MARKETING & OUTLOOK BRIEFS

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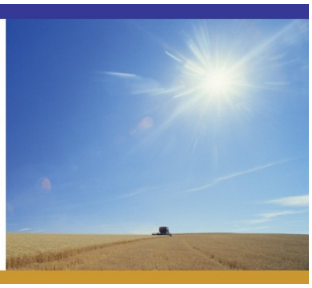

USDA Corn and Soybean Acreage Estimates and Yield Forecasts: Dispelling Myths and Misunderstandings

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INTRODUCTION[1]

The U.S. is the world's largest producer and exporter of corn and soybeans. As a result, the size of the crops in the U.S. has a substantial impact on the price of corn and soybeans. During the planting and growing season, market participants form expectations about the potential size of these crops from a variety of private and public sources of information. The National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture (USDA) is the primary provider of public information relative to potential crop size.

NASS has chronicled the historical price reaction to its *Crop Production* reports (NASS/USDA, March 2010a) and a number of academic studies have conducted formal statistical analysis of the impact these reports have on futures prices and market volatility. For example, Isengildina-Massa, et.al (2008) report that the variability of corn and soybean futures prices is about seven times higher on days NASS *Crop Production* reports are released compared to non-release days. There can be little doubt that NASS acreage and production reports are among the biggest market movers year-in and year-out.

NASS has provided detailed descriptions of their crop estimating and forecasting procedures (NASS/WAOB/USDA, 1999; NASS/USDA, 2006). In addition, a summary of survey and estimation methodology is included with each *Prospective Plantings, Acreage,* and *Crop Production* report. Still, market participants continue to demonstrate a lack of understanding of NASS methodology for making acreage, yield, and production forecasts and/or a lack of trust in the objectives of the forecasts. Some market participants are not fully aware of the sampling methodology employed in gathering acreage and yield data. Specifically, there does not appear to be widespread understanding that a combination of producer surveys and field observations are used to gather data for making planted acreage estimates and yield forecasts. In addition, the estimation process based on this data is often not clearly understood.

Beyond misunderstanding, some market participants continue to express the belief that the USDA has a hidden agenda associated with producing the estimates and forecasts. This "agenda" centers on price manipulation for a variety of purposes,

[1] We thank Joe Prusacki, Director, Statistics Division and Mark Schleusener, Deputy Director Illinois Field Office, of NASS for reviewing this brief and providing helpful comments. We are solely responsible for any errors, omissions, or inaccuracies.

including such things as managing farm program costs and influencing food prices.

Lack of understanding of NASS methodology and/or the belief in a hidden agenda can prevent market participants from correctly interpreting and utilizing the acreage and yield forecasts. The purpose of this brief is to provide a condensed version of extensive NASS descriptions of acreage estimation and yield forecasting procedures for corn and soybeans. We have attempted to capture the essence of NASS methodology without all of the underlying details. We believe users can more fully benefit from these estimates and forecasts by understanding the strengths and limitations of the methodology. This report is an extension of an earlier and much briefer description of NASS methodology (Good and Irwin, 2003, 2005, 2006).

Our focus is on acreage and yield because these estimates and forecasts are widely followed and highly anticipated by market participants and can have substantial influence on the price of corn and soybeans. Specifically we describe the methodology for the estimate of planting intentions released in early spring, the estimate of actual plantings and planting intentions in June, the forecasts of yield released each month from August through November, and the estimate of actual yield released in January following harvest. Figure 1 provides a timeline of these reports for the 2010 corn and soybean crops.

ACREAGE ESTIMATION

First in the cycle of acreage estimates is the *Prospective Plantings* report, currently released at the end of March each year. Prior to 1981, the report was released in April. In addition, a report of prospective plantings was also released in either January or February for a period in the 1970's and early 1980's. The estimates of planted acreage in the current *Prospective Plantings* report are based primarily on the March Agricultural Survey, a survey of farm operators conducted in late February and early March. The 2010 survey, for example, was conducted from February 26 through March 15. The survey is a probability survey in the sense that operations surveyed represent a sample drawn from a list of all producers in such a way that all operations have a chance to be included. This is referred to as a list frame sample. Approximately 86,000 farm operators were contacted by mail, internet, telephone, or personal interview in 2010.[2]

Surveyed producers are asked to report acres planted or to be planted this spring or this summer for the (current) crop year. For corn and soybeans, respondents are asked to report acreage for all purposes, excluding popcorn and sweet corn. Respondents are not asked to report expected harvested acreage. Each state NASS field office reviews the survey data for "reasonableness and consistency" with historical estimates and the results are submitted to the NASS Agricultural Statistics Board (ASB) for an independent review. The published acreage estimates are based on survey data, but some judgment may be used based on the historical relationship of official estimates to the survey data.

