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The Effect of Different Correspondence Methods on Response Rates in the 2010 Census of Agriculture Content Test

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EXECUTIVE SUMMARY

The National Agricultural Statistics Service's (NASS) primary purpose is to provide timely, accurate, and useful statistics on United States agriculture. The census of agriculture is conducted every five years to obtain agricultural statistics for the nation, every state, and every county or county equivalent. This report focuses on the 2010 Census of Agriculture Content Test which was conducted in preparation to the 2012 Census of Agriculture. Results from the 2010 Census of Agriculture Content Test were analyzed to identify modifications to incorporate into the final design of the 2012 Census of Agriculture data collection tools and procedures.

The 2010 Census of Agriculture Content Test experimented with different correspondence methods to encourage respondents to return their report form via mail or Internet. These experiments utilized combinations of cover letters, postcards, and pre-recorded telephone messages for the initial and follow-up contacts to determine respondent correspondence preferences.

The first experiment focused on ways to encourage respondents to report their data by the Internet rather than by mail. The second experiment tested the effectiveness of pre-survey recorded telephone message notification. The third experiment focused on the likely out of scope records for which the agricultural activity is unknown. Different follow-up methods were tested on the likely out of scope records to encourage respondents to return their report form. Finally, very similar to the third experiment, the fourth experiment tested the effectiveness of different follow-up methods on the probable farm sample.

Overall, results showed that response rates were significantly different between the treatment and control groups. The groups receiving either the postcard or the pre-recorded telephone message reminder stressing respondents may be personally visited or telephoned if they did not return their report form resulted in higher response rates than the groups receiving the standard message. Also, the groups receiving the postcard follow-up had higher response rates than the groups that received the pre-recorded telephone message follow-up. Generally, any form of courtesy reminders had some impact on improving response rates.

RECOMMENDATIONS

1. Always include a paper report form in the initial mailing.

2. Use pre-survey recorded telephone messages.

3. Use the autodialer software for reminders, such as for subpopulations which reported online in previous surveys to report online for the current survey.

4. Use postcards or recorded telephone messages for pre-survey and follow-up notifications stressing they may receive a personal visit or telephone follow-up if they do not return the form.

5. Increase the number of attempts made when using recorded telephone messages.

The Effect of Different Correspondence Methods on Response Rates in the 2010 Census of Agriculture Content Test

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Abstract

The 2010 Census of Agriculture Content Test experimented with different correspondence methods to encourage respondents to return their report form via mail or Internet. These experiments utilized combinations of cover letters, postcards, and pre-recorded telephone messages for the initial and follow-up contacts to determine the correspondence preferences of respondents.

The first experiment focused on ways to encourage respondents to report their data by the Internet rather than by mail. The second experiment tested the effectiveness of pre-survey pre-recorded telephone message notification. The third experiment focused on different follow-up methods to encourage likely out of scope respondents to return their report form. This likely out of scope group generally has low response rates as most do not qualify as agricultural operations, but they are still required to return the form indicating their status. The fourth experiment focused on probable farm operations with variations of follow-up correspondence to encourage them to return their report form.

Key Words: cover letter, Web surveys, electronic data reporting (EDR), postcard, pre-recorded telephone message

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1. INTRODUCTION

In an effort to increase response rates for the 2012 Census of Agriculture, the National Agricultural Statistics Service (NASS) conducted four different experiments during the 2010 Census of Agriculture Content Test. These four experiments utilized different versions of cover letters, postcards, and pre-recorded telephone messages for the initial and follow-up mailings. The objective was to determine which communication strategy most effectively persuaded respondents to return their report forms.

The first experiment focused on electronic data reporting (EDR). If respondents are not provided a paper report form and respondents are given detailed instructions on how to report their data via the Internet, then there may be an increased Web response rate. This experiment took place in November 2010 prior to the general December mail out of the report form. NASS tested the effectiveness of mailing a letter and a postcard without a questionnaire to two different groups of respondents to encourage reporting via the Internet.

Research regarding mixed-mode designs is extensive but also conflicting. An experiment using the 2000 Department of Defense's Information Services Survey, which targeted members of the armed forces and related populations, found a slight increase in response rates in the group given a choice of a Web option or a paper survey (Quigley, Riemer, Cruzen, & Rosen, 2000). Other research, such as the Yost & Homer's (1998) study, suggests that adding a Web option does not change the total response rate, just shifts the mode by which respondents complete the survey. Response rates stayed about the same with the introduction of a new mode option, and almost one-third of respondents given the choice used the Web to complete their survey. Still other research provides evidence that offering a choice of mode actually decreases the overall response rate relative to a mail-only-version. For example, adding an Internet response option for the American Community Survey lowered overall response rates (Griffin, Fischer, & Morgan, 2001). Griffin et al. found that providing respondents with a choice yielded lower mail response rates for the group invited to respond online.

The second experiment tested whether using a pre-survey recorded telephone message prior to the survey encouraged respondents to return their report form. All records selected for this sample had to have valid telephone numbers.

Several research studies, such as Xu, Bates & Schweitzer (1993), McCarthy (2008), and McCarthy & Tran (2010), found evidence supporting claims that leaving messages on telephone answering machines can have a positive impact on survey participation by potential respondents.

The third experiment targeted likely out of scope respondents. The objective of this experiment was to see if using stronger wording would increase cooperation from this population. Likely out of scope respondents tend to have a low response rate as most do not qualify or feel they do not qualify as agricultural operations. They were still required to return their report form indicating their status. Non-response from this group increases follow-up contacts cost and may

increase non-response bias. All four groups in this experiment received the standard mail out package with a cover letter and a printed copy of the 2010 Census of Agriculture Content Test report form. The difference between the groups was in the follow-up treatments. For the treatment groups, one group received a postcard and the other group received a recorded telephone message. The message for both these groups was the same stating that if they did not reply they may receive a personal visit or telephone call. They were asked to return the report form even if they were no longer farming or had never farmed. The control groups received either a postcard or a recorded telephone message with the standard message.

