

# Obstacles in Planning Establishment Survey Experiments:

## Census of Agriculture Content Test and Agricultural Resource Management Survey



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# NASS Experiments in Establishments Surveys

- Give concrete examples of setting up experiments
- Discuss implications and impacts of decisions
- Not about the results, about the process!



# National Agricultural Statistics Service

- Statistical agency within U.S. Department of Agriculture
- Conducts several hundred agricultural surveys a year, and the Census of Agriculture every five years
  - Crop and livestock production
  - Yield
  - Production practices
  - Economics
- Farm and ranch operations = any place where \$1000 of agricultural products is produced and sold



# Information Available for Our Establishments (farms)

- Characteristics of the individual unit (farm)
  - Commodities grown, production practices used, demographics, etc.
  - Measure of size (such as acreage, value of sales, number of x, etc.)
- Past survey response of individual unit (farm)
  - Number of past surveys
  - Timing of past surveys
  - Outcome of survey request
  - Survey data





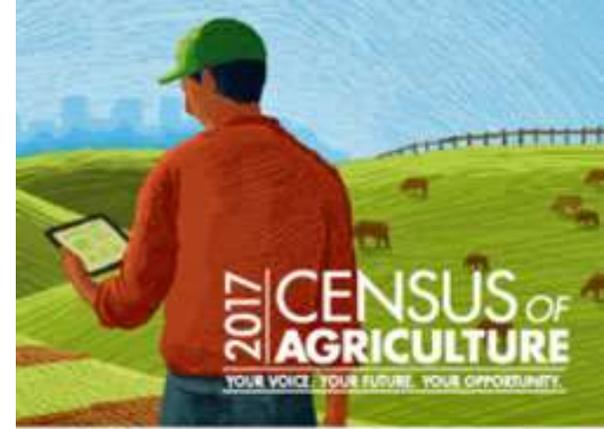
# Obstacles and Considerations in Planning Experiments in Establishment Surveys

- Two experiments presented
  - Census of Agriculture (COA) Content Test
    - Stand alone experiment
    - 30,000 records
  - Agricultural Resource Management Survey (ARMS) Tests
    - Embedded experiments in operational environment
    - Approximately 800-1,500 targeted records



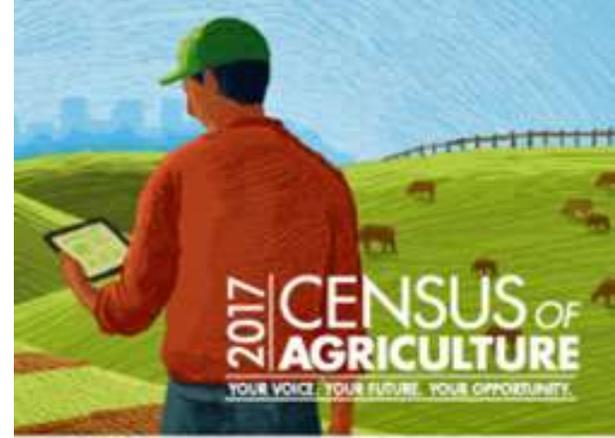
# Census of Agriculture

- Conducted every five years
- Mailed to 3 million farms and potential farms
- 2012 COA identified approximately 2 million farms

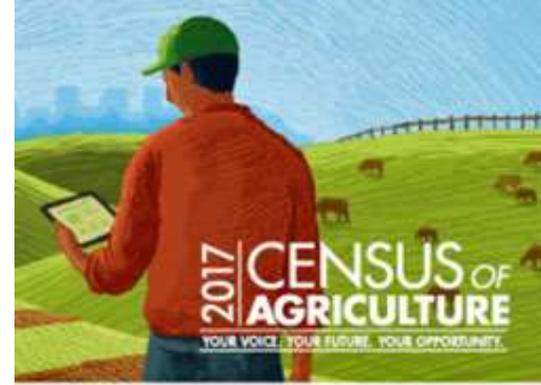


# COA Content Test Experiment Purpose

- Primary goal was to test several versions of the questionnaire
  - Unit nonresponse
  - Section nonresponse
  - Item nonresponse
  - Comparable data
  - Placement of sections
  - New questions



