

The Status of EAA in China and Its Reform Ideas

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Abstract

Agriculture is an important sector in China. The value-added of agriculture took a share of 11.8 percent to GDP in 2006. The EAA (economic accounts for agriculture) is the basis of national economic accounts. The value-added of agriculture is a comprehensive indicator in reflecting agriculture production. Before the year 2000, the calculation of growth rate of China's agriculture output value was based on constant price in 1990. However, Along with the emerging of new products, the variety and quality structure of agricultural products had changed greatly, therefore, the structure of agricultural products and their price levels, which were determined in 1990 for the calculation of agriculture growth rate, no longer reflect the current structure of agricultural products and changes in their prices. So, in 2000, NBS improved the list of agricultural products for the calculation of gross output in agriculture, and developed a survey on producer prices of agricultural products. In 2003, the price deflator method was applied. Moreover, NBS strengthened the management of the EAA at the provincial level, focusing on the areas of coverage, methods, data sources, data checking standards and data utilization, which makes the EAA more systematic and specific.

This article introduces the coverage of the EAA in China, the collection of basic data, the calculating methods for quarterly and annual gross output value of agriculture, its value-added and its growth rate, as well as the management on accounting results. The article also indicates some problems in China's EAA, and suggestions on improving China's EAA in the future.

I. Coverage of Accounting

According to *the Industrial Classification for National Economic Activities* and *the Reference Catalogue of Agriculture Products*, agricultural production covers five divisions: farming, forestry, animal husbandry, fishing and service activities for farming, forestry, animal husbandry and fishing.

Farming includes four groups: cereals and other crops, vegetables and horticultural crops, fruits, nuts, beverage and spice crops, and traditional Chinese medicinal materials. In turn, cereals and other crops include nine classes: cereals, roots and tubers, bean crops, oleaginous crops, cotton crops, sugar crops, hemp, tobacco crops, and other crops. Other farm crops include succulence, green manure, grazing, mulberry leaf, and collected wild plants, etc.

Forestry includes three groups: cultivation and growing of forests, logging of timbers and bamboos, and forest products. In turn, cultivation and growing of forests covers three types: operation of tree and seed nurseries, forestation, fostering and management. Forest products include the collecting activities of all kinds of forest products including wild forest products from natural or cultivated forest without felling, but not including mulberry leaf, tea, fruit and edible fungus, which are classified to planting trade.

Animal husbandry covers five groups: raising of cattle and the like, raising of hogs, raising of poultry and etc. In turn, raising of cattle and the like includes cattle, sheep, horses, donkeys, mules

and other main livestock slaughtered at the year-end, and milk, wool, down and other livestock products; raising of hogs includes slaughtered hogs and its byproduct; raising of poultry includes: main poultry products and eggs, feathers and other poultry byproducts.

Fishing covers two groups: seawater aquatic products and freshwater aquatic products, not including those living in the water without catching, and feeding of fish fry and seed.

Services include: service activities for farming, forestry, animal husbandry and fishing. Farming services include: irrigating services, primary processing of agricultural products, and other agricultural services. Forestry services include: prevention and cure from ill insects, rats and other animals in forests; forest fire control; and forest services performed by forest management stations, timber inspection stations, and control sand stations. Services for animal husbandry include: veterinary services, and other services for animal husbandry. Fishing services include: fish fry and seed farm, aquatics breed farm and aquatic proliferation farm, etc..

II. Data Sources

Output of Agricultural Products: Data on output of farming, forestry, animal husbandry, and fishing are reported in the *Annual Statistical Report on Production of Farming, Forestry, Animal husbandry, and Fishing*. Data of grain, hogs and livestock come from the sampling surveys conducted by the provinces, and that of other agricultural products were reported from village, county, city, province and up to the country level, level by level. The data, which cannot be obtained directly, are obtained by ratio estimates, acreage estimates or estimates of purchasing units.

