

# Developing and Testing New Survey Questions: The Example of New Questions on the Role of Women and New/Beginning Farm Operators

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## Abstract

The Census of Agriculture (COA) is one of the few sources that provides information on the characteristics of people operating U.S. farms and ranches. Several COA stakeholders have expressed dissatisfaction with the information provided from the COA on women and new or beginning farmers. Thus, at the request of the National Agricultural Statistics Service, the National Institute of Statistical Sciences convened an external panel of experts to provide input into additional measures that might be added to the COA to address this need. This paper describes the process used to solicit input from the panel, the incorporation of this input into the census, and the testing of this new content.

**Key Words:** Establishment Surveys, Questionnaire Development, Pre-testing

## 1. Introduction

The Census of Agriculture (COA) is conducted every five years by the National Agricultural Statistics Service (NASS) and is the leading source of information on U.S. farms and farm operators. NASS began collecting information on the age of farm operators using the COA 1890. Over time, NASS has collected increasingly more information on farm operators, such as operator's sex, race and farming tenure. In 2002, NASS began collecting information on up to three farm operators.

Information on farm operators is important to understanding changes in farm structure and the demographics of farm operators over time. By matching the number of farm operators participating in farm programs with COA counts by race, ethnicity and gender, the United States Department of Agriculture (USDA) can assess how well its programs serve the farm population. Understanding the demographics of farm operators also helps inform potential issues U.S. agriculture may face in the future such as an aging farm population.

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In addition to capturing information on farm operators, NASS also measures and publishes information on the principal operator for each operation using data from the COA, which historically has been defined as the “person in charge, such as hired manager, business manager, or the other person primarily responsible for the onsite, day-to-day operation of the farm or ranch business.” Identifying a principal operator is essential to understanding the economic well-being of the farm household. The concept of the principal operator also allows comparisons with historic data series on demographics of the principal operator population dating back to information collected on the Census of Agriculture beginning in the 1800s.

Based on data from the 2012 COA, 30 percent of all operators were women, and only 14 percent of principal operators were women. Additionally, there was a decrease (although nonsignificant) in the number of female operators between the 2007 COA and the 2012 COA. Following the publication of the 2012 COA, the National Agricultural Statistics Service (NASS) received feedback from the agricultural and government sectors with concern that the role of women and new/beginning farmers are not being adequately measured in their Census and survey programs.

In April 2015, at the request of NASS, National Institute of Statistical Sciences (NISS) convened an independent panel consisting of 13 experts from academia, government, and agricultural sectors to evaluate how NASS measures the contribution of women and new/beginning farmers (Notice of the Meeting of the Expert Panel on Federal Statistics on Women and Beginning, 2015). Based on panel recommendations, a new personal characteristics section in the COA was created. The revised section was then evaluated using iterative rounds of cognitive testing. The following paper will present results from the expert panel review and cognitive testing and discuss the utility of these two methods.

## **2. Methods**

### **2.1 Expert Panel**

The NISS was commissioned to assemble the expert panel. Thirteen professionals from academia, government, and agricultural sectors with expertise in economics, sociology, survey methodology, statistics, policy, and agriculture were selected.

Prior to the meeting, NASS provided panel members background materials, which included NASS data collection forms and NASS publications on women and new/beginning farmers. Materials from other U.S. and international surveys (e.g., Census Bureau’s Survey of Business Owners) that publish information on women and new/beginning business operators were also provided.

Stakeholders and the general public had opportunities to provide public comment in writing prior to the panel meeting or with advance registration, to present their points of view in person. In April 2015, the panel met in person and reviewed the operator characteristic information currently published by NASS. It provided guidance on how to improve the reporting of women and new/beginning operators in the 2017 COA. The panel met two subsequent times following the iterative rounds of cognitive testing to provide further guidance on the modification of the 2017 COA form.

### **2.2 Cognitive Interviews**

In total, 100 interviews were conducted across three iterative rounds of cognitive interviewing. Cognitive interviewing is a qualitative methodology used to assess respondents' cognitive processes when responding to survey questions (Willis 2005). During the interviews, respondents are assessed on four steps in the question response process: comprehension, retrieval, judgement, and response (Tourangeau, Rips and Rasinski 2000).