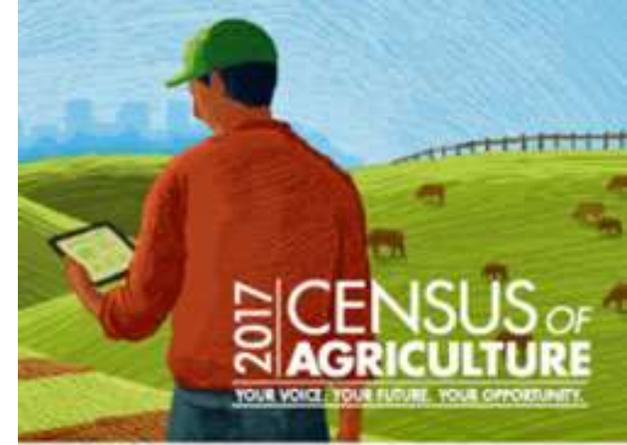
# COA Content Test Experiment Design



- Mailed out in late 2015, data collected through March 2016
- No estimates produced, no data publications released
- Stand-alone experiment, larger sample than most NASS experiments = 30,000
- Obstacles and considerations for this test in an establishment survey:
  - Overall universe creation
  - Universe split (for use of two forms)
  - Sample selection



# Obstacle/Consideration #1



## Overall Universe Creation

- Consideration of large operations
  - Importance to annual survey programs
- Consideration of burden
  - Operations in 12 or more surveys in 2015
  - Removed operations selected for any survey conducted between December 2015 and March 2016



# Overall Universe Creation (continued)



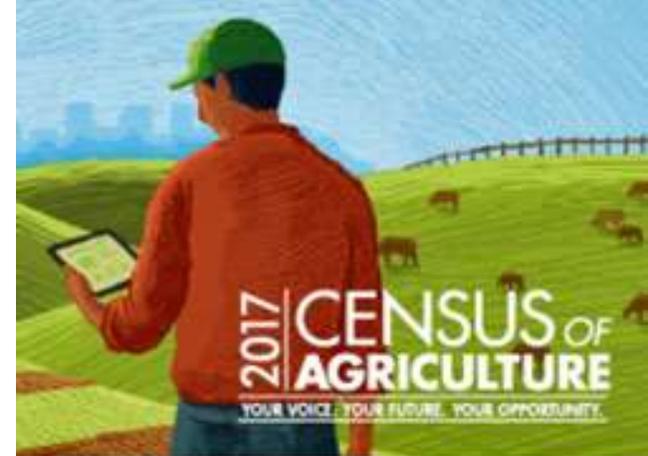
- Result: Reduced the potential universe for the experiment by 20%
  - Lost operations with largest acreage or value of sales
  - Lost certain types of operations such as many dairy farms (monthly survey) and all organic farms (survey conducted at the same time)
- Implication:
  - Findings from our study do not include these types of records



# Obstacle/Consideration #2

## Universe Split

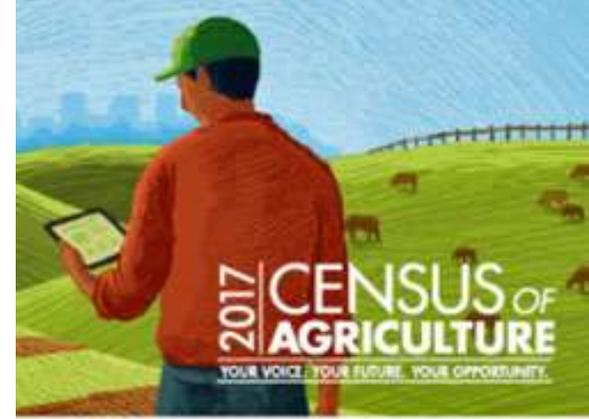
- Auxiliary information used to target specific establishments
  - Short(er) form universe
    - Cattle, horses, hay, no more than 3 field crops
  - Long form universe
    - Everyone else
- Result:
  - Able to create a form that is targeted to specific operations and then identify the universe of eligible cases



