

# Advisory Committee On Agriculture Statistics

## SUMMARY AND RECOMMENDATIONS

Annual Meeting, November 2-3, 2017



**U.S. Department of Agriculture**  
National Agricultural Statistics Service

## Meeting of the Advisory Committee on Agriculture Statistics (ACAS)

November 2-3, 2017

**The Brown Hotel**  
335 West Broadway  
Louisville, KY 40202

### Members Present

Shawn Boyd	Barbara Foltz
Kim Brackett	Mark Hodges
Kellie Bray, Committee Chair	Sylvia Jensen
Jennifer Brown	John Newton
Jennifer Dempsy	Juli Obudzinski
Zachary Ducheneaux	Juan Tricarico
Ben Duncanson	Peter Wright-Clark
Nick Orsini, (Census Bureau <i>ex-officio</i> )	Gregory Pompeli, (Economic Research Service <i>ex-officio</i> )

### Members Absent

Doug Goehring	Brian Schilling
Marvin Miller	

### Advisory Committee Officers

Renee Picanso, Executive Director  
Bryan Combs, Designated Federal Officer

**United States Department of Agriculture  
National Agricultural Statistics Service**

**NASS Senior Executive Service Attendees**

Huber Hamer, Administrator  
Renee Picanso, Associate Administrator  
Kevin Barnes, Director, Western Field Offices  
Dan Kerestes, Director, Statistics Division  
Joseph Prusacki, Director, National Operations Division  
Barbara Rater, Director, Census and Survey Division  
Ron Thompson, Director, Information Technology Division  
Linda Young, Director, Research and Development Division

**Speakers**

Renee Picanso, Associate Administrator  
Hubert Hamer, NASS Administrator  
Barbara Rater, Director, Census and Survey Division  
Michael Valivullah, Chief Technology Officer, Information Technology Division  
Doris Hamilton, KY Industrial Hemp Pilot Program  
Dan Kerestes, Director, Statistics Division  
Linda Young, Director, Research and Development Division

**Scribes**

Lisa Ferguson  
Kate Moore  
Eric Stout

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# MEETING SUMMARY

## 1. Introduction

The Advisory Committee on Agriculture Statistics (ACAS) annual meeting was called to order by Committee Chair Kellie Bray on Tuesday, November 2, 2017, at 8:09 a.m. Present were 14 of the 20 ACAS members, two Committee *ex-officio* representatives, and eight Senior Executive Service staff members from the National Agricultural Statistics Service (NASS). Committee members, NASS staff, and meeting guests were asked to introduce themselves, after which Ms. Bray welcomed everyone to the meeting.

Renee Picanso, who serves as the Advisory Committee Executive Director, welcomed the ACAS members to the Louisville, KY, then discussed the Committee's purpose and duties and thanked the members who participated in the previous Advisory Committee meeting in November 2016.

Bryan Combs, Designated Federal Officer, reviewed the contents of attendees' packets, which included a Confidentiality Certification form (ADM-004), a current list of ACAS members, and presentation materials for the meeting.

Mrs. Picanso reviewed the Committee's function and responsibilities and reminded members that the duties are solely advisory. The Committee represents the views and needs of both users and suppliers of agriculture statistics; its charge is to advise the Secretary on the conduct of the periodic census of agriculture, other surveys, and the types of information to obtain from survey respondents. The Committee also makes recommendations regarding the content of agricultural reports. Mrs. Picanso discussed the mission of NASS, which is to provide timely, accurate, and useful statistics in service to U.S. agriculture.

NASS is responsible for administering USDA's statistical estimating program and the every-five-year Census of Agriculture, coordinating federal and state agricultural statistics needs, and conducting statistical research, including research for other federal agencies, state agencies, private organizations, and other countries. NASS does not:

- Set policy
- Regulate activities
- Permit influence
- Disclose individual records or
- Favor any group above others

## 2. State of NASS

Hubert Hamer, NASS Administrator, welcomed and thanked everyone for taking time out of their busy schedules to help NASS chart its future. He stressed the importance of the Advisory Committee in this endeavor.

Mr. Hamer provided an update on the Agency's budget and the outlook for future budget planning. Mr. Hamer noted that the Advisory Committee can help NASS define what its base programs should be. This would provide guidance for NASS in determining which programs to suspend - in the event of funding changes in agricultural estimates programs. Mr. Hamer also informed the committee of several NASS priorities for the coming year which included: data quality, adapting to changing demographics, employee engagement, utilizing new technology, improving communication and utilizing the latest technologies to gain efficiencies in the data collection process.

**Discussion:** In response to questions from Advisory Committee members related to the implications of the final 2018 budget and adjustments to survey programs Mr. Hamer explained that planning is always a central part of all management meetings and that discussions continue as the FY18 budget process moves forward. The committee was also interested in the respondent burden on the Census of Agriculture. Mr. Hamer explained that NASS receives a lot of feedback on the length of questionnaires and the type of questions asked. Respondent burden is a balancing act in adding new questions, since currently existing questions are still needed to supply key data items and can't be removed.

### **3. 2017 Census of Agriculture, Census Programs, and ARMS & Chemical Use Programs Update**

Barbara Rater, Director, Census and Survey Division, provided an overview of Census programs and products. Mrs. Rater detailed the recent Census of Agriculture production schedule, data collection strategy, and communications strategy. Content Test and the upcoming National Agricultural Classification Survey which helps to prepare NASS for the 2017 Census of Agriculture. In addition, Mrs. Rater covered the currently scheduled Census program activities for the next few years. The planned 2017 Census of Agriculture data products were also shared with the committee. These included the U.S. and State, Volume 1, Congressional District profiles, Zip Code tabulations, Watersheds, Race, Ethnicity, and Gender profiles, and Typology.

Mrs. Rater also provided an overview of the Agricultural Resource Management Survey and Chemical Use program. Mrs. Rater detailed the new structure of the NASS-ERS steering committee which was divided into 3 teams focusing on survey performance, new technologies, and training and marketing. In addition Mrs. Rater provided the upcoming schedule of commodities of interest and noted publication dates of May for Chemical Use and August for Farm Production Expenditures.

**Discussion:** The committee had several questions related to the mail out of the Census of Agriculture and the outreach efforts that were being considered. Mrs. Rater explained that NASS includes potential operation in the Census mail out, casting a wide net to help verify and confirm agricultural activity. She also explained the work NASS has done with community partners and stakeholders through speaking engagements, web promotion, testimonials and public service announcements. A laminated card which has simple points of why it's important to respond will be part of the materials provided to enumerators. The committee inquired about the Census Data Query Tool and was informed that it was a static dataset that

can be downloaded to access census data offline. The committee noted that NASS was a leader in utilizing Application Programming Interfaces (APIs) and should look into creating the Census Data Query Tool using this technology. The committee also had questions related to what would be published from the updated operator section of the questionnaire. Mrs. Rater explained that NASS has convened a panel to look at this topic and help inform how to best package this information.

The committee noted that it is sometimes difficult to communicate expenditure information captured in the ARMS survey and if there was a way to capture more ad-hoc expenditures that would better communicate the present financial situation of farmers. Mr. Pompelli representing the Economic Research Service (ERS) noted that the cost of doing these surveys for every commodity every year is prohibitive, but recognized that as practices change it can be difficult to keep up with. Mr. Pompelli recommended that the committee members encourage producer groups to work with NASS and ERS to help identify new cost categories during survey development time.

#### **4. Big Data**

Dr. Michael Valivullah, Chief Technology Officer, provided an overview of big data, explaining what big data is, its status in agriculture and how NASS might adapt to make use of and the big data movement in creating agriculture statistics. Dr. Valivullah, discussed with the committee the concepts of machine learning, deep learning and artificial intelligence. Dr. Valivullah also provided examples of automation and precision agriculture and its wide adaptation in agriculture. Dr. Valivullah also discussed a potential path for NASS moving forward and the need to invest in people, technology and set policies for utilizing big data.

**Discussion:** The Committee discussed who the owners of the data are when collected by sensors. It was noted that this is some of the policy that needs to be clarified but several farm groups are currently lobbying for policies that would identify farmers as the owners of any data collected by sensors. Mr. Orsini noted that the Census Bureau had similar challenges with other economic data and they were attempting to identify areas where data pools existed such as credit card data.

#### **5. SEAC Panel Discussion**

Members of the Supervisory Enumerator Advisory Council (SEAC) were asked to compile examples of shared the challenges they and their colleagues encounter while collecting survey data with the committee. Advisory committee members were asked to compile examples of how they utilize NASS data. The two groups held an active discussion on the challenges of collecting data and the various uses of the data by the committee members.

**Discussion:** Members of the Supervisory Enumerator Advisory Council (SEAC) shared the challenges they and their colleagues encounter while collecting survey data with the committee. The SEAC addressed common reasons for not participating such as too busy, distrust/dislike of government and you just contacted me with another survey. They also noted

that producers are worried that other government agencies will get the detailed information and use it for regulator or other none statistical purposes. The SEAC discussed how developing relationships with farmers and how endorsements from producer associations helps with getting survey participation. The group also noted the importance of having enumerators that are well trained and prepared so they are respectful of the producer's time is key to successful completion of surveys.