The survey used to estimate acreage intentions is subject to sampling error since it is based on a sample of farm operators rather than a survey of all operators. That is, a different sample could produce different results and any sample might not accurately reflect the entire set of farm operators. Estimates may also reflect non-sampling errors such as incorrect reporting by survey respondents or errors in recording or processing the data.[3]

NASS publishes a table in each *Prospective Plantings* report summarizing the reliability

[2] More insight into the concept of a list frame is provided in a brief paper by Holland (1989).

[3] More insight into the concept of sampling and non-sampling error is provided in brief papers by Kott (1989) and Tremblay (1989), respectively.

of the prospective plantings estimates based on the record of historical differences between the March forecast of planted acreage and the final estimate of planted acreage. Based on these differences from 1990 through 2009, NASS reported in March 2010 that there was a 2 out of 3 chance that the March forecast of corn acreage would be within 2 percent of the final estimate and a 90 percent chance that the difference would not exceed 3.5 percent. For soybeans, NASS reported that there was a 2 out of 3 chance that the difference would not exceed 2.1 percent and a 90 percent chance that the difference would not exceed 3.6 percent.

For corn, the March 2010 estimate of planting intentions was 88.798 million acres. The previous reliability calculations imply a 90 percent chance that actual corn acreage would be within 3.108 million acres of the estimate, or between 85.690 and 91.906 million acres. Actual planted acreage reported in January 2011 was 88.192 million acres, only 0.7 percent less than the March estimate. For soybeans, the March 2010 estimate of planting intentions was 78.098 million acres. The reliability calculations imply a 90 percent chance that actual corn acreage would be within 2.812 million acres of the estimate, or between 75.286 and 80.910 million acres. Actual planted acreage reported in January 2011 was 77.404 million acres, only 0.9 percent less than the March estimate

The second in the cycle of acreage estimates is the *Acreage* report released at the end of June each year. The estimates of planted and harvested acreage in this report are based primarily on two surveys conducted in roughly the first two weeks of June. The 2010 survey, for example, was conducted from May 29 through June 15. One of these surveys is the June Agricultural Survey. In 2010, for example, approximately 71,500 farm operations were surveyed by phone, mail, internet, or personal interview. This survey is referred to as the list frame survey since a sample of operations to be surveyed is drawn from the list of all operations (like the earlier survey for the *Prospective Plantings* report). Before the sample is drawn, each farm is classified by a number of characteristics, including number of acres of crop land. Larger farms are sampled at higher rates than small farms. Very large farms are all selected for the survey and smaller farms are selected at the rate of 1 out of 25 to 50.

Farm operations selected for the list frame sample are asked to report acres of corn planted or intended to be planted for all purposes (excluding popcorn and sweet corn) and to report separately the acres intended for harvest for grain and for seed. Operators are asked to report acres of soybeans planted or to be planted for all purposes and acres intended to be harvested. Single cropped and double cropped acres are reported separately.

The second June survey is the area frame survey. This survey is described as a multi-step process. All land in each state is classified based on intensity of cultivation using a "…variety of map products, satellite imagery, and computer software packages". Intensively cultivated areas are divided into 1 square mile segments, while less intensively cultivated areas are divided into smaller segments, down to 0.1 square mile for urban areas. Segments in intensely cultivated areas are selected at the rate of about 1 out of 125 and segments in areas of lesser intensity of cultivation are selected at the rate of 1 out of 250 to 500. In 2010, about 11,000 total segments were selected in the area frame survey. Enumerators (those employed by NASS to interview segment operators and take measurements) identify the exact location of each segment and personally interview every operator with land within the segment. Crops planted or intended to be planted and acreage intended for harvest in each field are identified.[4]

Survey data are reviewed at the state and national level in the same way described for

[4] More insight into the concept of an area frame is provided in a brief paper by Holland (1989)

the March survey data. Data from the two surveys (list and area frame) are combined in such a way as to account for all acreage, but to avoid double-counting of acreage. The June survey is subject to the same type of sampling and non-sampling errors as described for the March survey. A summary of the reliability of the June estimates is included in each *Acreage* report. Based on the period 1990 through 2009, NASS reported in June 2010 that there was a 2 out of 3 chance that the June planted acreage estimate would be within 0.8 percent of the final estimate for corn and within 1.1 percent for soybeans. Similarly, there was a 90 percent chance that the difference would be less than 1.3 percent for corn and 1.9 percent for soybeans. Actual planted acreage of corn in 2010 was 0.4 percent larger than the June estimate and soybean acreage was 1.9 percent smaller than the June estimate.

