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IMPROVING RESPONSE TO MAIL
SURVEYS OF FARMERS AND RANCHERS

by

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January 1978

IMPROVING RESPONSE TO MAIL SURVEYS
OF FARMERS AND RANCHERS

INTRODUCTION:

The Economics, Statistics, and Cooperatives Service (ESCS) has a vital interest in obtaining and maintaining a high response rate to mail surveys. Each usable questionnaire returned by mail in probability surveys saves money by avoiding a telephone call or personal interview, and higher response rates in nonprobability mail surveys provide more information about the population of interest.

The Office of Management and Budget (OMB), from which Federal agencies must obtain approval to conduct statistical surveys, requires a minimum response rate of 50 percent. This often proves difficult for voluntary mail surveys.

ESCS is, therefore, interested in testing various techniques to obtain increased cooperation in response to mailed questionnaires. Excellent references and a summary of the literature are provided by Leslie Kamuck and Conrad Berenson [1]. However, little is available with specific reference to what works for improving response from farmers and ranchers. Recent papers from within ESCS by Kelly and Vogel [2], Arends [3], and Kelly [4] have provided much-needed insight about the agricultural population.

They found presurvey letters, shorter operation description questions, asking for livestock data in ranges, and follow-up mailing of the questionnaire to be effective at increasing the response rate, while inserts with the questionnaire, lengthy operation description sections and post card reminders had significantly less effect on response rates.

This study was designed to continue and expand the research of ESCS into ways for improving mail survey response rates. The survey used for testing alternative approaches was the Fall Acreage and Production (A&P) survey. It is a general purpose, nonprobability survey that provides indications of change in year-to-year crop production and provides information on the distribution of State totals among districts and counties within the State. The success of this survey is dependent upon 1) a group of consistent reporters whose reports can be matched from year to year, and 2) a large number of total reports to provide for small area statistics.

For the first objective a subpopulation of known respondents with a history of cooperation might suffice. Mailing only to this group would certainly provide very good response rates, thereby satisfying OMB requirements and reducing the cost per completed questionnaire. However, meeting the second objective by striving for a given large number of returns requires a very large mailing. This is not conducive to a good mail response rate though the total number of responses may be large. Obviously, if budget and time constraints were removed, almost any preassigned response rate could be achieved for any size sample by using other more expensive and time consuming methods of data collection. To go the extra step of insuring a particular response rate in addition to a large number of questionnaires, and to do so for a given budget requires the most efficient combination of number mailed and cost effective procedure. An informative discussion of the interrelationships between survey costs, questionnaires mailed and response rates is provided by Cox, Anderson and Fulcher [5].

PROCEDURES:

Eight States participated in the study. Six factors and various combinations of these factors were tested as ways to improve response rates in the Fall A&P survey. They were: 1) presurvey notification, 2) postage stamps on the survey envelopes (both outgoing and return), 3) redesigned questionnaires with larger print and more space for reporting (for examples of alternative questionnaires see pages 17-18), 4) redesigned envelopes, 5) narrative on a separate cover letter instead of on the questionnaire, and 6) follow-up mailings. These factors were chosen because of demonstrated success in other studies found in the literature (see [1]).

Each of the eight participating States was assigned one of four tests. Each test consisted of the standard survey method used in that State and three alternative methods. The tests, States and survey methods were as follows:

TEST A

Presurvey Notification and Post Survey Follow-Up (Iowa and North Carolina)

<u>Survey Method</u>	<u>Factors</u>	
	<u>Presurvey Notice</u>	<u>Follow-Up</u>
Standard	No	Reminder Card
Alternative 1	Yes	Reminder Card
Alternative 2	No	2 Follow-Up Questionnaires
<u>Alternative 3</u>	Yes	<u>2 Follow-Up Questionnaires</u>

TEST B

Mailing Procedures (Arkansas and South Dakota)

Survey Method	Factors	
	First Mailing	Follow-Up
Standard	Franked Envelopes	None
Alternative 1	Stamped Outgoing & Return Envelopes	None
Alternative 2	Franked Envelopes	Stamped Outgoing & Return Envelopes
Alternative 3	Stamped Outgoing & Return Envelopes	Stamped Outgoing & Return Envelopes

TEST C

Questionnaire (Ohio and Oregon)

