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
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 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
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

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

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
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

Field level detail recorded
- Entire farm data also recorded in other sections
Advantages & Disadvantages

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

- Area Frame
  - Sensitive to outliers
  - Not good for rare commodities
  - Need physical boundaries
  - Costly data collection

Methodology – List Frame

- List of farms/farmers with associated information
- Sample a name
- Collect agricultural data from the name on the list for the farm(s) he/she operates

<table>
<thead>
<tr>
<th>Name, Address</th>
<th>Cropland</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abraham Lincoln 1235 Fifth Avenue</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Lincoln, IA 55626</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ima Farmer 321 Cherry Street</td>
<td>1000</td>
<td>50,000</td>
</tr>
<tr>
<td>Iowa City, IA 52240</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farmer Brown 305 Oak Street</td>
<td>2000</td>
<td>100,000</td>
</tr>
<tr>
<td>Adel, IA 52240</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Methodology – List Frame

- Stratified based on size/type of farm
- Sample size varies by stratum
- Larger operations usually sampled at a higher rate

<table>
<thead>
<tr>
<th>Stratum Boundaries</th>
<th>Population</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 Cropland 300 - 599</td>
<td>5,164</td>
<td>103</td>
</tr>
<tr>
<td>66 Cropland 600 - 1,599</td>
<td>17,638</td>
<td>555</td>
</tr>
<tr>
<td>73 Capacity 10,000 - 46,869</td>
<td>17,831</td>
<td>751</td>
</tr>
<tr>
<td>72 Capacity 50,000 - 99,999</td>
<td>8,216</td>
<td>450</td>
</tr>
<tr>
<td>79 Cropland 1,600 - 4,999</td>
<td>2,137</td>
<td>212</td>
</tr>
<tr>
<td>78 Capacity 300,000 - 899,999</td>
<td>230</td>
<td>26</td>
</tr>
<tr>
<td>95 Cropland 5,000+</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>97 Capacity 1,000,000+</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>53,272</td>
<td>2,382</td>
</tr>
</tbody>
</table>
Advantages & Disadvantages

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

List Frame
- Not complete
- Increased non-sampling errors
- Goes out of date quickly
- High maintenance

Methodology – Multiple Frame

Combines the Strength of Each Sampling Frame
- List
  - Less Costly Data Collection
  - Rare & Specialty Commodities
- Area
  - Complete Coverage

Advantages & Disadvantages

Multiple Frame
- Complete
- Can control sampling variability
- Can control costs
- Can target commodities

Multiple Frame
- Overlap determination errors
- Must maintain list and area frames separately

Estimator – Multiple Frame Expansion:
Current Total = List frame expansion + Area frame expansion for farms not on the list (NOL)
Methodology – Administrative Data
Farm Service Agency

- FSA certified planted acreage data
- Have access to county totals
  - Aggregate to State level
  - Considered a minimum (not all farmers certify)
- Not complete and available until October

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

June Area Survey

Data Collection: May 29 – June 15

Sample Size: Approx 73,500 farms

~3,000 in Iowa

Approx 11,000 segments

418 in Iowa

Collection Methods: phone, mail, internet, personal interview

Personal interview

Data Items: Acres planted to specific crops, acres expected to be harvested, quantities of grains and oilseed stored on-farm

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?

Determining Production

Production =

<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 Objective Yield Surveys</td>
<td></td>
</tr>
</tbody>
</table>
Crop Yield Surveys

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

Crop Yield Surveys

- **Agricultural Yield**
  - Sample Selected From:
    - List Frame - June Crop/Stocks Survey
    - crops of interest
    - rotated out reps
    - exclude extreme ops
    - exclude NOL
  - Fields recorded on the June Area Survey

- **Objective Yield**
  - crops of interest
  - Each acre has equal chance of selection
  - More than 1 sample may fall in same field