In years of unusual delays in planting, surveyed operations may be revisited in July to determine actual plantings. Planted acreage estimates reported in June are also subject to change in August, September, October and November when yield surveys are conducted. In addition, estimates of planted acreage incorporate administrative data, primarily Farm Service Agency (FSA) certified acreage data, in October. Planted acreage estimates are also subject to change based on the December Agricultural Survey and on Census data that are available every 5 years. Adjustments in harvested acreage estimates can be made at anytime that planted acreage estimates are reviewed or new information becomes available.

YIELD FORECASTING

At the outset, it should be noted that the World Agricultural Outlook Board (WAOB) of the USDA provides a forecast of the U.S. average corn and soybean yield and production in their May, June, and July *World Agricultural Supply and Demand Estimates* (WASDE) reports. Those forecasts, however, are not survey-based. The methodology for making the yield forecasts has varied over time, but is based on trend analysis of historical yields. The May 2010 report included these descriptions of the methodology: "Projected corn yield based on the simple linear trend of the national average yield for 1990-2009 adjusted for 2010 planting progress." For soybeans, "Projected yield based on 1989-2009 trend analysis." Production forecasts in these reports use the NASS spring report of planting intentions and a forecast of harvested acreage. "For corn, harvested acres projected based on historical abandonment and derived demand for silage." For soybeans, "Harvested acres based on 5-year average planted to harvested ratios by state." These WAOB forecasts in May, June, and July are not included in the following discussion.

NASS corn and soybean yield forecasts are made in August, September, October and November. It is important to note that monthly yield forecasts are not revised; instead new forecasts are made each month. The final yield estimate is released in January after harvest. Two types of surveys are again used to collect data for the monthly NASS forecasts in August through November. These are generally referred to as the Monthly Agricultural Yield Survey (or the farmer-reported survey) and the Objective Yield Survey (or the field measurement survey). As an example, Table 1 summarizes the timing and scope of the farmer-reported and yield measurement surveys for corn and soybeans in 2010. These surveys along with yield estimating procedures are described in detail below.

Data for the final yield estimate released in January are collected in the December Agricultural Survey in which respondents report actual acres harvested and the actual yield or production. That survey was conducted between November 29 and December 17 in 2010 and consisted of approximately 84,500 surveys.

The Agricultural Yield Survey (AYS) is conducted for states with significant corn

and soybean acreage. In 2010, farm operators in 32 states were surveyed for corn and 29 states for soybeans. A sample of farm operations to be surveyed is drawn from those who responded to the list frame survey in June. A rather complicated sampling design is used to select the operations to be surveyed. The design uses multiple control items, such as number and type of commodities planted and desired sample size for each commodity, to determine the probability of selecting a particular operation. While the list frame and the sample of operations to be surveyed changes from year-to-year, for any particular year the same operations are interviewed each month from August through November.

Survey instruments are prepared in paper and electronic form, with most of the data collected in the electronic form using computer-assisted telephone interviewing. Some data are collected by mail, internet, and personal interview. Each state is expected to achieve a minimum response rate of 80 percent, conducting follow-up interviews for non-respondents if necessary.

In the August survey, respondents are asked to identify the number of acres of corn and soybeans to be harvested and to provide a forecast of the final yield of each of these crops. Harvested acreage responses are retained from month-to-month and the question is not asked in subsequent surveys. The AYS, however, does contain a distressed acres sub-survey that targets specific crops in states that have experienced extreme weather conditions in order to measure changes when extreme weather does occur. Respondents are asked to update yield forecasts in subsequent surveys, but once the crop is harvested and the final yield reported, subsequent yield forecasts are not gathered.

