

# **Annual Survey of Industries - 2007**

## **1. Introduction**

The Department of Census and Statistics (DCS) started to conduct its series of Annual Survey of Manufacturing Industries (ASMI) in 1979 with the reference year as the previous year 1978. The frame of this survey was restricted to manufacturing establishments registered with the Ministry of Industries and the State owned industrial establishments. (i.e. Public Corporations, Departmental undertakings, Govt. owned Business undertakings). The last survey of this series was carried out in 1982. After the Census of Industry conducted in 1983, the ASMI was replaced by the Annual Survey of Industries (ASI) covering Mining and Quarrying, Manufacturing and Generation and Distribution of Electricity, Gas and Water. The Industrial frame generated from the Census of Industry 1983 was used to conduct the series of Annual Survey of Industries from 1984 to 2003. The frame of the new series is the register of industrial establishments which is a by product of Census of Industry 2003/2004.

This survey is the 22<sup>nd</sup> of the ASI series, conducted in 2007 and the reference period is 2006. The report contains the important industrial indicators relevant to all establishments with 5 or more persons engaged.

## **2. Objectives**

The objectives of the survey are

- i. to provide indicators of the performance and the structure of the industrial sector.
- ii. to update the list of industrial establishments already available.

## **3. Scope and coverage**

The scope of the ASI is all activities categorised under three industry divisions namely, Mining and Quarrying, Manufacturing and Generation and Distribution of Electricity, Gas and Water of the International Standard Industrial Classification Revision 3 (ISIC) of the United Nations. All private sector establishments, state owned industries and industries coming within the purview of Board of Investment with 5 or more persons engaged have been covered in this survey.

## **4. Methodology**

ASI is predominantly a postal survey. But since this year, the field officers of the Department were sent for the data collection with regard to get higher percentage of responses.

#### **4.1     *The Questionnaire***

There were 20 questions in the questionnaire. The first 14 questions were on identification information. Questions 15 to 18 were on Input and Output and question number 19 and 20 were about the Investment and Labour of the establishment. The value of goods moved out, receipts from industrial services done for others and opening and closing stocks of output were collected to compile the gross output. Inputs were the addition of value of raw materials consumed for the year 2006, (i.e. Cost of raw materials adjusted for stocks) and the consumption of Electricity, Fuel and Water. Book value at the beginning of the year, Gross additions during the year, and Depreciation were canvassed under the four components of fixed assets namely, Land, Buildings and Other Constructions, Machinery and Other Equipment and Transport Equipment. The information on employment and earnings, was collected under two sub categories Nationals and Non nationals. The number of male and female national persons engaged were collected separately, but salaries were canvassed only for the total number of employees. In addition to the above, non national employees and their salaries also were canvassed.

#### **4.2     *Data Collection***

The first time for the districts, field officers of the department were sent to the establishments directly to collect the information. For the non responding establishments of all districts field officers had to visit quite a number of times to get the questionnaire completed. The collection of accurate data from industrial establishments is very tedious and time consuming. Sometimes officers had to visit them several times in order to get a good response.

#### **4.3     *Reference Period***

Reference period of the survey was the calendar year 2006 (i.e. 1<sup>st</sup> of January to 31<sup>st</sup> of December). But in some cases, establishments keep records not for the calendar year but for the financial year. (1<sup>st</sup> of April 2006 to 31<sup>st</sup> of March 2007) In those situations, financial year data were accepted when there was no significant differences between two 1<sup>st</sup> quarters of both years (2006 and 2007). Otherwise estimates for the calendar year were accepted.

#### **4.4     *Sample Survey Design and Estimation***

All industrial establishments with 5 or more persons as in the Census of Industry 2003/2004 was the frame (sample population) of ASI.

The whole frame was divided into two sectors as establishments with 500 or more persons engaged and establishments with 5 - 499 persons engaged. All establishments in the 500 or more sector (census part) and a probability sample of 5 to 499 sector (survey part) were canvassed.

This survey part was further stratified according to geographical location, industrial activity and size. Geographical strata were 25 administrative districts. Industrial activities were defined as the industry group levels, 2 digit level of ISIC. The persons engaged size classes which were defined as 5-9, 10-14, 15-19, 20-24, 25-29, 30-49, 50-99, 100-149, 150-199, 200-299, 300-499, 500-999 and 1000 or more persons engaged were used as the size strata.

There were 446 establishments in the census part and another 1922 were selected for the sample out of 24,091 industries. Higher probabilities were given to select rare industries. The sample was selected systematically within the strata.

