

## **The Road to Understanding Nonresponse in the National Agricultural Statistics Service's 2008 June Area Survey**

Michael W. Gerling, HoaiNam N. Tran  
Terry P. O'Connor<sup>1</sup>

United States Department of Agriculture – National Agricultural Statistics Service,  
Research and Development Division, 3251 Old Lee Highway, Fairfax, VA 22030

### **Abstract**

The National Agricultural Statistics Service (NASS) surveys farmers and ranchers across the United States and Puerto Rico in order to estimate crops and livestock, assess production practices, and identify economic trends. One of the surveys conducted annually is the June Area Survey (JAS). This survey requires NASS' field interviewers (enumerators) to visit sampled land areas (segments) designated on aerial photos and record all agricultural activity occurring within those specified land areas.

From 2000 to 2007, the national JAS's overall response rate has been gradually deteriorating. In 2000, the response rate was 86.5 percent, but it had fallen to 81.7 percent by 2007. The assumption is that the JAS national response rate will fall below the Office of Management and Budget's threshold rate of 80 percent in three to four years. Falling below this rate dictates the need for nonresponse bias analysis and, in general, heightens the concern about the potential negative impact on survey results. Since this study was conducted, the response rate dropped to 80.2 percent in 2008, before rebounding somewhat to 82.0 percent in 2009. Thus, the urgency to reduce nonresponse is on our door step.

This study examines some of the underlying causes of nonresponse occurring in the 2008 June Area Survey.

**Key Words:** Agriculture, Refusals, Inaccessibles, Data Collection, Nonresponse

### **1. INTRODUCTION**

The National Agricultural Statistics Service's (NASS) primary purpose is to provide timely, accurate and useful statistics on United States and Puerto Rico agriculture. NASS conducts hundreds of surveys annually for the purpose of making estimates on crops and livestock, exploring production practices, and identifying economic trends.

The June Area Survey (JAS) is an annual survey that provides information on U.S. crops, livestock, grain storage capacity, and number, type, and size of farms.

The JAS sample is comprised of designated land areas (segments). A typical segment is about one square mile -- equivalent to 640 acres. Each segment is outlined on an aerial photo and provided to NASS' field interviewers (enumerators). Field enumerators visit

these segments, locate and interview the operator(s) of any land found to have agricultural activity, and record this agricultural activity occurring within the segment boundaries on a paper questionnaire. A separate paper questionnaire is completed for each agricultural operation operating any land within the segment.

### **1.1 Problem: Response Rates for the June Area Survey Are Declining**

Over time, the JAS' response rate has been gradually decreasing by about half a percentage point a year. In 1996, the response rate was 87.9 percent. By 2007, the response rate had dropped to 81.7 percent. See Tables 11 and 12 in Section 10 for historic U.S. response rates. (These tables are provided in the complete report, which can be accessed at <http://www.nass.usda.gov/research/reports/date.htm>) If this trend continues, the JAS' response rate will fall below 80 percent within three to four years. Once below 80 percent, a nonresponse bias study will be required by the Office of Management and Budget (OMB). During this study, the June Area Survey's response rate fell to 80.2 percent, further emphasizing the importance of nonresponse reduction efforts and making the timeliness and importance of this study critical.

There are three types of survey nonresponse: 1) refusals, 2) inaccessible, and 3) incompletes.

Refusals are operators who were not willing to respond or participate in the survey.

Inaccessibles occur when field enumerators are unable to contact or reach the operators for data collection.

A questionnaire is considered incomplete if at least one of the questions is not answered.

Overall, survey nonresponse negatively impacts data estimates, increases survey costs and data collection time, and significantly complicates the data editing and summarization processes. Nonresponse also increases the potential for biasing the estimates in a way that can not be easily assessed or accounted for.

### **1.2 Purpose of the Research**

Focal points of recent nonresponse research have included the 2006 Agricultural Resource Management Survey Phase III in Louisiana (Gerling, Tran, & Earp, 2008) and a test study on five states participating in the 2007 June Area Survey (Gerling, Tran, & Earp, 2008).

