

Closing the Feedback Loop in Survey Design – How Public Sector Research Needs Inform Evolution of the Census of Agriculture

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Introduction

The Census of Agriculture is an enumerative and descriptive survey of American farm and ranch operators that is conducted every five years by the U.S. Department of Agriculture's National Agricultural Statistics Service (USDA-NASS). For Census purposes, a farm is any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the Census year. Response is mandated by law. Data are collected on land use and ownership, operator characteristics, demographics, production practices, income, expenditures, and other areas.

The Census of Agriculture provides the only source of uniform, comprehensive agricultural data that is tabulated for every county in the nation. Census data are used by public sector researchers to discover trends, predict program outcomes, evaluate program effectiveness, and respond to legislative requests for information prior to policy formulation. Two goals for data development are stability – obtaining the same statistical data over the years to establish a time series – and responsiveness – including questions to elicit information on emerging topics that are of interest to consumers of the data products.

To address these goals, the USDA-NASS may add or reformulate questions in the Census to identify key subgroups, from which additional information may be collected in Special Studies, referred to as census follow-on surveys. There were four follow-on surveys conducted after the last census of agriculture in 2007. Among the four were the 2008 Organic Production Survey and 2009 On-Farm Renewable Energy Production Survey. The organic and renewable energy follow-ons were new to USDA-NASS and were developed in response to an increased need for more detailed information regarding these key subgroups. In each instance, the survey population was established based on specific responses to questions in the 2007 Census of Agriculture.

Given the expense of designing, testing, and conducting the Ag Census, changes require strong justification. This paper explores the feedback loop between public sector researchers and the design of the Census of Agriculture. We describe the process of design evolution resulting from policy and research needs, and offer two examples of feedback loops that resulted in changes to the Census questionnaire to initiate data gathering on organic production and local foods marketing. We discuss the challenges of responding to researcher and policy maker needs.

Census of Agriculture Data Usage

The value of conducting a national census of agricultural production has long been recognized. The first agricultural census was taken in 1840 as part of the decennial population census. Up until 1996, the U.S. Department of Commerce was responsible for collecting agriculture data. The 1997 Appropriations Act transferred the responsibility to the USDA-NASS. The last iteration was the 2007 Census of Agriculture, which marked the 27th Federal agriculture census but only the third executed by USDA-NASS. The next census of agriculture is scheduled for reference year 2012.

In a review of the Census of Agriculture conducted at the request of USDA-NASS, The Council on Food, Agricultural, and Resource Economics (C-FARE) (2007) commented that the report is one of the most widely used sources of data describing the nation's agriculture sector. The most important challenges noted by C-FARE (2007) is dealing with a wide range of often competing uses and demands for the data, the ever changing nature of the agriculture sector, and resource constraints in funding the data collection effort.

Information from the census of agriculture is routinely requested by farm organizations, businesses, governmental bodies, college and university researchers, and the media outlets. Some uses of agriculture census data include:

- Evaluate, change, promote, and formulate farm and rural policies and programs that help agricultural producers;
- Study historical trends, assess current conditions, and plan for the future;
- Formulate market strategies, provide more efficient production and distribution systems, and locate facilities for agricultural communities;
- Allocate local and national funds for farm-related programs, including extension service projects, agricultural research, soil conservation programs, and land-grant colleges and universities;
- Analyze and report on the current state of food, fuel, feed, and fiber production in the United States.

In providing a justification for conducting a national census, as opposed to a series of less expensive sample surveys, C-FARE (2007) pointed out that a census is needed to provide a benchmark for annual estimates of crop acreages and livestock inventories on farms, to provide detail for small geographic areas and small crop or livestock segments that might not otherwise be large enough to be sampled in a survey, to provide a list frame for inter-census surveys, and to allow for cross-tabulations of detailed subpopulations, such as minority-operated farms producing a specific crop. The U.S. Department of Agriculture-Economic Research Service (USDA-ERS) is one such beneficiary, using the Census of Agriculture results to benchmark results in its annual Agricultural Resource Management Survey (ARMS).