The ACAS members noted the following whys they utilized NASS data in their organizations:

- Use NASS data on a daily basis, ensure the Indian country has a voice in the farm bill discussions.
- Use NASS information on pasture, cropland, woodland acres for calculating tax offsets
- Use NASS data for advocating for farmers and ranchers to Congress and the legislative branch
- Use NASS data to tell the story, that farmers are being responsible, hard-working, and safe in producing food and agriculture products.
- Use NASS Census data for comparability in evaluating trade information and to validate economic data.
- Use NASS data for analyzing production practices, chemicals, and fertilizer uses for wheat production
- Use NASS data on organic agriculture and local food systems to provide tangible evidence of the market, the importance of cultivating this segment, and for designing programs and services
- Use NASS data to try to explain the situation farmers are experiencing to congressional staffers that are not necessarily familiar with agriculture. Use NASS data for business outreach and planning in controlling risk and other aspects of the lending process.
- Use specialty crop information at the county and regional level to understand what's being grown
- Watch grain stocks and livestock reports for current information. Acknowledged it's hard to break the association of NASS reports to market movements. Some producers view NASS as an extension of the mercantile exchange. Must be understood that NASS is statistical and has no political affiliation. Exchanges have gotten so far away from the producers and there is animosity.
- Use cattle on feed reports and crop yield projections for comparison and keeping up to date.
- Advocating for cotton producers and explaining how many producers there are and the acres that are out there.
- Use NASS data to answer questions from community leaders on planning for agriculture and to spatially visualize agricultural land and understand changes over time. Use farm size data in a forecasting model for land use and development trends.
- Cash rents are used for educational programs on how to lookup agricultural statistics when planning for how and where to start farming.

## 6. Strategic Planning Discussion

Committee members were provided four questions prior to the meeting and requested to develop responses to assist NASS in developing strategic goals. The committee was divided into small groups which discussed the questions and developed discussion topics to bring to the full committee. The questions asked were:

1. What is NASS doing right? (factors to consider as strengths or opportunities)
2. What actions might we consider if we know our budget in the next five years was going to be double?
3. What do you see as the important trends affecting agriculture that NASS needs to consider in our statistical programs?
4. In order to achieve success, what do we need to: do more of, change, do less of, or remove?

**Discussion:** The committee discussed each of the questions and provided the ranking information below for each of the questions.

1. What is NASS doing right? (factors to consider as strengths or opportunities)
  - a) Consistency of data (on time, accessible, reliable)
  - b) Confidentiality
  - c) API interface with QuickStats
  - d) Infographics and highlights
2. What actions might we consider if we know our budget in the next five years was going to be double?
  - a) Improve the online platform for data visualization and customized reports
  - b) Create incentives for producers to respond (personal dashboards, non-monetary)
  - c) Expand surveys (bringing back surveys and expand geographic scale)
3. What do you see as the important trends affecting agriculture that NASS needs to consider in our statistical programs?
  - a) Data security
  - b) Harness the data to produce reports that are understandable
4. In order to achieve success, what do we need to: do more of, change, do less of, or remove?
  - a) Retain and get talent
  - b) Address respondent burden

## 7. Public Comment Period

One individual requested to address the committee at the meeting. Mr. Richard Preston, corn farmer from Central Kentucky and a member of both the local corn and soybean associations. Mr. Preston noted his understanding of how NASS data is used in the calculation of ARC payments but that there is frustrations among farmers as they don't always understand how the process works. It was also noted that farmers do not always understand or follow the directions when reporting, he is aware of cases where the surveys are filled out to get a benefit and skipped when producers think yields are too high. Mr. Preston expressed concerns that the general public does not understand statistics and the margin of error. In the ARC program, the

margin of error gets magnified. More education would help and continued support from commodity associations is important.

Mr. Preston also noted basis concerns with using RMA data. He felt the most important think was communicating with producers that the government does care about a secure food supply and producer participation in NASS surveys is important to ensuring that food supply continues.

One written comment was provided following the meeting from Mr. Nathan Rosenberg, which is included in appendix D.

## **8. Modernizing Publications**

Dan Kerestes, Director, Statistics Division, discussed modernizing NASS publications with the committee. Mr. Kerestes explained the current challenges with our paper publication products specifically noting the need to make our products 508 compliant. Mr. Kerestes highlighted three options to the committee for consideration and comments. The first maintaining paper publications either in the current state or reducing the size, only highlighting major items in a paper format and making additional data available through QuickStats. The second was increase data visualization products available. The third was to create tailored data products which would allow for respondent to compare their data to historic data. The pros and cons of each option was discussed with the committee.

**Discussion:** The committee shared very positive comments surrounding updating QuickStats and creating products such as a dashboard to give back to producers. The committee had questions related to and concerns with data users being able to access information. Mr. Kerestes noted that the anticipation is that any highlights or small paper publications would include active links to pre-defined queries and data visualization products. The committee also suggested that NASS explore making the data easily available on mobile devices.

## **9. NAS Panel Briefing**

Linda Young, Director, Research & Development Division, presented the committee with a briefing on the summary of the National Academies of Sciences' (NAS) report on Improving Crop Estimates by Integrating Multiple Data Sources. The NAS panel was asked to examine multiple sources of data that could be used for improving the county-level estimates are potentially available, including NASS surveys, remotely sensed data, data from other agencies, and automated field-level data collected by farm equipment. The panel was asked to consider technical issues involved in using these data sources, such as methods for integrating the data, the assumptions underpinning the use of each source, the robustness of the resulting estimates, and the properties of desirable estimates of uncertainty. On Wednesday, October 11, 2017, the consensus panel issued its report, *Improving Crop Estimates by Integrating Multiple Data Sources*.

The NAS panel presented its major recommendations in terms of a vision for NASS in 2025. This vision has three components with multiple recommendations under each component. First, NASS should evolve its Agricultural Statistics Board (ASB) process so that county-level estimates based on models that incorporate multiple data sources, as well as uncertainty measures for the estimates, are presented to the ASB. The ASB would then be responsible for reviewing model-based predictions; macro-editing; and ensuring that models are continually reviewed, assessed, and validated. Second, the NASS list frame should become a georeferenced farm-level database, serving as a sampling frame for surveys and facilitating the use of farm data in statistical analyses. Third, NASS should acquire all georeferenced administrative and remotely sensed and ground-gathered data relevant to developing estimates and use these data to complement its survey data.

**Discussion:** Committee members had questions about how models were being developed and geo-referencing. The committee also noted concerns with getting livestock producers to report since remotely sensed data would not capture animal counts. Dr. Young explained to the committee that geo-referenced data allows us to know where farmers are on a map and the goal would be to link survey data with spatial data to get the best estimates possible. Dr. Young also noted that farmers are concerned over data security and that any geo-referenced maps would be protected and never map available to the public. Mr. Kerestes noted that for many livestock items NASS utilizes data from the Agricultural Marketing Service so there is not a need to contact producers for that information. NASS is continuing to explore other opportunities such as these to reduce burden on both crop and livestock producers.

## **10. Discussion and Drafting of Recommendations**

The Advisory Committee spent much of Friday, November 3, developing the committee's recommendations. The ten recommendations passed by the Committee are shown in the following section, along with NASS responses. Committee elections were held where Ms. Kellie Bray was elected as the committee Chair and Dr. Brian Schilling was elected as the committee Vice Chair.

## **11. Closing Remarks**

After the Committee discussed and passed its recommendations, Mrs. Picanso and Mr. Hamer thanked the members for volunteering their time to attend the meeting. Ms. Bray, as Committee Chair, called the meeting officially adjourned at 11:59 a.m. on Friday, November 3, 2017.

## ACAS 2017 RECOMMENDATIONS and NASS RESPONSE

**Recommendation No. 1.** The committee recommends that NASS Continue developing data visualization and other modernization efforts of their publications while maintaining current data products until databases, etc are updated. NASS should also ensure that products continue to be available for less tech savvy users.

**Background:** NASS has provided data to users via QuickStats and published reports for many years. However, since its conception new products and approaches have been developed that demonstrate the need for improvements to QuickStats.

**NASS Response:** As NASS works towards the goal of improving data visualization, stream lining publications, and improving QuickStats it will make sure that all data users have the products and information they need.

**Recommendation No. 2.** The committee recommends that NASS should provide the ACAS an analysis of the cost to the taxpayer attributable facilitating participation by operators who are reluctant, unwilling, or refuse to participate in the mandatory census and surveys conducted by NASS.

**Background:** Achieving adequate responses to surveys and the census is always a primary objective for NASS. A recent report by the Committee on National Statistics of the National Academy of Sciences documented declines in response rates. Declines were not universal, and some surveys experienced greater declines than others, but the phenomenon of declining responses is sufficiently widespread that it has generated growing concerns about the potential impacts. Along with other Federal Statistical Agencies, NASS has realized reduced response rates. The declining response rates for NASS surveys has led to increased analysis and research into determining the contributing factors, including costs. In 2016, NASS formed an internal team to address the many factors believed to be contributing to a general decrease in responses. The Response Rate Research Team has grown in scope to focus sub-teams on specific factors which include respondents' perspectives, opinions, beliefs, and attitudes about NASS surveys, services and promotional materials.