The estimated value of a variable will be given by,

$$\hat{Y} = \sum_{i=1} \sum_{j=1} \sum_{k=1} \frac{N_{ijk}}{n_{ijk}} Y_{ijk}$$

Where,  
 $N$  = total no. of units in the population  
 $n$  = number responded  
 $k$  = size class of persons engaged  
 $j$  = industry group of ISIC  
 $i$  = district

### ***Determination of weights***

The final weight for respondent  $k$  in stratum  $h$ ,  $w_{hk}$ , is a composite of the base weight,  $w_{1hk}$ , the non-response adjustment  $w_{2hk}$  and the factor to compensate for coverage errors  $w_{3hk}$  such that

$$w_{hk} = w_{1hk} \times w_{2hk} \times w_{3hk} \quad (1)$$

### ***Base weight ( $w_{1hk}$ )***

The base weight is the inverse of the probability of selection.

### ***Non-response weight( $w_{2hk}$ ) and Sampling Frame Error weight( $w_{3hk}$ )***

The non-response weight is the ratio the sample size to the total respondents. The establishments that were considered as non-respondents are those who refused to participate in the survey.

The followings are considered as frame problems: Those establishments that cannot be located, those that were closed (they should not be included in the sampling frame), those that are out-of-scope (the ISIC classification was not specified correctly) and those that were duplicates and mergers.

Therefore, requires an adjustment factor to be incorporated in the weight. To illustrate, if  $N_h$  is the population size for stratum  $h$  and  $n_h$  is the corresponding sample size, then the corresponding selection probability  $p_h$  is

$$P_h = \frac{n_h}{N_h} \quad (2)$$

If given the stratum  $h$ ,  $q_{1h}$  is the proportion of establishments with frame problems (proportion of those that should not be included in the frame) and  $q_{2h}$  is the proportion of establishments that were missed

in the frame (those that should be listed but were not included), then the true population size of stratum  $h$  should be

$$N_h^1 = N_h \times (1 - q_{1h} + q_{2h}) \quad (3)$$

and the frame adjustment weight,  $w_{3hk}$

In the case of this survey, we do not have a measure for  $q_{2h}$ . Please note that we could only assume that  $q_{2h}$  is almost 0 because list was updated recently. The final weight as defined by equation (1).

$$W_{3hk} = (1 - q_{1h} + q_{2h}) \quad (4)$$

### ***Estimation***

Estimates for each of the strata described above could be derived separately. For example, the estimator for a total in stratum  $h$  is

where  $y_{hk}$  is the observed value from the  $k^{th}$  sample in stratum  $h$

$$\hat{Y}_h = \sum_k w_{hk} y_{hk} \quad (5)$$

## **5. Concepts and Definitions**

The concepts and definitions used in ASI-2007 were broadly in accordance with the United Nations recommendations.

### **5.1 Statistical Unit**

Statistical unit of ASI is the establishment which is defined as an unit engaged in the single or related activities of Mining and Quarrying, Manufacturing and Generation and Distribution of Electricity, Gas and Water in one location under a single ownership or control. However, industrial enterprises, which are engaged in production of more than one related activity in one location or one activity in several locations, were treated as one unit of enumeration whenever no separate records are available.

Any way in the analysis, the ideal definition of the establishment was followed. The information collected at enterprise level was disaggregated into establishment level using the proportion of output. Ancillary units such as warehouses, garages, etc. were treated as part of the main establishments.

### **5.2 Output**

Information on output has been collected on shipment basis. The variables canvassed were the value of products moved out from the establishment, value of stocks of finished goods and receipts from industrial services rendered to others.

#### **a. Value of products moved out**

- i. Value of products made by the establishment using its own raw materials
- ii. Products made by another establishment using material inputs owned by the establishment

have been considered, as the products made by the establishment and the following three situations have been considered as the moving out.

- i. sending to another establishment or a person
- ii. sending to another branch of the same enterprise
- iii. sending abroad

These products were valued at the price at which the producer disposes of his goods to the customer (i.e. producer's price). All duties and taxes which fell on the products when they leave the establishment are included and subsidies recovered are excluded. Price rebates, discounts and allowances on returned goods allowed to the customer have been deducted and any transport charges which may be invoiced to the purchaser or user have been excluded. Products released to other establishments of the same enterprise have been treated as though sold and valued at producer's prices.

#### **b. Stocks of finished goods**

The values of stocks of finished goods at the beginning and at the end of the year 2006 have been collected.