Content Development

Consistent with the previous two agriculture censuses, the 2012 report form contains 24 pages of questions related to the nation's agricultural activity. Since one of the primary objectives of the census of agriculture is to provide a count of all farms and ranches, much of the content is made up of questions related to agriculture production used to determine whether an operation is a farm. Most of the remaining content provides valuable data about operator characteristics, production practices, expenses, and farm related income and activities.

C-FARE (2007) urged USDA-NASS to maintain focus on agriculture as an economic sector, but to respond to stakeholder requests for more data on marketing, production, environmental practices, government payments, and farm labor. USDA-NASS was also reminded to account for the diversity in scale and purpose of farm operations, from large complex agribusinesses to "lifestyle" farmers.

After including the main content items, USDA-NASS is left with very little space in the form to address these additional concerns. In order to increase the relevance of the Census Programs, beginning with the 2007 Census of Agriculture, USDA-NASS reserved some space for emerging issues. To limit the area these emerging issues account for, a simple yes/no screening question is asked of all respondents. These screening questions are concentrated in the "Practices Section" of the census report form. One use for responses to these questions is to develop sampling frames for subsequent detailed follow-on surveys of populations who engage in a particular practice. C-FARE (2007) recommended that USDA-NASS continue to use follow-on surveys as a least-cost means of collecting data items that do not apply for all farms or all counties, and consult with other federal agencies and stakeholders as to what follow-on surveys would be most relevant.

Even before publishing the results of the census of agriculture, work begins on developing the next iteration of the questionnaire. USDA-NASS solicits content items during its data user meetings and also publishes a Federal Register Notice asking for input on new content items. All items received are considered but only a limited number are incorporated. There are certain criteria that need to be met in order to be incorporated. Aside from a formal request, favor is given to content requests that are national in scope. Additionally, new content items requested should assist in making policy decisions. A justification must accompany all requests.

In order to move forward with the design and testing of a new questionnaire, there comes a time to exercise a closeout for submitting requests for new content. Recognizing the need to be responsive to the agricultural community, USDA-NASS developed a protocol for handling late requests. The protocol consists of a series of internal review panels aimed to validate the content request, assess impact of the question, and formulate a publication strategy. If accepted, a request is usually limited to a yes/no question within the Practices Section. Following is a timeline for content development for the 2012 Census of Agriculture.

Key dates in the 2012 Census of Agriculture Content Development

February 4, 2009	-	Census of Agriculture Release
May 28, 2009	-	Federal Register Announcement
August 29, 2009	-	Federal Register Closed
August 31, 2010	-	Closeout for Content Test
April 30, 2011	-	Closeout for Census of Agriculture
July 31, 2011	-	Census of Agriculture form finalized for printing

Responses to the census of agriculture are predominately self-reported, which introduces the risk of misreporting. This may be due to misunderstanding or misinterpreting the practice being reported, or its applicability to the respondent. To combat this, USDA-NASS limits data published from the Practices Sections to expanded operation counts. The screening question and subsequent count of farms provide a snapshot of the scale of an emerging issue but more importantly provide a vehicle to identify a population for collecting more detailed data. By establishing the population, USDA-NASS is positioned to conduct a sampled survey or complete census of those operations with a positive response to the screening question. A census follow-on survey is designed for the specified population and provides more reliable data that may inform policy decisions.

USDA-NASS has staff with expertise in survey and questionnaire design for insight into the question wording. Figure 1 describes how the agency works with the data user to develop question wording. This staff will consult with the group requesting the content to capture the data needs and use appropriate wording to elicit the desired publishable data. If time allows, USDA-NASS will perform testing or cognitive interviews with the new content. This testing is critical for understanding respondent’s interpretation of the question and for making appropriate modifications to the wording.