In a study conducted by Nichols, Jurgenson & Norris (2009), they pretested a series of deadline messages proposed for the 2010 Census Program for Evaluations and Experiments (CEPEX). This study concluded that non-respondents were motivated to return their report form when the message mentioned that an enumerator would personally visit them to conduct an interview and collect the information.

The fourth experiment was for probable farm operations, the majority of the 2010 Census of Agriculture Content Test sample. Similar to Experiment Three, the objective of this experiment was to see if using stronger wording would increase response rates from this population. All four groups in this experiment received the standard mail out package with the cover letter and a printed copy of the 2010 Census of Agriculture Content Test report form. The difference between the groups was in the follow-up treatments. One group received a postcard and another group received a recorded telephone message stating that if they did not reply they may be personally visited or would receive a telephone call. The control groups received either a postcard or a recorded telephone message with the standard message.

These experiments were analyzed using a combination of the chi-square test of homogeneity, the Mantel-Haenszel chi-square test and Fisher's exact test. The chi-square test is a family of tests commonly used in the statistical analysis of experimental data (Bolboaca, Jantschi, Sestras, Sestras, & Pamfil, 2011). It was used to determine whether frequency counts were identically distributed or proportions in each category were similar across all treatments.

Let r be the number of treatments (columns) and c the number of response categories (rows). The chi-square degrees of freedom were calculated by $(r-1)*(c-1)$. The null hypothesis states that the response rates in each category were similar across all groups. The alternative hypothesis states otherwise (i.e. there were at least two different response rates in one response category, across all groups). Mathematically:

$$H_0: P_{i,j} = P_{i,k}$$
$$H_a: P_{i,j} \neq P_{i,k}, \text{ for every } j \neq k \text{ and } 1 \leq i \leq c;\ 1 \leq j,k \leq r$$

The null hypothesis was rejected if the p-value was less than alpha, $\alpha=0.05$.

The Mantel-Haenszel chi-square statistic tests the alternative hypothesis that there is a linear association between the row and column variables.

Fisher's exact test is the probability of observing a table value that gives at least as much evidence of association as the one actually observed, given that the null hypothesis is true. Fisher's exact test is more accurate than the chi-square test of independence when the expected numbers are small.

2. EXPERIMENT 1: ELECTRONIC DATA REPORTING

2.1 Method

This experiment took place in November 2010 prior to the general mail out of the report form which occurred on December 30, 2010. This experiment consisted of three groups with a sample of 1,000 records in each group. Two of the groups were treatment groups and one was a control group. The samples were selected from respondents of the 2007 Census of Agriculture who reported having high speed Internet access. The assumption was those who reported having high speed Internet access would be more likely to report online. Treatment group 1 received an initial letter (L2 – shown in Appendix) by mail without a report form. This letter encouraged respondents to report online and gave detailed instructions on how to complete their 2010 Census of Agriculture Content Test report form on the NASS Internet site. The letter was printed on attractive paper with an agriculture related picture.

Treatment group 2 received a folded postcard (L3 – shown in Appendix) by mail without a report form. The message on this postcard was succinct and encouraged respondents to visit the NASS Internet site to complete their 2010 Census of Agriculture Content Test report form. The folded postcard contained their personal 17 digit survey code needed to access their report form on the NASS Internet site.

Group 3 was the control group which received the standard mail-out package containing a cover letter (L1 – shown in Appendix) and a printed copy of the 2010 Census of Agriculture Content Test report form. This package was mailed on December 30, 2010. The cover letter used was similar in wording and style to the one used for the 2005 Census of Agriculture Content Test and included instructions on how to access the NASS Internet site to complete the report form.

During the week of January 12, 2011 the entire sample received a thank you/reminder postcard (L4 – shown in Appendix). This postcard encouraged respondents once again to visit the NASS Internet site to complete the 2010 Census of Agriculture Content Test report form.

All three groups were mailed the same follow-up package which consisted of a cover letter (L14 – shown in Appendix) and a report form on February 17, 2011.

Table 1 outlines the EDR experiment. This table shows the sample size, and correspondence materials used for each group.

Table 1: EDR Experiment

	Treatment Group 1 Letter and No Printed Report Form	Treatment Group 2 Postcard and No Printed Report Form	Control Group 3 Letter and Printed Report Form
Sample Size	1,000	1,000	1,000
First Mailing	Letter L2[2] with no printed report form	Folded postcard L3[2] with no printed report form	Standard letter L1[2] with printed report form
Follow-up	Thank you/reminder postcard L4[2]		
Second Mailing	Letter L14[2] with printed report form		

[2] See Appendix for the text of the messages.

2.2 Results

Table 2 shows response rates by groups. The chi-square results showed that there were statistically significant differences between the expected frequencies and the observed frequencies across the three groups at an alpha level of 0.05. The control group 3, which received the mailing package with the cover letter and the printed report form, achieved the highest overall response rate. The response rate for the control group was 15.7 percentage points higher than the response rate for treatment group 1, which received a letter and no printed report form; and 14.5 percentage points higher than the response rate for treatment group 2, which received a postcard and no printed report form.

Table 2: EDR Experiment -- Response Rates

	Treatment Group 1 Letter and No Printed Report Form		Treatment Group 2 Postcard and No Printed Report Form		Control Group 3 Letter and Printed Report Form	
	No.	**%**	**No.**	**%**	**No.**	**%**
Returned Records	364	36.4	376	37.6	521	52.1
Out of Scope (OS)	98	9.8	101	10.1	83	8.3
Non-response	538	53.8	522	52.2	395	39.5
Refusals	0	0.0	1	0.1	1	0.1
Total	1,000	100.0	1,000	100.0	1,000	100.0

χ^2 (4, N=3,000) = 63.64, p<.0001 (Refusals were eliminated for the analysis.)
Mantel-Haenszel χ^2 (1, N=3,000) = 19.1023, p<.0001
Fisher: $p=7.201E^{-20}$

Table 3 shows response rates by data collection mode: EDR, paper, and Computer Assisted Telephone Interviews (CATI). The two treatment groups had slightly higher response rates for EDR and CATI than the control group. However, the control group, which received the printed

report form, had the highest paper return rate approximately 20 percentage points higher than the two treatment groups.