Survey Method	Factors	
	Questionnaire Design	Narrative
Standard	One Page Front & Back	On Questionnaire
Alternative 1	Redesigned Questionnaire	On Questionnaire
Alternative 2	One Page Front & Back	On Cover Letter
Alternative 3	Redesigned Questionnaire	On Cover Letter

TEST D

Envelopes and Questionnaires (Georgia and Montana)

Survey Method	Factors	
	Envelopes	Questionnaires
Standard	Regular	Current
Alternative 1	Redesigned	Current
Alternative 2	Redesigned	Redesigned
Alternative 3	Regular	Redesigned

A simple random sample of 2000 was assigned to alternative methods 1, 2, and 3, except for the stamped envelope treatments which had a sample size equal to 1000. All remaining list names received the standard survey method for that State. Detailed cost records were maintained for each treatment to permit an analysis of the cost associated with increasing the response rate.

There is no widely accepted definition of response rate for mail surveys, but in this report the analysis is based on a response rate defined as the number of questionnaires tabulated divided by the sum of the number of questionnaires tabulated and the number of questionnaires not returned. Returns by the Post Office are excluded. This was done so the response rate would reflect the relative influence of each treatment upon the recipient to return the questionnaire.

ANALYSIS:

Two hypotheses were tested for each State:

H_0^1 : The expected response rates are equal for all survey methods.

H_0^2 : The expected response rate for each method is 50 percent or more.

The first hypothesis was tested by using a chi square test for four binomial populations (the four survey methods) and if that test was significant, the chi square test was used to compare each pair of methods. For example, in Table 1, for the Test A methods in Iowa, the chi square statistic for testing the hypothesis of no difference in the expected response rates for the four methods gives a value of 231.52 with 3 degrees of freedom. Since this is significant it is of interest to determine where the differences occur. Significant differences occur between the standard survey method and Alternative 1 and between Alternatives 1 and 2. Comparing Alternatives 2 and 3 gives $\chi^2 = 3.83$ with 1 degree of freedom which is very near the 5 percent significance level.

For each survey method the second hypothesis was tested against the one sided alternative that the expected response rate is less than 50 percent. If the observed response rate was less than $.5 - 1.645 \sqrt{1/(4n)}$, where n is the sample size on which the response rate was calculated, it was concluded that the expected response rate is less than 50 percent.

RESULTS:

Response rates are presented by State for each test in Tables 1-4. In addition, the out of pocket cost per tabulated return is shown for each alternative survey method. These average costs are dependent upon both the response rate and the mailing procedure used. Differences between States may be large for the same survey method and similar response rates simply because their mailing practices differ, e.g., third class postage versus first class or no follow-up versus post card reminder. Cost comparisons should therefore be made across survey methods by State. For documentation purposes, the number tabulated and the total of tabulated plus not returned are also given in the tables for each State and survey method.

Following the tables are the ordered treatments for each State from lowest to highest response rate. Those treatments connected by brackets were not significantly different at the $\alpha = .05$ level.

Table 1: Test A Results on Presurvey Notification and Post-Survey Follow-Up, Iowa and North Carolina

Survey Method ^{1/}	Percent Response ^{2/}		Out of Pocket Cost Per Return		Number Tabulated		
	IA	NC	IA	NC	No. Tab + No. not Returned	IA	NC
<u>Standard</u> No Presurvey Notice but a Reminder Card	46.0*	41.8*	.55	.58	<u>6277</u> <u>13635</u>	<u>4850</u> <u>11594</u>	
<u>Alternative 1</u> Presurvey Notice and Reminder Card	50.1	41.5*	.71	.62	<u>944</u> <u>1884</u>	<u>774</u> <u>1865</u>	
<u>Alternative 2</u> No Presurvey Notice and Two Follow-Ups	60.6	55.2	.50	.80	<u>1106</u> <u>1825</u>	<u>943</u> <u>1707</u>	
<u>Alternative 3</u> Presurvey Notice and Two Follow-Ups	63.8	58.3	.62	.77	<u>1187</u> <u>1861</u>	<u>1009</u> <u>1732</u>	

^{1/} A follow-up mailing here refers to the mailing of additional questionnaires to nonrespondents on designated cut-off dates.

^{2/} * indicates reject H_0 , i.e. 50% + response rate for that State and survey method rejected.