Prices of Agricultural Products: These come from the producers' price surveys on agricultural products conducted by provincial survey organizations of NBS by sampling methods and key case survey. Prices charged by the agricultural holdings selling their agricultural products are obtained through random sampling surveys. For the prices of those agricultural products that are produced only in certain areas, the subjective sampling survey method is adopted in the main producing areas. The unit that is investigated is asked to provide registered name, total sales, quantity and value of main products. All regions must comply with national unified classification standards and codes in *Reference Contents of Agriculture Products*.

Deflators are derived from the producers' price surveys on agricultural products conducted by all the survey organizations of NBS at the provincial level. It is calculated and reported by provincial survey organizations of NBS. All provinces, autonomous regions and municipalities use the unified deflators.

Ratios of value added are obtained on the basis of annual surveys on intermediate consumption and input-output survey conducted once every five years, integrating typical surveys and key case surveys. Quarterly ratios of value added are adjusted correspondingly by comprehensive analysis according to climate, natural disaster, scientific and technological level, and farmers' investment in that year.

III. Calculating Methods

National data are obtained through a tabulation of all provinces, autonomous regions and municipalities. Output value at current price = output of products x produce price. Output value at constant price = output value at current price / deflator. Growth rates are calculated on the basis of values at constant prices.

A. Total output value at current price:

For products whose quantity of output can be directly obtained, the calculation is simply done by multiplying output in quantity by produce price. Otherwise, the calculation is based on estimation technique using area, ratio like yield of commodity and other data.

The output of cultivation and planting of forest is based on costs instead of growth, i.e. according to the costs expensed on production activities by all engaging plantations. That is to say, the first thing is to obtain data on the following six aspects from forestry production statistical report: acreage of tree nurseries, forestation acreage, number of scattered tree planting, reforestation area, young forest tending area, and aged forest tending area. The next step is to multiply each of those six parts by its per mu costs for production activity (scattered tree planting calculated based on cost of each one). The calculation of output value of livestock except poultry in animal husbandry is based on the weights of slaughtered number.

The output value of each kind of livestock products except poultry is calculated by multiplying quantity output in weight of each kind by its unit price.

- Output value of livestock= number of slaughtered livestock x average gross weight of each x unit price.
- Output value of poultry=number of each kind of slaughtered poultry x price of aged poultry.

Output of fishing is calculated by multiplying quantity of aquatic products by their produce prices.

The values for service activities for agriculture, forestry, animal husbandry and fishing are obtained directly from business income in census years, or by estimating on the basis of ratios of value-added over output in non-census years.

B. Annual value added at current prices:

Annual value added at current prices for farming, forestry, animal husbandry and fishing are calculated on the basis of production, i.e. they are obtained by deducting intermediate consumption from the total output.

The calculation of value added for service activities for agriculture, forestry, animal husbandry and fishing of a non-census year is based on ratios of value-added in the census year, i.e. they are equal to output value (business income) of service activities*ratio of value-added. Ratios of value added are derived from data of input-output survey or tertiary industry census, or estimated by distribution method according to labor wages, data of industrial and commercial units, materials of input and output survey, and other related data in non-census years. Details are as follows:

Value added of service activities for agriculture, forestry, animal husbandry and fishing=labor costs + net taxes on production+ depreciation of fixed assets+ operating surplus

Labor costs =income from wages and social benefits+ self-employed income+ other income in-kind + farmers concurrent income

Information on wages and number of employees are from *Annual Statistical Report on Labor*. Ratios of other incomes over the total wages come from data of input and output survey. Ratios of the net production taxes on service activities for agriculture, forestry, animal husbandry and fishing and that of farming, forestry, animal husbandry and fishing are estimated according to the data of input and output survey. Depreciation of fixed assets are estimated according to *Annual Statistical Report on Fixed Assets*.

C. Quarterly value added at current prices:

Quarterly value added at current prices are calculated by output value of farms multiplied by ratios of value-added. Ratios of quarterly value-added at current price are adjusted correspondingly according to value-added of last year, climate of that year, scientific and technological level, consumer price, prices of productive means and etc.

D. Output and value added at constant prices:

The calculation of total output value and value added at constant price are based on the method of price deflation.