Table 3: EDR Experiment -- Response Rates by Data Collection Mode

Response Code	Treatment Group 1 Letter and No Printed Report Form		Treatment Group 2 Postcard and No Printed Report Form		Control Group 3 Letter and Printed Report Form	
	No.	%	No.	%	No.	%
EDR Returns	121	12.1	117	11.7	93	9.3
Paper Returns	229	22.9	244	24.4	428	42.8
CATI Returns	70	7.0	66	6.6	38	3.8
Other OS	42	4.2	50	5.0	45	4.5
Non-response	538	53.8	522	52.2	395	39.5
Refusal	0	0.0	1	0.1	1	0.1
Total	1,000	100.0	1,000	100.0	1,000	100.0

This experiment demonstrates the importance of including a paper report form in the initial mailing to the entire sample.

3. EXPERIMENT 2: PRE-SURVEY RECORDED TELEPHONE MESSAGE

3.1 Method:

There were two groups in this experiment each with 1,000 records. Treatment group 4 received a pre-survey recorded telephone message (L5 – shown in Appendix) during the week of December 27, 2010. This pre-survey recorded message informed respondents that they would receive the 2010 Census of Agriculture Content Test report form in the mail shortly and encouraged them to complete and return the form promptly.

Group 5 was the control group for this experiment. They did not receive a pre-survey recorded telephone message. They received the standard mail out package with the cover letter (L1 – shown in Appendix) and a printed copy of the 2010 Census of Agriculture Content Test report form.

Two weeks later, both the treatment and the control group received the standard follow-up materials consisting of a thank you/reminder postcard (L6 – shown in Appendix) followed by a second mailing of a letter (L14 – shown in Appendix) and a report form.

Table 4 outlines the pre-survey recorded telephone message experiment.

Table 4: Pre-survey Recorded Telephone Message Experiment

	Treatment Group 4 Pre-survey Recorded Telephone Message	Control Group 5 No Pre-survey Recorded Telephone Message
Sample Size	1,000	1,000
Pre-notification	Pre-survey recorded telephone message	No pre-survey recorded telephone message
Initial Mailing	Letter L1[2] with printed report form	
Follow-up	Thank you/reminder postcard L6[2]	
Second Mailing	Letter L14[2] with printed report form	

[2] See Appendix for the text of the messages.

3.2 Number of Automated Telephone Call Attempts

For the pre-survey recorded automated message, if the message was delivered to either a person or to an answering machine, the call was coded as complete. If the call had a busy signal, fax, or modem, or any other outcome such as the outgoing message is too long, up to three attempts were made to leave a message. After three automated attempts, if the message was not delivered to either a person or an answering machine, no more attempts were made.

3.3 Results

The outcome of the recorded automated message attempts was analyzed. Respondents with invalid telephone numbers were excluded from all comparisons. As shown in Table 5, 71 percent of the calls were delivered to either a person or an answering machine, of which 46 percent were answered by a person who listened to the entire message. Around 11 percent did not receive the recorded automated telephone reminder message.

Table 5: Pre-Survey Recorded Telephone Message Experiment -- Outcome

Outcome	Pre-survey Recorded Telephone Message (Group 4)	
	No.	%
No Answer (maximum attempt 3 calls)	107	10.7
Answered by a Person	455	45.5
Answered by an Answering Machine	258	25.8
Hang Up/Partial Message Left	0	0.0
Busy	20	2.2
Not Called	42	4.2
Other [3]	118	11.8
Total	1,000	100.0

[3] No connection, outgoing message (OGM) too long, Fax or Modem, Telephone Co. message.

Table 6 shows the response rates from Experiment 2 by groups. Differences between groups were statistically significant at the .05 level. The response rate for treatment group 4, the group which received the pre-survey recorded telephone message, was 7.7 percentage points higher than the response rate for control group 5, the group which did not receive the pre-survey recorded telephone message. Using a pre-survey recorded telephone message helped increase response rates.

Table 6: Pre-survey Recorded Telephone Message Experiment -- Response Rates

Response	Treatment Group 4 Pre-survey Recorded Telephone Message		Control Group 5 No Pre-survey Recorded Telephone Message	
	No.	%	No.	%
Response	510	51.0	433	43.3
Out of Scope	96	9.6	108	10.8
Non-response	393	39.3	459	45.9
Refusal	1	0.1	0	0.0
Total	1,000	100.0	1,000	100.0

χ^2 (2, N=2,000) = 12.11, p=.0024 (Refusals were eliminated for the analysis)
Mantel-Haenszel: χ^2 (1, N=2,000) = 3.4041, p=.0650
Fisher: p=5.229E^{-6}

4. EXPERIMENT 3: LIKELY OUT OF SCOPE POPULATION

4.1 Method

This experiment focused on the likely out of scope population. This population consists of records for which agricultural activity is unknown. This group typically shows a low response

rate as most do not qualify or feel they do not qualify as agricultural operations. They were still required to return the report form.

There were four groups in this experiment each consisting of 500 records. All four groups received the standard mail-out package with the cover letter (L1 – shown in Appendix) and a printed copy of the 2010 Census of Agriculture Content Test report form. The experiment focused on each group having different follow-up treatments.

Treatment group 6 received a thank you/reminder postcard (L7 – shown in Appendix) with wording targeting likely out of scope respondents. It instructed respondents to write on their report form if they were no longer farming and return it. Later they received a second mailing consisting of a letter with screening questions (L13 – shown in Appendix), a cover letter (L14 – shown in Appendix), and a report form.

Treatment group 7 received a recorded telephone message (L8 – shown in Appendix) instructing respondents to specify that they were no longer farming on their report form and return it. They also received a second mailing consisting of a letter with screening questions (L13 – shown in Appendix), a cover letter (L14 – shown in Appendix), and a report form.

Control group 8 received the standard follow-up materials by mail which consisted of a thank you/reminder postcard (L6 – shown in Appendix) followed by a second mailing of a letter (L14 – shown in Appendix) and a report form.

