USDA’s National Agricultural Statistics Service

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The NASS Mission

The National Agricultural Statistics Service provides timely, accurate, and useful statistics in service to U.S. agriculture.
Who We Are

- An official U.S. federal statistical agency
- Statisticians, IT Professionals, Public Affairs Specialists, and Geographers
- 1,000 staff across the country
- 3,000 enumerators collecting data
What does NASS do?

administer USDA’s domestic agricultural statistics program

over 450 reports each year

120 crop items
45 livestock items

Agricultural census every 5 years
Farm & ranch irrigation survey every 5 years
Horticultural census every 10 years
Aquaculture census
Agricultural economics & land ownership survey
Agricultural Industries (New)
# NASS Ongoing Agricultural Statistics Program

## Crops:
- grains
- hay
- oilseeds
- cotton
- tobacco
- potatoes
- sugar
- other field crops
- citrus fruit
- non-citrus fruit
- nuts
- vegetables
- Floriculture
- Organics

## Livestock:
- cattle
- hogs
- sheep
- goats
- equine
- poultry
- milk & dairy products
- aquaculture
- bees & honey
- Mink
- Organics

## Other:
- number of farms
- land in farms
- land values
- cash rents
- agricultural labor
- number of workers
- hours worked
- wages paid
- cold storage
- holdings
- capacity
- cash receipts
- production expenditures
- Agricultural Industries

### Crop Progress:
- acreage
  - prospective plantings
  - planted
  - harvested
- yield & production
  - forecasts
  - final
  - by utilization

### Yield & Production:
- crop progress
- acreage
- yield & production
- stocks
- disposition
- processing
- prices received by farmers
- agricultural chemical use

### Inventory & Production:
- inventory
  - total
  - by class
  - births
  - deaths
  - predator losses
- marketings
- slaughter
- production/disposition
  - meat
  - other products
  (milk, dairy products, wool, mohair, eggs, honey, etc.)
- prices received by farmers
- inventory/production values

### Weekly ~ Monthly ~ Quarterly ~ Annual
What We Do.

- Administer USDA’s statistical estimating program and the 5-year Census of Agriculture
- Coordinate Federal/State agricultural statistics needs
- Conduct statistical research for Federal, State or private organizations and other countries
What We Do.

- We supply the statistics necessary to manage USDA programs
- Our statistics help to improve efficiency of these programs
- Facilitate in the development of new programs
What We Don’t Do.

• Set policy
• Regulate activities
• Permit influence
• Disclose individual reports
• Favor any group above others
Agricultural Estimates Program

• Official U.S. Statistics for Production, Inventory, Value, Demographics
  – 120 Crop estimates produced annually
  – 45 Livestock commodities produced annually
  – Over 450 Reports published annually

Farm Definition - Any place from which $1,000 of agricultural products were produced and sold, or normally, would have been sold. (Unchanged since 1974).
# Agricultural Estimates Program

The image displays a screenshot of the Agricultural Estimates Program website. The screenshot shows a calendar feature with details of publications released on specific dates. The publications include topics such as cotton, catfish production, broiler hatchery, and others.

### Publications by Date

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
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<tr>
<td>3:00 pm ET - Cotton System</td>
<td>3:00 pm ET - Catfish Production</td>
<td>3:00 pm ET - Broiler Hatchery</td>
<td>3:00 pm ET - Quick Stats Database</td>
<td>3:00 pm ET - Peanut Prices</td>
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<td>- Fats &amp; Oils</td>
<td>- Cold Storage - Ann.</td>
<td>- Dairy Products</td>
<td>- County Estimates: All Rice &amp; Flaxseed</td>
<td>- Peanut Prices</td>
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<tr>
<td>3:00 pm ET - Poultry Slaughter</td>
<td>12:00 pm ET - Crop Production</td>
<td>3:00 pm ET - Broiler Hatchery</td>
<td>12:00 pm ET - 2017 Census of Agriculture</td>
<td>3:00 pm ET - Crop Values Final Est.</td>
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<tr>
<td>4:00 pm ET - Crop Progress</td>
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<td>15</td>
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</tr>
<tr>
<td>3:00 pm ET - Potato Stocks</td>
<td>3:00 pm ET - Broiler Hatchery</td>
<td>3:00 pm ET - Cattle on Feed</td>
<td>3:00 pm ET - Farms and Land in</td>
<td></td>
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Additional links to publications, data, and statistics are available on the website.
Agricultural Estimates Program

- Commodity Statistics
- Economic Statistics
- Demographic Statistics
- Environmental Statistics
NASS Modes of Data Collection

• Mail
  – Cheapest and slowest

• Electronic Data Reporting (EDR)
  – Web based through secure technology

• Phone
  – Effective only if phone numbers available
  – Conducted through Blaise with built in edit checks

• Personal enumeration
  – Costly but most effective in response
  – Part time intermittent contract employees
  – Collection done via iPads
NASS Objective Yield Programs

- Objective measures done in the field from randomly selected areas in the state. Other surveys are subjective farmer-based opinions.

