National Agricultural Statistics Service
Presentation for ISU Students

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USDA-NASS

The History of NASS

- The USDA was founded by Lincoln in 1862.
- NASS, formerly known as the Division of Statistics and then the Bureau of Statistics, was founded in 1863.


USDA Organizational Chart

HQ Divisions
- Located in Washington DC

NASS Field Offices

What Does NASS Do?

- Administer USDA’s Statistical Estimating Program and the 5-year Census of Agriculture
- Supply the statistics necessary to manage and improve the efficiency of USDA programs
- Coordinate Federal/State agricultural statistics needs
- Conduct statistical research for other Federal/State or private organizations and other countries
- Outreach to promote our data collection efforts

The NASS Mission

- To provide timely, accurate, and useful statistics in service to U.S. agriculture

NASS issues about 500 statistical reports each year and about 9,000 reports and news releases from its 46 field offices.
What Doesn’t NASS Do?

- Set policy
- Regulate activities (non-regulatory)
- Permit influence, including political influence
- Disclose individual reports
- Favor any group above others
- Proprietary survey work

Program Areas

- Commodities
  - Crops, Livestock, Poultry, Cold Storage
- Economics
  - Agricultural Prices, Ag Labor, Farm Production Expenditures
- Environmental
  - Pesticide usage
- Census of Agriculture
  - Uniform & comprehensive data for every county
- Reimbursable Surveys

How are the data collected?

- Mail
- Telephone
  - Individual State Offices
  - Data Collection Centers
- Personal Interview
- Internet

NASS Principles

- Safeguard Confidentiality of individual’s data
  - Protected by law from any court or legislative action
    (U.S. Code, Title 7, Chapter 55, Section 2276)
- Independent and Impartial Analysis
  - No political influence in estimates and forecasts
  - Timeliness
  - Security
  - Release reports to all users at same time

Where do the official statistics come from?

- Sample Surveys – Voluntary Reporting [Confidentiality Pledge]
- Agriculture Census – Mandatory Reporting
- Administrative Data

Sample Survey Process

1. Target Population
2. Sample
3. Generate Point Statistics
   Totals
   Ratios
   Precision
4. Estimation
   The value of the sample statistics are used along with other administrative sources to set estimates
Methodology

- Sampling Frames (target population)
  - Area Frame
  - List Frame
- Estimators (indications)
- Advantages - Disadvantages

Methodology – Area Frame

- All land area in Iowa
- Sample blocks of land called segments
- Collect agricultural data from the block of land

Methodology – Area Frame

- State is stratified based on percent of the land cultivated
- Strata are divided into “segments” (about 1 sq. mile)

Methodology – Area Frame

- Data collection by personal interview
- Account for all land within the segment boundaries
Advantages & Disadvantages

**Area Frame**
- Complete
- Reduced non-sampling errors
- Good for common commodities
- Low maintenance

**List Frame**
- Inexpensive data collection
- Can target commodities
- Reduced sampling variability
- Cost efficient

**Multiple Frame**
- Combines the Strength of Each Sampling Frame
  - List
    - Less Costly Data Collection
    - Rare & Specialty Commodities
  - Area
    - Complete Coverage by using portion not on the list (NOL)
Methodology – Administrative Data
- FSA certified planted acreage data for crops
  - Have access to county totals
    - Aggregate to State level
    - Considered a minimum (not all farmers certify)
  - Not complete and available until October
- Import & Export data
- Slaughter data for livestock

Methodology – Remote Sensing, Cropland Data Layer
- Uses Satellite Imagery
- NASS Area Frame and Farm Service Agency data used for ground truth
- Regression-based acreage estimator

Acreage & Yield Data Collection

Crop Production Cycle
- NASS Survey, Estimation, and Publication Cycle

When farmers are planning... estimate planting intentions.

After farmers have planted... estimate acreage.

Throughout growing season... forecast yield & production.

At end of season... estimate final acreage, yield, production.