Control group 9 received a recorded telephone message (L9 – shown in Appendix) similar in content to the standard thank you/reminder postcard (L6 – shown in Appendix) followed by a second mailing of a letter (L14 – shown in Appendix) and a report form. Table 7 outlines the likely out of scope experiment.

Table 7: Likely Out of Scope Population Experiment

Treatment	Treatment Group 6 Follow-up Postcard Modified Message	Treatment Group 7 Follow-up Recorded Telephone Modified Message	Control Group 8 Follow-up Postcard Standard Message	Control Group 9 Follow-up Recorded Telephone Standard Message
Sample Size	500	500	500	500
Initial Contact	Letter L1[2] and Report form			
Follow-up	Postcard Modified Message (L7) [2]	Automated Modified Message (L8) [2]	Postcard Standard Message (L6)[2]	Autodial Standard Message (L9) [2]
Second Mailing	Letter with screening questions (L13) [2] Letter (L14) [2] and Report form		Letter (L14) [2] and Report form	

[2] See Appendix for the text of the messages.

4.2 Results

Table 8 shows for both autodial groups about 40 percent of the sample received the message with either the call answered by a person or by an answering machine. Also, for both groups, about 50 percent of the sample had three attempts made but no answer was achieved.

Table 8: Likely Out of Scope Population Experiment -- Outcome

Outcome	Pre-recorded Telephone Message Reminder Calls			
	Group 7		Group 9	
	No.	%	No.	%
No Answer (maximum attempt 3 calls)	268	53.6	245	49.0
Answered by a Person	88	17.6	70	14.0
Answered by an Answering Machine	116	23.2	120	24.0
Hang Up/Partial Message Left	2	0.4	1	0.2
Busy	2	0.4	46	9.2
Not Called	3	0.6	3	0.6
Other[4]	21	4.2	15	3.0
Total	500	100.0	500	100.0

[4] No connection, outgoing message (OGM) too long, Fax or Modem, Telephone Co. message.

Table 9 displays the response by group of the likely out of scope experiment. Response rates were very similar across all four groups. Group 6, which received the postcard with the modified message, had the highest response rate at 11.2 percent and also the highest out of scope rate at 11.4 percent. Group 8, which received the postcard with the standard message, had the lowest out of scope returns at 6.4 percent. In addition, it was also clear from this experiment that this

group did indeed have very low overall response rates (about half of the response rate for groups included in the other experiments.)

Table 9: Likely Out of Scope Population Experiment -- Response Rates

Response Code	Treatment Group 6 Follow-up Postcard Modified Message		Treatment Group 7 Follow-up Recorded Telephone Modified Message		Control Group 8 Follow-up Postcard Standard Message		Control Group 9 Follow-up Recorded Telephone Standard Message	
	No.	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Responses	56	11.2	54	10.8	50	10.0	46	9.2
Out of Scope	57	11.4	43	8.6	32	6.4	51	10.2
Non-response	386	77.2	403	80.6	418	83.6	403	80.6
Refusals	1	0.2	0	0.0	0	0.0	0	0.0
Total	500	100.0	500	100.0	500	100.0	500	100.0

Table 10 summarizes the response rates in a two by two factorial design, testing the model *(No.=a+b*Mode+c*Message+d*Mode*Message)*, to see whether the mode (postcard, autodial), and message (modified or standard message), and/or their interaction had an impact on response rates with the logistic procedure. Binary (response or non-response) are required for the logistic model. The "Responses" and "Out of Scope" categories were combined into Response. Similarly, "Non-response" and "Refusals" were combined into "Non-response".

Table 10: Likely Out of Scope Population Experiment -- Responses by Mode and Message

Mode	Response	Modified Message		Standard Message		Mode Main Effect	
		No.	**%**	**No.**	**%**	**No.**	**%**
	Response	113	22.6	82	16.4	195	19.5
Postcard	Non-response	387	77.4	418	83.6	805	80.4
	Response	97	19.4	97	19.4	194	19.4
Autodial	Non-response	403	80.6	403	80.6	806	80.6
Message Main Effect	Response	210	21.0	179	17.9		
	Non-response	790	78.9	821	82.1		

Effect	P-value
Mode	0.9605
Message	0.0800
Mode*Message	0.0800

The result showed that the mode, message, and their interaction were not statistically significant at the alpha level of 0.05. However, the message and the interaction effects' p-values are both 0.08, suggesting the postcard with the modified message stressing personal visit or telephone call tends to increase response rates.

5. PROBABLE FARMS REMINDER MESSAGE EXPERIMENT

5.1 Method

The remaining 25,000 records from the content sample were split into four groups of 6,250 records each. This sample consists of probable farms from the census mail list. All four groups received the standard mail out package with the cover letter (L1) and a printed copy of the 2010 Census of Agriculture Content Test report form. Each group had a different follow-up treatment.

Treatment group 10 received a postcard (L11) with a message stressing that if the form was not returned by the due date they might be personally visited or telephoned by an enumerator. This was followed by a second mailing of a cover letter (L14) and a report form.

Treatment group 11 received a recorded telephone message (L10) stressing that if the form was not returned by the due date they might be personally visited or telephoned by an enumerator. This was followed by a second mailing of a cover letter (L14) and a report form. Control group 12 received the standard follow-up materials by mail which consisted of a thank you/reminder postcard (L6) followed by a second mailing of a letter (L14) and a report form.

Control group 13 received a recorded telephone message (L9) similar in content to the control thank you/reminder postcard (L6). Later they received a second mailing of a letter (L14) and a report form.

Table 11 summarizes the probable farm reminder message experiment.

Table 11: Probable Farms Reminder Message Experiment

	Treatment Group 10 Follow-up Postcard Modified Message	**Treatment Group 11 Follow-up Recorded Telephone Modified Message**	**Control Group 12 Postcard Standard Message**	**Control Group 13 Recorded Telephone Standard Message**
Sample Size	6,250	6,250	6,250	6,250
Initial Contact	Letter (L1) [2] Report form			
Follow-up	Postcard Modified Message (L11) [2]	Automated Modified Message (L10) [2]	Postcard Standard Message (L6) [2]	Automated Standard Message (L9) [2]
Second Mailing	Letter (L14) [2] and Report form			

[2] See Appendix for the text of the messages.