This study takes a broader look at nonresponse, by examining all states participating in the 2008 June Area Survey. Alaska and Hawaii were excluded since they were not part of the 2008 June Area Survey.

The goals of the study are to:

- 1.) Document and categorize the most common reasons for nonresponse occurring in the 2008 June Area Survey.

- 2.) Determine areas(s) of the survey process that need improvement to prevent further decline in response rates.

### 1.3 Definitions

*Segments:* Land areas with identifiable boundaries such as ditches, roads, railroads, streams, etc., that serve as sampling units in the June Area Survey. Segments are assigned a permanent number and outlined in red on aerial photos. Segments generally range in size from one-half square mile to three square miles.

*Tract:* An area of land inside a segment under one type of land operating arrangement.

There are two types of tracts:

- 1.) Ag. Tract: Consists of agricultural land.
- 2.) Non-Ag Tract: Consists of residential, shopping centers, lakes, woods, and any land not considered agricultural.

*Usable:* Completed reports for agricultural tracts - questionnaires containing usable data.

## 2. METHOD

The 2008 JAS's sample was comprised of 10,912 segments, across 48 states. The enumeration of these segments resulted in 41,075 tracts indicating agricultural activity. Enumeration attempts for these tracts resulted in a national response rate of 80.2 percent usables, 9.4 percent refusing, and 10.4 percent recorded as inaccessible. Tables 1 and 2, displayed in Section 3.1, show response counts and rates by state. (Table 2 is provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ).

### 2.1 Enumerator Training

Field enumerators are instructed on the collection procedures for the JAS at an annual workshop conducted in May. For this study, the field enumerators were provided the following instruction:

- 1.) In the event of a refusal, the field enumerator was to ask and record the operator's primary reason for not participating in the survey.
- 2.) For inaccessibles, the field enumerator was to document why the operator could not be contacted.
- 3.) For incompletes, the field enumerator would record why the operator did not answer specific questions.

4.) In all three cases, field enumerators were instructed to review a supplemental handout listing various nonresponse reasons, each of which had a corresponding code number. The field enumerator would record this code in the *Office Use Box* of the questionnaire. See Appendix A for a copy of the supplemental handout. (Appendix A is provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ).

The additional nonresponse training administered for this study averaged approximately 15 minutes per field office.

## 2.2 Project Costs

The reasons for nonresponse research involved no additional field enumerator training costs since the additional training was absorbed into the states' JAS workshops. Also, no additional burden fell on the field enumerators since recording the reasons for the nonresponse is a documented requirement for all NASS surveys.

## 3. FINDINGS

The compiled findings in this report reflect the results after the primary and post survey data collections and edits, unless otherwise noted.

### 3.1 Overall Response Rates

Table 1 displays the number of segments surveyed and the number of agricultural and non-agricultural tracts within those segments. Usable agricultural tracts refer to those whose data were deemed complete. Non-agricultural tracts screen out of the survey process with no data collected; hence, response rates and the completeness of data/data usability do not apply to them.

**Table 1: 2008 June Area Survey: Number of Sampled Segments, Surveyed Agricultural Tracts versus Usable Agricultural Tracts, and the Number of Non-Agricultural Tracts**

State	Sample Size (No. of Segments)	No. of Agricultural Tracts		No. of Non-Agricultural Tracts
		Surveyed	Usable	
U.S. <sup>1/</sup>	10,912	41,075	32,927	40,124

<sup>1/</sup> Includes all states, except Hawaii and Alaska.

State response rates and the U.S. average response rate can be found in Table 2. Table 2 is provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ). There were only 23 states (highlighted in green) that exceeded OMB's 80 percent response rate requirement. The U.S. response rate (80.2 percent) exceeded OMB's requirement by a meager 0.2 percent. Tennessee had the highest response rate at 94.6 percent, with Maine having the lowest at 53.2 percent.

#### 4. REASONS FOR REFUSALS

A refusal occurs when an operator declines to participate in the survey. In this case, the field enumerator records the reason for the refusal, determines which nonresponse reason best matches the situation from the supplemental handout, and finally codes the questionnaire appropriately.