March Intentions Data Collection

March Crops/Stocks Survey
Data Collection: Feb. 26 – March 15
Sample Size: Approx 86,000 farms - 3,100 in Iowa
Collection Methods: Phone, mail, internet, personal interview
Data Items: Acres planted and to be planted to specific crops, quantities of grains and oilseed stored on-farm

June Acreage Data Collection

June C/S Survey
- Data Collection: May 29 – June 15
- Sample Size: Approx 73,500 farms - 3,000 in Iowa
- Collection Methods: Phone, mail, internet, personal interview
- Data Items: Acres planted to specific crops, quantities of grains and oilseed stored on-farm

June Area Survey
- Data Collection: May 29 – June 15
- Sample Size: Approx 11,000 segments - 418 in Iowa
- Collection Methods: Personal interview
- Data Items: Information on land use within segment and quantities of grains and oilseed stored on entire farm
**Why do March Intentions Usually Differs from June Acreage?**

- **March Survey**
- **June Survey**

![Usual Planting Progress Graph](image)

- 6 weeks

**Determining Production**

Production =

- **Harvested acres**
- **X**
- **Yield**

<table>
<thead>
<tr>
<th>Harvested acres</th>
<th>X</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>June Crops/Stocks Survey and Area Survey – updated as needed to reflect current growing conditions based on survey, satellite, and FSA acreage data</td>
<td>Agricultural Yield Surveys</td>
<td>Objective Yield Surveys</td>
</tr>
</tbody>
</table>

**Crop Yield Surveys**

- **Agricultural Yield**
  - List Frame - June Crop/Stocks Survey
    - crops of interest
    - rotated out reps
    - exclude extreme ops
    - exclude NOL
  - Fields recorded on the June Area Survey
    - crops of interest
    - each acre has equal chance of selection
    - more than 1 sample may fall in same field

- **Objective Yield**
  - NASS conducts two surveys for yield
    - List frame survey conducted in all States (May – November)
    - Area frame survey conducted in major States (Aug. – Dec.)

**Agricultural Yield Survey**

- Acres Harvested (or to be harvested)
- Expected Yield (based on farmers assessment of yield prospects until harvest)
- Reference date – 1st of the month
- Mail, phone, internet

Data collection starts 25th of previous month

Yields to reflect conditions as of 1st of month
Agricultural Yield Survey

<table>
<thead>
<tr>
<th>Month</th>
<th>U.S.</th>
<th>Iowa</th>
</tr>
</thead>
<tbody>
<tr>
<td>August</td>
<td>28,000</td>
<td>800</td>
</tr>
<tr>
<td>September</td>
<td>13,000</td>
<td>400</td>
</tr>
<tr>
<td>October</td>
<td>15,000</td>
<td>400</td>
</tr>
<tr>
<td>November</td>
<td>11,000</td>
<td>400</td>
</tr>
</tbody>
</table>

Objective Yield Surveys

- Randomly selected fields
  - Initial interview to update/verify acreage, ask permission
- 2 Randomly located plots per field
- Objective measurements made in the fields
  - Measure Row Width
  - Count Plants (or stalks)
  - Count Fruit (pods, ears, or proxy early in season)
  - Weigh Fruit (pods, ears, or proxy early in season)
  - Gleanings (harvest loss)

Objective Yield Surveys

- Data collected from about 25th of previous month through the 3rd of the survey month
- Return to the same plots for several months until crop is mature or harvested
- Personal interviews and field visits

Objective Yield Surveys

- Enumerators use a frame when laying out soybean sample plots
Objective Yield Surveys

Objective Yield Survey

- **CORN** \( n=1920 \) (only half completed in August)
- **10 states average \(-85\% of U.S. corn production**

Objective Yield Survey

- **SOYBEANS** \( n=1835 \) (only half completed in August)
- **11 states average \(-85\% of U.S. soybean production**

Final Acreage, Yield, & Production

\[
\text{Production} = \text{Harvested acres} \times \text{Yield}
\]

Net Yield

Variables used to measure the number of fruit and weight vary each month based on the stage of maturity.

What about Livestock Estimates?