5.2 Results

Table 12 displays the outcome of the recorded telephone message attempts for treatment group 11 and control group 13. Approximately 65 percent of the sample for both groups received the message either by person or on an answering machine. About 14 percent of the sample in each group had three attempts made but no answer was achieved.

Table 12: Probable Farms Reminder Message Experiment -- Outcome of Recorded Telephone Message Attempts

Outcome	Recorded Telephone Message Reminder Calls			
	Treatment Group 11		Control Group 13	
	No.	%	No.	%
No Answer (maximum attempt 3 calls)	870	13.9	853	13.7
Answered by a Person	2,323	37.2	2,324	37.2
Answered by an Answering Machine	1,801	28.8	1,916	30.6
Hang Up/Partial Message Left	9	0.2	10	0.2
Busy	277	4.4	221	3.5
Not Called	315	5.0	296	4.7
Other [5]	655	10.5	630	10.1
Total	6,250	100.0	6,250	100.0

[5] No connection, out-going message (OGM) too long, Fax or Modem, Telephone Co. message.

Table 13 shows response rates by treatment group. Treatment groups received the message either by postcard or recorded telephone message stressing personal visit or phone follow-up resulted in higher response rates than the control groups that received the standard message. Also, for the treatment groups, the postcard follow-up resulted in slightly higher response rates than the recorded telephone message follow-up.

Table 13: Probable Farms Reminder Message Experiment -- Response Rates

	Group 10 Follow-up Postcard Modified Message		Group 11 Follow-up Recorded Telephone Modified Message		Control Group 12 Postcard Standard Message		Control Group 13 Recorded Telephone Standard Message	
	No.	%	No.	%	No.	%	No.	%
Responses	3,111	49.8	3,034	48.6	2,992	47.9	2,991	47.9
Out of Scope	623	10.0	615	9.8	599	9.6	551	8.8
Non-response	2,515	40.2	2,600	41.6	2,656	42.5	2,706	43.3
Refusals	1	0.0	1	0.0	3	0.0	1	0.0
Total	6,250	100.0	6,250	100.0	6,250	100.0	6,249	100.0

Table 14 summarizes the response rates in a two by two factorial design, testing the model *(No.=a+b*Mode+c*Message+d*Mode*Message*) to see whether the mode (postcard, autodial), and message (modified or standard message), and/or their interaction had an impact on response rates with the logistic procedure. Binary (response or non-response) were required for the logistic model. Therefore, "Responses" and "Out of Scope" categories were combined into Response. Similarly, "Non-response" and "Refusals" were combined into "Non-response".

The result showed the message was statistically significant with a p-value equal to 0.0014. The mode and the interaction of mode and message were not statistically significant.

Table 14: Probable Farms Reminder Message Experiment -- Response Rates

Mode	Response	Message				Mode Main Effect	
		Modified Message		Standard Message			
		No.	%	No.	%	No.	%
Postcard	Response	3,734	59.8	3,591	57.5	7,325	58.6
	Non-response	2,516	40.3	2,659	42.5	5,175	41.4
Autodial	Response	3,649	58.4	3,542	56.7	7,191	57.5
	Non-response	2,601	41.6	2,707	43.3	5,308	42.4
Message Main Effect	Response	7,383	59.1	7,133	57.1		
	Non-response	5,117	40.1	5,366	42.9		

Effect	P-value
Mode	0.0866
Message	0.0014
Mode*Message	0.6311

6. CONCLUSION

Results from the EDR experiment strongly suggest that including a paper report form with the initial mailing would help to increase the likelihood of response. Although, the groups that did not receive a paper report form had higher EDR response rates, their overall response rates were much lower than the group receiving the paper form. These findings were consistent with the study conducted by Quigley, Riemer, Cruzen, & Rosen (2000). This study found a slight increase in response rates in the group given a choice of a Web option or a paper survey.

All the experiments showed response rates increased by adding automated telephone notification/reminders. These findings were consistent with previous research studies such as Xu, Bates & Schweitzer (1993), McCarthy (2008), and McCarthy & Tran (2010), which found that leaving messages on telephone answering machines can have a positive impact on survey participation. The experiment suggested it may be beneficial to increase the number of autodial attempts as the no answer category ranges from about 11 to 54 percent. Since the price per call is minimal, response rates might be further increased if more call attempts were made with automated messages, and consequently more messages were delivered. Studies conducted by

McCarthy (2007, 2008) suggest that five automated telephone attempts may increase the number of messages received by sample units.

In addition, using the modified message stressing that non-response would result in telephone or in person contacts helped to increase response rates. The groups receiving the postcard follow-up had higher response rates than the groups that received the recorded telephone message follow-up.

Generally, any form of courtesy reminders had some impact on improving response rates. However, not providing a paper report form and providing only instructions for completing the form on-line resulted in significantly lower overall response rates.

Further studies are needed utilizing combinations of postcards, letters, and autodial messages. Presently, a research study is being conducted by NASS on the National Agricultural Classification Survey (NACS). The NACS survey is conducted in preparation of the Census of Agriculture to determine whether or not the records should be included on the Census mailing list. The current study utilizes a standard cover letter and a modified cover letter with stronger wording, stating that if the respondent does not reply, they may be personally visited or receive a telephone call.

Federal mandates seek to minimize the paperwork burden on individuals and businesses. The Government Paperwork Elimination Act of 1998 requires Federal agencies to allow individuals or entities the option to submit information electronically. NASS should continue to investigate contact strategies that will not only encourage response to surveys, but encourage respondents to use the Web as the preferred response mode.

7. RECOMMENDATIONS

1. Always include a paper report form in the initial mailing.

2. Use pre-survey recorded telephone messages.

3. Use the autodialer software for reminders, such as for subpopulations which reported online in previous surveys to report online for the current survey.

4. Use postcards or recorded telephone messages for pre-survey and follow-up notifications stressing they may receive a personal visit or telephone follow-up if they do not return the form.