**NASS Response:** NASS is aware of the rising cost of non-response and have taken action to better understand and address this trend. For example, the Agricultural Resource Management Survey (Phase III) is one of the most costly surveys NASS administers because of the complexity and length of the study. Over the last 4 years, the average non-response rate for the ARMS Phase III survey is approximately 40%. The average data collection cost for those unwilling or refusing to participate in the survey is on average \$140 per sample. By contrast, the average data collection cost for completed surveys is approximately \$460 per sample. We are exploring different, more efficient sampling techniques and leveraging technology across all our census and survey programs that will help us achieve cost efficiencies, with better precision and smaller sample sizes.

**Recommendation No. 3.** The committee recommends that NASS should provide a map that includes estimated response rates at a state and county level as applicable for strategizing on targeted efforts to facilitate improved participation prior to the 2018 meeting.

**Background:** In recent years various NASS sponsored survey programs have experienced declines in survey participation rates. NASS implemented a Response Rate Research Team (RRRT) charged with identifying changes in NASS's processes that will lead to increased response rates and helping to move these changes into production. The RRRT serves an ongoing and active role in advising agency leaders with proposed improvements to systems/tools, survey preparation analysis, sampling procedures, and other appropriate aspects to improve survey participation rates.

**NASS Response:** NASS has identified four survey programs to create response rate maps for. These maps will be provided to the ACAS members for review and discussion at the annual meeting. In addition, a response rate map for the Census of Agriculture will be provided to the committee every 5-years.

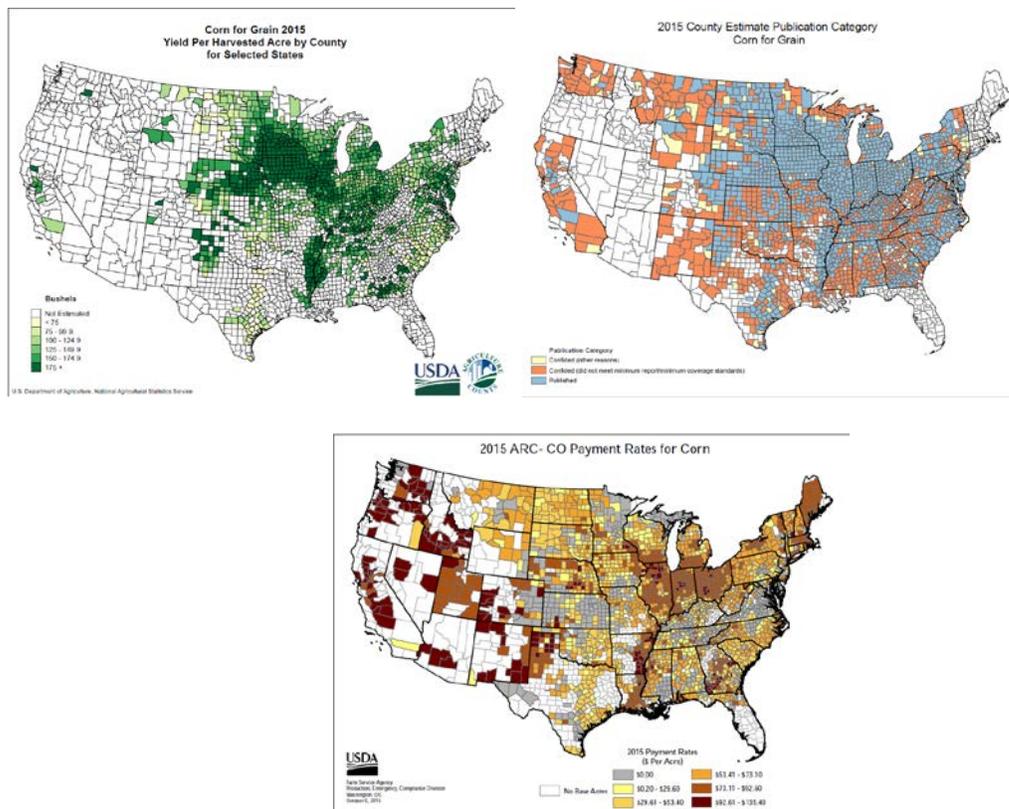
**Recommendation No. 4.** The committee recommends that NASS should provide an analysis or compilation of existing studies to the ACAS and for promotional purposes, to explain the impacts to individual producers and the industry as a whole that result from inaccurate, incomplete, or under-reported data. This analysis should include but not be limited to: market impacts, program payment impacts, insurance premium, and indemnity impacts, production planning impacts, and the impacts on consumer satisfaction.

**Background:** Within USDA, inaccurate statistics would have an adverse impact on policy evaluation and analysis. For example, the Economic Research Service uses NASS data extensively to provide official estimates of farm income, assets and debt of the farm sector. NASS data are also used to fulfill congressional mandates to report cost of production estimates for a number of commodities. Thus, NASS data are used to provide an accurate picture of the US farm economy. Using these data, farm programs can be evaluated, and economists can provide policy analysis to decision makers in the USDA, Congress and the White House. Inaccurate or incomplete data can result in either decisions made based on faulty information, or the inability to propose or initiate programs. The impacts are difficult to quantify.

**NASS Response:** If NASS statistics have unacceptably high levels of uncertainty or missing data, statistics may not be published. In some cases this may result in NASS being unable to publish statistics for small geographical areas. That is, state or national statistics may be available while county-level statistics may not be published. As an example, consider NASS county estimates program for corn, which provides point estimates that are used in setting payments for USDA's ARC-CO program. In Figure 1, the official map of corn for grain yield displays the county estimates published by NASS for the 2015 crop year. This information is contrasted with the map in Figure 2, which identifies counties as published or confided (not published—suppressed—to preserve confidentiality of the

respondents). The counties shown in blue correspond to the 1,433 individually published counties shown in Figure 1. The number of published corn for grain counties is considerably smaller than the total number of counties where collected data indicate the presence of corn (2,490 counties). NASS did not publish county-level estimates for the orange areas in Figure 2 because the counties did not meet established publication standards due to an insufficient number of responses from sampled farm operations; these are primary suppressions.

In order to avoid disclosure of unpublished county estimates (through simple arithmetical operations), NASS practices complementary suppression; that is, county estimates that may be fit for publication on their own merits are suppressed to protect the confidentiality of counties subject to primary suppressions. Thus, nonresponse in one county may result in suppression of other counties as well. These complementary suppressions are shown in blue in Figure 2. USDA’s Farm Service Agency must administer local programs even in counties that NASS suppresses. Figure 3 shows 2015 ARC-CO payment rates per acre of corn (Source: USDA Farm Service Agency). In counties not published by NASS, FSA will use other sources of data to establish benchmarks and references for these payments. These other sources (RMA yield, NASS district-level yields, and yields established by FSA’s state committees) vary in their specificity and representativeness for that purpose.



**Recommendation No. 5.** The committee recommends that NASS pursue non-monetary incentives for producers to complete surveys by providing responders with comparison data via a data dashboard.

**Background:** In the past, data users have been provided with paper reports that provided summarized results of a particular survey. These reports typically contain data tables and graphics depicting the results.

**NASS Response:** NASS will explore a data dashboard approach to provide data responders with their own data and a comparison to summarized data. This approach will allow data responders to see how they compare to other producers in their respective

**Recommendation No. 6.** The committee recommends that NASS explore leveraging the federal statistical system and partner with external organizations to produce new and/or enhanced data products.

**Background:** NASS has traditionally provided data via paper publications and QuickStats. These two forms of data transfer have served the industry and NASS well over the years. NASS has experience partnering with the Economic Research Service to provide maps from data collected for the Census of Agriculture.

**NASS Response:** NASS will explore the different data products produced by other federal statistical agencies such as the Bureau of Census, Bureau of Economic Analysis, and the Economic Research Service. This could possibly be tied into the work being done for Recommendation No. 1.

**Recommendation No. 7.** The committee recommends that NASS should incorporate the Tenure, Ownership and Transition of Agricultural Lands (TOTAL) survey into future data collection efforts and explore the possibility of increasing frequency, and continue to build additional data collection and reporting on farmland ownership, tenure, farm transition, and demographics into existing activities.

**Background:** The Census of Agriculture Program is conducted on a five-year cycle. As part of this cycle, NASS utilizes the responses from the census of agriculture to identify subpopulations in order to collect more detailed information in a Census Special Study. Following the 2012 CoA, NASS conducted the 2014 Tenure, Ownership, and Transition of Agricultural Land (TOTAL) Survey. This comprehensive study of all land rented out for agricultural purposes, including both land rented out by those who are themselves farmers and ranchers (operator landlords) and land rented out by those who do not operate a farm themselves (non-operator landlords) was done in partnership with ERS. NASS collected data by mail, personal interviews, and online from over 40,000 landowners across the United States. The last time these type of data were collected was in 1999 in the Agricultural Economics and Land Ownership Survey (AELOS). While the two surveys collected similar data, there were differences in how the surveys were sampled, conducted, and summarized.