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

Yields to reflect conditions as of 1st of month

Data collection starts 25th of previous month
### Agricultural Yield Survey

#### Agricultural Yield Survey

**Sample Size (approximate)**

<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 Survey

- 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

CORN Objective Yield Sample Plot Location

- Corn
  - 73 Rows
  - 22 Paces

- Measuring Tape
- Dowel Stick
- 15 foot count area
- 5 foot buffer
- 22nd Pace

Objective Yield Surveys

Soybeans

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

Objective Yield Components and Forecast Variables

<table>
<thead>
<tr>
<th>Crop</th>
<th>Component</th>
<th>Forecast Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td>Ears</td>
<td>stalks, ears &amp; ear shoots, ears with kernels</td>
</tr>
<tr>
<td></td>
<td>ear weight</td>
<td>historic average, length over husk, kernel row length, ear diameter</td>
</tr>
<tr>
<td>Soybeans</td>
<td>Plants per plant</td>
<td>plants, main stem nodes, lateral branches, blooms, dried flowers &amp; pods, pods with beans</td>
</tr>
<tr>
<td></td>
<td>pod weight</td>
<td>historical average, pods with beans</td>
</tr>
</tbody>
</table>

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

Objective Yield Survey

- **CORN n=2020** (only half completed in August)
- **10 states average ~85% of U.S. corn production**
Objective Yield Survey

- SOYBEANS  n=1855 (only half completed in August)
- 11 states average ~85% of U.S. soybean production

Interpreting the Survey Indications

- Indications include direct measures and ratios
  - Normally have more than one indication to set 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

Interpreting the Survey Indications

<table>
<thead>
<tr>
<th>Year</th>
<th>Board</th>
<th>Aug</th>
<th>Diff</th>
<th>Sept</th>
<th>Diff</th>
<th>Oct</th>
<th>Diff</th>
<th>Nov</th>
<th>Diff</th>
<th>std err</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>126.0</td>
<td>144.0</td>
<td>18.0</td>
<td>141.7</td>
<td>18.7</td>
<td>147.0</td>
<td>10.2</td>
<td>152.2</td>
<td>15.2</td>
<td>160.2</td>
</tr>
<tr>
<td>2005</td>
<td>136.8</td>
<td>138.1</td>
<td>-1.3</td>
<td>147.5</td>
<td>-7.5</td>
<td>148.0</td>
<td>-0.9</td>
<td>148.6</td>
<td>-0.6</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>137.0</td>
<td>140.0</td>
<td>12.0</td>
<td>147.7</td>
<td>9.7</td>
<td>148.0</td>
<td>-7.9</td>
<td>150.8</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>122.8</td>
<td>140.5</td>
<td>-17.7</td>
<td>136.3</td>
<td>-16.2</td>
<td>139.4</td>
<td>-14.4</td>
<td>131.0</td>
<td>-9.0</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>144.3</td>
<td>148.3</td>
<td>3.9</td>
<td>154.4</td>
<td>10.1</td>
<td>156.2</td>
<td>-1.9</td>
<td>153.0</td>
<td>-3.3</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>132.8</td>
<td>173.6</td>
<td>40.8</td>
<td>178.3</td>
<td>4.7</td>
<td>179.2</td>
<td>-0.2</td>
<td>184.4</td>
<td>5.4</td>
<td></td>
</tr>
</tbody>
</table>

Diff 10-yr  | -16.1 | -15.6 | -15.3 | -6.1 |
Diff 5-yr  | -14.0 | -13.6 | -13.2 | -8.9 |
std err  | 14.7 | 12.8 | 7.4 | 4.1 |
Interpreting the Survey Indications

OCTOBER CORN YIELD (bushels)

Time Series Chart

Ag Yield vs. Obj. Yield

Forecast = 168 bu.

Iowa Corn Data

Plants per Acre, Iowa

Other Analysis - Objective Yield Survey Components
Yield/Production Forecasts - Work Flow

Field Offices
- Review Survey Data at State Level
- IDAS, etc.

- Set State Recommendations
- "mini-boards", etc.
- Comments on weather, markets, etc.

- Prepare Justification
- IDAS, etc.

- Send to Washington

Headquarters
- Review Survey Data at National Level
- Pre-board, commodity specialists

- Set Regional & National Targets
- Agricultural Statistics Board

- Reconcile State Recommendations with National Targets
- Non-spec: pre-board
- Spec: post-board

Completed in Lock-up

Agricultural Statistics Board

Agricultural Statistics Board (ASB) - Security

- 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

Secretary Johanns and an aide sign-in with security to attend the Crop Report briefing.
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 estimates

Agricultural Statistics Board

- The Crop Reports are released at 8:30 am ET on specified dates.
The Secretary of Agriculture or his designee attends the briefing and signs the report.

Reports are printed inside the lock-up area.

Reporters are allowed inside lock-up to prepare their news articles for release at 8:30 am ET.

Production =

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</tr>
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</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) 727-9540