5. Increase the number of attempts made when using recorded telephone messages.

8. REFERENCES

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Griffin, D., Fischer, D., and Morgan, M. (2001). Testing an Internet Response Option for the American Community Survey. Presented at the Annual Conference of The American Association for Public Opinion Research. Retrieved at http://www.census.gov/acs/www/Downloads/library/2001/2001_Griffin_01.pff

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Quigley, B., Riemer, R.A., Cruzen, D.E., and S. Rosen. (2000). Internet Versus Paper Survey Administration: Preliminary Findings and Response Rates. Presented at the 42nd Annual Conference of the International Military Testing Association, Edinburgh, Scotland.

Xu, M., Bates, B., and Schweitzer, J. (1993). The Impact of Messages on Survey Participation in Answering Machine Households. Public Opinion Quarterly 57(2): 232-237.

Yost, P.R., and Homer, L.E. (1998). Electronic Versus Paper Surveys: Does the Medium Affect the Response? Presented at the 13th Annual Conference of the Society for Industrial and Organizational Psychology.

APPENDIX **:** COVER LETTERS, POSTCARDS, AND PRE-RECORDED TELEPHONE MESSAGES

L1

10-A0200(L1)

United States Department of Agriculture

National Agricultural Statistics Service

December 30, 2010

Dear Farmer or Rancher:

The National Agricultural Statistics Service (NASS) is testing the 2012 Census of Agriculture report form, and we need your help. We are asking a group of 30,000 farmers and ranchers across the United States to participate in this test before the next census of agriculture. Your timely response helps save costs and provides valuable information for developing the final census form. The enclosed report form is a draft and will be modified based on the results of this test.

The 2012 Census of Agriculture will collect important information about farm and ranch operators in the U.S., the use of various production practices, commodities produced and expenses, and other items needed by your community. Census results are used by agribusinesses and farm organizations to evaluate and propose programs that support America's farmers and ranchers.

Responses to the census of agriculture are protected by law (Title 7, U.S. Code and CIPSEA Public Law 107-347). Federal law requires that your individual answers are kept **confidential**.

Please help us make the census a success by completing the enclosed report form and returning it by **February 4, 2011.** You may mail back your form or use our secure online response system at www.agcounts.usda.gov. You will need the 17-digit survey code printed on your census mailing label. If you need guidance or have questions, call 1-888-424-7828. Please have your 17-digit survey code handy.

Thank you for taking part in this effort to improve the 2012 Census of Agriculture.

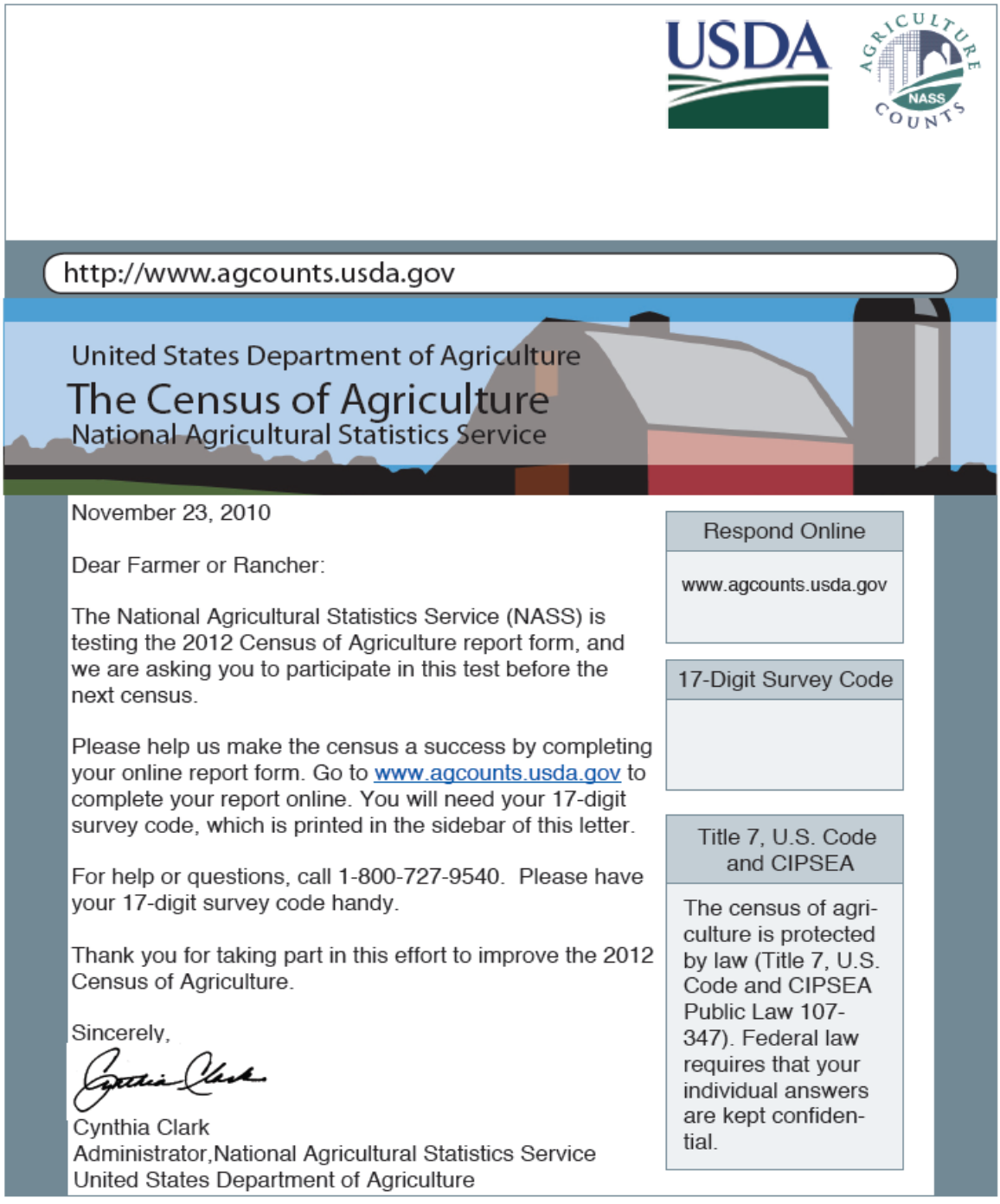
Sincerely,

Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

Enclosures

L2

10-A0200(L2)



http://www.agcounts.usda.gov

United States Department of Agriculture

The Census of Agriculture

National Agricultural Statistics Service

November 23, 2010

Dear Farmer or Rancher:

The National Agricultural Statistics Service (NASS) is testing the 2012 Census of Agriculture report form, and we are asking you to participate in this test before the next census.