**NASS Response:** NASS has plans to conduct the TOTAL Survey again in 2024. In consult with ERS and other stakeholders, it was determined that the span of 10 years between similar surveys would adequately reflect the changing landscape of farmland ownership. As with any Census Special Study, appropriate funding levels for the Census of Agriculture Program must be maintained to plan and execute the 2024 TOTAL

**Recommendation No. 8.** The committee recommends that NASS should increase reporting and explore the possibility of additional data collection on beginning, socially disadvantaged, veterans and women farmers in both existing and future census and survey products, which may include follow on surveys, collaborating with ERS on a special study, and making available predefined queries and special tabulations.

**Background:** NASS has strived to provide data on all facets of American agriculture. Following the 2012 Census of Agriculture, NASS engaged a panel of experts from across academia, government, and industry to provide input for the enhancement of demographic data for the 2017 Census of Agriculture. The current agricultural census collects information on beginning, veteran and women producers, and demographic data on up to four producers. The results from the enhanced demographic characteristics section will be available in February 2019.

**NASS Response:** NASS will investigate opportunities to expand the availability of beginning, socially disadvantaged, veterans and women farmer data products during the planning for the 2022 Census of Agriculture, and the follow-on survey work resulting from the 2017 Census of Agriculture. As data products are published, NASS will provide predefined queries to make data readily available for the demographic groups identified. NASS will continue to partner with the Economic Research Service to expand data availability through current, and potential future survey efforts.

**Recommendation No. 9.** The committee recommends that NASS continue to develop electronic data collection applications.

**Background:** NASS continues to be engaged in several initiatives to maximize benefits of technology to improve performance of applications, improve survey response rates, streamline business processes, improve engagement and user experience for respondents, and leverage Department IT Modernization efforts. NASS recently implemented a new responsive web data collection system for the Census of Agriculture. NASS saw an increase of over 62 percent in the total census forms received via the web compared to the 2012 Census of Agriculture. This new system provides an enhanced web experience for agricultural producers responding to the census and NASS surveys which reduces burden while also improving data quality. Responsive web designed forms improve usability, dynamically format the questionnaires to fit any device and embrace industry best practices for survey questionnaires and website designs. The new web forms improve usability for smart phones and other mobile devices while maintaining Section 508 compliance.

**NASS Response:** The transition to responsive web forms using the new system is in full

swing for all NASS surveys, with full implementation expected to be completed the summer of 2019. NASS is currently using emails for outreach and to promote select surveys. However, we are exploring ways to use the latest technology to streamline procedures for using emails and text messages to improve respondent engagement and data dissemination. This includes conducting pilot studies and working to leverage Department IT Modernization efforts.

## APPENDICES

- A. Agenda: 2017 ACAS Meeting
- B. 2016 Recommendations and NASS Response
- C. Summary of the National Academies of Sciences' Report: Improving Crop Estimates by Integrating Multiple Data Sources
- D. Public Comments

### 13. Appendix A

Thursday, November 2, 2017		
Time	Agenda Item	Presenter
8:00 am	Call to Order and Welcome	Kellie Bray
8:05 am	Introductions and ACAS Committee Overview	Renee Picanso
8:15 am	Meeting Overview	Bryan Combs
8:30 am	' <i>State of NASS</i> ' Address	Hubert Hamer
9:00 am	Census of Agriculture/Census Programs/ARMS & Chemical Use	Barbara Rater
9:20 am	Discussion	
9:30 am	Big Data	Michael Valivullah
10:00 am	BREAK	
10:15 am	SEAC Panel Discussion*	Moderator – Field Operations
11:30 am	Strategic Planning Activity*	Moderator - Kellie Bray
12:00 pm	<b>Lunch</b>	
12:45 pm	Strategic Planning Activity - Continued	
1:15 pm	Discussion	
1:50pm	<b>Break</b>	
2:00pm	Overview of KY Industrial Hemp Pilot Program	Doris Hamilton
2:20pm	Depart Hotel for Tour	Dave Knopf
4:30 pm	Return to Hotel from tour	Committee
5:00 pm	Day 1 Wrap-up	Committee

**Friday, November 3, 2017**

<b>Time</b>	<b>Agenda Item</b>	<b>Presenter</b>
8:00 am	Recap and Review of Previous Day	Renee Picanso
8:15 am	Public Comment	
9:00 am	Modernizing Publications	Dan Kerestes
9:15 am	Discussion	
9:30 am	NAS Panel Briefing	Linda Young
10:00 am	BREAK	
10:15 am	Drafting Recommendations	Committee
11:15 am	Presentation of Recommendations and Committee Chairperson Elections	Kellie Bray
11:45 am	Wrap Up	Renee Picanso
12:00 am	Adjourn	

## 14. Appendix B

### ACAS 2016 RECOMMENDATIONS and NASS RESPONSE

**Recommendation No. 1:** The committee recommends that NASS Continue exploring the use of “big data” to improve and supplement their surveys, including web scraping, remote sensing and administrative data. In addition, we recommend that NASS investigate cooperating with outside big data providers (Google, ClimateCorp, John Deere, Case IH, Google, Grocery Manufacturers Association, National Restaurant Association, etc).

**Background:** The availability and uses of big data have greatly expanded in recent years. NASS is using several big data sources, but needs to continue to explore big data options and set priorities within the agency’s resources. NASS has been a leader in the use of remote sensing data, and its program was complimented in the recent USDA JASON report. However, more opportunities in remote sensing and other areas exist. NASS has used web scraping, administrative data, and remotely sensed data in urban agriculture, organics, horticulture, and local foods. These emerging sectors of agriculture tend to be comprised of operations that are smaller, more diverse, and more transient than the more traditional farms that tend to be in rural areas.

**NASS Response:** NASS is establishing an “Alternative Data Team” with the purpose of identifying new and innovative ways to use alternative data sources that will lead to reduced respondent burden, increased efficiencies, and higher quality estimates. This team will investigate big data sources to determine their availability, feasibility, and value.

**Recommendation No. 2:** The committee recommends that NASS Continue developing “smart” web forms to collect data along with customizing them for their target users.

**Background:** The Response Rates Research Team (RRRT) is currently researching various options (including the “Omnibus” survey concept) that would allow NASS to customize multiple survey instruments for individual respondents. This research along with other endeavors that have been initiated by the team have been targeted toward reducing respondent burden and survey cost through use of improved survey methodology and advances in data collection technology.

**NASS Response:** The Response Rates Research Team (RRRT) is working on a Specialty Commodity Omnibus Survey that would take a number of single fruit and vegetable surveys into one or two Omnibus surveys. This would require the team to connect those specialty commodities with similar marketing dates to align with similar forecasting and final publication reporting dates. The team is exploring the possibility of surveying all specialty commodity operators twice a year. We are targeting the 2018 Specialty Commodity season to test this concept. The Specialty Commodity Omnibus Survey will be the stepping stones for the ultimate 2022 Omnibus Survey that would consist of combining the December APS Survey, Row Crop CAPS Survey, January Cattle Survey, January Sheep and Goats Survey, and the 2022 Census of Agriculture Survey. The premise of this Omnibus Survey would be one instrument to collect data for all these surveys and distribute the necessary data to the appropriate summarized publication. The RRRT will provide NASS staff with an update on their research efforts and will engage stakeholders at the appropriate time.

**Recommendation No. 3:** The committee recommends that NASS consider exploring alternatives to the full 5-year agricultural census, including a model with an abbreviated form from census years and an extended form every year to a random sample of respondents (similar to the decennial Census and American Community Survey).

**Background:** NASS conducts the Census of Agriculture every five years, in years ending in 2 and 7. The 2012 Census of Agriculture form consisted of 24 pages. Although the 2017 Census of Agriculture form will be 24 pages long, a short version of 16 pages will be sent to some farmers and ranchers. Given that the forms are sent to about three million people, the Census is a large burden on the agricultural community.

**NASS Response:** Through its Response Rate Review Team (RRRT), NASS is exploring numerous options to reduce respondent burden. A shortened Census of Agriculture form would greatly reduce burden. The challenge is to ensure that NASS is able to provide the same, or more, quality estimates using an alternative approach. In particular, one of the most valued products from the Census is the county-level profiles. Because farms are sparser than people, it is not immediately evident that these profiles could be provided with an alternative approach. That said, NASS does plan to begin exploring alternatives to the full 5-year agricultural census.

**Recommendation No. 4:** The committee recommends that NASS pilot a benchmark data set which would only be available to survey respondents on a survey of NASS's choice.

**Background:** NASS has over 100 years' experience collecting agricultural statistics, hence we have very large, complex data sets at our disposal. Modern big data analytics tools present an opportunity for NASS to examine ways to use these data sets and develop tools that will provide our survey respondents "value added" for responding to our surveys, such as creating dashboards on data that can provide direct benefits to respondents. Some of the challenges of using big data to providing respondents data sets include data capture, visualization and information privacy.

**NASS Response:** USDA (REE Mission Area) has formed a team to examine opportunities with an infrastructure bill (verify team name and purpose). NASS has a representative on this that can work with other USDA agencies to find ways to use big data to help NASS better harness our data sets and identify opportunities to provide producers data products.