- Cotton and Soybean Objective Yield Surveys are done in Arkansas.

- Monthly plant measures are made to forecast end of the season yield. Based on survivability models.
NASS Remote Sensing Work

• Collecting information on crops based off satellite imagery

• Infrared imagery and ground truth

• Currently researching using vegetative index for crop yields

• NASS website has cropland data layer numbers back to 1997
NASS Remote Sensing Work
NASS Remote Sensing Work
U.S. Census of Agriculture History

- First census conducted in 1840
- Done every 10 years until 1920
- Done every 4 to 5 years beginning in 1925
- Beginning in 1982, conducted every 5 years on the 2s and 7s
- Transferred from the Department of Commerce to Department of Agriculture in 1997
- The 2017 Census of Agriculture will be the 29th overall and 5th for NASS
1997 Census of Agriculture
- 1998 Farm and Ranch Irrigation Survey
- 1998 Census of Aquaculture
- 1998 Census of Horticultural Specialties
- 1999 Agricultural Economics and Land Ownership Survey

2002 Census of Agriculture
- 2003 Farm and Ranch Irrigation Survey
- 2005 Census of Aquaculture

2007 Census of Agriculture
- 2008 Farm and Ranch Irrigation Survey
- 2008 Organic Production Survey
- 2009 On-Farm Renewable Energy Survey
- 2009 Census of Horticultural Specialties

2012 Census of Agriculture
- 2013 Farm and Ranch Irrigation Survey
- 2013 Census of Aquaculture
- 2014 Organics Survey
- 2014 Census of Horticultural Specialties
- 2014 Tenure, Ownership and Transition of Land Survey (TOTAL)
National Agricultural Statistics

Mission:

To provide **timely, accurate and useful** statistics in service to U.S. agriculture
United States Department of Agriculture
National Agricultural Statistics Service

All Reports Available at
www.nass.usda.gov

Questions?

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Sampling
How & Why
Sampling Terminology

- Sampling: the action or process of taking samples for analysis.
- Population: The whole group we are interested in.
- Census: A collection of data from the whole population.
- Sample: A collection of data from part of the population.
- Stratification: The arrangement or classification into different groups.
- Bias: The tendency of a statistic to overestimate or underestimate a parameter.
- Parameter: A value that tells you something about a population whereas a statistic tells you something about a small part of the population.
Delta Region AREA Frame

What is it?

land area of the Delta Region divided into segments using physical boundaries

associate farms, crops, animals, etc. with land inside the segments
Delta Region AREA Frame

The area frame sample is a complete and independent frame that is used in combination with the list frame to establish multiple frame estimates. Multiple Frame estimates use the area frame to measure the incompleteness of the list frame. **For this reason the area and list frames must be maintained separately.** Thus the area frame **must never** be used to update the list frame under any circumstance.
Delta Region AREA Frame

*How is it constructed?*

using...
- satellite imagery
- topographic maps
- GIS software
- aerial photography

① divide land area into strata based on land use & likelihood of finding agriculture

② subdivide land use strata into strata blocks

③ select a sample of strata blocks

④ subdivide selected strata blocks into segments
Delta Region AREA Frame

Strengths:

- ✓ complete coverage
- ✓ reduced non-sampling errors
- ✓ estimates well for commonly produced commodities
- ✓ versatility
- ✓ longevity
Delta Region AREA Frame

Weaknesses:

✗ expensive (frame construction & data collection)
✗ difficult to target specific or rare commodities
✗ sensitive to outliers
✗ can be inefficient
✗ requires definable physical boundaries
Delta Region AREA Frame

✓ Provides key Indications for:
  ▪ Acreage
  ▪ Number of Farms and Land in Farms
  ▪ Land Values and Cash Rents
  ▪ NOL Component for the July Cattle and Sheep Surveys