Please help us make the census a success by completing your online report form. Go to www.agcounts.usda.gov to complete your report online. You will need your 17-digit survey code, which is printed in the sidebar of this letter.

For help or questions, call 1-800-727-9540. Please have your 17-digit survey code handy.

Thank you for taking part in this effort to improve the 2012 Census of Agriculture.

Sincerely,

Cynthia Clark
Administrator,National Agricultural Statistics Service
United States Department of Agriculture

Respond Online

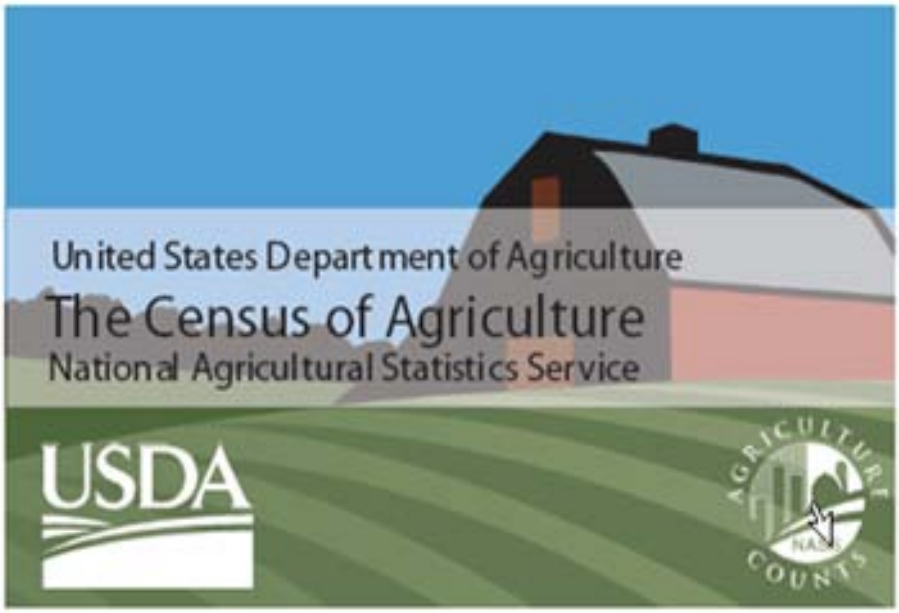
www.agcounts.usda.gov

17-Digit Survey Code

Title 7, U.S. Code and CIPSEA

The census of agriculture is protected by law (Title 7, U.S. Code and CIPSEA Public Law 107-347). Federal law requires that your individual answers are kept confidential.

L3



CENSUS OF AGRICULTURE

L3

10-A0200(L3)

17-Digit Survey Code

Dear Farmer or Rancher:

The National Agricultural Statistics Service (NASS) is testing the 2012 Census of Agriculture report form, and we are asking you to participate in this test before the next census.

Please help us make the census a success by completing your online report form. Go to www.agcounts.usda.gov to complete your report online. You will need your 17-digit survey code, which is printed at the top of this postcard.

For help or questions, call 1-800-727-9540. Please have your 17-digit survey code handy. Thank you for taking part in this effort to improve the 2012 Census of Agriculture.

Sincerely,

Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

L4

CENSUS OF AGRICULTURE
YOUR VOICE. YOUR FUTURE. YOUR RESPONSIBILITY.

L4

10-A0200(L4)

URGENT REQUEST

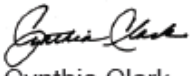
Dear Farmer or Rancher:

We realize you may already have responded to the 2010 Census of Agriculture Test. Thank you if you have, but if not:

Provide your Census of Agriculture Test information via the Internet at www.agcounts.usda.gov using the 17-digit survey code, previously supplied.

- To save tax dollars and avoid further follow up contacts, complete your census of agriculture report form by **February 4, 2011**.
- If you do not reply, you may be personally visited or receive a telephone call.
- Need help? Call TOLL FREE 1-800-727-9540

Thank you in advance for making the 2012 Census of Agriculture a success.



Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

L5

Pre-notification Pre-recorded telephone message

Hello, this is the United States Department of Agriculture's National Agricultural Statistics Service. In a few days you will be receiving a 2010 Census of Agriculture Test report form. This is a critical trial run before the 2012 Census of Agriculture. Please, provide your information promptly by Internet or mail. The information you provide is confidential and protected by law.
If you have questions or require assistance please visit www.agcensus.nass.usda.gov or call toll-free, 1-888-424-7828. Thank you for your cooperation.

L6

CENSUS OF AGRICULTURE
YOUR VOICE. YOUR FUTURE. YOUR RESPONSIBILITY.

L6

10-A0200(L6)

THANK YOU...if you returned the United States Department of Agriculture's 2010 Census of Agriculture Test report form you received earlier this month.

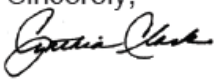
If you have not returned your report form, please complete and return it by **February 4, 2011**. Your prompt reply will help determine the best questions and design for the 2012 Census of Agriculture.

You may provide your Census of Agriculture Test information via the Internet at www.agcounts.usda.gov using the 17-digit survey code previously supplied.

The information you provide is confidential and protected by law.

If you have any questions or need help, please call us at 1-888-424-7828.

Sincerely,



Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

L7

CENSUS OF AGRICULTURE

YOUR VOICE. YOUR FUTURE. YOUR RESPONSIBILITY.

