Supporting Statement

FIELD CROPS OBJECTIVE YIELD SURVEYS
OMB No. 0535-0088

B. COLLECTION OF INFORMATION EMPLOYING STATISTICAL METHODS

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection has been conducted previously, include the actual response rate achieved during the last collection.

The following table shows U.S. estimates of planted acres and response rates for States in the objective yield program. Sample fields are selected with probabilities proportional to acreage. Response rates are based on responses for the latest survey year, 2007. This is an ongoing program with very stable response rates. The respondents are a sub-sample of farmers who voluntarily cooperated on one of several surveys a few weeks earlier (March Ag Survey, June Ag Survey or June Area Survey OMB No. 0535-0213).

Projected Counts and Actual Response Rates

Survey Crop		No. of States	Questionnaires	2008 Allocation		2007 Resp Rate*%
			ID Numbers	Planted Acres (000)	No. of Sample Units	
Corn		10	120032 A, B, C-1, C-2, E	86,014	2,100	91
Cotton		6	120033 A-1, B, C, E	9,390	1,250	92
Potatoes		7	120038 A, B, C-1, C-2, E	1,010	1,400	87
Soybeans		11	120034 A, B, C-2, E	74,793	1,950	90
Wheat	Winter	10	120031 A-1W, B, C-1, C-2, E-W	46,840	1,450	91
	Durum	1	120031 A-2D	2,630	150	91
	Other Spring	3	120031 A-2S	14,333	400	92

* Form A rate. Not adjusted for duplication due to selection of more than one sample per field.

2. Describe the procedures for the collection of information including:

- **statistical methodology for stratification and sample selection,**
- **estimation procedure,**
- **degree of accuracy needed for the purpose described in the justification,**
- **unusual problems requiring specialized sampling procedures**

Objective Yield surveys are conducted in major producing States for corn, upland cotton, fall potatoes, soybeans, winter wheat, durum wheat, and other spring wheat. For each

commodity except potatoes, a series of monthly net yield forecasts culminates in a final net yield at maturity. Only the final net yield is measured for potatoes.

Forecasts of acreage, yield, and production are made monthly from May through August for winter wheat, and August through September for durum and other spring wheat. Monthly forecasts of acreage, yield and production are made from August through November for corn and soybeans, and August through January for cotton. For potatoes, estimates of acreage, final yield and production are made in November and December. These forecasts and estimates, based on data obtained from the Objective Yield Surveys, are published in the monthly *Crop Production* reports.

All Objective Yield samples except winter wheat and potatoes are drawn from an area frame parent survey. Sample fields for corn, cotton, soybeans, durum and other spring wheat are selected from fields reported with the crop planted or to be planted on the June Area Survey (OMB No. 0535-0213). Winter wheat sample fields are selected from fields reported with wheat planted or to be planted for harvest as grain on the March Agricultural Survey (OMB No. 0535-0213). For potatoes, sample farms are selected from farms reporting potatoes planted in the June Agriculture Survey (OMB No. 0535-0213).

The sample fields for all crops are selected with probability proportional to size (PPS) and the net effect is a self-weighting sample of areas with the crop of interest in each State. Samples are selected at the State level. The detail of the recorded area frame survey data allows sample selection at the field level for corn, cotton, soybeans, and durum and other spring wheat. Potato and winter wheat acres are collected at the farm level. Sample potato fields are selected proportional to size within a farm by the enumerator during the initial interview with the farm operator. Fields with large acreage or expansion factors may be selected for more than one sample. Separate plots are laid out for each sample within a field up to four samples per field.

The major goal of the OY program is to produce indications of expected yield and final harvest yield using actual plant counts and measurements. OY indications calculated from actual plant counts and measurements eliminate some of the biases found in the farmer reported yields from other surveys.

The OY surveys produce indications for harvested acres, yield, and production. Objective measurements (counts of plants, ears, pods, bolls, etc.) are made on small plots of land. At maturity, the small plots are harvested and yield is calculated based on the actual production taken from these small plots, less an allowance for harvest loss.
OY surveys collect data at different times during the growing season. During the initial OY interview (Form A), the operator is asked to verify the acreage reported on the parent survey. This is done on a field by field basis. The main purpose is to verify the subsampling frame by checking the acreage reported on the parent survey and recording any changes. Changes may be due to recording or reporting errors in the parent survey, failure to fulfill planting intentions, or switching to other utilizations. Only total farm winter wheat and potato acreage were asked on the base survey(s). Therefore, farmers are asked to report individual fields of winter wheat or potatoes during the initial interview. Other data that must be obtained from the operator are collected at this time: planting date, planter row width, seeding practices, irrigation use, and application of pesticides. Enumerators ask for permission to enter the sample field and make counts and measurements.