In each round of cognitive interviews, respondents were asked to complete the survey questionnaire. Retrospective probe questions were then used to evaluate their comprehension of the survey questions and the validity of their responses. Data from the cognitive interviews were analyzed using the constant comparative methods of analysis (For more information see Ridolfo 2015, Sloan et al. 2015, and Pick et al 2016). Following each round of cognitive testing, modifications were made to the survey questionnaire, and those changes were then evaluated in subsequent rounds of testing.

### 3. Results

#### 3.1 Expert Panel

The panel identified two key issues that must be addressed in order to effectively measure women and new/beginning farmers.<sup>2</sup> First, the evolution of farm structure into complex entities, both large and small, has created problems for assessing the roles of individuals in the operation. Responsibilities are often divided amongst several individuals whether the operation is a small family farm or a large corporation. The Census of Agriculture must be able to capture the full range of individual responsibilities within these small and large operations. A second, even more challenging issue raised by the panel was the cultural norms in the farming community that reinforce the perception that farm operators are men. Cognitive testing at NASS has found that the oldest, male family member is viewed as the principal operator even if this individual has limited or no day-to-day involvement in farming, while the roles of women often go unreported on the COA and other surveys.

The panel provided specific recommendations for changes to the COA questionnaire that would address the key issues detailed above (see Figure 1 for an example of 2012 COA questionnaire). First, the panel recommended defining operators in terms of function rather than titles. The panel argued that titles such as “operator” and “principal operator” do not have universal definitions and are open to interpretation. Given the deference to the oldest, male family members when reporting operators, it was recommended that NASS define operators based on function (i.e., involvement in decisions pertaining to the operation) and allow for joint involvement. Furthermore, they recommended that the COA ask about involvement in a variety of decisions, not just day-to-day decisions. The panel also recommended that respondents be allowed to report up to four operators on the COA. Finally, the panel recommended transitioning away from the concept of a principal operator. Although they recommended the retention of this measure for bridging purposes, they suggested that respondents be allowed to report more than one principal operator. Additional information on the panel recommendations can be found in the *Report of the Expert Panel on Statistics on Women and Beginning Farmers in the USDA Census of Agriculture*.

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<sup>2</sup> This paper focuses on results pertaining to the women operators. More information on recommendations regarding new/beginning farmers can be found in the full report:

**Figure 1: 2012 Census of Agriculture**

SECTION 35 OPERATOR CHARACTERISTICS			
1. In 2012, how many operators (individuals) were involved in the day-to-day decisions for this operation? Enter the number of operators and the number of women operators. Exclude hired workers unless they were a hired manager or family member. . . . 1575	Total Number of Operators		Number of Women Operators
	1574		
2. Answer the following questions for up to three primary operators of this operation as of December 31, 2012.	Principal Operator or Senior Partner	Operator 2	Operator 3
	1835	1852	1872
a. Full name . . . . .	<input type="text"/>	<input type="text"/>	<input type="text"/>
b. Sex of operator . . . . .	0926 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1586 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	1597 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female
c. Is operator 2 or 3 the spouse of the principal operator? . . . . .		1590 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1601 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
d. At which occupation did the operator spend the majority (50 percent or more) of his/her worktime in 2012?	0928 <b>Mark one answer only.</b> 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other	1580 <b>Mark one answer only.</b> 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other	1591 <b>Mark one answer only.</b> 1 <input type="checkbox"/> Farm or ranch work 2 <input type="checkbox"/> Other
e. Is this operator retired? . . .	0924 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1582 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1593 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
f. How many days did the operator work off the farm in 2012? Include days in which the operator worked at least 4 hours per day in an off-farm job. Include work on someone else's farm for pay. . . . .	0929 <b>Mark one answer only.</b> 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1831 <b>Mark one answer only.</b> 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more	1931 <b>Mark one answer only.</b> 1 <input type="checkbox"/> None 2 <input type="checkbox"/> 1 - 49 days 3 <input type="checkbox"/> 50 - 99 days 4 <input type="checkbox"/> 100 - 199 days 5 <input type="checkbox"/> 200 days or more

**3.2 Cognitive Interviews**

*3.2.1 Total number of operators*

In the 2012 Census of Agriculture, the first question in the Operator Characteristics Section asked respondents to report the total number of operators and the number of female operators involved in the day-to-day decisions for the operation (see Figure 1). In the first two rounds of cognitive testing, all labels that the panel identified as problematic (i.e., operator, principal operator) were removed and “day-to-day” decisions was removed from the first question (see Figure 2).