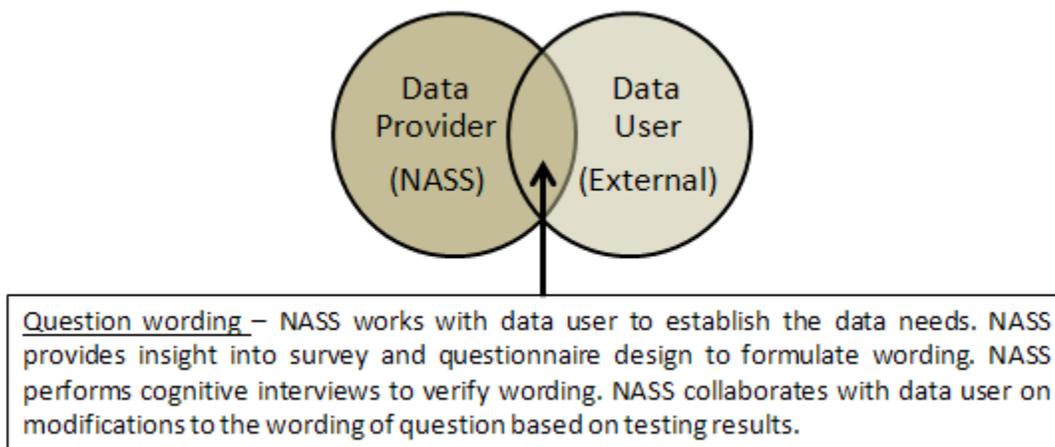
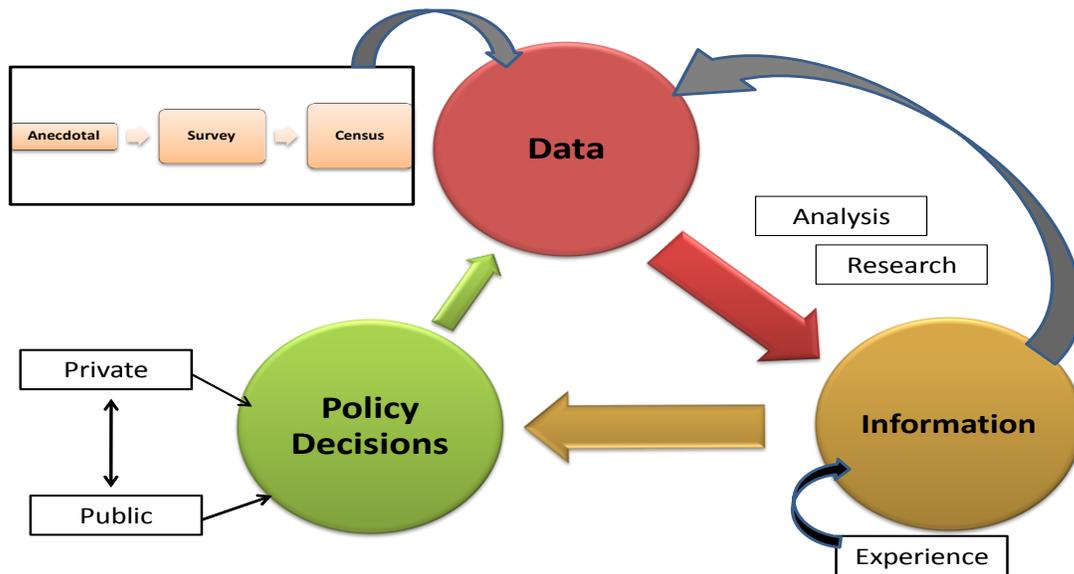


Figure 1. Process of Developing Wording for Screening Questions

As an example, in the 2007 Census of Agriculture, respondents were asked....*At anytime during 2007, did this operation – Generate energy or electricity on the farm using wind or solar technology, methane digester, etc.?* When additional funding was available, USDA-NASS conducted a follow-on special study aimed to collect and publish more detailed data about specific renewable energy systems. Any operation that responded affirmatively to the yes/no screening question was included in the 2009 On-farm Renewable Energy Production Survey. NASS worked with subject matter experts within the industry to formulate relevant questions for the follow-on study.