The reasons for refusing to participate in the survey are displayed in Table 3. (Table 3 is provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ). The data revealed that “*Refused but no reason given*” was recorded 989 times (27 percent of the total refusals).

There were also 217 reports for which the field enumerators failed to record a nonresponse code in the office use box. These 217 reports were excluded from the analysis. The authors suggest that statisticians overseeing the survey re-emphasize to field enumerators the importance of collecting nonresponse data. This would result in more data for NASS to better understand the rationale of the growing refusal population.

Excluding those questionnaires recorded as “*Known refusal, no contact attempted*” and “*Refused but no reason given,*” the top three reasons for refusal were:

- 1.) “*Would not take time / too busy.*”
- 2.) “*Contact attempted, but respondent refuses on all surveys, and refused this one.*”
- 3.) “*I do not like surveys / I do not do surveys.*”

Four percent (163 reports) of the total refusals were recorded as “*The respondent feels that surveys and reports hurt the farmer more than help,*” and another 4 percent cited “*I will have nothing to do with the Government.*” Also, there were an additional 15 reports with “*Mentions a specific grievance with the SSO or NASS (other than confidentiality),*” and another 18 reports had “*Does not believe in statistics, so will not complete an interview.*” The authors propose that State Directors address the operators of these agricultural operations through personal contact, telephone and/or mail to better understand the operator’s feelings on these matters and to explain the importance of NASS’ estimates and publications. Appendices D and E (Provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ) contain individual state specific nonresponse tables.

#### 5. REASONS FOR INACCESSIBLES

A questionnaire is recorded as inaccessible if the field enumerator was unable to contact the operator. For inaccessible, the field enumerators were instructed to code the reasons for the nonresponse on the questionnaires.

The reasons for questionnaires being coded inaccessible are shown in Table 4. (Table 4 is provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ).

There were 376 questionnaires recorded as inaccessible for which the field enumerators failed to record a reason. These reports were removed from the analysis.

An additional 1,544 reports were cited as *“Inaccessible but no reason provided.”* This reason may be valid for refusals but not for inaccessibles. For these instances to occur, the field enumerators failed to record the reason why they could not contact the operator. This provides additional support for the earlier recommendation of the statisticians overseeing the survey to emphasize the importance of collecting and recording reasons for questionnaires being recorded as inaccessible.

Excluding *“Inaccessible, but no reason given,”* the number one reason for questionnaires being coded as inaccessible was *“Tried several times; but could not reach anyone for an appointment.”*

In all, 173 instances (five percent of all inaccessibles) were coded inaccessible because the field enumerator’s heavy workload prevented contacting these operators. The authors propose improved communication between field office staff and supervisory field enumerators to ensure that workload is distributed appropriately and is being completed in a timely matter, so that all JAS segments and tracts are enumerated.

## 6. INCOMPLETES

A report is coded as incomplete if the respondent provided partial information, but would not or could not provide enough information to make the questionnaire complete. Table 5 (Provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm> ) shows that incompletes are rare. Indiana has the highest number of incompletes at 34, (2.6 percent).

## 7. REGIONAL BREAKOUT

See the complete report which is accessible at <http://www.nass.usda.gov/research/reportsxdate.htm> for the complete analysis and findings of reasons for nonresponse at the regional level.

## 8. STATE LEVEL

Reasons for nonresponse were examined at the state level, with Appendices D and E (Provided in the full report, at <http://www.nass.usda.gov/research/reportsxdate.htm> ) containing the reasons for refusals and for inaccessibles, respectively.

A review of the reasons for nonresponse, brought the following findings to the forefront:

Illinois, Colorado, Indiana, Kansas, Maryland, Minnesota, Missouri, Montana, Nebraska, North Dakota, Ohio, Oregon, South Dakota, Utah, Wisconsin and Wyoming had field enumerators cite one or more of the following reasons for nonresponse: *“Does not believe in statistics, so will not complete interview,”* *“Mentions a specific grievance with the state cooperators,”* and *“Mentions a specific grievance with the SSO or NASS (other than confidentiality).”*

The authors, as noted earlier, suggest reviewing these operations and, if practical, having the State Directors communicate with the operators to obtain their support for future NASS surveys.