Once the monthly AYS data are collected, the data from the various survey methods (telephone, mail, etc.) are merged and reviewed for consistency with previous surveys for the individual respondents, referred to as within-record data checks. In addition, an across-record review is conducted to identify any extreme values that need to be re-checked. A summary program which accounts for sampling weights and includes an adjustment for non-respondents is used to generate an indication of expected average yield for Agricultural Statistics Districts (regions within states) and for each state surveyed. The yield indications from the survey obviously reflect the judgment of respondents to the survey. Historical relationships indicate that respondents tend to be conservative in estimating final yields (underestimate yield potential) particularly under drought conditions. This tendency is quantified and factored into the official yield forecasts.

The Objective Yield Survey (OYS) is based on an area frame sampling design similar to that described for the June Acreage Survey (JAS). The primary goal of the OYS program is to generate yield forecasts based on actual plant counts and measurements, thus eliminating some of the biases associated with the farmer reported yields. The sample of fields selected for the OYS survey is selected from farms that reported corn (soybeans) planted or to be planted in the area frame of the JAS. Samples for corn are selected from the JAS tracts in the 10 principal producing states, while samples for soybeans are selected in 11 states. Records from the JAS are sorted by state, district, county, segment, tract, crop, and field. A random sample of fields is drawn with the probability of selection of any particular field being proportional to the size of the tract.

Two counting areas, or plots, are randomly selected in each field. This selection process is completed as soon as possible following the final summary of the JAS. Objective measurements (such as counts of plants, ears, and pods) are made for each plot each month during the survey cycle. When mature, the plots are harvested and yield is calculated based on actual

production minus an allowance for harvest loss. During the August survey, the operator is asked to verify, field-by-field, the acreage reported in June and permission is received to enter the sample field and make the necessary counts and measurements.

For corn, each of the two independently located sample plots consists of two parallel 15 foot sections of row. For soybeans, each plot consists of two parallel 3.5 foot sections of row, portioned into a 3-foot and a 6-inch section. Each plot is selected by using a random number of rows along the edge of the field and a random number of paces into the field.

Enumerators count all fruit and fruiting positions in corn and, if ears have formed, a sample of ears is measured for length and circumference. Just before the field is harvested, both plots are hand harvested and weighed by the enumerator. Four ears are sent to the NASS lab for shelling and measurement of moisture. These data are used to compute gross yield at 15.5 percent moisture. Harvest loss is measured in separate units near the yield plots.

Data collected from each corn plot during the forecast cycle are used to measure size of the unit and to measure or forecast the number of ears and grain weight. These data include (as available) row width, number of stalks per row, number of stalks with ears or ear shoots per row, number of ears with kernels, kernel row length, ear diameter, ear weight in dent stage, weight of shelled grain, moisture content, total ear weight of harvested unit, lab weight of sample ears, weight of grain from sample ears, and moisture content of shelled grain from sample of mature ears.

At each visit, the enumerator establishes a corn maturity category for the plot, ranging from 1 (no ear shoots) to 7 (mature). Prior to the blister stage, the number of ears is forecast based on the number of stalks, ear shoots, or ears and both the weight per ear and harvest loss are forecast based on the 5-year average. From the blister through the dough stage, the weight per ear is forecast based on kernel row length and harvest loss is forecast based on the past 5-year average. Ear weight is measured in the dent and/or mature stage. Harvest loss is measured following harvest.

Prior to maturity and harvest, corn yield is forecast based on the forecast of the number of ears, the forecast of the weight per ear, and the forecast of harvest loss. Forecasts are based on conditions as of the survey date and projected assuming normal weather conditions for the remainder of the growing season. The forecast of gross corn yield then is based on the following formula:

Gross Yield= [number of ears X weight per ear at 15% moisture] ÷ 56

Number of ears and ear weight are either forecast or actual and 56 is a conversion from weight to bushels.

NASS has procedures in place to account for sample data that are missing in one or more months due to farmer refusal, inaccessibility due to weather, early farmer harvest, and abandoned or destroyed samples.[5] The state average gross corn yield is the simple average of the gross yields for all the sample fields. Weighting of samples is not required since fields have been selected with probabilities proportional to size of the fields.

The procedure described above involves averaging all the sample yield forecasts to determine a state yield forecast. In addition, a state yield forecast is also made by first averaging the forecast or actual yield factors (such as stalk counts, ear counts, and ear weight) and then forecasting the state average yield directly from these averages. This forecast is based on a regression analysis of the historical relationship (15 years) between the yield factors and the state average yield.

[5] More insight into how NASS handles non-responses is provided in a brief paper by Willimack (1989).