Data-Information-Policy Feedback

The driving force behind informed policy decisions is data. Figure 2 demonstrates the relationship between data, information, and policy decisions. It also reflects the interactions between public and private sectors, the vehicles for gathering data, and significant factors contributing to gaining valuable information.



4

Figure 2. Feedback Relationships in Survey Design

Data

Data can come from several different sources. Figure 2 identifies three specific sources of data. In general terms, anecdotal data (“stories” or cases) are not statistically defensible as they come from a limited number of samples or are obtained without a known population. However, anecdotal data often lead to conducting a statistically fortified survey that properly represents the entire population. The ability to measure a known population is the key to the validity and reliability of survey data. Data that come from a properly designed survey represent the entire population and are accompanied by quality measures. Quality measures provide the data user with an understanding of data reliability. Survey data may indicate statistically significant trends or conditions in a sample, which in turn may justify exploring a topic further in a census. Data from a census, for purposes of this paper the Census of Agriculture, provide the most comprehensive data picture because the entire population is questioned, leading to less variance and higher confidence in the published responses.

Information

Information is tied very closely to data gathering though it can come from experience or observation as well as from data. Typically, data are obtained and then analyzed through research to produce information. In this sense, someone other than the data provider interprets the data to turn them into usable information. Experience in a disciplinary field or practical background with the practice or industry may moderate the way the analysis is conducted and the way analysis is interpreted into research results. Analysts and researchers such as economists, geographers, sociologists, policy analysts, and industry statisticians play an instrumental role because without them the data are

effectively just numbers. The data analyst (data user) should be independent from the statistical agency (data collector) to insure greater objectivity in analytical results and interpretations.

Information may also become available over time and through experience. In many cases however, information gained from experience will lead back to data collection for validating new research hypotheses or updating previous results. Information from experience alone is rarely as influential in guiding policy decisions as when accompanied with sound data analysis.

The relationship between data and information forms a loop. After data are collected, analyzed, and transformed into information there are often gaps which lead to modification of data collection procedures to narrow or close these gaps. This can occur repeatedly and is enhanced through interactions with data users and data collectors. These interactions lead to improved data and information quality and over time provide a series of data that reflects trends. Analysis of trends may help describe the longitudinal effects of a policy choice, and lead to policy improvements.

Policy Decisions

Policy decisions are often based on information provided but frequently a question about the appropriate policy choice drives the need for data. Public and private policy makers may not have sufficient information, which in turn may be due to lack of data necessary for analysis. Unsatisfied demand for information by a policy maker (information user) can result in support for new data collection efforts that will ultimately provide information to satisfy this demand. From a purely scientific standpoint, policy decisions are ideally made after data is collected and turned into usable information that answers the policy questions raised. However, this may not occur. Sometimes, data is gathered ex post as a way of assessing the impact of the policy. Sometimes the public and private decision makers will request data in order to amend an existing policy decision. Sometimes the private and public sector interact to identify needed information and support additional data collection.

An Organic Example

Organic data collected though the Census of Agriculture provides a good example of how the Data Cycle works. Table 1 shows some of the significant events that led to organic content additions to the census of agriculture.

Table 1. Industry-Policy Timeline of Events Leading to Organic Data Collection in the Census of Agriculture

1980's	1990's	2000's
<p>*1980 – USDA Study Team on Organic Farming issues report and recommendations</p> <p>*1984 – Organic Food Production Association of America founded. Later becomes Organic Trade Association (OTA)</p> <p>*1985 – Food Security Act</p> <p>*1988 – Low-input Sustainable Agriculture (LISA) programs implemented to promote sustainable farming practices</p>	<p>*1990 – Organic Foods Protection Act requires USDA to develop and maintain National standards</p> <p>*1990 – Organic Farming Research Foundation (OFRF) founded. Conducts national farm surveys in 1993, 1995, 1997,2002</p> <p>*1997 – USDA releases proposed organic rules for public comment</p> <p>*1999 – American Organic Standards ratified by OTA</p> <p>*1997-1999- Acceleration in acquisitions of organic food processors by nonorganic firms</p>	<p>*2000 – USDA releases National Organic Program Standards</p> <p>*2001 – Accreditation begins</p> <p>*2002 – Census of Agriculture begins collecting organics data</p> <p>*2007 – Census of Agriculture increases amount of data collected on organic production</p> <p>*2009 NASS Conducts Special Study on Organic Production Survey</p>