**Recommendation No. 5:** The committee recommends that NASS consider utilizing a professional speaker to represent NASS at meetings and conventions around the U.S. This would be someone who is very engaging and utilizes cool and informative NASS statistics to tell the story and encourage people to report and utilize a variety of approaches to publicize NASS and the importance of the data.

**Background:** NASS has and seeks many opportunities to speak with stakeholders, producers and policy makers throughout the year and across the United States. These opportunities range from small, local ag-related meetings to very large, national ag-conferences. NASS has many people who can and do routinely speak to these groups as part of their job. Representing NASS at these events and communicating benefits of responding to surveys and of using NASS data is part of the job for many. Not everyone is a natural public speaker nor do they necessarily have public speaking/presentation training.

**NASS Response:** Hiring a professional speaker to present on behalf of NASS is not realistic given budgets and content expertise needed. One way to improve presentations would be to hire a public speaking coach to give staff most likely to be speaking to groups training in public speaking and presentation best practices. Related training could be part of individual professional development plans for all staff.

**Recommendation No. 6:** The committee recommends that NASS working through the County Estimates Panel take additional steps to increase the number of county-level published estimates for production of specific agricultural commodities and cash rental rates, including modeling or revisiting publication standards.

**Background:** In the Agricultural Act of 2014, FSA was charged with administering the Agriculture Risk Coverage (ARC-CO), which provides revenue loss coverage at the county level. NASS's estimates of yield, acreage and production are to be used to set the ARC-CO guarantee level, if they are available.

NASS was directed through the 2008 Farm Bill to collect cash rents data for use by the Farm Service Agency (FSA) in program administration. The Food, Conservation, and Energy Act of 2008, Section 2110, states, "The Secretary (acting through the National Agricultural Statistics Service) shall conduct an annual survey of per acre estimates of county average market dry land and irrigated cash rental rates for cropland and pastureland in all counties or equivalent subdivisions within each state that have 20,000 acres or more of cropland and pastureland." In the Agricultural Act of 2014, the frequency with which the survey is to be conducted was changed to "not less frequently than every other year."

NASS publishes only estimates that meet its publication standards, which has led to estimates not be published for numerous counties in support of each of these programs.

**NASS Response:** At the request of NASS, the National Academy of Sciences and Engineering's Committee on National Statistics has convened a panel to review the statistical methodology underlying both the county-level cash rents estimates and the county-level estimates of acreage, yield, and production. The review includes the publication standards and the potential use of modeled estimates in combination with survey estimates and alternative data sources, such as remotely-sensed data. The last meeting of the panel is to be held in 2017, and it is anticipated that the consensus report will be provided to NASS in 2018. NASS plans to explore all of the panel's recommendations in its continuing efforts to produce as many reliable county-level estimates as possible.

**Recommendation No. 7:** The committee recommends that NASS work with the National Association of County Agricultural Agents and similar groups to (1) inform and educate personnel about the nature and importance of NASS data collection efforts and (2) have personnel encourage producer participation.

**Background:** The NASS structure consists of a full-time outreach position in each State (the New England States and Maryland/Delaware are combined and covered by one person each). This position is primarily responsible for maintaining external relations with the State Department of Agriculture, our data users, providers, and state-wide partners. This includes the Extension service

and County Agricultural Agents. As part of this outreach, the individual participates in and presents at many conferences each year. These include producer and industry meetings.

**NASS Response:** In an effort to improve response and as a result of this suggestion, the State Statisticians who encumber these outreach positions have been charged to ensure their efforts reach beyond the State level contacts. Specifically, during 2017 it has been made a performance priority to ensure outreach extends to the County level. NASS will also ensure attendance at the National Association of County Agricultural Agents (NACAA) annual meeting in Salt Lake City, UT from July 9-13, 2017.

**Recommendation No. 8:** The committee recommends that NASS continue its organic data collection activities including the organic producer survey. Additionally, the committee recommends that NASS and RMA continue to work together to ensure that data collected by NASS is able to be fully utilized by RMA in order to develop additional organic price elections for organic producers as required by the 2014 Farm Bill.

**Background:** NASS completed four [Organic Producer Surveys](#) between 2001-2017 (two surveys in partnership with RMA), providing important information on the size of the organic market, farm gate prices, and production practices. This information is key to creating appropriate risk management and disaster assistance programs. NASS also completed a census of organic certifiers to estimate the number of certified organic acres, livestock head, and other data on the size of the US organic sector. NASS and the Animal and Plant Health Inspection Service (APHIS) collaborated to collect data on economic losses to organic producers due to the presence of genetically engineered material, the first nationally-available data source on the issue.

**NASS Response:** The 2016 Certified Organic Survey is part of NASS's Organic Program and is funded by the USDA's Risk Management Agency. The primary purpose of the survey is to collect acreage, production, and sales data for a variety of certified organic crop and livestock commodities at the commodity level. Participation in the survey is voluntary and release of the results is expected for September 2017. If funding allows, the 2019 Organic Survey will be conducted as a follow-on survey to the 2017 Census of Agriculture. Participation would be mandatory and release expected for late 2020.

**Recommendation No. 9:** The committee recommends that NASS expand coverage and sampling for diverse sectors of agriculture (including small, urban, local food, beginning farmers, veterans, socially disadvantaged) in future NASS data collection activities such as Census and ARMS, in addition to continuing the Local Foods Marketing Survey in future years to allow for trend data.

**Background:** NASS is examining the practice of web scraping or web crawling techniques to identify non-traditional agricultural farms to improve coverage of our list sampling frames. Web scraping is an automated process for harvesting large amounts of data from websites

**NASS Response:** In 2016, NASS partnered with a private company to develop software, integrate data sources, and produce recommendations that will help USDA improve awareness and accountability of the local food market and urban farms. The effort will evaluate and implement new technologies to harvest open source information to identify urban farms, farming entity providers to farmers markets, roadside stands, Community Supported Agriculture (CSA) initiatives and restaurants that in turn directly sells to consumers in local markets.

**Recommendation No. 10:** The committee recommends that NASS continue collecting data on the costs of Food Safety Modernization Act (FSMA) compliance and continue to work with ERS to share these findings with producers and other stakeholders.

**Background:** In 2015, NASS partnered with ERS to conduct the Produce Post-Harvest Microbial Food Safety Practices Survey (PPHMFSPS). The purpose of the PPHMFSPS was to assess the levels of food safety awareness, sanitation, and post-harvest practices used by various agribusinesses; including canners, chippers, dehydrators, fresh cut processors, packers, juicers, peelers, picklers, etc. Research from this survey will examine the effects of the Food Safety Modernization Act (FSMA) across fresh produce supply chains.

**NASS Response:** By 2018, FSMA guidance documents will be complete and regulations will have been implemented for firms across size categories. Produce growers, buyers, and consumers will be operating under the new risk-based food safety system established by FDA. To fully track the implications of the new system and answer policy-relevant food safety questions, ERS, in partnership with NASS, is in discussions to conduct follow-up surveys on produce food safety practice with initial efforts beginning in Fiscal Year 2018 if funding becomes available.

## 14. Appendix C

### **Summary of the National Academies of Sciences' Report: Improving Crop Estimates by Integrating Multiple Data Sources**

#### **Background**

In September 2014, NASS entered into a cooperative agreement with the Committee on National Statistics of the National Academies of Sciences, Engineering, and Medicine (NAS) to assess the data and statistical methods underpinning the county-level crop and cash rents estimates and to offer recommendations on methods for integrating data sources to provide more precise county-level estimates of acreage and yield for major crops and of cash rents by land use. NASS periodically requests reviews of its programs and seeks recommendations for improvement. A panel recently provided recommendations for publishing results from the revised decision-making questions in the 2017 Census of Agriculture. Active NAS panels are reviewing livestock estimates and farm structure.

Multiple sources of data that could be used for improving the county-level estimates are potentially available, including NASS surveys, remotely sensed data, data from other agencies, and automated field-level data collected by farm equipment. The panel was asked to consider technical issues involved in using these data sources, such as methods for integrating the data, the assumptions underpinning the use of each source, the robustness of the resulting estimates, and the properties of desirable estimates of uncertainty. On Wednesday, October 11, 2017, the consensus panel issued its report, *Improving Crop Estimates by Integrating Multiple Data Sources*.

#### **Primary Components of Recommendations**

The NAS panel presented its major recommendations in terms of a vision for NASS in 2025. This vision has three components with multiple recommendations under each component. First, NASS should evolve its Agricultural Statistics Board (ASB) process so that county-level estimates based on models that incorporate multiple data sources, as well as uncertainty measures for the estimates, are presented to the ASB. The ASB would then be responsible for reviewing model-based predictions; macro-editing; and ensuring that models are continually reviewed, assessed, and validated. Second, the NASS list frame should become a georeferenced farm-level database, serving as a sampling frame for surveys and facilitating the use of farm data in statistical analyses. Third, NASS should acquire all georeferenced administrative and remotely sensed and ground-gathered data relevant to developing estimates and use these data to complement its survey data.

