

Risk Management

How USDA Forecasts Production and Supply/Demand

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USDA publishes crop supply and demand estimates for the U.S. each month. Because of the comprehensive nature and objectivity of these reports, market participants regard them as the benchmark of the fundamental supply/demand situation in agricultural markets. Producers, merchandisers, processors, traders and other market participants rely on the information in these reports when making their buying and selling decisions. Therefore, it is useful to know what is behind the reports, how they are developed, and what they really represent.

Due to the sensitivity of commodity markets to reports like those discussed here, USDA goes to extraordinary lengths to protect their security and prevent premature release of the information contained in them. This security procedure is known as the "lock up." Beginning about midnight of the day of the scheduled report release, statisticians compiling final data are literally locked in under armed guard. Once the doors are locked, telephone and computer lines are disconnected and no one is admitted without clearance and a special pass. Lock up does not end until the report is released, usually at 8:30 a.m. Eastern time.

Production Forecasts

Production forecasts are generated by estimates of harvested acres and yield per acre.

Forecasts are based on conditions as they exist when the survey is made and projections of normal conditions for the remainder of the season. That means it is assumed that rainfall and temperatures will occur at their historic averages for the rest of the season.

When significant weather events occur after a report, actual production may vary from the forecast estimates. When weather events occur between the survey and the issuance of the report, then the National Agricultural Statistics Service (NASS) attempts to adjust production accordingly while remaining within the survey data ranges.

Planted and Harvested Acres

The largest survey of the year is the June Agricultural Survey. In early June, NASS surveys more than 125,000 farmers to get information on acres they have planted and intend to plant, acres they intend to harvest, and on farm grain stocks and livestock inventories. These data provide the first estimate of planted and harvested acres.

This survey uses two different samples, called frames. The first is the area frame, which is the land area of the United States. This ensures that the population of farmers is covered by the survey. The second frame is the list frame. This is a list of all known farmers and ranchers. The list frame is a more efficient data collection method because it uses people who are already known to be in the business.



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The area frame survey uses known data about land cultivation intensity, by state, to sample farmers. The more intensively farmed the area, the more intensively it is surveyed. That means that more farmers in heavily farmed areas are contacted. Land is broken up into segments, then the segments are chosen in which the farmers will be interviewed in person. About 10,000 area segments are used in the June survey.

Approximately 75,000 farmers are chosen from the list of addresses to participate in the June survey. Before the survey, farms are classified by various characteristics, including size, to ensure that larger farms can be sampled at higher rates. In fact, in Iowa and Illinois all farms greater than 5,000 and 5,500 acres, respectively, are surveyed. The results from the list survey and the area survey are then combined and compared to prevent duplication. Planted and harvested acres are then forecast.

Yield Forecasts

A subset of the farmers surveyed for the acreage estimates are asked to help develop monthly crop yield projections. These farmers project what they expect their crops to yield and then provide actual yield information after harvest.

Objective yield surveys are performed monthly in the largest producing states. These surveys provide data for estimating yields from small plots in randomly selected fields using plant and fruit counts, measurements and weights. These fields are selected during the area frame survey. Plots from these fields are surveyed. The number of fruit and fruit weights then are used in statistical models based on historical observations to forecast yields. Table 1 indicates fruit and weight factors that are used to forecast yields.

After harvest, the plots are again surveyed to measure harvest loss. These measurements can change over time. For example, as soybean production has moved to narrower rows, record production counts have occurred. Rapid management or technological changes can show up in the objective yield counts.

The estimates of harvested acreage and yield are combined to generate the production estimate. Of course, ongoing weather events can and do change the estimates of harvested acres and

yields. As those events occur, NASS makes revisions to the forecasts. Often fields are abandoned, or not harvested, because of storms or freezes. As this occurs harvested acres are revised, and production forecasts can decline without a change in yields. Yields per acre may increase as fields with poor yield potential are abandoned, then reclassified as planted, but not harvested.

Uses of Production Forecasts

The NASS production estimates are used by USDA to estimate the supply of and use of U.S. agricultural commodities. A balance sheet is developed for each crop; it includes beginning stocks, production and imports to estimate total supply. Estimates of crop use (both domestic use and exports) are developed for each crop.

Table 1. Objective yield forecast variables for number of fruit and weight per fruit.

Crop	Component	Forecast variable
Corn	ears	- stalks - ears and ear shoots - ears with kernels
	ear weight	- historic average - length over husk - kernel row length - ear diameter
Soybeans	plants	- plants
	plants per plant	- mainstream nodes - lateral branches - blooms, dried flowers and pods - pods with beans
	pod weight	- historical average - pods with beans
Cotton	bolts	- squares - blooms - small bolts - large bolts - open bolts
	boll weight	- historical average - large boll weight
Wheat	heads	- stalks - heads in boot - emerged heads
	head weight	- historical average - fertile spikelets - grains per head

Source: NASS

How Does the NASS Report Differ from Others?

Many private companies and individuals make acreage, yield and production forecasts. These are done in a variety of ways, including phone surveys of farmers, elevator surveys, drive-by window surveys, and even some limited field samples similar to, but on a much smaller scale than, NASS. No one surveys producers and does objective field tests to the extent that NASS does. For that reason, private forecasters release their estimates ahead of the USDA reports, and will get the attention of market participants until the USDA reports are released. Once the USDA estimates are released, they become the benchmark until the next USDA estimates are released, and the private analysts' estimates are discounted. While many companies provide forecasts, they all adjust their projections toward the NASS estimate as the season progresses.

It is also worth noting that the NASS data is public information and is freely passed to all. It does rely on producer involvement. For the cost of time to participate, the producer gets the benefit of market information to use in planning. Private firms do forecasts for their own reasons. One is to generate business. It is important that producers evaluate the source of data they use, particularly if an estimate comes from a company involved in futures and options trading. There are potential conflicts of interest that can influence their forecasts.

Crop Progress Reports

Every Monday morning during the growing season, NASS releases a report on crop progress and conditions. For the major commodities in major producing states, this report briefly details crop planting, percent of crops at various stages of maturity, and percent harvested. Estimates of crop conditions are made by classifying the per-

cent of the crop in excellent, good, fair and poor condition. Cash and futures market prices have been known to increase or decrease dramatically in response to changes in this report from one week to the next as market participants adjust their buying and selling activities to reflect the changing crop fundamentals. These estimates are often compared to crop progress during the same week of the previous year and to the 5-year average.

It is important to remember that the crop progress reports can change drastically from week to week. They often change in response to changing weather during planting, pollination and harvest seasons. These reports are often quoted in the media and used by analysts to forecast yields and production.

Summary

NASS uses large surveys of real farmers and fields to forecast crop production. It is a large effort that succeeds because of the participation of farmers. It is a survey at a specific point in time, in which measurement and forecast errors can occur. The timing of weather and other events can affect the usefulness of the survey. If conditions change from one month to the next, the estimates also change. However, the market information is valuable and serves as the benchmark for many of the market participants' buying and selling decisions. For that reason, it is important for producers to understand how the information and reports are constructed, and what their correct uses are and are not.

References

U.S. Department of Agriculture. "Understanding USDA Crop Forecasts." National Agricultural Statistics Service and Office of the Chief Economist, World Agricultural Outlook Board. Miscellaneous Publication No. 1554, March 1999.

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