

Appendix II

Methodology of Index Numbers of Area, Production and Yield

Base Year

The Directorate of Economics and Statistics (DES) had adopted Triennium Ending (TE) 1981-82 as base year for the purpose of Index Numbers of Area, Production and Yield in Agriculture until 1999-2000. In 2000-01, it decided to adopt TE 1993-1994 as a way of updating the base to a recent year and keep it in harmony with the other series of indices such as Index of Industrial Production, Whole Sale Price Index and the series of National Accounts Statistics. Since area and production in agriculture can fluctuate a great deal from year to year, the average of area/production over the TE 1993-94 is taken for determining the base level of area/production against which the area/production of the succeeding years is to be compared.

In a chapter of this publication, growth rates of various crops worked out from index numbers based on the above mentioned two base years have been separately given.

Weighting Diagram

The weight of a commodity for the production index is taken as the average production of the commodity in the TE 1993-94 and the national average price of the commodity during 1993-94 as obtained from the National Accounts Statistics. This has been done to fix the base production at its average level by eliminating the cyclical variation and to evaluate the production with the same price for all states in view of wide variations observed in the state prices. A similar exercise was done for preparing weighting diagram for TE 1981-82.

Coverage

The index numbers of agriculture commodities cover 46 crops under two main groups and eight sub-groups. The crops and groups are listed below:

Foodgrains

- i. Cereals - Rice, wheat, *jowar*, *bajra*, maize, *ragi*, barley and small millets. (Crops except rice and wheat constitute the sub-group coarse cereals).
- ii. Pulses - Gram, *tur* and other pulses.

Non-foodgrains

- i. Oilseeds - Groundnut, sesamum, rapeseed & mustard, linseed, castorseed, safflower, nigerseed, soyabean, sunflower, coconut and cottonseed. (The oilseed crops except coconut and cottonseed constitute 9 oilseeds)
- ii. Fibres - Cotton, jute, mesta and sannhemp. (Jute and Mesta constitute a sub-group)
- iii. Plantation crops - Tea, coffee and rubber.
- iv. Condiments and spices - Pepper, ginger, garlic, chillies, turmeric, arecanut, coriander and cardamom.
- v. Fruits & vegetables - Potato, onion, banana, cashewnut, tapioca and sweet potato.
- vi. Other crops - Sugarcane, tobacco and guarseed

Methodology

- Let a_{ijk} - the area under i^{th} crop in the j^{th} year in k^{th} state.
 a_{iok} - the area under i^{th} crop in base year period in k^{th} state.
 p_{ijk} - production of i^{th} crop in the j^{th} year in k^{th} state.
 p_{iok} - production of i^{th} crop in base year period in k^{th} state.
 w_{ik} - weight of i^{th} crop in k^{th} state.
 P_{io} - price per unit of the i^{th} crop in the base period.

For the state k and for the year j , individual crop indices are calculated as below:

$$(a) \text{ Index number of area} = \frac{a_{ijk}}{a_{iok}} \times 100 = IA_{ijk}$$

$$(b) \text{ Index number of production} = \frac{p_{ijk}}{p_{iok}} \times 100 = IP_{ijk}$$

$$(c) \text{ Index number of yield} = \frac{IP_{ijk}}{IA_{ijk}} \times 100$$

For any sub-group G of commodities, the indices for the year j and state k are calculated as below:

$$(a) \text{ Index number of area} = \frac{\Sigma a_{ijk}}{\Sigma a_{iok}} \times 100$$

The state index is obtained by including all the items of the state in sub-group G where the summation is taken over items in G.

$$(b) \text{ Index number of production} = \frac{\Sigma p_{ijk} P_{io} \times 100}{\Sigma p_{iok} P_{io}}$$

$$(c) \text{ Index number of yield} = \frac{\text{Index number of production} \times 100}{\text{Index number of area}}$$