#### **NASS Perspective**

NASS is pleased that the panel's recommendations are consistent with the vision the agency has for producing county-level estimates that are both more precise and published for more counties. The ideas presented in this report can also be used to enhance programs other than those focusing on county estimates. As the NASS models mature, the ASB is increasingly

relying on modeled estimates; thus, the Agency has been moving in a direction consistent with the report. In September, NASS Administrator Hubert Hamer signed a decision memo signifying the start of NASS's efforts to associate geospatial coordinates with each farm on the NASS list frame as in the second point above. Finally, NASS has been increasingly acquiring and using some administrative and remotely sensed data. The Agency is striving to move the current and other big data, such as data automatically collected from farm equipment, to a cloud environment so that these massive amounts of data can be fully integrated to produce more precise estimates. In summary, the panel's recommendations provide a roadmap that will enable NASS to move toward fulfilling its vision of evolving its processes so that it will continue to be the leading source of unbiased US agricultural statistics. The direction is clear. The rapidity with which NASS makes progress depends on resources.

## **15. Appendix D**

### **Public Comments**

Written public comments were received from Nathan Rosenberg during the two week period following the committee meeting. Items submitted are included below:

November 1, 2017

Advisory Committee on Agriculture Statistics  
National Agricultural Statistics Service  
Room 5041 - South Building  
1400 Independence Avenue, SW  
Washington, DC 20250

Dear Committee members:

I am writing this letter to encourage the Advisory Committee on Agriculture Statistics to work with NASS to ensure that the data on zero-sales farmers—who now make up almost a quarter of all farmers in the Census of Agriculture—more accessible. I have attached a peer-reviewed article recently published in the *Food Systems Journal* that includes, for the first time, data on zero-sales farmers from 1982 to 2012.

As the article discusses, the number of zero-sales farmers quadrupled between 1992 and 2002, profoundly shaping how researchers and practitioners have viewed a number of issues, including land consolidation, farm demographics, and farm income. But, as discussed in the article, most zero-sales farmers are not new—they were just much less likely to be counted and reported in the agricultural census prior to 2002. So many of the trends we *thought* had occurred between 2002 and 2012, it turns out, resulted in large part from methodological changes rather than real-world ones.

These methodological changes were positive—the Census of Agriculture is much more accurate now than it was before NASS inherited it in 1997. Nonetheless, NASS should discuss these changes—and how they affect reported results—when discussing or releasing agricultural census data. The Census Bureau, for example, highlights methodological changes to the American Community Survey whenever it discusses the ACS, including in press releases.

Zero-sales farmers are a group with distinctive motivations, services, and needs and practitioners, researchers, and policymakers need to be able to identify and better understand the characteristics of zero-sales farmers in their communities. To this end, USDA should release additional information about its system for classifying properties with zero sales as farms, include additional questions in the agricultural census on operator goals and household finances, and introduce a zero-sales category in the census results. The last recommendation is long overdue: if adopted as a sales category, zero-sales would be the largest in the census and more than twice as large as the next largest category.

Sincerely,

Nathan Rosenberg

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## Farmers who don't farm: The curious rise of the zero-sales farmer

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### Abstract

While researchers have extensively studied the growth in the number of small farms between 1982 and 2012 reported in the Census of Agriculture (COA), there has been little discussion of trends among farm operators who do not sell any agricultural products. Using previously unreleased COA data collected between 1982 and 2012, this research empirically examines these “zero-sales farmers” for the first time. There was a large increase in the number of zero-sales farmers from 104,000 in 1982 to 466,000 in 2012, as well as a remarkable rise in their share of the farming population, from 5 percent in 1982 to 22 percent in 2012. Women and minority farmers were disproportionately likely to be zero-sales operators: at least 30 percent of women, Native American, and black farmers reported no sales in 2012. Older and beginning farmers were also more likely to report zero sales in 2012 than younger and experienced

ones, respectively. Zero-sales farmers dramatically influenced recent census data on farm income, farm size, and operator age, among other results, due to their substantial share of the overall population. In order to effectively utilize COA data, practitioners, policymakers, and researchers should include zero-sales farms in their analyses. There are several steps the U.S. Department of Agriculture (USDA) can take to make information about zero-sales farmers more readily available and widely understood, such as introducing a zero-sales category in the census results.

### Keywords

Agriculture; Census; Census of Agriculture; Farmers; Women Farmers; Beginning Farmers; Black Farmers; African American Farmers; Small Farms; Hobby Farms; Zero Sales

### Introduction

The verb “farm” has long been associated with commercial activity. When the word first appeared in writing in the 15<sup>th</sup> and 16<sup>th</sup> centuries, it meant to acquire the rights to something temporarily—often

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but not exclusively land—for a fixed payment or, inversely, to assign one’s property rights to another temporarily in exchange for a fixed payment, a meaning which has survived in the contemporary phrase “to farm out” (*Oxford English Dictionary Online*, 2017). Thus, when Richard II says that he is “enforc’d to farm our royal realm” to raise revenue in Shakespeare’s *King Richard the Second* (Shakespeare, 1623/2012, 1.4.45), he means that he must rent or lease out the land, not that he must use it for agricultural production (*Oxford English Living Dictionaries Online*, n. d.). It was not until the early 19<sup>th</sup> century that the word began to be used in recorded speech to refer to the cultivation of one’s own land (*OELD Online*, n. d.).

Today, the Oxford American College Dictionary defines the verb “farm” as to “make one’s living by growing crops or keeping livestock” (*OELD Online*, n.d.). While there is widespread awareness that many farmers today cannot or do not make a living from farming, it is still generally regarded as an act conducted for income. The Census of Agriculture (COA) appears to adopt this view, defining “farm” as “any place from which [US]\$1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the year” (USDA, National Agricultural Statistics Service [USDA NASS], 2014a, Appendix A, 1). In recent years, however, after significant changes in COA methodology and implementation, the census has reported rapid increases in the number of zero-sales farms—farms that do not sell any agricultural products.

Conducted every five years, the COA is the most comprehensive government survey of any industry in the country. It is used by policymakers, advocacy organizations, academics, and others to understand economic and demographic characteristics of the country’s farms, and to develop, implement, and evaluate programs and policies. Despite its prominence, a number of researchers have argued that COA counts of minority, women, and small-scale farmers are inaccurate. An analysis of Georgia tax digests, which provide a more complete account of land ownership than the COA, estimated that the 1920 census undercounted black-owned farmland in Georgia by about 27 percent and the 1959 census by about 49 percent

(Fisher, 1978). Spot checks made in North Carolina and Mississippi after the 1969 COA suggested that the census may have undercounted black-owned farmland by as much as 30 percent (Salamon, 1976). A study of black farmers in a Mississippi Delta county concluded that while the 1997 COA was more accurate than previous censuses, it nonetheless excluded 27 percent of the black farmers surveyed in the study because they sold less than US\$1,000 in agricultural products and thus did not meet the COA definition of farmer (Wood & Gilbert, 2000). While most studies of undercounting are of black farmers, researchers have also found that women and other minority farmers have been undercounted. Until 2007, the COA counted all farms within each Native American reservation as a single farm, which led to severe undercounts (Bartecchi, 2009; USDA NASS, 2009).<sup>1</sup> Women operators are disproportionately more likely to operate small-scale farms (Sachs, Barbercheck, Braiser, Kiernan, & Terman, 2016), which has contributed to their being undercounted in the COA.

The COA has become more accurate in recent years, but this has masked real trends in the number of farms. When the USDA statistical division, the National Agricultural Statistics Service (NASS), replaced the Census Bureau as the administrator of the COA in 1997, the survey became more accurate (Gilbert, Sharp, & Felin, 2002). Gilbert, Sharp, and Felin argue that this improved accuracy created a “false ‘trend,’” in which the number of black farmers appeared to stabilize or even increase, although the actual number likely decreased in the 1990s (Gilbert et al., 2002, p. 5). Changes made to COA sampling procedures in 2002 increased the number of small-scale farms (as measured by sales) reported in the census, skewing COA averages (Duffy, 2008). As discussed below, changes to the COA adjustment methodology were also implemented in 2002, and then again in 2012, further

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<sup>1</sup> USDA conducted a pilot project during the 2002 COA to collect and publish data on individual farms and ranches on Native American reservations in Montana, North Dakota, and South Dakota (USDA NASS, 2004). Data on farms and ranches on reservations in other states were not collected, however.

increasing the number of minority, women, and small-scale farmers reported by the census. While Gilbert, Sharp, and Felin limited their discussion to black farmers, the same “false ‘trend’” appears to exist for other groups disproportionately likely to operate small-scale farms. A 2013 USDA report on women farmers compared COA data from 1982 and 2007 and found that zero-sales farms had increased fivefold—almost twice as fast as any other sales class during that period (Hoppe & Korb, 2013). The authors also found that almost 60 percent of the increase in women farmers between 1982 and 2007 was due to the growth of zero-sales farms (Hoppe & Korb, 2013).

This article builds on previous research by demonstrating the important role that zero-sales farms have played in recent COA trends. The rapid growth of zero-sales farms counted in the census has had a sizable impact on COA results, particularly on income averages, and on data on women and minority farmers. Prior to this article, however, data on zero-sales farmers were generally unavailable, making it difficult to assess the impact of those farms on census results. This article provides an in-depth evaluation of data on zero-sales farms for the first time.