✓ Measures incompleteness of NASS List Frames
  ▪ Tracts Not on a NASS list are sub-sampled for follow-on surveys
    ▪ Follow-on Surveys: Collect farm level data only
Delta Region AREA Frame

✓ Identifies sample fields for the **Cotton** and **Soybean** Objective Yield Surveys
✓ Both Tract level and Farm Level data are collected
  - Accurate tract and farm acres for weighting purposes
  - **Accurate** Name of Operators is critical for OL/NOL procedures
Once a segment is sampled

- *It* remains in the sample for 5 years.
  - Tract operators only purge from that segment
    - Not other segments they may be in
  - Tract operators can only be removed during the June survey period.
    - Adding and Deleting tracts
Delta Region List Frame

- Based on control data
  - Date collected from previous surveys and kept in a database.
    - List Frame
- The larger you are the more often you will be sampled.
  - By commodity
    - Capacity
    - Cropland acres
- Livestock Unique or rare commodities
- Diverse operation
  - The more commodities, the higher the chance of being sampled in multiple surveys
NASS Sampling Frames

• A listing of elements of the population that allow one to select a sample with known probabilities.

• Effective if **complete** and **unique**

• NASS Sampling Frames:
  • List Frames
  • Area Frame
  • Multiple Frame/ Dual Frame
Sampling Frames

Area Frame

List Frame

Target Population
NASS Sampling (List) Frames

✓ Serves as the foundation for the annual NASS Survey program and the Census of Agriculture.

✓ Enterprise level relational database with over 50 tables!

✓ Basic Data Maintained:
  – Names
  – Contact information - addresses, phone numbers, etc - which are necessary for data collection
  – Demographic data
  – Location data
  – Comments
  – Links between records
  – Control Data
What is Control Data?

- Control Data are associated with each operation and provides a profile of the type of entity (farm or agricultural business)
- Define items of interest for NASS survey sampling program
- Standardization of control data across states as part of Operational Efficiency Initiative
- Approximately 400 standardized control Items are maintained on the frame
- Approximately 600 state defined control Items are maintained on the frame
- The sampling population’s control data determines the usefulness and efficiency of the list as a sampling frame.
**Farms and Ranches**

Production related information:
- Total cropland acres
- Planted acres by specific crop
- Peak number of livestock on operation by species
- Value of Sales
- Type of Farm

**Agricultural Businesses**

Indicator or capacity for survey items of interest:
- Off Farm Grain storage capacity
- Processor, Buyer, Shipper Indicator by commodity
- Principle Type of Storage Activity
- Quantity of commodity purchased
NASS List Frame

How is it used?

1. **classify**  
   Identify farmers &/or agri-businesses likely to have item(s) of interest

2. **stratify**  
   Group similar units together based on size or amount of item(s) to be measured

3. **sample**  
   Select units from each group

4. **survey**  
   Collect data for selected units

5. **summarize**  
   Expand data using probabilities of selection
NASS List Frame

**Strengths:**

- ✓ can use inexpensive data collection methods (mail, telephone)
- ✓ can target specific or rare commodities
- ✓ can reduce variability due to sampling
- ✓ cost efficient
- ✓ Efficient for large farms
List Building

• The incorporation of names (operations) into the NASS List Frame that qualify as an agricultural operation:

• List Building Process:
  1. Acquiring Lists of Potential Ag Operators (new names)
  2. Determining if the new names are currently on the NASS List Frame
  3. Determining if the names (operations) qualify as an agricultural operation
Acquiring Lists of Potential Ag Operators

List Building Sources:

• USDA Agencies
  Farm Service Agency (Payments Database)
  Agricultural Marketing Service
  Risk Management Agency

• Outside Sources
  • National Lists
  • Commodity Lists
  • State Lists
  Pesticide Applicator Lists
  Grower Association List

• Federal Tax Information
Sampling and Estimating: The Jellybean Method
Project Goal

• To estimate missing or unknown values when solving a problem.

• To understand how to utilize a sampling method to get conclusions from a population.
Methodology

• Fill the jellybean jar with different colors of jellybeans. It is important to know the number (quantity) of each color of jellybean in the jar (the population).

• Randomly select ten jelly beans from the jar after mixing them.

• Record the sample and compare the average sample collected to average population in the jar.
Questions for discussion

• How do you define sampling?
• How many species of jellybeans are in the population?
• Was there any sampling bias?
• Were there any rare species?
Questions