A Brief Introduction of China's Crop Production Survey & Estimate

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China has basically formed a system of statistical survey methodologies, by taking the periodical censuses as its basis, sampling surveys as its main body, and supplemented by the necessary reporting forms, key unit surveys, and comprehensive analysis, etc.

**Census:**
Census is a kind of comprehensive survey specially organized. The main purpose of census is to investigate the aggregates and structure of a socio-economic phenomenon at a certain time point or in a certain period.

**Sampling Survey:**
Sampling survey is a kind of non-comprehensive survey that randomly selects a subset of individual observations within a population intended to yield some quantitative characteristics about the population of concern.

**Reporting form:**
Reporting form is a kind of survey method to provide basic statistical data on a regular basis, based on nationally unified tables, unified indicators, unified reporting time, and reporting from bottom to top and level by level.

**Key Unit Survey:**
Key unit survey is a kind of non-comprehensive survey that is specially organized, by selecting a part of key units from all units to investigate.

**Typical Survey:**
Typical survey is a kind of survey basing on the preliminary analysis of the population concerned and the purposes of the survey, consciously selecting some representative units to investigate, and intended to yield some knowledge about the developing-and-changing law of the population concerned.
• Conducted every 10 years, Years ending in 6.
• The first Agricultural Census in 1996
• The third AC will be conducted in 31 Dec 2016.
• We can get more accuracy information about crop production, compile a more accuracy sampling frame for future survey.
Sample Survey

• Mainly conducted among rural-household.
• Over 200 million households live in rural area
• Average Acreage less than 0.6 hectare Per Rural-Household
• Over 95% of the country's grain produced by rural-household
• Mainly survey&estimate major crop's acreage and yield
Sample Survey Chart

Population

PSU

FSU

Field survey

31 Province-level Population

Administrative village

Rural-Household/Plots

Acreage and Yield
Sample Survey Method

- Stratified two-stage Sampling, PPS
- Village as PSU, household/plots as FSU
- Stratification by proportion of major crop's acreage of the cultivated land.
Sample Size

- **Acreage**: about 480,000 rural-households
- **Yield**: about 68,000 Plots
Reporting Form

- Relied on administrative data
- Report from bottom to top and level by level
- Local bureau collect and review data from basic administration unit, then report it to the upper level till NBS.
- Mainly used among non-major grain(such as millet,sorghum),beans and tubers
Crop Cutting Experiment

Sampling & Cutting:
1. Select sample plots systematically based on the planted areas of the crop plots.
2. Fix 3 or 5 reaping sample per mu (Chinese measurement unit, about 1.1m²) for each sample plot.
3. Usually cutting crops several days before harvesting.
Crop Cutting Experiment

Dry & Thresh
1. Dry the sample crops;
2. Crop threshing by tiny machine;
3. Purify the kernel and measure the moisture;
4. Estimate the loss from the process of harvest.
Crop Cutting Experiment

- All Province included vary by crop
- Regional office can decide which crop do cutting experiment
- Generally, Only major crops do cutting experiment (Paddy, Corn, Wheat, Soybean and Cotton).
- Non-major crops yield estimated by asking local peasants
- Crop production reviewed after each AC
Rural Observer System

- Established in March 2015
- 2 observers per major county, Totally 2890 observers
- Conducted by mobile phone
- Large scale, Rapidly, Accuracy, Low cost
- Have a fair idea about the variety of the crop yield by asking rural observer
- Don't need to went to field
Crop Condition

Speculate crop yield based on field survey.

Field survey in different crop growth stage

Collect key indicators about crop production, such as tiller number, number of plants per ha., weight per 1000 ear (wheat/rice)

Estimation combined with peasant's reporting expected yield
Remote Sensing

- Conducted in recent years, mainly on crop acreage
- Will be used in third AC
- Mainly use NDVI to monitor crop growing condition
Remote Sensing

Dec 2013  April 2013  June 2014  synthesis
Econometric Model

- Establish econometric model based on statistical time series data to forecast crop yield
- Regression model/Grey model/Input-Output model etc.
- Usually efficiency in short term
Existing Issue

• Heavy workload

• Obsolete equipment

• Urbanization & Migration

• Agricultural structure changed
Heavy workload

- Usually 6-7 person in county office, only 1 person do crop survey, along with the other 2-3 survey.
- Work quality may be affected due to heavy workload and lack of hand
- Insufficient funding also is a major problem: wages of county investigator is too low to mobilize working enthusiasm
Obsolete equipment

- Crop cutting tools obsolete
- Time-Consuming, Labor-Intensive
- Accuracy may be affected

Chines Steelyard
Spring Scale
Measuring Tape
Urbanization & Migration

• Cultivated Land be occupied large scale because urbanization.
• Over 200 million peasants work and live in city, left children, disabled and elderly in rural.
• It's difficult to conduct crop survey based on rural-household because most young people went to city.
Agricultural structure changed

• Agricultural structure may be changed rapidly due to economic development.

• Sampling frame may be couldn't reflect the real agricultural structure.
Further Work
Reform the crop survey system

• NBS prepared to reform the current crop survey which based on rural-household.
• With the help of 3S technology, NBS ready to establish a frame which consists of sample's GeoSpatial information.
• NBS start to conduct crop survey based on area frame in several major province, and will extend it to all province in future.
Utility of spatial information technology

• NBS has used the RS technology to estimate major crop's acreage in several province.
• Estimate major crop's acreage and production in county-level by the 3S technology.
• Estimate non-major crop's acreage and production in county-level in future.
Application of New Device

- Vehicle mounted crop monitoring system
- Unmanned aerial vehicle
- Agricultural parameter device
New Device
Agricultural parameter device

- NBS cooperated with enterprise and institution developed several handhold agricultural parameter device, begun to do filed expriment.

- NBS will compare the result with the traditional method, try to esatblish a statistical model which combined with the device and the field survey to forecast crop production.
Thanks