Ratio indications comparing the initial interview acres to the parent survey are computed to determine if acreage revisions are in order. Planting date gives an indication of harvesting date so enumerators are aware of when the final pre-harvest field visit will occur. Enumerators use the planter row width as an indicator of when the sample plots will be laid out. For example, narrow row soybean sample units are laid out as early as possible to limit the amount of destruction which can occur to the plants. When analyzing the data, the use of Bt seed, herbicide resistant varieties, and irrigation are taken into consideration. Enumerators ask about applications of pesticides for safety reasons.

Two units are laid out for each sample. The units are located and laid out according to specific procedures to assure randomness in field location. Plant and fruit counts, fruit measurements, and maturity determinations are recorded each month using the Form B until the crop is mature or harvested. Early season data are entered into regression equations used to forecast gross yield and the components of yield--number of fruit and weight per fruit. At maturity, the final visit obtains crop cutting data used to directly calculate final gross yield. The counts and measurements from all visits are added to the historical database used to derive future forecast equations.

Regional laboratories record measurements of fruit on the Form C. Lab samples are submitted for every sample hand-harvested by field enumerators. Lab measurements include weighing the fruit (ears, pods, bolls, heads, or tubers), weighing the grain after threshing, and determining moisture content. These data are obtained in a controlled environment. The data are used to calculate a threshing fraction and adjust to standard moisture. For wheat, labs count spikelets and grain from “green” heads early in the season which are used to forecast grain weight per head.

After the farmer has harvested the sample field, post-harvest gleaning data are collected on the Form E. All unharvested fruit and loose grains are gleaned from plots laid out after harvest in a subset of the sample fields. The gleanings are sent to the regional labs where they are weighed and tested for moisture. Harvest loss computed from these data is deducted from estimates of gross yield (calculated from Form B) to arrive at a net yield. During pre-harvest forecasting, historical average harvest loss is used.

A series of equations is used in forecasting the components of yield. In the case of wheat for example, the two components are weight of grain per head and number of heads for each sample. These regression equations utilize current monthly counts and measurements as the independent variables.

Linear regression equations relate historic number of plants per unit to number of plants at the end of the season. The correlation coefficient provides a measure of the relative effectiveness of the models and is used to weight equations together.

When the field reaches maturity, and just prior to the farmer harvesting the field, sample units are harvested by the enumerator. These counts and weights are expanded to a per acre yield and adjusted to a standard moisture for the commodity. After harvest, separate sample plots in the same sample fields are gleaned to indicate harvesting loss. Estimates of these losses are computed and subtracted from the biological (gross) yield of the harvest plots to determine net yield per acre.

A separate document of the entire NASS yield estimating methodology and procedures is available, the *Report on Yield Forecasting Program of NASS* is attached.

3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.

To maximize response rates, enumerators attend State training workshops to learn how the survey information is used; this develops proper interviewing techniques. The Objective Yield Survey training also stresses the need for careful and accurate measurements and counts. All enumerator field work procedures are subject to quality control review in order to keep non-sampling errors at a minimum.

The coefficient of variation of yields from the Objective Yield Survey ranges from 2 to 6 percent in the major States. When these major States are grouped together the coefficient of variation is further reduced to provide a very reliable indicator of yield.

4. Describe any tests of procedures or methods to be undertaken.

No tests of procedures or methods are planned.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), or other person(s) who will actually collect and/or analyze the information for the agency.

State-employed enumerators working out of NASS field offices (FOs) do the primary data collection for these surveys. Sampling procedures and sizes for each State are reviewed by the Statistical Methods Branch (202-720-4008) of the Statistics Division and the Sampling Branch (202-720-3895) of the Census and Survey Division. Coordination of data collection, training, and quality control is the responsibility of the Survey Administration Branch; the current survey administrator is John Gibbons (202-720-6203).

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