Those operations in California, Colorado, Illinois, Kansas, Kentucky, Louisiana, Maryland, Missouri, Nebraska, New York, North Carolina, North Dakota, Oklahoma, Oregon, Texas, and Washington for which questionnaires are recorded as violent, threatening refusals should be readdressed with the field enumerators. Comments describing the situation should be documented in the comments section of NASS' List Frame.

## 9. PAST STUDIES

In 1990 and 1991, NASS examined reasons for nonresponse occurring on the Agricultural Resource Management Survey Phase III (ARMS III), (O'Connor 1991 & 1992). ARMS III aims to understand the financial welfare of the farming industry by asking detailed questions regarding farming expenses and income.

Although the JAS and ARMS III surveys differ in several ways (questionnaire, focus, and sampling scheme), a comparison of reasons for refusals and inaccessible across studies was conducted. Table 9 (Provided in the full report, <http://www.nass.usda.gov/research/reportsxdate.htm>) displays the 2008 JAS' top five refusal reasons in rank order, according to the past ARMS III studies.

Comparing nonresponse reasons reported in the 2008 JAS versus those from the 1990 and 1991 ARMS III shows similar ranking of refusal reasons and consistency with those from previous studies.

Table 10 (Provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm>) compares the 2008 JAS study's top five reasons for recording a questionnaire as an inaccessible with those from past ARMS III studies. Unlike refusals, the rankings varied across studies.

In the 1990 ARMS III study, the main reason for inaccessibility was "*The operator is away on extended vacation.*" This was ranked eighth on the JAS study. Differences in reported reasons for nonresponse suggest that there may be something unique to JAS (questionnaire, sampling scheme, time, publicity, etc...) creating these differences between studies. Also, the time differences between when the ARMS studies were conducted in the early 90's and the JAS study was carried out in 2008 may also have been a factor.

## 10. HISTORIC TRENDS

Up to this point, the report has focused on reasons for nonresponse for the 2008 JAS. The next step was to look at response rates from 1999 through 2008. JAS refusal and inaccessible rates by state from 1999 through 2008 can be found in Tables 11 and 12 (Provided in the complete report, <http://www.nass.usda.gov/research/reportsxdate.htm>).

From 1999 through 2008, the refusal rate trended upward for all states except Arizona,

Florida, Kentucky, Mississippi, Nevada, New Jersey, New Mexico, Tennessee, and Wisconsin.

For this same time period, the inaccessible rate trended upward for all states except Alabama, Arkansas, Florida, Georgia, Illinois, Indiana, Kentucky, North Dakota, Washington, and Wyoming.

Only Kentucky, Mississippi and West Virginia have maintained a low refusal and a low inaccessible rate from 1999 through 2008

## **11. REFUSAL OR INACCESSIBLE?**

The Nevada Field Office has maintained one of the lowest refusal rates (near zero) over time. However, Nevada has an extremely high and volatile inaccessible rate of 0 to 44 percent. The reason for this is that if parts of a segment fall within Indian Reservations which have refused in the past, the segments are simply kept in the office and coded as inaccessible. These situations should actually be coded as refusals.

## **12. POSSIBLE APPROACHES TO MAINTAINING / IMPROVING RESPONSE RATES**

States having a high response rate through time (Florida, Kentucky, Mississippi, Pennsylvania and West Virginia) were contacted to determine if these field offices were doing something unique in or in addition to their normal field enumerator training. These field offices' Directors, Deputies and/or statisticians overseeing the survey were contacted.

The Kentucky Field Office believes that keeping field enumerator workloads at or under 10 segments each is very important. Pre-screening of probable non-agricultural segments and new segments is also conducted ahead of time, although no interviews take place until the official data collection start date. Low turnover of field enumerator staff is also beneficial. Training is conducted by a mix of field enumerator supervisors, office staff, and sometimes a guest speaker. Field enumerator supervisors also work with new field enumerators before the workshop so that the survey is not completely new when training commences.