For soybeans, the plot selection and data selection process is the same as described for corn. Data collected from soybean plots (as available) include row width; number of plants in each section of row; number of main stem modes, lateral branches, dried flowers and pods, and pods with beans in the 6 inch section; weight and moisture content of beans harvested by enumerator; and weight and moisture content of harvest loss.

On each visit, enumerators classify each soybean plot into four maturity categories ranging from pods set, but leaves still green to pods brown, almost mature or mature. These categories are further refined into 10 forecasting categories ranging from no plants present in the 6-inch section to field maturity 5. Forecasting models for each of the forecasting categories are used to forecast the number of plants per 18 square feet and the number of pods with beans per plant for each of the 2 units in the plot using the counts and measurements at each visit. The models are based on the historical relationship between the measured factors and plant and pod numbers. The weight of beans per pod with beans is forecast using a 5-year average, excluding any unusual years.

As described above, the soybean yield forecast for each unit (2 per plot) requires a forecast of the number of plants per 18 square feet, the number of pods with beans per plant, and bean weight per pod. The forecast of the number of plants per 18 square feet uses the count of plants in the 3.5 feet of row expanded to 18 square feet. The number of pods with beans per plant is forecast using the measurements that are available, which in turn depends on the stage of maturity. Five maturity stages are defined: (V1) only plant numbers available; (V2) number of main stem nodes per plant; (V3) number of lateral branches with blooms, dried flowers, or pods per plant; (V4) the number of blooms, dried flowers, and pods per plant; and (V5) the actual number of pods with beans per plant. The forecast at each maturity stage is based on the relationship of the measured factors to actual pod counts in the previous 5 years. The bean weight per pod is forecast using the past 5-year average bean weight per pod at 12.5 percent moisture. Forecasts are based on conditions as of the survey date and projected assuming normal weather conditions for the remainder of the growing season. Actual bean weight is used at maturity. The average gross soybean yield for each unit is then forecast as follows:

Gross yield = [number of plants per 18 square feet x pods with beans per plant x average bean weight], all converted to bushels per acre.

The two unit level yields are averaged for each plot and plot averages are averaged to obtain a state level yield forecast. A second state level yield forecast is generated in the same manner as described for corn. At maturity, the gross yield is calculated as the number of pods with beans per 18 square feet times bean weight per pod, and then converted to bushels per acre. Harvest loss is estimated using plots near each unit for one quarter of the samples and is used to compute net yield.

The survey and forecasting procedures described above produce a number of indictors of the net yield of corn and soybeans. In August these indicators include: average field level yields, average state level counts, and the average yield reported by farmers in the AYS. After harvest begins, yields reported by farmers are also included as an indicator of final yield. Each of the indicators results in a point yield forecast for which forecast errors are computed based on the historical relationships between forecasts and actual yield. The computed forecast errors of each of the indicators establish a range for the forecast yield around the point forecast. Typically, the ranges for each of the yield indictors overlap so that an official yield forecast can be selected from the overlapping range of forecasts.

The range of yields is evaluated relative to all of the pieces of available data to assist in the selection of the official yield forecast. These factors should support the yield selection. These factors include, average maturity category to determine if crop maturity is unusually late or early; forecast fruit count since fruit count has a high correlation to the final yield; forecast fruit weight; averages of the raw data since these data provide insight into shifts in the components of yield, such as plant populations; the interaction of fruit counts and weights to determine how the forecast combination of count and weight compares to final estimates in previous years; and how the five factors above shift from month-to-month to make sure statisticians understand the reason for any shifts. This process is completed independently in each state and at the national level.

A formal Agricultural Statistics Board (ASB) consisting of 7 to 10 statisticians is convened to review regional yield indicators and determine an official yield forecast. Each member reviews all the data and brings his or her perspective to the collective review where the Board reaches a consensus on the national yield forecast. Gardner (1992) describes the process this way:

> "A NASS board in Washington then assesses all the indicators of yield, including the estimates of a month earlier. This is not done using a pre-specified formula—in which case a computer could replace the NASS board—but through a consensus of the Board members based on their experience and the full information before them. (p. 1068)

Note that the summation of the state forecasts is compared to the consensus forecasts and any differences are reconciled by the Board.

