important to consider their effect on total response, i.e. did the treatments influence telephone and interview response or refusals? Table 2 shows the distribution of the entire sample by type of response (or non-response) for the various treatments.

The null hypothesis is that treatments did not affect returns by type of response. The Chi-square statistic was highly significant. This was caused by the larger mail return resulting from the letter mailed before the questionnaire. The number of refusals did not differ significantly between treatments.

Table B in the Appendix shows the distribution of the sample by treatment and response category for each stratum. The refusal and inaccessible categories were combined at the stratum level.

The results show significant differences in two of the strata, again indicating that treatments are having an effect on total survey returns. The letter mailed before the questionnaire was the treatment causing the significant differences. In Stratum 4, the difference was caused by the increase in mail returns. The significance in Stratum 6 resulted from the number of refusals in the group receiving the letter before the questionnaire.

Table 2: Distribution of the Sample by Treatment and by Response Category, Hog and Pig Multiple Frame Survey, Wisconsin, June 1974

Response Category	Treatment BW/Q	LW/Q	BB/Q	LB/Q	Control
Mail	145	152	157	195	142
Telephone & Interview	170	162	161	114	182
Inaccessible	15	18	14	17	13
Refusal	18	15	15	21	10
Total	348	347	347	347	347

Another factor considered was whether the size of operation responding to one treatment differed from the size of operation responding to other treatments. The average size of operation is shown by treatment in Table C in the Appendix. The multiple comparison test indicated the variation in the means by treatments was caused by sampling variation. Therefore, the treatment effects did not differ by size of operation.

SUMMARY

Only the letter sent before the questionnaire significantly improved mail response. The responses by treatment were about the same for all sizes of operations.

The following items should be considered in the analysis of this study. First, it was limited to one State for one survey. The results could change as the sample is used for future surveys. A reminder card was sent to all of the individuals; thus, when the letter or brochure were sent before the questionnaire, the person was contacted three times through the mail. It was not possible to measure the effects of the three contacts versus the two contacts resulting from the other treatments.

Further research should be conducted to improve mail response over the more costly and time consuming methods of telephoning and personal interviewing. It is recommended more of these special projects be conducted to analyze treatments in different States, surveys, and time periods. Such a study should be designed so that it also measures the time effect, since samples are used several times. The procedure that improved mail response for the first survey may not be the one which maintains the best response over the cycle of four surveys. Testing to improve mail response should not be confined to the treatments used in this study, but should be expanded to include such variables as questionnaire design and the use of reminder cards.

APPENDIX

TABLE A: Mail Returns by Treatment and by Stratum, Hog and Pig Multiple Frame Survey, Wisconsin, June 1974

STRATUM	TREATMENT: BW/Q	LW/Q	BB/Q	LB/Q	Control	D.F.	Computed Chi Square[1/]
	(Number Mail Returns)						
(1) No Livestock (<189 acres)	20	16	19	33	19	4	8.5
(2) No Livestock (190+ acres)	6	8	7	10	10	4	1.6
(3) No Hogs (<189 acres)	15	11	9	18	12	4	3.8
(4) No Hogs (190+ acres)	33	39	36	44	36	4	2.0
(5) 1 - 99 Hogs	26	36	28	36	29	4	2.8
(6) 100 - 249 Hogs	32	30	41	32	29	4	2.8
(7) 250 - 499 Hogs	13	12	17	22	7	4	9.1
Total	145	152	157	195	142	4	(11.6)*
Interaction						24	(19.0)[2/]

1/ Under the null hypothesis of no significant differences between treatments, the probability of obtaining a Chi-square greater than:

9.49 is less than 5 percent with 4 degrees of freedom
13.28 is less than 1 percent with 4 degrees of freedom
36.40 is less than 5 percent with 24 degrees of freedom.

2/ The Interaction Chi-square for the test of independence is sum of stratum Chi-squares minus Chi-square on Totals. (30.6 - 11.6) = 19.0 with 24 degrees of freedom.

TABLE B: Distribution of the Sample by Treatment and Response Category by Stratum, Hog and Pig Multiple Frame Survey, Wisconsin, June, 1974

Stratum	Response	TREATMENTS BW/Q	LW/Q	BB/Q	LB/Q	Control	D.F.	Computed Chi-Square[1/]
1	M	20	16	19	33	19		
	T & I	13	22	12	14	18	8	12.4
	Other	3	3	6	4	1		
2	M	6	8	7	10	10		
	T & I	11	7	6	4	10	8	8.4
	Other	2	0	2	1	0		
3	M	15	11	9	18	12		
	T & I	14	8	11	6	12	8	14.1
	Other	1	4	0	2	0		
4	M	33	39	36	44	36		
	T & I	46	48	51	20	51	8	17.8*
	Other	7	8	4	3	7		
5	M	26	36	28	36	29		
	T & I	37	32	34	29	38	8	7.3
	Other	10	4	7	9	6		
6	M	32	30	41	32	29		
	T & I	33	30	30	25	36	8	20.1**
	Other	4	8	3	15	3		
7	M	13	12	17	22	7		
	T & I	16	15	17	16	17	8	7.0
	Other	6	6	7	4	6		
Total	M	145	152	157	195	142		
	T & I	170	162	161	114	182	8	32.5**
	Other	33	33	29	38	23		
Interaction							48	54.6[2/]

1/ The probability of obtaining a Chi-square greater than:
15.5 is less than 5 percent with 8 degrees of freedom.
20.1 is less than 1 percent with 8 degrees of freedom.
67.5 is less than 5 percent with 48 degrees of freedom.

2/ The interaction Chi-square for the test of independence is the sum of stratum Chi-squares minus the Chi-square for totals. (87.1 - 32.5) = 54.6 with 48 degrees of freedom.

Table C. Average number of hogs and pigs per questionnaire returned by mail for the five treatments used in the Hog and Pig Multiple Frame Survey, Wisconsin, June, 1974[1/]

Treatment	Number of questionnaires returned by mail n	Average Hogs & Pigs $\bar{X}$	Standard Error[2/] $S_{\bar{x}}$
BW/Q	145	12.8	3.0
LW/Q	152	10.0	2.0
BB/Q	157	13.5	2.5
LB/Q	195	9.7	1.9
C	142	7.8	1.9

Pooled Standard Error over all Treatments ($S_{\bar{x}}$ = 2.28)

1/ Data were weighted to reflect the different probabilities of selection used between strata.

2/ The Student-Newman-Keuls multiple comparison test was used to test the hypothesis that there was no significant difference between the means from the five treatments. The hypothesis is rejected if $\bar{X}max - \bar{X}min > (3.86)(2.28)$. The difference in the means can be attributed to sampling variation.