Output value (value added) at constant price of farming, forestry, animal husbandry and fishing = output value (value added) at current price of report period / price index of agricultural products at the report period

Output value (value added) at constant price of service activities for agriculture, forestry, animal husbandry and fishing = output value (value-added) at current time of report period / consumer price index at the reporting period

E. Growth rate calculation:

Before 2003, the calculation of China's agriculture growth rate was based on fixed prices of 1990. Since 2004, the former calculation method was canceled, and the deflation method has been applied to agricultural products.

Growth rate of agriculture = Output value (value added) at constant prices of farming, forestry, animal husbandry and fishing at the report period / output value (value added) at constant prices of of farming, forestry, animal husbandry and fishing x 100%

F. Prices of agricultural products

Prices of agricultural products are basic prices in the terminology of the SNA. These prices reflect the values received by the producers at the village level where taxes on products are excluded. Price statistics on agricultural products are collected by multi-sampling technique. The primary sampling units are the prefectures or counties which are administrative units below the provincial level. The second stage sampling units are the villages and the ultimate sampling units are producers and households.

1. Average price of a unit of a representative agricultural product by at a village sampling unit = sum of the sales of the product during the report period by that sampling unit/ sum of the quantity of this product sold during the report period by the same sampling unit, calculated with the following formula:

$$p_i = \frac{\sum_{j=1}^n p_{ij} q_{ij}}{\sum_{j=1}^n q_{ij}}$$

p_i is average price of representative product no. i , $\sum_{j=1}^n p_{ij}q_{ij}$ is value of sales of the

representative product no. i at the village sampling unit where j refers to the ultimate sampling units,

$\sum_{j=1}^n q_{ij}$ is the sum of quantities of the products sold at that village.

2. Average product price in a prefecture or county and at a higher level like provinces (autonomous regions and municipalities) and the nation = sum of the sales value of one product during the report period by all sampling units in the respective area / sum of the quantity this product sold by these units in the same respective area during the report period, which is calculated with the following formula:

$$P_i = \frac{\sum_{j=1}^n p_{ij}q_{ij}}{\sum_{j=1}^n q_{ij}}$$

p_i is average price of representative product No. i , p_{ij} is sales price of representative product no. i by survey area no. j , q_{ij} is the quantity of representative products sold in the survey area no. j .

3. Determination of representative products of agricultural products: Representative products are selected for all divisions in agriculture section, that is farming, forestry, animal husbandry and fishing, all groups and over 90 percent of classes. They are products with large quantity of output and values whose shares are stable over time; new products with developing prospect; products with local characteristics and being the main products in some seasons. Generally, the representative products will be utilized for five years.

On the basis of the above principles, NBS formulates the representative category and then representative products in each representative category for the national price survey on agricultural products, including 4 divisions: farming, forestry, animal husbandry and fishing, 14 groups, 30 classes and 180 representative products (see Annex III Reference Category of Agriculture Products). All the representative products are typical enough because of the fact that sales of each representative product make up a share of over 70 percent of that category in the national total.

All provinces, autonomous regions and municipalities use the same unified national classification standard and code, according to the *National Reference Category of Agriculture Products*. Considering the locality, some products, which are important in a local area but not included in the national list, may be candidates for representative products. But they must be reported to NBS for approval and get a unified coding.

4. Calculation of the weights of representative products: The calculation of the weights of representative agricultural products is only for representative categories and products, not for non-representative products. It is calculated as an average of the data from 2000 to 2002, and normally replaced once every five years. It is important to check the weights for large, medium and small categories and typical varieties. For example, let us take the case of farming as the large category. The farming category in turn consists for three representative medium categories: corn

and other cereals, vegetables, and fruits and nuts. The method is to assign weights to only representative medium categories for the calculation of price index of a larger category of farming (see the table below for an example). Thus implicitly the price index for the group of non-representative products is assumed to have the same price index as the derived weighted price index of the large category. This same method is used to derive price indexes of small representative categories of products before the price indexes of medium representative categories are derived.