Beginning with the formation of a USDA Team to study and make recommendation on organic agriculture in 1980, policy decisions started to take shape. Early policy decisions set the foundation for advancement in research and food safety. By the 1990's, the public sector was directed to establish guidelines for producers to be certified as organic. Meanwhile, the private sector recognized a need to have data for making policy decisions. By the end of the decade, the private sector was pushing the public sector for organic qualifications because of consumer driven sales which were now crossing state boundaries.

The organic sector formed its own data gathering organization and conducted national surveys of farmers to fill the void of missing public data on organic production and marketing. Using certifier registries and appealing to farmers to respond in their own self-interest, the collected data were not representative of the entire U.S. organic farming sector until reliability and validation standards were applied in the 1997 and 2002 surveys. At the same time, the USDA-ERS was creating estimates of amount of organic acreage by commodity using certifier records. It wasn't until the 2000's that accurate data could be collected based on the public sector's insistence on accreditation for all organic farmers to a single standard, which defined the population.

The decision to establish a known population led to data being collected in the 2002 Census of Agriculture in the form of a single question relating to organic commodity sales value. The initial data did not provide enough usable information for detailed analyses. However, the results helped drive interest in expanding content in the 2007 Census of Agriculture. Figure 3 shows the content evolution between the 2002 and 2007 Censuses of Agriculture.