- Frequency of reports mainly determined by production cycle
  - Quarterly Hog report (Mar, Jun, Sep, Dec)
  - Semi Annual Cattle report (Jan, Jul)
  - Monthly Cattle on Feed report
- Other livestock reports also available
**Hog & Pig Survey**
- Target population = all hog owners
- Conducted quarterly
- Multiple frame survey design
  - Gives everyone who owns hogs a chance to be selected for the survey
- Sample is stratified by size of operation
  - Larger operations sampled at a higher rate
  - Nationally, 8,800 or 11,600 owners in contacted depending on the quarter
  - Over 1,400 in Iowa

**Estimates from the Hog & Pig Survey**
- All Hogs & Pigs
- Breeding Herd Inventory
- Market Hog Inventory
  - By weight group
- Sows Farrowing, Litter Rate, Pig Crop
  - Litter rate by size of operation for U.S.
- Farrowing Intentions
  - Next 3 months
  - 3 to 6 months

**Hog & Pig Estimating Program**

**Cattle Survey**
- Target population = all operations w/ cattle
- Conducted in January and July
  - State estimates only published in January report
- Multiple frame survey design
  - Gives every cattle operation a chance to be selected for the survey
- Sample is stratified by size and type
  - Larger operations sampled at a higher rate
  - Nationally, about 40,000 producers contacted
  - Over 2,100 in Iowa

**Estimates from the Cattle Survey**
- All Cattle & Calves
- All Cows that have calved
  - Beef cows and Milk cows that have calved
- Heifers 500 pounds and over
  - Beef and Milk cow replacements
  - All other heifers
- Steers 500 pounds and over
- Bulls 500 pounds and over
- Calves under 500 pounds
- Calf Crop
- Total Cattle and Calves on Feed (all size lots)

**Cattle on Feed Surveys**

- **1000+ COF Survey**
  - Federally Funded
  - Conducted monthly
  - List Frame census of all lots with 1000+ hd capacity
  - Add any new lots
  - Data collected mostly by personal interview

- **LT 1000 COF Survey**
  - State Funded
  - Conducted monthly
  - List Frame survey of lots w/ LT 1000 hd capacity
  - Not complete coverage
  - Data collected by mail and phone
Cattle on Feed Estimating Program

- Monthly Survey/Monthly Estimates Published for 1000+ COF
- Monthly 1000+ Survey/Annual Estimates Published for All COF
- Annual Survey/Annual Estimates Published for All COF
- Monthly Survey/Monthly Estimates Published for both & All COF

LT 1,000 Hd Capacity COF Survey

- February - Mail to all operations with LT 1000 head capacity - about 13,000 lots
- For Subsequent Months - Select a sample of February survey respondents
  - Stratified Replicated Sample
    - About 1,100 sampled each month
    - Sample is stratified by February reported capacity
    - Replication scheme limits operators to 6 contacts per year but allows 40% carryover of the sample from month to month
    - Have about 600 good reports each month

Estimates from the COF Survey

- Monthly 1000+, LT 1000, & total cattle on feed in all lots
  - Quarterly steers, heifers, & cows/bulls on feed for 1000+ lots
- Number placed during the month
- Number marketed during the month
- Other disappearance during the month

All Cattle on Feed, Iowa

<table>
<thead>
<tr>
<th>Year</th>
<th>Board</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>126.0</td>
<td>144.0</td>
<td>141.7</td>
<td>147.0</td>
<td>140.2</td>
<td>140.2</td>
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<tr>
<td>2001</td>
<td>128.6</td>
<td>147.9</td>
<td>140.2</td>
<td>140.2</td>
<td>140.2</td>
<td>140.2</td>
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<tr>
<td>2002</td>
<td>127.8</td>
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<td>147.0</td>
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<td>140.2</td>
<td>140.2</td>
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<tr>
<td>2003</td>
<td>142.8</td>
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<td>160.5</td>
<td>159.4</td>
<td>159.4</td>
<td>159.4</td>
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<tr>
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<td>155.0</td>
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<td>175.6</td>
<td>172.2</td>
<td>172.2</td>
<td>172.2</td>
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<tr>
<td>2005</td>
<td>162.3</td>
<td>189.5</td>
<td>189.5</td>
<td>184.2</td>
<td>184.2</td>
<td>184.2</td>
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<tr>
<td>2006</td>
<td>168.9</td>
<td>195.1</td>
<td>195.1</td>
<td>194.0</td>
<td>194.0</td>
<td>194.0</td>
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Interpreting the Survey Indications