<u>Iowa</u>		<u>North Carolina</u>	
	Standard		Alternative 1
	Alternative 1		Standard
<u>1/</u>	Alternative 2	<u>1/</u>	Alternative 2
	Alternative 3		Alternative 3

1/ Significantly different at $\alpha = .10$ level.

The largest differences noted in Test A were the result of two follow-up mailings of the questionnaire. Response rates from alternatives 2 and 3 were significantly better in both States than the standard method and alternative 1 which used only a reminder card. The presurvey notice was effective in improving the response rate in Iowa when no follow-up mailings were made but not in North Carolina (alternative 1 versus standard survey method). It also achieved a significant improvement at $.05 \leq \alpha \leq .10$ in both States when there were follow-up mailings (alternative 3 versus alternative 2).

For the best response rates at the least cost it appears that alternative 2 is preferred in Iowa while alternative 3 provides the best result in North Carolina. Differences in costs between these two States were chiefly due to a first class mailing of second and third requests in North Carolina at 13 cents compared to third class mailings at $7\frac{1}{2}$ cents in Iowa. North Carolina also mailed more second requests. On the other hand North Carolina was able to mail their presurvey notice under a special plan for less than 1 cent per item while Iowa sent it third class. Both States used third class mail for the initial mailing and the reminder card.

Table 2: Test B Results on Mailing Procedures, Arkansas and South Dakota

Survey Method ^{1/}	Percent Response ^{2/}		Out of Pocket ^{3/} Cost Per Return		Number Tabulated No. Tab + No. not Returned	
	AR	SD	AR	SD	AR	SD
<u>Standard</u> Franked Envelopes and No Follow-Up	35.1*	22.3*	.66	.73	$\frac{3565}{10153}$	$\frac{2387}{10717}$
<u>Alternative 1</u> Stamped Envelopes and No Follow-Up	40.2*	25.6*	1.04	1.17	$\frac{374}{931}$	$\frac{256}{1000}$
<u>Alternative 2</u> Franked Envelopes and Stamped Follow-Up	45.7*	36.2*	.86	1.15	$\frac{419}{917}$	$\frac{362}{1000}$
<u>Alternative 3</u> Stamped Envelopes and Stamped Follow-Up	48.7	38.4*	1.24	1.37	$\frac{438}{899}$	$\frac{384}{1000}$

^{1/} Arkansas mailed a reminder card for the Standard and Alternative 1 procedures.

^{2/} * indicates reject H_0^2 , i.e. 50% + response rate for that State and survey method rejected.

^{3/} Franked envelopes were sent third class in Arkansas and first class in South Dakota.

<u>Arkansas</u>	<u>South Dakota</u>
Standard	Standard
Alternative 1	Alternative 1
Alternative 2	Alternative 2
Alternative 3	Alternative 3

It appears that in both Arkansas and South Dakota it would be extremely difficult to obtain a response rate of at least 50 percent at a modest cost. Only Alternative 3 in Arkansas had a response rate that was not significantly less than 50 percent. However, it was at a cost of \$1.24 per return.

In both States, there was a significant improvement in response rates if a stamped envelope is used instead of a franked envelope when there was no follow-up mailing of a questionnaire. However, when a follow-up was used there was no significant difference between stamped or franked envelopes for the initial mailing. Alternatives 2 and 3 are significantly better than either the present procedure or alternative 1 indicating the usefulness of a follow-up procedure. Alternative 2 is preferred over alternative 3 because of the substantial cost savings with no significant difference in returns.

Table 3: Test C Results on Questionnaire and Narrative Changes, Ohio and Oregon

Survey Method ^{1/}	Percent Response ^{2/}		Out of Pocket Cost Per Return		Number Tabulated	
	OH	OR	OH	OR	No. Tab + No. Not Returned	
<u>Standard</u> Current Ques and Narrative on Ques	36.4*	27.2*	.52	.79	<u>3246</u> 8920	<u>927</u> 3411
<u>Alternative 1</u> Redesigned Ques and Narrative on Ques	35.4*	27.7*	.52	.79	<u>682</u> 1925	<u>531</u> 1916
<u>Alternative 2</u> Current Ques and Narrative on Cover Letter	40.1*	28.1*	.48	.77	<u>765</u> 1909	<u>538</u> 1916
<u>Alternative 3</u> Redesigned Ques and Narrative on Cover Letter	33.8*	26.4*	.55	.84	<u>649</u> 1919	<u>501</u> 1898

^{1/} No follow-up mailing was made in either State.