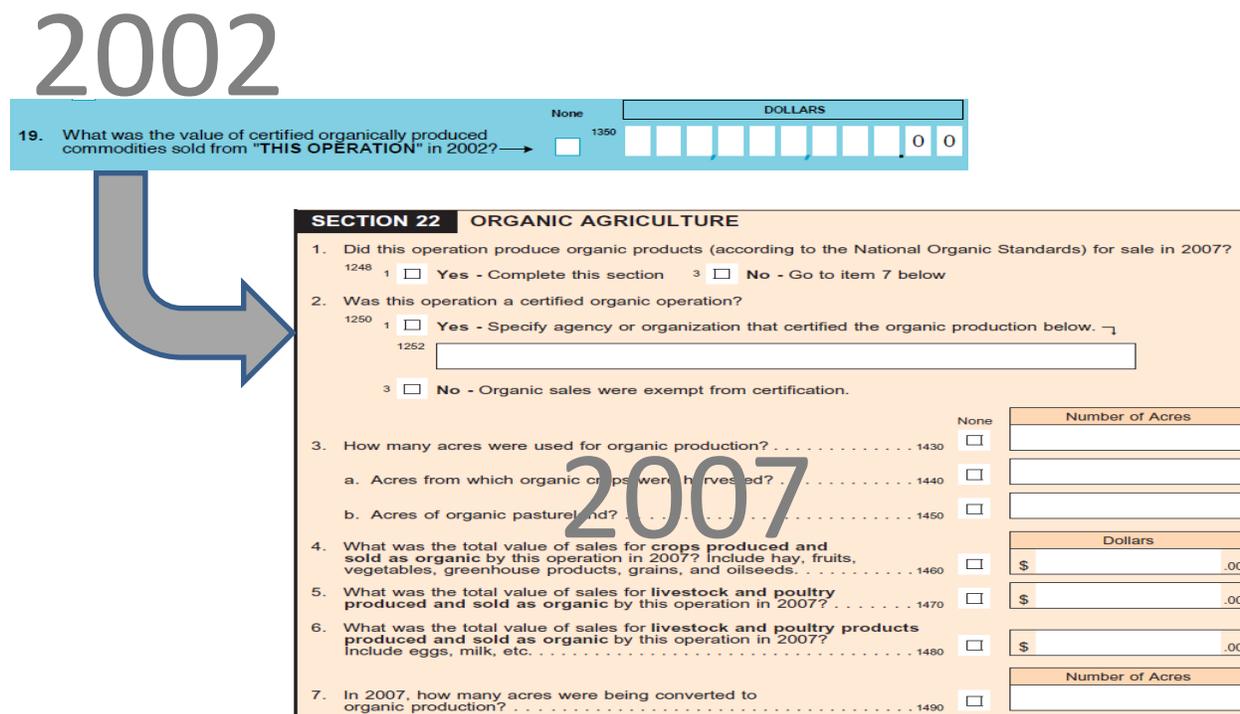


Figure 3. Evolution of Organic Content in Census of Agriculture from 2002 to 2007

With a now well established population, USDA-NASS was able to capture more detailed data with a Census Follow-on in 2009. USDA-NASS worked with groups representing both the public and the private sectors to design the follow-on study. In 2012 the organic content in the Census of Agriculture references the National Organic Program as a result of comments by data users that the self-reporting aspect of the census allowed noncertified organic practitioners to be counted without the distinction being made. Policy makers could not accurately distinguish if programs were having the desired effects and data users could not produce statistics by the various categories of producer certification. Figure 4 shows how the organic content in the latest Census of Agriculture addresses these concerns.

SECTION 27 ORGANIC AGRICULTURE

1. In 2012, did this operation produce organic products according to USDA's National Organic Program (NOP) standards or have acres transitioning into USDA NOP production?

3501 Yes - Complete this section 3 No - Go to SECTION 28

2. Report type of production. Check all that apply

3502 USDA NOP certified organic production (exclude handling). Specify agency or organization that certified the organic production in 2012: _____

1252 _____

3503 USDA NOP organic production exempt from certification (exempt is production normally less than \$5,000 in sales).

3504 Acres transitioning into USDA NOP organic production.

3506 Production according to USDA NOP standards but NOT certified or exempt.

3. What was the value of USDA NOP certified or exempt organically produced commodities sold from this operation in 2012? 3505 None

Value of Sales (Dollars)	
\$.00

Figure 4. Organic Content in 2012 Census of Agriculture

In 2008, with a well-established population from which to sample, USDA-NASS was able to capture more detailed data with an organic follow-on survey. The results of the 2008 Organic Production Survey were well received and led to additional collaboration with other public sectors to guide policy decisions. Subsequently, new policy needs arose as the USDA Risk Management Agency (USDA-RMA) moved toward developing organic crop insurance premiums. A collaboration between USDA-NASS and USDA-RMA resulted in the 2011 Certified Organic Production Survey, another inter-census survey designed to collect information for a government program that benefits organic producers. Figure 5 compares portions of the two follow-on surveys related to organic farming that drew from the 2007 Census of Agriculture sampling frame.

2008 ORGANIC PRODUCTION SURVEY

Form Number: 08-A62 (04/07/09) Draft 3

USDA

National Agricultural Statistics Service

Please return your completed report to:

Census of Agriculture
1201 East 10th Street
Jeffersonville, IN 47132

OFFICE USE ONLY

0809 0811 0816

Please make corrections to name, address, and ZIP code if necessary.

Everyone who receives a form must complete and return one by mail or via the Internet at www.agcensus.usda.gov. Your report is due by June 17, 2009. To fill out the paper form, use a black or blue ballpoint pen. Duplicate forms? If you received data report forms for the SAME farming operation, return all report forms in the same envelope with this completed report. Questions? Call us toll-free at 1-888-424-7128.

NOTICE: Response to this inquiry is required by law (Title 7, U.S. Code). By the same law, YOUR REPORT IS CONFIDENTIAL and it will only be used for statistical purposes. Your report CANNOT be used for purposes of taxation, investigation, or regulation. The law also prohibits that copies made in your file be shared with other agencies.