L7

10-A0200(L7)

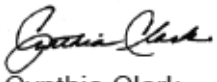
URGENT REQUEST

We realize you may already have responded to the 2010 Census of Agriculture Test. Thank you if you have, but if not:

- Reporting is easy on our online site, www.agcounts.usda.gov using the 17-digit survey code on the label of the report form you previously received.
- The due date for returning your 2010 Census of Agriculture Test report form is **February 4, 2011**.
- If you do not reply, you may be personally visited or may receive a telephone call.
- Need help? Call TOLL FREE 1-888-424-7828

If this form does not apply to you because you have never farmed, are no longer farming, are a small operation, etc.: **YOU SHOULD REPLY**, so we can update our records.

Thank you in advance for making the 2012 Census of Agriculture a success.



Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

L8

Hello, this is the United States Department of Agriculture National Agriculture Statistics Service, reminding you to return your 2010 Census of Agriculture Test report form. THANK YOU...if you already returned your report form. If not, **February 4, 2011** is the due date.
You can report online at www.agcounts.usda.gov using the 17-digit survey code on the label of your report form. If you do not reply, you may be personally visited or receive a telephone call from one of our enumerators.
Even if you think this form does not apply to you because you have never farmed, are no longer farming, are a small operation, etc.: You **SHOULD REPLY** so we can update our records. The information you provide is confidential and protected by law. If you have questions please call toll-free, 1-888-424-7828. Thank you for your cooperation.

L9

Pre-recorded telephone message

Hello, this is the United States Department of Agriculture's National Agricultural Statistics Service reminding you to return your 2010 Census of Agriculture Test report form. THANK YOU...if you already returned your report form.
If you have not returned your report form, please take a few minutes to complete and return it by February 4, 2011. Your prompt reply will help determine the best questions and design for the 2012 Census of Agriculture. The information you provide is confidential and protected by law. If you have questions please call toll-free, 1-888-424-7828. Thank you for your cooperation.

L10

Pre-recorded telephone message

Hello this is the United States Department of Agriculture's National Agricultural Statistics Service reminding you of the due date for returning your 2010 Census of Agriculture Test report form. **REPLY via mail or online by February 4, 2011** to avoid a personal or telephone follow-up contact**.** The information you provide is confidential and protected by law. If you have questions please call toll-free, 1-888-424-7828. Thank you for your cooperation.

L11

CENSUS OF AGRICULTURE
YOUR VOICE. YOUR FUTURE. YOUR RESPONSIBILITY.

L11

10-A0200(L11)

URGENT REQUEST

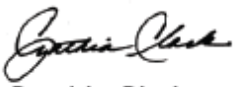
Dear Farmer or Rancher:

This is a reminder of the due date for returning your 2010 Census of Agriculture Test report form.

To avoid a personal contact or a telephone call **YOU SHOULD REPLY** via mail or online at www.agcounts.usda.gov by **February 4, 2011**.

Need help? Call TOLL FREE 1-888-424-7828

Thank you in advance for making the 2012 Census of Agriculture a success.



Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

L12

United States Department of Agriculture

National Agricultural Statistics Service

10-A0200(L12)

March 7, 2011

Dear Farmer or Rancher:

Previously, we mailed you a Census of Agriculture Test report form, but have not yet received your response. Since your response is so important, we wanted to make sure you received the Census of Agriculture Test report form. This is why we are sending the report form to you via certified mail. Your report will provide valuable information on the content, wording, and design of the next agriculture census questionnaire. In case you have misplaced the previous report form, we are enclosing another copy for your completion.

We are counting on your cooperation in this effort, as you are one of only 30,000 farmers and ranchers across the United States selected to participate in this test. Please return your completed report form as soon as possible. You should reply via mail or online at **www.agcounts.usda.gov**.

If you have any questions or need help, please call 1-888-424-7828 (toll-free). Thank you for your cooperation in this important endeavor.

Sincerely,

Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

Enclosures

L13

United States Department of Agriculture
National Agricultural Statistics Service

10-A0200(L13)

Dear Resident:

Previously, we mailed you a Census of Agriculture Test report form, but have not yet received your response. **February 4, 2011** is the due date for returning your Census of Agriculture Test report form. Answer the following questions to determine if you need to complete the report form.

Since January 2010...

Did you own, rent or operate land with potential for agricultural production?	Yes ☐	No ☐
Did you own or operate cropland?	Yes ☐	No ☐
Did you receive any federal or state agricultural payments (Include Federal Farm Program, CRP, WRP, FWP, and CREP payments)	Yes ☐	No ☐
Did you have any hay or pasture?	Yes ☐	No ☐
Did you produce or raise any type of livestock?	Yes ☐	No ☐
Did you have any equine?	Yes ☐	No ☐
Did you grow any type of poultry or birds?	Yes ☐	No ☐
Did you own any colonies of bees regardless of location?	Yes ☐	No ☐
Did you have any aquaculture?	Yes ☐	No ☐
Did you have any agricultural sales?	Yes ☐	No ☐

If you answered **NO to all of the questions** return the 2010 Census of Agriculture Content test report form with a note on the front page indicating you are not farming.

If you answered **YES to any of the questions** complete and return the 2010 Census of Agriculture Content test report form.

Sincerely,

Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

Enclosures

L14

United States Department of Agriculture

National Agricultural Statistics Service

10-A0200(L14)

February 14, 2011

Dear Farmer or Rancher:

We realize this is a very busy time of year for you, but we have not received your completed report form for the 2010 Census of Agriculture Content Test report form. Your report will provide valuable information on the content, wording, and design of the next agriculture census questionnaire. In case you have misplaced the previous report form, we are enclosing another copy for your completion.

We are counting on your cooperation in this effort, as you are one of only 30,000 farmers and ranchers across the United States selected to participate in this test. Please return your completed report form as soon as possible.

Responses to the census of agriculture are protected by law (Title 7, U.S. Code and CIPSEA). Federal law requires that your individual answers are kept **confidential**. If your records are not easily accessible, you may use estimates in completing this report.

You may mail back your form or use our secure online response system at www.agcounts.usda.gov. You will need the 17-digit survey code, which is printed on the census mailing label. If you have any questions or need help, please call 1-888-424-7828 (toll-free). Thank you for your cooperation in this important endeavor.

Sincerely,

Cynthia Clark
Administrator, National Agricultural Statistics Service
United States Department of Agriculture

Enclosures