The Mississippi Field Office runs a competition among the various field enumerator supervisors and their enumerator staffs. A small prize is given out to the group having the overall best response rate. If an enumerator encounters a refusal, a different enumerator is sent out to try to obtain a completed report. The office typically does not conduct any pre-survey work, believing that the element of surprise obtains better results. Also, a field enumerator is given the same segments/land area to enumerate from year to year. Several of the enumerators also have an agricultural background and have collected data for NASS for many years. More survey work is allocated to those with the best productivity. The Mississippi Field Office feels that having a positive attitude and knowing agriculture and the questionnaire makes the difference.

West Virginia's enumerators are very similar to Mississippi's. However, West Virginia holds mini-training workshops and relies primarily on the field enumerator supervisors to



instruct the field enumerator staff. They also practice ways to greet a respondent, how to start off an interview and just simply how to be likeable. Also, a personalized thank-you note is sent thanking the operator for his/her participation.

The Pennsylvania Field Office tries to have a field enumerator cover the same operations/land areas from year to year. They feel that this creates a rapport that stimulates participation. The field training is conducted differently by having each enumerator complete a mocked segment at the workshop. The supervisory field enumerators are the primary instructors with field office staff providing assistance and additional feedback. This replaces the standard (classroom style) training method of reviewing each section of the questionnaire, with office staff being the primary instructors.

The Florida Field Office feels that the first of two primary reasons for a turnaround in their response rates is the availability of an on-line database of Florida land owners. This is openly available and provides the field enumerator with a good contact to start with. The second is the use of Info USA's telephone number finder called Powerfinder. The Florida Field Office staff feels that this software provides a more current telephone number than what is on the list frame.

Florida only has a small number of segments (100). This is viewed as a negative in that it's especially crucial that each segment is completed, since those that are estimated could have a large negative impact on the estimates. On the upside, this small number provides for more easily manageable workloads, while still providing the six supervisory field enumerators with enough work to do a thorough job. These supervisory field enumerators are generally 50+ years of age and have an agricultural background. Supervisory field enumerators attend a one day training workshop by office staff. They then take what they learned and train their own field enumerators.

Based on this information, the authors suggest that field offices below the 80 percent threshold reach out to their fellow field offices having a good response rate and try to implement techniques that are working in those high response rate states. Also, at the next NASS Management Conference, consider having a session conducted by those field offices with high response rates to share what they are doing to maintain/improve their response rates.

### **13. FIRE UP RESPONSE**

Fire Up Response is a training course developed by NASS for training field enumerators on how to handle potential nonresponse situations. A substantial part of the training involves role playing various nonresponse situations and demonstrating the best techniques to obtain cooperation. Although partially implemented in the past, the effects of the training were never measured. Therefore, the authors recommend updating, formalizing, and implementing the Fire Up Response training in those states with lower response rates and measure whether the training has any effect on them.

### **14. LESSONS LEARNED**

For future nonresponse studies, the statistician overseeing the survey needs to re-

emphasize to the field enumerators the importance of collecting reasons for the nonresponse.

The nonresponse tables should be provided to the field offices by April of the following year, allowing them to be used at the JAS training workshops. Hence, the authors suggest that the Survey Processing System or the Interactive Data Analysis System produce output for each state to enable them to view their own reasons for nonresponse counts.

## 15. CONCLUSION

This research has generated additional interest across the agency in improving response rates. Implementation of the recommendations will not completely solve the deterioration of response rates; however, it is a step in the right direction. The recommendations proposed are also not limited to the JAS but can be implemented on NASS' 400 other surveys where practical.

During the writing of this report, response rates for the 2009 June Area Survey were published. The overall response rate improved 1.8 percent to 82.0 percent, with the majority of improvement in the area of inaccessibles. This upswing in response rates may be due, at least in part, to this research project causing a greater awareness of nonresponse and the importance of improving response rates. Also, requiring the field enumerators to write the reason for a questionnaire being marked as inaccessible might have given the field enumerators more incentive to complete those interviews that required a little more work than normal to complete.

In the future, the Research and Development Division will continue to work with field offices and NASS' Survey Administration Branch in studying nonresponse to effectively increase future response rates.

## 16. ACKNOWLEDGEMENTS

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