SECTION 1 OPERATION INFORMATION

1. Did this operation produce or grow any organic crops, vegetables, fruits, livestock, poultry, or have any transitional organic acreage in 2008? Please report for production on land owned, rented, or used by you, your spouse, or by the partnership, corporation, or organization named on the label above.

110 Yes - Continue No - Go to Section 10, last page

a. Was this operation Certified Organic by a USDA accredited organization?

111 Yes - Specify certifying agency _____ - Go to Question 2
 No, exempt from certification (under \$5,000 in annual organic sales) - Go to Question 1b
 No, not certified - Go to question 1b

b. If not certified, will this operation become certified organic in the next 3 years? Yes No

2. Of the total acres in this operation in 2008, how many were:

(Include all land owned or rented from others. Exclude land rented to others)

	None	Acres
a. Certified or exempt organic cropland?	<input type="checkbox"/>	121
b. Certified or exempt organic pastureland and/or rangeland?	<input type="checkbox"/>	122
c. Transitioning organic cropland?	<input type="checkbox"/>	123
d. Transitioning organic pastureland and/or rangeland?	<input type="checkbox"/>	124
e. Non-organic cropland?	<input type="checkbox"/>	125
f. Non-organic pastureland and/or rangeland?	<input type="checkbox"/>	126
g. All other land (farmstead, buildings, woods, waste, buffer strips, etc.):	<input type="checkbox"/>	127
TOTAL ACRES OPERATED IN 2008 (sum items 2a - 2g)		128

Project 908 QID 115245 Version 00 OMB No. 0535-0240 Approval Expires 7/31/2014

CERTIFIED ORGANIC PRODUCTION SURVEY - December 2011

USDA

NATIONAL AGRICULTURAL STATISTICS SERVICE

RMA

RISK MANAGEMENT AGENCY

U.S. Department of Agriculture,
Rm 5030, South Building
1400 Independence Ave., S.W.
Washington, DC 20250-3000
Phone: 1-800-725-9540
Fax: 202-690-2000
Email: nass@nass.usda.gov

Information requested in this survey is used to produce estimates of selected agricultural commodities. Under Title 7 of the U.S. Code and CIPSEA (Public Law 107-347), facts about your operation are kept confidential and used only for statistical purposes in combination with similar reports from other producers. Response is voluntary.

Please make correction to name, address, and ZIP code if necessary.

SECTION 1 OPERATION INFORMATION

1. Did this operation have any Certified Organic production as determined by the USDA's National Organic Program (NOP) standards in 2011?

111 Yes - Specify certifying agency _____ - Go to Item 2
 No - Not certified - Go to Section 10, Back Page

2. In 2011, how many acres did this operation: (Please report all land including organic and conventional acres)

	Acres
a. Own?	901
b. Rent or Lease from others or use Rent Free? (Exclude land used on an animal unit month (AUM) basis)	902
c. Rent or Lease to others?	905
3. [Calculate items 2a + 2b - 2c]. Then the total acres operation in 2011 were:	900

4. Of the total acres operated reported in Item 3, how many acres were:

	Acres
a. Certified Organic Cropland?	121
b. Certified Organic Pastureland and/or Rangeland?	122

Figure 5. 2008 and 2011 Inter-Census Organic Production Surveys

Growing Interest in Locally Sourced Food

Interest is growing in supporting local agricultural economies through purchase of foods from sources that are geographically close to the consuming areas, via channels that are direct from farm to consumer or at most one step removed. A significant policy push for local food systems occurred with the institution of the USDA Know Your Farmer, Know Your Food Initiative (KYF2) in September 2009. The KYF2 Initiative was in turn a response to the perceived consumer and producer interest. The initiative was designed to eliminate organizational barriers to improve coordination and availability of resources for the promotion of local food systems. Johnson, Cowan, and Assenberg (2012) noted that many community and farm advocacy groups are pushing for changes in the next major agricultural program legislation (the Farm Bill) that will directly target local foods producers, consumers, and markets. Despite the emphasis of policy makers, there are few national surveys of local production and sales that provide the necessary sampling frame for conducting a representative and reliable national estimate of production and consumption.