An example of a scheme for deriving weights

	Code	Output value	Represent large category weight	Weights (shares) of medium category in a large category
		1	2	3
1. Farming - total	A	4209775	405.85	1000
a) Others (non-representative)		668132		0
b) Sum of the representative medium categories	A'	3541643		1000
1.1 Corn and other cereals	1.1'	1369544		386.7
1.2 Vegetables	1.2'	1039272		293.44
1.3 Fruits and nuts	1.3'	1132827		319.86

When calculating the weights of the commodities, of which their quantity output and sales are not large and difficult to collect data, we must firstly confirm their values by category, and the weights of the main commodities in each category, then use the method of apportioning to distribute the surplus weight to the remaining commodities in proportion to their importance.

As explained above, weights for agricultural products are calculated mainly on the basis of their sale values, and those of all representative products sales in a category total to 1000.

5. Calculation of producers' price index on agricultural products $k_{ij} = \frac{P_{ijt}}{P_{ij0}}$

(a) Each representative product price index by per survey unit

(k_{ij} is unit index of representative product no. i of the survey unit no. j, P_{ij1} is average price of representative product no. i by survey unit no. j at the report period t, P_{ij0} is average price of representative product no. i by survey unit no. j at the base period.)

(b) Price index of a representative product $K_i = \sqrt[n]{k_{i1} \times k_{i2} \times \dots \times k_{in}}$

($k_{i1}, k_{i2}, \dots, k_{in}$ are price indexes of the representative product no. i respectively in different survey units from no.1 to no.n)

(c) Price index of a small category of products $K = \frac{\sum K_i W_i}{\sum W_i}$

(K is the index of a small category of products, K_i is price index of representative product no. i in this small category, W_i is the weight of output value of the representative product no. i).

(d) Price index of medium category of products
$$K = \frac{\sum K_i W_i}{\sum W_i}$$

(K is the index of a medium category index, K_i is small category index of no. i in this medium category, W_i is the weight of output value or sale value of small category no. i)

(e) The methodology on price indexes discussed above are applied consistently from the lowest sampling stages to the primary stage, and from there all administrative levels up to the national level

IV. Joint Data Review and Data Dissemination procedure

Since 2005, China has conducted periodic national reviews to cross-check data at the lower level to data at the national level. The data are checked to see if prices of goods are covered by surveys, and the products selected for price surveys are truly representative, thus the appropriateness of deflation indexes. If there are significant differences with reality, detail explanation must be given in the evaluating report, or if data on prices are not obtainable by surveys, whether data from purchasing units or trade markets are used instead.

Examination on the steadiness of annual ratios of value added is also carried out as they are believed to change little over the years, and also examination of quarterly data to see if they are based on agriculture climate condition of each quarter in the year.

Outputs value and growth rates of value added are verified with respect to the tendency of rising and falling of the agricultural products that have particular influence on the output of some manufacturing industries. Also verified is the tendency for the output value at constant price to be consistent with that for the corresponding product quantity output.

In data evaluation, all regions must perform the data evaluation on local agricultural production and then report it to NBS.

Reporting forms by each province must be submitted to the NBS; they are then examined and must be approved with signature.

Data are disseminated only after verification.

V. Main Problems of China's Agricultural Statistics

1. Statistics on agricultural basic data has yet satisfied all the needs of accounting for a complete coverage of agricultural production.

- a) Part of agricultural products such as collection of wild plants and Chinese medicinal materials has not been fully covered due to data collection difficulty, especially with respect to the accuracy of production data on a quarterly basis.
- b) The output of animal husbandry only includes hogs and cattle and the like on a sample survey basis.
- c) The quantity indicators used for estimating vegetables and fruits are still weak and need to be improved.
- d) Part of the products selected for price surveys may not be representative. This mainly refers to aquatic products, forest products and new industrial products. It is necessary in the future to enlarge the products to be covered in the samples that reflect better the

conditions of the provinces.

2. Absence of statistical basis for service activities for agriculture, forestry, animal husbandry and fishing. These activities are incorporated and classified according to the new standard classification on national economic industry in 2003, however their statistical coverage, statistical reliability and basic data used for extrapolation were short of quality particularly in deriving historical series.