^{2/} * indicates reject H_0^2 , i.e. 50% + response rate for that State and survey method rejected.

<u>Ohio</u>	<u>Oregon</u>
Alternative 3	Alternative 3
Alternative 1	Standard
Standard	Alternative 1
Alternative 2	Alternative 2

Oregonian farmers and ranchers do not appear to be influenced by either questionnaire designs or placement of the narrative. Not only were there no significant differences between responses for any of the survey procedures, but the procedures were remarkably consistent, having a range of only 1.7 percent. It would be interesting to test the effects of a follow-up procedure in Oregon at a later date.

Ohio farmers appear to respond best to the current questionnaire design with the narrative on a cover letter since alternative 2 gave the only significant increase in response rate. Again, the effects of a follow-up would be of interest in Ohio. In both states all response rates were significantly less than 50 percent.

Table 4: Test D Results on Envelopes and Questionnaires, Georgia and Montana

Survey Method ^{1/}	Percent Response ^{2/}		Out of Pocket Cost Per Return		Number Tabulated	
	GA	MT	GA	MT	No. Tab + No. not Returned	
<u>Standard</u> Regular Envelopes and Current Ques	49.4	23.2*	.51	.71	<u>907</u> 1835	<u>910</u> 3923
<u>Alternative 1</u> Redesigned Envelopes and Current Ques	52.6	<u>3/</u>	.55	<u>3/</u>	<u>433</u> 823	<u>3/</u>
<u>Alternative 2</u> Redesigned Envelopes and Redesigned Ques	45.2*	<u>3/</u>	.55	<u>3/</u>	<u>381</u> 843	<u>3/</u>
<u>Alternative 3</u> Regular Envelopes and Redesigned Ques	44.1*	21.2*	.55	.76	<u>373</u> 846	<u>2145</u> 10140

^{1/} Georgia made one follow-up mailing while Montana made only the initial mailing.

^{2/} * indicates reject H_0^2 , i.e. 50% + response rate for that State and survey method rejected.

^{3/} Montana's redesigned envelopes were not received from the printer in time to use for the survey.

<u>Georgia</u>	<u>Montana</u>
Alternative 3	Alternative 3 (Redesigned ques)
Alternative 2	Standard (Old ques)
Standard	
Alternative 1	

For the Montana survey, overall response rates were low, and there was no significant difference in response rates obtained by the present survey method versus redesigning the questionnaires. For Georgia, the response rate was most influenced by whether or not the questionnaire was redesigned. Whether using regular envelopes or redesigned envelopes, the response rates were significantly lower using redesigned questionnaires than using current questionnaires. The redesigned envelopes produced slightly higher response rates both with the current questionnaire and with the redesigned questionnaire, but the differences were not statistically significant. The current questionnaire, with regular or redesigned envelopes, produced response rates that were consistent with the hypothesis that the expected response rate is 50 percent or greater, but the response rate was significantly less than 50 percent for the redesigned questionnaire alternatives.

SUMMARY:

Only follow-up mailings of the questionnaire consistently resulted in significantly higher response rates among the survey methods tested. Expected response rates of 50 percent or more were also only achieved where there was more than one mailing of the questionnaire. On the other hand, multiple mailings raised costs per tabulated questionnaire to levels where telephone interviewing becomes competitive. It also requires a long survey period which was permissible for this survey but is not always possible.

Presurvey notices mailed in Iowa and North Carolina gave the next most encouraging results. Although not entirely consistent among the alternatives, the presurvey notice did provide a significant improvement in Iowa compared to no presurvey notice under the standard procedure and a significant difference at $\alpha = .10$ for both States when used in conjunction with two follow-ups to the initial questionnaire mailing.

Stamped envelopes, both outgoing and return, appear to have significantly improved response when there were no follow-up mailings. However, this initial mailing was significantly improved upon by a second mailing using stamped envelopes regardless of whether or not the original mailing was stamped. No significant difference was detected between a stamped versus franked initial mailing when a stamped follow-up mailing was made. Using two 13 cent stamps per questionnaire, whether returned or not, is a very expensive procedure per tabulated questionnaire. South Dakota more than doubled overall returns for the standard and alternative 1 test groups through a telephone follow-up for approximately \$.81 per tabulated response. This was substantially less than the cost of increasing response rates through a stamped follow-up mailing.