All data are protected against disclosure at every step of the forecast process. Data are always tended or locked up and data from the largest producing states are encrypted before transmission to the ASB. At the national level, offices where data are received and reviewed are designated as secure offices and visitors are not allowed. The formal meeting of the ASB to establish the final numbers and prepare the report is conducted under "lock up" conditions. The meeting location is isolated behind locked doors and windows and elevators are covered or sealed. Telephones are disconnected and the computer network inside the "lock up" area is isolated from the full network. Transmitters are not permitted and the "lock up" area is monitored for electronic signals. The area remains locked up until 8:30 a.m. EST when the report is released.[6]

Each month during the yield forecasting cycle, NASS reports a production forecast based on the yield and harvested acreage forecasts. The reliability of the production forecasts is also reported based on the relationship of the production forecast and actual production in the previous 20 years. Most of the errors in production forecasts are associated with errors in yield forecasts since errors in harvested acreage forecasts are generally small. In August 2010, for example, NASS reported a 2 out of 3 (67 percent) chance that the corn production forecast would not differ from the final estimate by more than 6 percent and a 9 out of 10 (90 percent) chance that the difference would not exceed 10.3 percent. The August forecast of 13.365 billion bushels was 7.4 percent larger than the final production forecast. As shown in Table 2, the reliability of the production forecasts increases for each month of the forecast cycle.

CONCLUDING THOUGHTS

Table 3 provides a convenient summary of the surveys and survey estimates or forecasts in the most important NASS reports for corn and soybeans. Acreage, yield, and production estimates and

[6] See Bernard (2007) for an overview of the security measures.

forecasts provided by NASS are the result of a complex, multilayered process developed over many decades (e.g., Houseman and Becker, 1967; Abreu and Riberas, 2008). Given this complexity, it is not entirely surprising that a great deal of misunderstanding and outright myth surrounds these forecasts.[7] Most of the controversy centers on yield forecasts and the resulting production forecasts. The survey and estimation procedures for prospective and actual acreage are generally better understood and less controversial.

Review of the NASS yield forecasting methodology reveals the following strengths:

(1) The data collection methodology employs statistically rigorous sampling procedures;
(2) The objective yield survey involves counting and measuring appropriate yield determining factors;
(3) The forecasting methodology reflects some of the variation in historical relationships between factors measured and actual yields;
(4) The forecasting methodology captures the well-documented advantage of composite forecasts (combining alternative forecasts); and,
(5) The survey and forecasting procedures are consistent from year- to-year and appear to maximize objectivity.

The methodology lends itself to the following misunderstandings or shortcomings:

(1) Users may not recognize that yield data are collected in two separate and very different surveys;
(2) The forecasts based on the farmer survey have a clear bias, but the magnitude of the bias is not constant and therefore not known with certainty for the current year;
(3) The concept of survey sampling error may be poorly understood, and this may be compounded by the fact that the potential for sample bias in a particular report is of unknown size;
(4) The forecasts based on the objective yield survey are limited to the factors that can be counted and measured at the time of the survey;
(5) The relationship between yield factors and actual yield varies from year-to-year so that averages or tendencies may or may not reflect relationships in the current year; and,
(6) The assumption of normal weather conditions subsequent to the survey period is often violated.

For further discussion of these and related issues please see Eglekraut et. al (2003), Irwin and Good (2003, 2005, 2006), and Isengildina, Irwin, and Good (2006).

While NASS has clearly described the yield forecasting methodology for corn and soybeans, users still appear to assume too much accuracy, particularly in the first forecasts of the season. To help users appreciate the complexity and challenge of yield forecasting, NASS might consider revealing the results of the farmer and objective yield surveys separately.

[7] This situation is not new. In 1904, John Hyde, Chief of the Division of the USDA responsible for agricultural estimates, made these observations, "Criticism is not lacking. On the contrary, it is one of the curious features of this work that the more closely reports represent the actual facts and the wider the appreciation of their accuracy the more subject they become to criticism. This is undoubtedly due to the fact that as their general accuracy is more and more widely recognized they necessarily exercise a greater influence upon the markets, thus inevitably favoring or antagonizing, as the case may be, some of those who are engaged in the game of speculation in agricultural products. This immediately attracts the adverse comments of the losers. This result is unavoidable, and is apparently the inevitable penalty the Department must pay for issuing reports so reliable and so generally appreciated as to have instant effect on the markets. Were the reverse true, and were these reports regarded as unreliable, they would not influence prices, and criticisms would be reduced to a minimum." (as quoted by Houseman and Becker, 1967, p. 15)