### Data Sources

After initially withholding the data due to confidentiality concerns, NASS provided the author with the total number of principal operators reporting zero sales for each of the seven censuses conducted between 1982 and 2012. In addition, NASS released data to the author from the 2012 COA on the following characteristics of principal operators with zero sales: race, ethnicity, and gender identity; age; and years of operator experience.<sup>2</sup>

A literature review found that the USDA has only released data on zero-sales farms twice prior to this article. A 1951 USDA Bureau of Agricultural Economics paper on operator income included the number of zero-sales farms counted in the 1945 COA and a smaller survey conducted in 1947 (Koffsky & Lear, 1951). Its results are

briefly discussed below. As mentioned above, a 2013 report by the successor to the Bureau of Agricultural Economics, the USDA Economic Research Service, also included data on the number of zero-sales farms by gender in the 1982 and 2007 censuses (Hoppe & Korb, 2013).

### Results

The following section shows the total number of principal operators with zero sales for each COA between 1982 and 2012, and discusses how changes in the COA contributed to the recent rise of zero-sales operators, with an analysis of demographic characteristics of zero-sales operators in the 2012 COA across the three broad categories stated above.

*Historical Trends:* Between 1982 and 2012, the number of principal operators with zero sales rose considerably, as did their share of the farming population. A 1951 Bureau of Agricultural Economics paper on operator income, which included the percentage of farms reporting zero sales in 1945 and 1946, found that the share of principal operators in the COA with zero sales was much lower in the mid-20<sup>th</sup> century than it is today. In 1945, the first year for which data are available, zero-sales farmers accounted for 9 percent of all farmers (Koffsky & Lear, 1951). A follow-up sampling survey conducted by the Bureau of Agricultural Economics in January of 1947 found that 7.4 percent of farmers reported zero sales in 1946 (Koffsky & Lear, 1951). Although changes in sample size and methodology may account for some of the difference between the 1945 and 1946 results, the number of zero-sales farms reported in the 1945 COA may have also been abnormally high due to the wartime exodus of farmworkers and farmers into the military and industrial front (Carpenter, 1997).

In 1982, the next year for which data are available, zero-sales farmers made up 5 percent of all operators. Their share of the farming population changed little over the next 10 years: the 1992 COA reported 108,000 zero-sales operators, making up almost 6 percent of the total. This share rose to 9 percent in 1997, however, and by 2002, the COA included 449,000 zero-sales operators—21 percent of the total farming population. As

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<sup>2</sup> The data are available from the author by request. They can also be retrieved from the NASS Data Lab by requesting special tabulations 23377 and 23378.

shown in Figure 1, the censuses in 2007 and 2012 reported similar totals. The 2012 COA reported 466,000 zero-sales operators, which accounted for 22 percent of all principal operators.

The dramatic increase in zero-sales operators is due in part to changes made to the COA's adjustment methodology beginning in 2002. In contrast to decennial census results, COA data are adjusted after the enumerative count. The USDA uses sampling surveys and other methods to establish estimates on census-eligible properties that were either not counted or miscounted, and then adjusts the data accordingly.

Prior to the 2002 COA, the USDA only adjusted data for nonresponses. The agency used databases, surveys, and, occasionally, telephone calls and in-person visits to estimate the characteristics of farm operators that failed to return census forms (USDA, NASS, 1999, Appendix C). These estimates were then used to modify collected data, increasing COA accuracy. As a result, a significant number of the farms reported in the census results never actually filled out a census form. In 1997, for example, 12 percent of the farms included in the final census report were added to adjust for nonresponses (USDA NASS, 1999, Appendix C).

The USDA added a new element to their adjustment methodology for the 2002 COA. In addition to accounting for nonresponses, the USDA began making "coverage adjustments"—adjustments intended to account for farms it had missed (USDA NASS, 2004, Appendix C).<sup>3</sup> About 30 percent of the farms in the 2002 COA were added in the adjustment phase: 12 percent for nonresponses and 18 percent for the coverage adjustment (USDA NASS, 2004, Appendix C). Similarly, 31 percent of the farms in the 2007 COA were added in the adjustment phase (USDA NASS, 2009, Appendix A). In 2012, the USDA added a third component to the adjustment phase: misclassification. The misclassification adjustment

modifies the data for properties that were mistakenly classified as farms or nonfarms (USDA NASS, 2014a, Appendix A). As a result, the percentage of farms reported in the COA that was due to adjustments rose to 35 percent, with 16 percent of the total added to account for nonresponses, 12 percent from the coverage adjustment, and 6 percent due to misclassification (USDA NASS, 2014a, Appendix A).

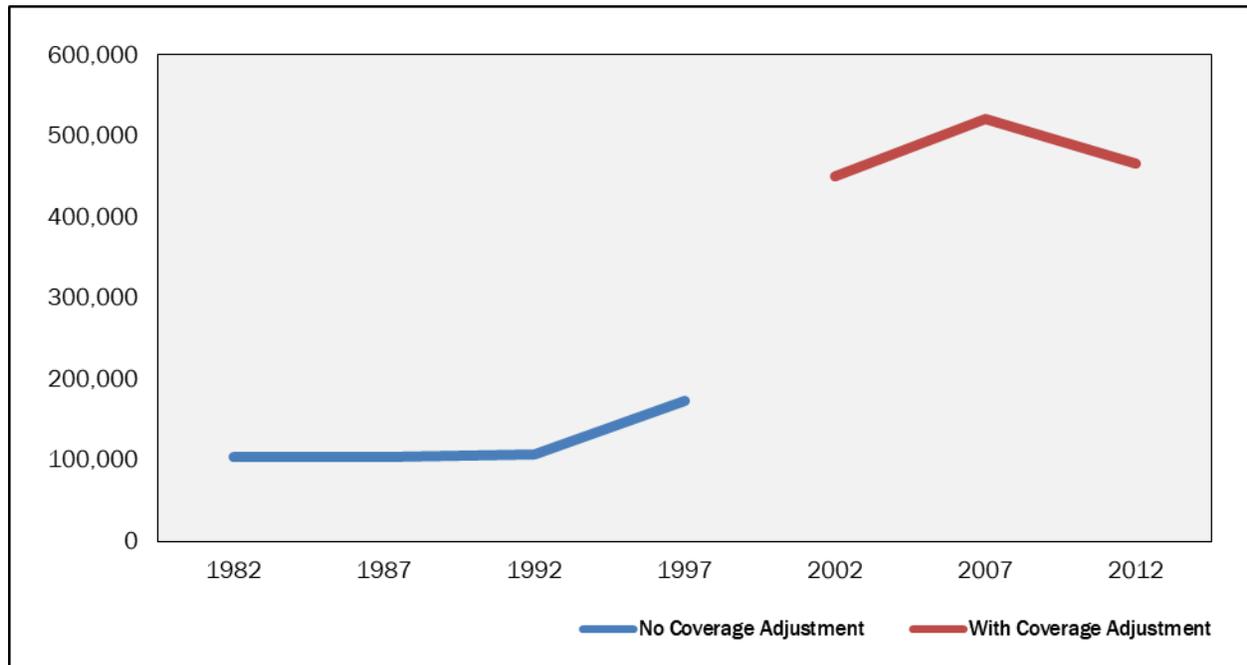
As Figure 1 demonstrates, these COA changes coincided with a massive increase in the number of principal operators reporting zero sales. In 2002, when the coverage adjustment was added, the number of zero-sales operators jumped 160 percent from the previous COA in 1997. While we do not know exactly how many of the 277,000 "new" zero-sales operators reported in 2002 were added due to the coverage adjustment—and will not know, unless the USDA releases these data—we do have such data for operators with sales below US\$1,000. As a result, we can calculate how many were added due to changes in adjustment methodology. This is significant since the <US\$1,000 sales category largely comprises principal operators with zero sales: almost 80 percent of the farmers in this category were zero-sales operators in 2002.

Figure 2 shows the total number of principal operators with sales below US\$1,000 from 1982 to 2002. Then, from 2002 to 2012, it shows the number of principal operators with sales below US\$1,000 both with the coverage adjustment and without it (operators added due to the misclassification adjustment are included in the coverage adjustment category). As Figure 2 indicates, the number of principal operators in the <US\$1,000 sales category would have increased considerably regardless of whether the coverage adjustment was added. In 2002, for example, there would have been an additional 107,000 principal operators even without the coverage adjustment. Thus, while coverage adjustment explains much of the increase in farms with sales below US\$1,000—up to 64 percent of the category's growth in 2002—it was not the only factor. Other possible factors are discussed in the subsequent section.

