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.

Respondents to the Field Crop Objective Yield Survey are a sub-sample of farmers who participated in one of the following surveys a few weeks earlier: March Agriculture Survey, June Agriculture Survey or June Area Survey (OMB No. 0535-0213). The overall response rates for the March Agriculture Survey, the June Agriculture Survey and the June Area Survey in 2010 were 72.9%, 69.1%, and 83.6%, respectively. The table below provides response rates by survey crop for those crops featured in the Field Crop Objective Yield Survey for 2010.

Nonresponse to the parent surveys is being addressed through weighting procedures prior to defining the sampling population for the Objective Yield Survey.

The completion rates for the Field Crop Objective Yield Survey (Form A) appear below, by survey crop. U.S. estimates of planted acres and sampled units are also shown. Sample fields are selected with probabilities proportional to acreage.

Table B.1.a Projected Counts and Actual Completion Rates, Form A, By Crop

Survey Crop	No. of States	Questionnaires	2011 Allocation		2010 Com-pletio Rate%
		ID Numbers	Planted Acres (000)	No. of Sample Units	
Corn	10	120032 A, B, C-1, C-2, E	91,897	2,000	88
Cotton	6	120033 A, B, C, E	14,431	1,300	93
Potatoes	7	120038 A, B, C-1, C-2, E	948	1,300	84
Soybeans	11	120034 A, B, C-2, C-2R, E, R	74,966	1,900	91
Wheat	10	120031 A, B, C-1, C-2, E	40,646	1,500	90
Totals			222,888	8,000	89

The completion rate for the Field Crop Objective Yield Survey, Form A is calculated as follows:

Completion rate = (a + p)/n

Where a = complete Form A and any field observations (status code 1)
r = refusal of Form A (status code 7)
p = commodity sample field was planted but plowed or abandoned before first visit or not planted (status codes 11, 12 and 13)
n = number of sample units

The acre to be observed (Form B) is selected at the beginning from the parent survey and the operator of the farm containing that acre is identified and interviewed. The response to the Form A determines if the field can be entered. Once Form A is completed, a sample field is identified for observation. The field is visited by a field observer at multiple time points to observe, collect and measure crop specimens.

The available field observation data, by crop and visit for 2010 appear below. These percentages reflect a completed Form A.

Table B.1.b. Completion Rate of Form B Instruments per Month, by Crop, 2010

	Wheat	Corn	Cotton	Soybeans	Potatoes
May	85				
June	89				
July	90				
Aug	90	82	93	81	
Sept		87	93	88	
Oct		87	92	87	
Nov		87	93	89	82
Dec			92		82
Jan			93		

The sample units for the Field Crop Objective Survey are selected proportional to size--for both the overall sample eligible to receive Form A, and within a given farmer's tract, sampled plots for field observations. In this way, the sample is self-weighting. There are no non-response adjustments made to these data.

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, cotton, potatoes, soybeans, and winter 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. 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, and soybeans, 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, and soybeans. 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 sub-sampling 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 on subsequent surveys. For more information on NASS's Objective Yield Sample Design, please reference Chapter 2, pages 4-9 of "The Yield Forecasting Program of NASS." (Attached in the ROCIS submission system)

Ratio indications comparing the initial interview acres to the parent survey are computed to determine if acreage revisions are in order. The 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: biological pest controls, such as Bacillus thuringiensis (Bt) seed; herbicide resistant plant varieties; or irrigation are taken into consideration. Enumerators ask about applications of pesticides for data collection safety reasons, since they will be handling the live plants.

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 are 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. For more information on this topic, please reference Chapter 8, pages 78-85 in “The Yield Forecasting Program of NASS.” (Attached in the ROCIS submission system.)

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.

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.

The National Association of State Department’s of Agriculture (NASDA), under a cooperative agreement with NASS, hires and helps NASS train quality field enumerators. The majority of the field enumerators come from rural or agricultural backgrounds. They are aware of many of the complexities of the farming industry and the importance of having accurate and timely data when making operating

decisions. Many of the field enumerators have been collecting data for NASS for multiple years. The majority of the field supervisors have been collecting data for NASS for over 20 years.

In addition to their experience in the farming industry and in prior data collections, enumerators receive rigorous initial and on-going interviewer training from NASS and NASDA. Specifically, objective yield enumerators attend State training workshops, during which field procedures, measurement techniques, and interview skills are reviewed. Enumerators also learn how the survey information is used, which enables them to communicate the purposes and use of survey data to potential study participants. All enumerator procedures are subject to quality control review in order to keep non-sampling errors at a minimum.

To maximize response rates, NASS utilizes the same enumerators across all field enumerator surveys. This helps farm operators to become accustomed to providing data to the same enumerator on a regular basis.

The Objective Yield Survey data are found to be reliable predictors of actual yield. In 2010 data, the coefficient of variation produced from models using data from the Objective Yield Survey ranged from 2 to 6 percent in the major States, across all observed crops. When these major States are grouped together, the coefficient of variation is further reduced to 1 percent on average, across all participating States and all observed crops, which is considered 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.

Survey design and methodology are determined by the Statistical Methods Branch, Statistics Division; Branch Chief is Dave Aune, (202)720-4008.

The sample size for each State is determined by the Sampling Branch, Census and Survey Division; Branch Chief is William Iwig, (202) 720-3895.

Data collection is carried out by NASS Field Offices; Western Field Operations Director, Kevin Barnes (202)720-8220 and Eastern Field Operations Director, Norman Bennett (202) 720-3638.

Coordination of data collection, training, and quality control is the responsibility of the Program Administration Branch; Branch Chief is Christina S. Messer, (202) 690-8747, the current survey administrator is Brent Chittenden (202-720-6203).

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