The redesigned questionnaire tested for this survey had very disappointing results, actually decreasing response in most instances for the four States where it was used. This may be the result of a conditioning effect where the respondents feel more comfortable with a questionnaire they have seen before. It would be interesting to test other questionnaire designs on subsamples but it is not recommended for any state to abruptly change a questionnaire for their entire mailing list.

The current questionnaire design but with the narrative on a cover letter instead of on the questionnaire did provide a significantly better response rate in Ohio though not in Oregon. This procedure is encouraging and appears to be cost effective so further research with narrative on a cover letter is recommended. The redesigned envelopes tested in Georgia resulted in somewhat higher response rates than the comparable treatments with regular envelopes but not significantly higher.

Based on results from this study, to have the best chance to achieve a 50 percent response rate for moderate cost in a mail survey, the State Statistical Offices should use the standard mailing procedures and questionnaires with two follow-up mailings to the initial mailing. Where costs are not increased appreciably the States could further test the effects of a presurvey notice and/or narrative on a cover letter. Caution must be exercised in redesigning questionnaires or envelopes. Stamping envelopes does not appear, by itself, to justify the increased cost.



Statistical Reporting Service

U.S. Department of Agriculture

Original Questionnaire

ACREAGE AND PRODUCTION OF CROPS - 1977

17
Form Approved
O. M. B. Number 40-R0127
Approval Expires 7-31-80
C. E. 02-9851
Georgia

Dear Reporter:

The information requested is needed in preparing final estimates of acreage and yield of harvested crops in 1977, and in estimating wheat and rye sowings this fall.

Response to this survey is voluntary and not required by law. Please fill out this form on both sides and return it promptly in the enclosed envelope which requires no stamp. Your report will be kept confidential.

Respectfully,
Frasier T. Galloway
Frasier T. Galloway
State Statistician

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

INSTRUCTIONS Report for the land you operate including land rented from others. If you share-rent any land, your report should include landlord's share for acres and production, as well as any toll paid for harvesting or combining. Where harvest is not complete, make your best possible estimate of acres to be harvested and expected total production in bushels, bales, tons or pounds, as specified. Please report small grains seeded or to be seeded this fall.

REPORT FOR CROPS GROWN IN 1977		Acres	Total production harvested and to be harvested
Give the information as accurately and completely as possible. Where acreages and production are not definitely known, make careful estimates.			
FIELD CROPS		180	
1. Cotton planted		181	
2. Cotton harvested and to be harvested			Bales
3. Corn planted for all purposes		130	
4. Corn harvested and to be harvested for grain including white corn		133	Bu.
5. Corn cut for silage		139	Tons
6. Corn cut for fodder, pastured and hogged down (without husking)		145	
7. Corn abandoned (will not be harvested or pastured)		148	
8. White Corn harvested and to be harvested for grain (included above)		151	Bu.
9. Sorghums planted for all purposes (exclude sorghum x Sudan crosses)		570	
10. Sorghums harvested and to be harvested for grain		573	Bu.
11. Sorghums cut for silage		579	Tons
12. Sorghums cut for fodder and hay or used only for pasture		594	
13. Sorghums used for sirup and molasses or abandoned		597	
14. Soybeans planted for all purposes		625	
15. Soybeans harvested and to be harvested for beans		628	Bu.
16. Soybeans cut for hay, used for silage, pasture only, plowed under or abandoned ...		634	