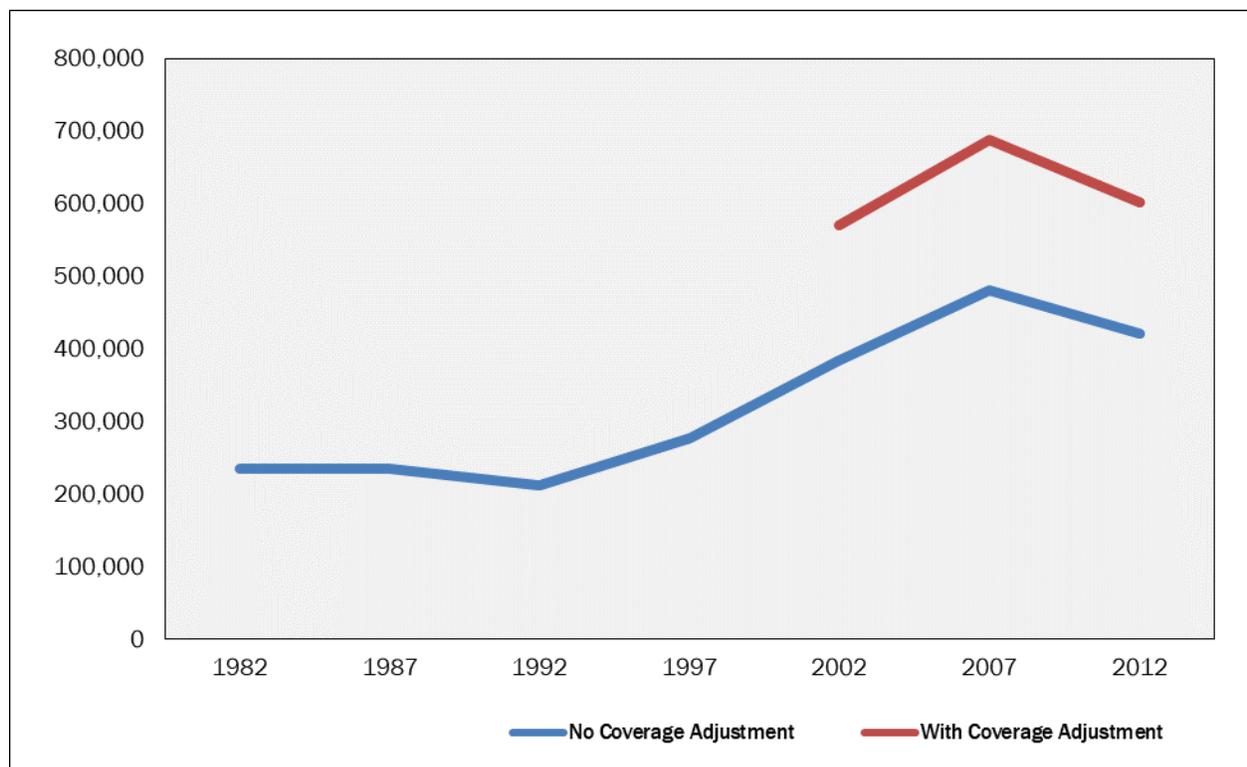
*Race, Ethnicity, and Gender:* In 2012, zero-sales operators were disproportionately likely to be minority and women. Among the racial and ethnic

<sup>3</sup> The term "coverage adjustment" can refer to adjustments for various things, such as overcoverage, undercoverage, and errors. I follow NASS's practice here of using the term to refer to adjustment for farms that were not counted in the census but should have been.

**Figure 1. Number of Principal Operators with Zero Sales, 1982–2012**



**Figure 2. Number of Principal Operators with Sales Below US\$1,000, 1982–2012**



groups included in the COA, Native Americans were the most likely to be zero-sales operators (32%), followed by blacks (30%), Hispanics (26%), operators reporting more than one race (23%), and whites (22%) (Table 1).<sup>4</sup> A significant share of Pacific Islander (24%) and Asian (12%) principal operators were also classified as zero-sales operators; however, there were too few principal operators from each group in the COA for the results to be statistically reliable. Among all the ethnic, racial, and gender groups included in the COA, women principal operators were the most likely to report zero sales (35%), while male principal operators were the least likely (20%).

*Age:* The share of principal operators reporting zero sales rises dramatically with age (see Table 2). The percentage of zero-sales operators in the oldest age group (29%), for example, was more than twice the percentage of zero-sales operators in each of the two youngest age groups (13%).

*Years of Experience:* Beginning farmers were slightly more likely to report zero sales than principal operators with a decade or more of experience. Approximately 24 percent of principal operators with less than 10 years of experience on any farm had zero sales (Table 3). This was true

<sup>4</sup> Although the COA asks farm operators if they are of “Spanish, Hispanic, or Latino origin,” it does not treat Hispanic or Latino as a racial category. As a result, Hispanic farmers are identified as multiracial, black, white, or any of the other four other racial categories in the COA in addition to being categorized as Hispanic. See USDA, National Agricultural Statistics Service (2014a, Appendix B).

**Table 1. Principal Operators with Zero Sales by Race, Ethnicity, and Gender, 2012**

Race, Ethnicity, or Gender	Number of Principal Operators with Zero Sales	Percentage of Principal Operators with Zero Sales
Black	10,042	30%
Hispanic	17,230	26%
Multi-Racial	2,322	23%
Native American	12,131	32%
White	439,096	22%
Female	100,847	35%
Male	364,791	20%
Total	465,638	22%

**Table 2. Principal Operators with Zero Sales by Age, 2012**

Age Group	Number of Principal Operators with Zero Sales	Percentage of Principal Operators with Zero Sales
Under age 25	1,391	13%
Ages 25–34	13,968	13%
Ages 35–44	37,487	18%
Ages 45–54	94,363	20%
Ages 55–64	134,757	22%
Ages 65–74	109,001	25%
75 years and over	74,671	29%

**Table 3. Principal Operators with Zero Sales by Years of Experience, 2012**

Years of Experience Operating Any Farm	Number of Principal Operators with Zero Sales	Percentage of Principal Operators with Zero Sales
Under 5 years	31,415	24%
5 to 9 years	60,756	24%
10 years or more	373,467	22%

both for principal operators who began farming after the 2007 COA (those with under five years of experience) and for principal operators who began farming between the 2002 and 2007 censuses (those with five to nine years of experience). By contrast, 22 percent of farmers with 10 years or more of experience reported zero sales.

## Conclusions

The dramatic growth of zero-sales farms reported in the COA has several important implications.

Practitioners, researchers, and policymakers should consider the influence of zero-sales farms on any COA data before using it. Programs and policies often target farmers who participate in commercial markets, yet rely on data with zero-sales farms—which do not participate in agricultural markets—to evaluate their effectiveness. This may not have been a critical issue in 1982 when zero-sales farms accounted for only 5 percent of the total, but today, when they compose 22 percent of all farms, their inclusion has a substantial impact on important quantitative indicators, such as median farm income.

Zero-sales farms have a particularly significant impact on data regarding minority, women, and beginning farmers, since farmers in these groups are disproportionately likely to be zero-sales operators. In particular, claims that the numbers of minority, women, and beginning farmers have risen since 1997, which are commonly made by the USDA, journalists, and researchers alike (e.g., Harvey, 2016; Raftery, 2011; Sachs et al., 2016; USDA NASS, 2014b) should be re-examined in light of these new data. Further research will be needed to clarify the extent to which COA results for these groups have been affected by changes in COA methodology and implementation, as well as the rise of zero-sales farms.

The ubiquity of zero-sales farms also calls into question the widespread assumption that most small farms either compete with larger-scale farms or would do so given sufficient resources (e.g., Moyer, 2015; Smith, 2014). While undoubtedly some small farms participate in the same markets as larger-scale farms, almost 40 percent of small farms do not participate in any commercial markets for agricultural products, despite USDA data showing that, on average, small farm households have high levels of wealth (even when farm assets are excluded from the total) and low levels of debt (USDA, Economic Research Service, 2016). Further research should examine the extent to which zero-sales operators engage in agricultural production, their motivations for doing so, and their ability to access the capital necessary to operate a commercial farm.

As discussed above, changes in COA methodology likely only account for about two-thirds

(64%) of the rise in zero-sales operators since 1997. Research will be needed to identify other possible factors contributing to the rise, such as shifts in land use and changing USDA practices, including its census outreach efforts.

Finally, the USDA should consider changing its data collection and reporting practices in view of the major role that zero-sales farms play in the U.S. agricultural landscape. Among other actions, the USDA could release additional information about its system for classifying properties with zero sales as farms,<sup>5</sup> include additional questions in the COA on operator goals and household finances, and introduce a zero-sales category in the census results.<sup>6</sup> Farms that do not sell products nevertheless can provide their communities with significant environmental, educational, and recreational benefits, among other contributions, thus meriting their inclusion in the COA. By gathering and sharing additional information about these operations, the USDA will allow policymakers, researchers, and practitioners to better understand their distinctive needs, characteristics, and services. 

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<sup>5</sup> While the USDA definition of a farm has been in place since 1975, it gives the agency significant leeway in interpreting the requirement that a place “sold or normally would have sold” at least US\$1,000 of agricultural goods to qualify as a farm. The USDA currently considers properties to meet this requirement if they demonstrate the potential to produce US\$1,000 in sales from agricultural products, even if they are not actively engaged in agricultural production (O’Donoghue, Hoppe, Banker, & Korb, 2009).

<sup>6</sup> There are currently 15 different sales categories in the COA, ranging from less than US\$1,000 agricultural products sold to US\$5,000,000 or more. If adopted as a sales category, zero-sales would be the largest in the census and more than twice the size of the next largest category. See USDA, NASS (2014a, Table 2).

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