- Indications include direct measures and ratios
  - Normally have more than one indication to set estimate/forecast
- Guiding principles for setting yield forecasts
  - Reference period = 1st of the month
  - Do not extrapolate beyond data collection period
  - Assume normal conditions the remainder of the season

Two Questions:

- Historically, how well have the indications performed?
- Is there a consistent bias in the indications?

Tools – difference tables, charts, supporting analysis balance sheet

Interpreting the Survey Indications

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<tr>
<td>2000</td>
<td>14.7</td>
<td>12.3</td>
<td>7.4</td>
<td>4.1</td>
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OCTOBER CORN YIELD (bushels)

<table>
<thead>
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<th>Year</th>
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<th>Nov</th>
<th>Dec</th>
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Time Series Chart
Interpreting the Survey Indications

Balance Sheet Review
- Supply: Beginning Inventory + Pig or Calf Crop + Imports +
- Disposition: Commercial Slaughter - Farm Slaughter - Death - Exports -
- Indicated Inventory =
- Estimated Inventory
- Residual

Agricultural Statistics Board
- Since 1905, the ASB has secured its data to prevent leaks from influencing speculative trading markets
- Armed guards stand watch outside of the lock-up area to prevent disclosures

Agricultural Statistics Board (ASB) - Security

Estimate / Forecasts - Work Flow

Other Analysis - Objective Yield Survey Components
Agricultural Statistics Board (ASB) - Security

- Window shades are secured and phones are disconnected
- The computer system is disconnected from computers outside of lock-up

Agricultural Statistics Board

- The ASB is comprised of commodity experts who set regional and national yield and production or livestock estimates

Agricultural Statistics Board

- The Secretary of Agriculture or his designee attends the briefing and signs the report

Agricultural Statistics Board

- The Crop Reports are released at 8:30 am ET on specified dates.
- Hogs and Pigs, Cattle, and COF reports are released at 3:00 pm ET.

Agricultural Statistics Board

- Reports are printed inside the lock-up area
- Reporters are allowed inside lock-up to prepare their news articles for release

How Reliable are the NASS numbers?

- NASS reports include reliability information
- Also include information on
  - Survey and estimation procedures
  - Revision policy

<table>
<thead>
<tr>
<th>Item</th>
<th>Most mean squared error</th>
<th>50 percent confidence level</th>
<th>Average</th>
<th>Smallest</th>
<th>Largest</th>
<th>Above limit</th>
<th>Below limit</th>
<th>Difference between first and latest estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cattle</td>
<td>0.3</td>
<td>0.3</td>
<td>5.0</td>
<td>5.0</td>
<td>5.0</td>
<td>7</td>
<td>7</td>
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<tr>
<td>All cows</td>
<td>0.4</td>
<td>1.1</td>
<td>1.1</td>
<td>5.0</td>
<td>5.0</td>
<td>6</td>
<td>6</td>
<td>0</td>
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<tr>
<td>Calf trace</td>
<td>1.8</td>
<td>1.8</td>
<td>2.1</td>
<td>15.7</td>
<td>15.7</td>
<td>10</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>
In Conclusion……..

- Information makes for efficient markets
- NASS mission is to provide information
- NASS estimates/forecasts based on survey data - only possible with the cooperation of farmers
- Confidentiality and Security – taken seriously
- NASS statistics are available to all
- Everyone gets the same results at the same time

NASS Contact Information

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  (800) 772-0825
  nass-ia@nass.usda.gov
- Customer Service:
  (800) 727-9540