**Figure 2: Questionnaire Used in Round 2 Testing**

SECTION 6 PERSONAL CHARACTERISTICS		
1. In 2015, how many individuals were involved in the decisions for this operation (include family members and hired managers)? Enter the total number of individuals and the number of women. Exclude hired workers unless they were a hired manager or family member. . . . 1575	Number of Individuals Making Decisions	
	Total	Women
1574		

During cognitive testing, it was found that when answering Question 1 (In 2015, how many individuals were involved in the decisions for this operation), respondents reported individuals with a broad range of involvement in decisions. Some respondents reported

those who were involved in only day-to-day decisions; others reported those only involved in major decisions (e.g., purchasing land, direction of the farm); and some reported those involved in all kinds of decisions. In terms of level of involvement, some respondents reported those involved in the majority or all decisions; some reported those who were only involved in one or two decisions; some reported those who simply provided advice; and others reported those who actually made the decision or those who were the final decision maker. Thus, while reporting was not consistent across respondents, it was collecting information on a broader range of people than just those making day-to-day decisions.

### 3.2.2 Number of men and women

Although the scope of individuals reported was broadened, undercounts of women were still present. During the cognitive interviews, some male respondents discussed how women were involved in the decisions regarding the farm but they did not report them on the questionnaire. When asked why, they gave reasons in alignment with cultural norms that subordinate women and their role on the farm, such as “we (the men) have the final say,” or “she is only involved in certain decisions.” In one case, a woman was reluctant to report herself despite her involvement in decisions for the farm, stating “the Bible says he’s in charge.” These findings indicate that these revisions to the questionnaire do not completely circumvent norms that preclude the reporting of women’s contributions to agriculture.

An unexpected finding from the cognitive testing was that women were offended by the formatting of Question 1. They felt that asking about women (but not men) separately highlighted the fact that women are a minority in agriculture. They felt the question should ask for the number of men and women. Other respondents assumed that this question was asking for the number of men and women and reported the number of men in the “total” answer space.

In the third round of testing, “women” was removed from Question 1 and a second question, which asked for the total number of men and women who were involved in decisions for the operation was added (see Figure 3).

**Figure 3: Round 3 Cognitive Test Version**

SECTION 6 PERSONAL CHARACTERISTICS		Total
1. In 2015, how many individuals were involved in the decisions for this operation (include family members and hired managers)? Exclude hired workers unless they were a hired manager or family member. . . .1575		
2. Of the total number of individuals making decisions for this operation, how many are men and how many are women? . . . . . 1571	Men	Women
	1574	

In round 3 of cognitive testing, this change worked well. Responses to Question 2 summed to responses given to Question 1 the majority of the time. Respondents with no female operators sometimes left the “women” response space blank. One limitation to this question was that some respondents felt Questions 1 and 2 were redundant. However, in all, this question is an improvement to what was used in 2012 because respondents are thinking of more than just individuals who are involved in the day-to-day decisions and are including a wide variety of individuals who are involved in various decisions for the operation.

### 3.2.3. Involvement in decisions

The panel also recommended that NASS ask about individuals' involvement in a variety of decisions. A series of new questions was added to the questionnaire to capture individuals' varying levels of decision-making involvement. Respondents were asked to report how much involvement each person had in specific decisions: a) day-to-day decisions, b) land acquisition or sale decisions including leasing, c) land use and crop decisions including planting, crop spraying, timber harvesting or other e.g., grazing, d) livestock decisions including purchases, sales, breeding, and pasturing, e) major farm equipment purchases or sales, f) hiring and managing employees, g) accounting, payroll, office records decisions, h) finance/financial management, i) estate planning or succession planning, and j) participation in government agricultural programs. The response options went through several iterations. In the first round of testing, the response options included: All, Some, None. However, some respondents indicated that their operation does not engage in these types of decisions (e.g., livestock decisions) and therefore wanted to report not applicable. In the second round of testing a "not applicable" category was added (See Figure 4).