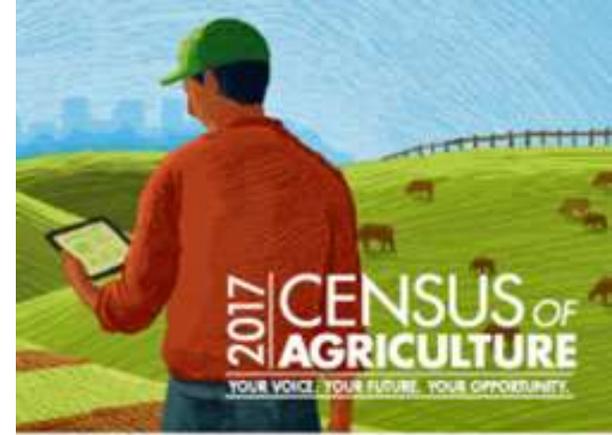
# Obstacle/Consideration #3

## Sample selection: set minimum thresholds for sample

- Test every section of the questionnaire
  - Type of farm - Bees, aquaculture, cotton, Christmas trees, etc.
  - Practices - Production contracts, participation in government programs
- Include operations across varying demographics/operating arrangements
  - Race, gender, age, more than four operators, year began operating



# Sample Selection (continued)



- Result: Able to ensure that we met minimum thresholds in our sample for a variety of variables
  - Met almost all thresholds
    - Missed thresholds for aquaculture, cotton, Hispanic origin, but within 10% of threshold
    - Some types of production contracts were very rare, had to add more to our sample



# Agricultural Resource Management Survey

- Annual survey run by National Agricultural Statistics Service (NASS) and Economic Research Service (ERS) of the U. S. Department of Agriculture.
- Three stage survey:
  1. First stage is a screening process
  2. Second stage captures production expenses, chemical use, and area-specific commodities
  3. Third stage focuses on financial data such as expenses and income

➤ *Stage 3 is the focus of embedded experiments 2011-2015*



# Purpose and Methods

Purpose: Increase response rates with alternative data collections

- Early stages (2011-2013) – targeted “highly unlikely to respond” operations
  - Too small of samples to statistically test, maybe “too” hard to get
- Later stages (2014-2015) – targeted “unlikely to respond” operations
  - Larger samples, more likely to cooperate
- Experimental design with alternative data collection strategies
  - In-person enumeration using State Statisticians, Deputies Directors, etc.
  - In-person drop and collect method



# Obstacles and Considerations

## 1. Propensity scoring of operations

Modeling response on characteristics of operations and not an individual

*Solution* – Use proxy data from past Census of Agriculture

## 2. Large establishments with special handling were excluded

These operations already have special data collection procedures

*Solution* – Not part of standard collection procedures regardless



# Obstacles and Considerations

## 3. Confounding data collection coordination efforts

Establishments can get multiple surveys during the same time period

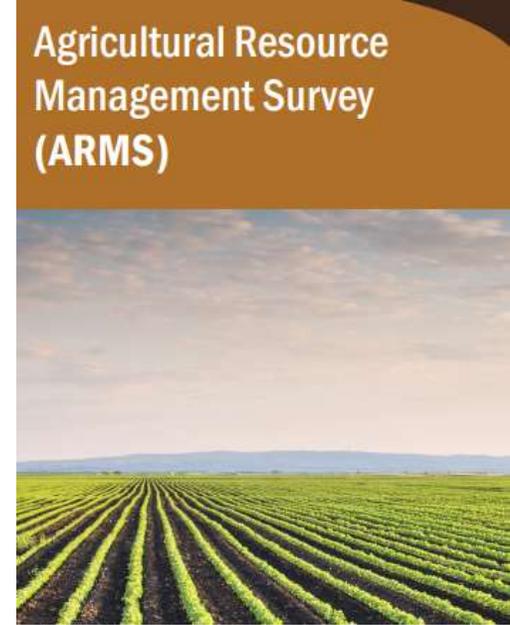
*Solution* – Follow-up measures on how treatment was handled

- 15% of sample did not receive experimental data collection efforts

## 4. Voluntary and mandatory requirements

Household survey generally voluntary, while establishment surveys more likely to be mandatory

- Test data collection efforts multiple years to examine effect of years when voluntary or mandatory



# What happened.....?

- Unlikely responders to ARMS III are not easily influenced by alternative data collection procedures

Or...

- Unlikely responders to ARMS III are already being captured, to the extent that they can, with standard data collection procedures

➤ *These findings were strengthened with multiple tests over time*



# Summary

- There are several obstacles and implications in planning for experiments in establishment surveys
  - Use of auxiliary data
    - Universe creation
    - Sample selection
    - Modeling non-response for establishments
  - Data collection
    - Data collection coordination
    - Excluding large units



# Thanks!

## References

- Allred, S. B., & Ross-Davis, A. (2011). The drop-off and pick-up method: An approach to reduce nonresponse bias in natural resource surveys. *Small-Scale Forestry*, 10(3), 305-318.
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