Back of Original Questionnaire

C.E. 02-9851
Georgia
1977

REPORT FOR CROPS GROWN IN 1977	Acres	Total production harvested and to be harvested
Give the information as accurately and completely as possible. Where acreages and production are not definitely known, make careful estimates.		
FIELD CROPS (Cont'd)	445	
17. Sweetpotatoes planted.....	446	447 55-pound Bu.
18. Sweetpotatoes harvested and to be harvested.....	420	
19. Peanuts planted for all purposes.....	423	426 Pounds
20. Peanuts harvested and to be harvested for nuts.....	921	
21. Watermelons planted for sale.....	922	923 Melons
22. Watermelons harvested for sale.....	666	667 Pounds
23. Tobacco harvested.....	342	345 Tons
HAY CROPS		
24. Coastal Bermuda cut for hay.....	316	319 Tons
25. All other hay including alfalfa, lespedeza, soybean, cowpea, peanut, clovers, Johnson Sudan, millet, other tame grasses, sorghum x Sudan crosses, but excluding grain cut for hay.....	524	525 Pounds (clean seed)
26. Tall fescue harvested for seed.....	735	
WHEAT AND RYE SEEDINGS - FALL 1977 (If none, enter zeros)		
27. Wheat sown and to be sown for all purposes, fall 1977.....	491	
28. Rye sown and to be sown for all purposes, fall 1977.....	995	
TOTAL LAND		
29. ACRES OF ALL LAND YOU OPERATE (Include land rented from others).....		

Over, please.

If you would like to receive a report of the results of this survey, PLEASE CHECK HERE 998

Reported by _____ Date _____

COMMENTS: _____



STATISTICAL REPORTING SERVICE
U.S. DEPARTMENT OF AGRICULTURE

FEDERAL
OFFICE BLDG
355 E. HANCOCK AVE
ATHENS, GA
30601

FORM APPROVED
OMB NUMBER 40-R0127
APPROVAL EXPIRES 7-31-80
CI-02-9851

Redesigned Questionnaire



GEORGIA ACREAGE & PRODUCTION OF CROPS

1977

Dear Reporter

The information we're asking from you is needed to prepare final county and state estimates of acreage and production of 1977 crops, and the acreage seeded to winter wheat this fall.

Please answer as completely as possible and return this form in the enclosed postage-free envelope.

Your response is voluntary and not required by law. The information you provide is confidential and will be used only in summary with similar reports from other producers.

Thanks for your cooperation.

Sincerely,

Fraser F. Galloway
Fraser F. Galloway
Statistician in Charge

Instructions

Please report for the land you operate, including land rented from others. If you share-rent any land, include landlord's share for acres in production, and any toll paid for harvesting or combining. If harvest is not complete, please estimate acres to be harvested and the expected total production. Please report small grains seeded or to be seeded this fall.

Field Crops		Acres	Total production harvested and to be harvested
Cotton	planted	180	—
	harvested and to be harvested	181	183 bales
Corn	planted for all purposes	130	—
	harvested and to be harvested for grain, including white corn	133	136 bu
	cut for silage	139	142 tons
	cut for fodder, pastured and hogged down (with husking)	145	—
	abandoned (will not be harvested or pastured)	148	—
White Corn	harvested and to be harvested for grain (included above)	151	155 bu
Sorghums	planted for all purposes (exclude sorghum x Sudan crosses)	570	—
	harvested and to be harvested for grain	573	576 bu
	cut for silage	579	582 tons
	cut for fodder and hay or used only for pasture	594	—
	used for syrup and molasses or abandoned	597	—
Soybeans	planted for all purposes	625	—
	harvested and to be harvested for beans	628	631 bu
	cut for hay, used for silage, pasture only, plowed under or abandoned	634	—
Sweetpotatoes	planted	445	—
	harvested and to be harvested	446	447 55-lb bu
Peanuts	planted for all purposes	420	—
	harvested and to be harvested	423	426 lbs
Watermelons	planted for sale	921	—
	harvested for sale	922	923 melons
Tobacco	harvested	666	667 lbs
Hay Crops			
Coastal Bermuda	cut for hay	342	345 tons
All other hay	including alfalfa, lespedeza, soybean, cowpea, peanut, clovers, Johnson, Sudan, millet, other tame grasses, sorghum x Sudan crosses, but excluding grain cut for hay	316	319 tons
Tall Fescue	harvested for seed	524	525 lbs (clean seed)

Page 3 of Redesigned Questionnaire

Wheat and Rye Seedings – Fall 1977 If none, enter zeroes.

Wheat	sown and to be sown for all purposes, fall 1977	735	—
Rye	sown and to be sown for all purposes, fall 1977	491	—

Total Land

Acres

Acres of All Land You Operate (Include land rented from others)	995	—
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If you would like to receive a report of the results of this survey, please check here 998

Reported by

Date

Telephone Number

Comments:

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