Low and Vogel (2011) reported that while mainstream markets account for \$297 billion in sales, direct producer-to-consumer markets are worth \$1.2 billion, while intermediated (producer-to-intermediary-to consumer) markets are estimated to generate \$2.7 billion in sales. The USDA-ERS ARMS used to produce these estimates had no benchmark data except for questions on the Census of Agriculture that asked respondents to indicate whether the operation had sales of products direct to consumers for human consumption and the value of those sales. In this case, the policy decisions were driving the data collection, which was at the level of a survey. The data were used to produce analysis and research results that in turn were supporting policy decisions. Yet, this work did not have a supporting framework of a defined national population from which to draw the survey sample.

Public sector and private sector policy decisions in support of local food systems are driving an intensifying need for data. For example, the Tester Amendment to the 2011 Food Safety and Modernization Act of 2011 exempts local sales and direct marketing from certain provisions in an effort to reduce regulatory barriers to transactions. An exemption from federal government inspection of meat sold across adjacent state boundaries if inspected to federal standards by state agencies gives greater control to state governments to promote regional meat sales. Market promotions of locally sourced foods by private sector sellers from farmers market managers to Walmart is increasing the need for information about where that food will come from.

As a direct response to this policy decision push, the USDA-NASS included a content question in the 2012 Census of Agriculture to capture data needed to benchmark the size of the intermediated local foods market. Figure 6 shows the relationship between the direct to consumer sales and the intermediated market sales questions.

The image shows a portion of the 2012 Census of Agriculture questionnaire. A blue arrow points to question h. The form is divided into sections, with SECTION 33 titled 'DIRECT SALES FOR HUMAN CONSUMPTION'. Question 1 in this section asks about direct sales to individual consumers, with a table for 'Value of Sales (Dollars)'. Below the table is a field to 'Specify product(s)' and a 'No' option to go to SECTION 34.

h. Market products directly to retail outlets (including restaurants, grocery stores, schools, hospitals, or other businesses) that in turn sell directly to consumers? 1751 1 Yes 3 No

i. Have an on-farm packing facility for distributing vegetables, potatoes, fruit, nuts, berries or other crops? 1752 1 Yes 3 No

SECTION 33 DIRECT SALES FOR HUMAN CONSUMPTION

1. During 2012, did you produce, raise, or grow any crops, livestock, poultry, or agricultural products that were sold directly to individual consumers for human consumption?

INCLUDE - sales from

- roadside stands
- farmers markets
- pick your own
- door to door, etc.
- Community Supported Agriculture (CSA)

EXCLUDE

- craft items
- processed products such as cheese, butter, jellies, sausages, and hams
- wine and cider

		Value of Sales (Dollars)	
1409	1 <input type="checkbox"/> Yes - Gross value of these direct sales 0920	\$.00

Specify product(s) →

3 No - Go to SECTION 34

Figure 6. Positioning of Direct Sales and Intermediated Sales Questions in the 2012 Census of Agriculture

The intermediated sales question is in the Practices Section, where it can be used in conjunction with the direct sales questions to develop a population sampling frame for a follow-on survey of producers who sell through these marketing channels. Lessons learned from the Organic Production Survey and input from data users and policy makers have helped to streamline the development of the question and its placement in the 2012 Census of Agriculture.

Conclusions

Demands for data to analysis special populations of agricultural producers are growing. The most visible national interest currently is to obtain data that will support development and assessments of local food systems programs and policies. The dual push of public and private decision makers for new content in the Census of Agriculture has been observed previously in response to dramatic growth in organic production and consumption. As a result of self-analysis and experience with the organic data demands, USDA-NASS has refined its procedures for introducing new content, developing population frames, and getting subpopulation reports out to the public and private sector users who need the information for decision making. Responsiveness to the needs of policy makers while maintaining the integrity of the process, the reliability of the data, and the usefulness of the delivered products remain the goals of USDA-NASS in constructing and implementing the Census of Agriculture.

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