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Table 1. Timing and Survey Information for NASS Corn and Soybean *Crop Production* Reports in 2010

	Farmer Reported Survey		Field Measurement Survey		
Report Month	Data Collection Period	Number of Surveys	Data Collection Period	Number of Corn Fields	Number of Soybean Fields
August	July 30 - August 6	27,000	July 25 - August 6	1,920	1,835
September	August 30 – September 7	13,000	August 25 – September 1	1,920	1,835
October	September 29 – October 5	15,000	September 24 – October 1	1,920	1,835
November	October 30 – November 4	11,000	October 25 – November 1	1,920	1,835

Source: Presentations prepared by NASS for the monthly Crop Production Briefings in 2010

Table 2. Estimated Reliability of NASS Corn and Soybean Production Forecasts

	2/3 Chance of Falling in Range		9/10 Chance of Falling in Range	
Report Month	**Corn**	**Soybeans**	**Corn**	**Soybeans**
August	+/-6.0%	+/-6.6%	+/-10.3%	+/-11.5%
September	+/-5.1%	+/-5.3%	+/-8.8%	+/-9.2%
October	+/-3.1%	+/-2.4%	+/-5.4%	+/-4.1%
November	+/-1.2%	+/-1.3%	+/-2.1%	+/-2.3%

Source: August-November 2010 NASS *Crop Production* reports

Table 3. Summary of Survey Estimates and Forecasts Contained in NASS Acreage and Production Reports

		Survey Used in Report		Estimates/Forecasts Contained in Report			
Report	Release Month	List Frame	Area Frame	Planted Acreage	Harvested Acreage	Yield	Production
Prospective Plantings	March	Yes	No	Yes	No	No	No
Acreage	June	Yes	Yes	Yes	Yes	No	No
Crop Production	August	Yes	Yes	Yes	Yes	Yes	Yes
Crop Production	September	Yes	Yes	Yes	Yes	Yes	Yes
Crop Production	October	Yes	Yes	Yes	Yes	Yes	Yes
Crop Production	November	Yes	Yes	Yes	Yes	Yes	Yes
Crop Production	January	Yes	No	Yes	Yes	Yes	Yes

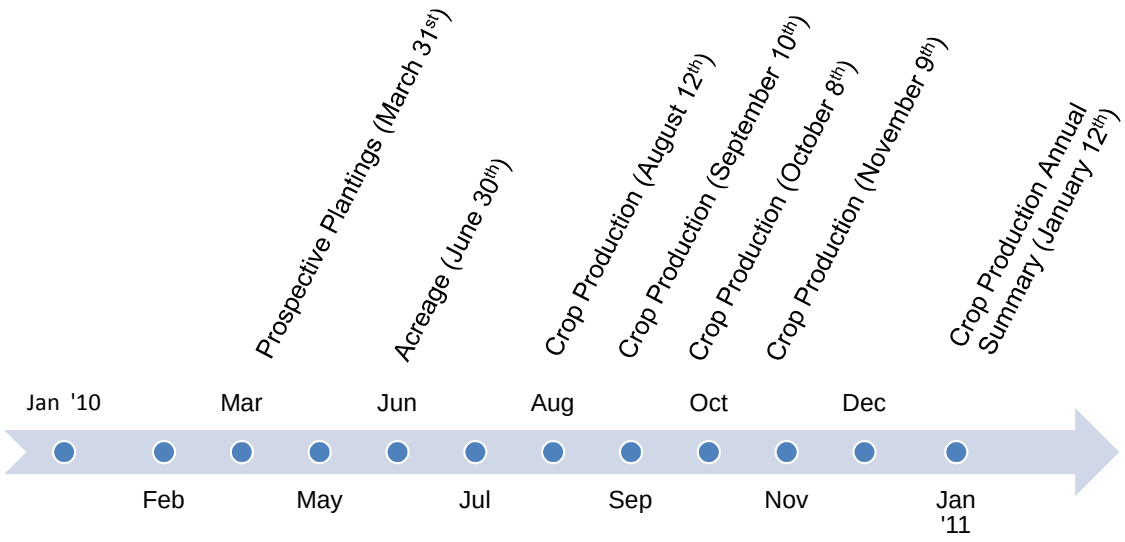

Figure 1. Timeline of NASS Acreage, Yield, and Production Reports for 2010 Corn and Soybean Crops