**Figure 4:**

4. How much involvement did each person have in these specific decisions as of <b>December 31, 2015</b> ? For each person and for each item, mark one.				
	Person 1, continued	Person 2, continued	Person 3, continued	Person 4, continued
a. Day-to-day decisions . . . . .	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable
b. Land acquisition or sale decisions including leasing . . . . .	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable
c. Land use and crop decisions including planting, crop spraying, timber harvesting or other, e.g., grazing. . . . .	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable
d. Livestock decisions including purchases, sales, breeding and pasturing . . . . .	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable	<del>xxxx</del> 1 <input type="checkbox"/> All 2 <input type="checkbox"/> Some 3 <input type="checkbox"/> None 4 <input type="checkbox"/> Not applicable

In Rounds 2, respondents continued to have difficulty using these response options appropriately. Respondents indicated that they were unsure how to use these responses to report joint decision making and did not do so in a consistent manner. In the third round of cognitive testing, the response options were changed to "yes," "no," "not applicable." Unfortunately, this did not resolve issues respondents were having with accurately reporting involvement in decisions. Respondents did not interpret the "no" and "not applicable" categories accurately. For example, respondents used "no" or "not applicable" interchangeably to indicate they made decisions not to engage in particular activities such as hiring employees. Due to the amount of response error and the fact that NASS does not intend to publish responses of "no" and "not applicable", this series of questions were redesigned to a checklist where respondents can check all the decisions each individual is involved in.

Across the different rounds of testing, respondents indicated that the length of this section was burdensome and that they often found these decision questions, in particular, to be redundant. Many respondents commented that items C (land use), D (livestock decisions) and F (hiring and managing employees) were day-to-day decisions. For this reason,

removal of items C, D, and F from the questionnaire was recommended. Respondents also felt that items G (accounting, payroll, office records) and H (finance and financial management) were redundant. Combining these items into a new item that asks about “Financial management and record keeping” was recommended as well as combining items B (land acquisition) and E (major farm equipment purchases or sales) to ask about “buying, selling or renting land and/or equipment.”

### 3.2.4 Principal operator

In 2012, respondents were instructed to report information on the “principal operator” in the first column of the demographics table. Although this term “principal operator” was categorized by the panel as problematic, it was recommended that it be retained to bridge the data series. It was reformatted and asked as a standalone question of each person reported in the demographic table (Figure 5)

**Figure 5: Question Used in Round 3**

5. Is this person a Principal Operator or Senior Partner? . . .	1765 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1766 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1767 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1768 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No
6. Is this person the spouse of a Principal Operator or Senior Partner? . . .	1769 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1590 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1601 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No	1773 1 <input type="checkbox"/> Yes 3 <input type="checkbox"/> No

Respondents did not interpret this question consistently and although it was reworded to allow respondents to report more than one principal operator, respondents continued to have difficulty reporting multiple principal operators. Some respondents indicated that this term contradicted the notion of operating jointly, and therefore it did not make sense to mark more than one “principal” operator. Others with similar operating arrangements marked more than one principal operator. Based on this testing, it was recommended that this question and the subsequent question that asks about the principal operator’s spouse be removed.

## 4. Conclusion

In conclusion, it is beneficial to use an expert panel and cognitive interviewing to evaluate the effectiveness of the measures and to develop ways to improve the measures of women farmers. The expert panel provided NASS with an outside perspective and critical review of its current measures. Drawing on their expertise in sociology, survey methodology, economics and agriculture, panel members provided insight into the modern realities of farm structure and the factors that are potentially biasing NASS data.

Farm structure and the roles of individuals on the farm are very complex constructs to measure using a survey questionnaire. It was essential to test these new measures in multiple rounds and in multiple ways. The expert panel fully supported this research effort and was essential in providing feedback as new findings emerged from the testing.

Through multiple rounds of cognitive testing, NASS was able to confirm a major concern of the panel – cultural stereotypes affect respondents’ reporting of farm operators. Different versions of the questions were tested and improved measures were developed. Although the bias in the data occurring due to cultural norms was not completely eliminated, the changes adopted will increase the number of women being reported in the 2017 Census of Agriculture and provide additional information on the role of women in farming.

The evaluation of these measures does not end with the cognitive testing. Evaluation of these questions will continue using the 2015 Census Content Test data and the 2017 COA data and improvements will be made as necessary. Through this continued research, NASS will more accurately capture the role of women farmers in future Censuses.

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