This consists of all finished goods made by the establishment using their own raw materials and manufactured by another establishment using raw materials owned by this establishment and ready for release. Finished goods held by the establishment which were made from materials owned by others have been excluded. Valuation is in producer's prices.

#### **c. Receipts from Industrial Services**

The total value of receipts from

- i. Contract and Commission work done for others on materials owned by them,
  - ii. Repairs and installation work done for others,
  - iii. Sales of scraps and refuses,
  - iv. Own account investment work,
- have been included here.

#### **d. Value of output**

The value of output was obtained from the value of shipments and other receipts of Industrial Services adjusted for changes in the values of stocks of finished goods during the reference period.

$$\text{Value of Output} = (\text{Value of products moved out}) + (\text{Closing stocks of finished goods}) - (\text{Opening stocks of finished goods}) + (\text{Receipts from Industrial Services})$$

### 5.3 *Inputs*

Information on inputs has been collected covering the costs of

- a. Raw materials, parts and components and packing materials (Imported and Indigenous) consumed,
- b. Industrial services done by others for the establishment,
- c. Fuel, Electricity & Water consumed.

#### a. **Cost of raw materials, parts and components and packing materials**

##### i. Cost of raw materials, packing materials purchased

All material inputs (Raw materials, parts, components containers and supplies) purchased by the establishment for the production process either in this establishment or in another establishment have been included. All materials have been valued at purchaser's prices.

i.e. The delivered value at the establishment, including the purchase price transport charges, cost of insurance, all taxes and duties on the goods. Discounts or rebates allowed to the purchaser and the value of packing materials returned to the supplier have been deducted.

The value of materials owned by others and received by the establishment for production process have been excluded and material inputs received by the establishment from other establishments of the same enterprise (not purchased) for processing have been valued as if purchased.

##### ii. Values of stocks of raw materials and packing materials etc.

The opening and closing stocks of all input materials (imported and indigenous) including packing materials which are purchased (or treated as purchased) have been included.

The valuation was at purchaser's prices. The stocks of raw material used for own account work for producing own fixed assets have been excluded.

#### b. **Cost of industrial services done by others**

The total cost of

- i. Contract and commission work done by others on materials supplied by the establishments and
- ii. Repairs and maintenance services provided by others are included.

#### c. **Fuel, electricity and water consumed**

The total of the values of Fuel (LP Gas, Coal and Charcoal, Petrol, Diesel Oil, Furnace Oil, Kerosene Oil, Firewood and others) Electricity and Water consumed has been included.

### **5.3.1 Raw Materials Consumed**

Raw materials consumed (i.e. actually used) has been computed by adjusting stocks of raw materials to the total value of raw materials (imported and indigenous) and packing materials purchased.

$$\begin{aligned} &\text{Raw materials and packing materials consumed} \\ &= (\text{Raw materials and packing materials purchased}) (\text{Imported} + \text{Indigenous}) + \\ &\quad (\text{Opening stocks of materials}) - \\ &\quad (\text{Closing stocks of materials}) \end{aligned}$$

### **5.3.2 Value of Inputs**

The total value of raw materials consumed, cost of industrial services done by others and Fuel, Electricity and Water consumed have been defined as the value of Inputs.

### **5.4 Value Added**

Value added has been defined as the difference of the value of output and value of inputs i.e. value of Output - value of Inputs.

### **5.5 Fixed Capital Assets**

The book value at the beginning of the year, value of gross additions during the year and depreciation of all assets with productive life of one year or more, owned by the establishment (i.e. Land, Buildings, Other constructions and Land improvements, Machinery and Other equipment, Transport equipment) have been collected. Leased or rented assets have not been included.

#### **a. Book value at the beginning of the year**

This refers to the original cost price of the item less its depreciation, less assets retired and sold upto the beginning of the year.

#### **b. Gross additions to fixed assets during the year**

This is defined as the total of the costs of new and second hand fixed assets acquired during the year and alterations, renovations and improvements purchased, cost of own account work less the value of sales of used fixed assets.

Valuation of fixed assets acquired from others was to be at the delivered price plus cost of installation and any necessary fees and taxes. Valuation of fixed assets produced own account had to be valued with imputation for own labour and materials used and an allocation for overhead costs. Value of sales of used assets were to be at actual amounts realised.

### **5.6 Employment and Earnings**

The information obtained on employment related to the number of persons engaged in the establishment.

#### **a. Number of persons engaged**

This is defined as the total number of persons who work in or for the establishment, including working proprietors, active partners, unpaid family workers, operatives and all other employees.

**b. Working proprietors and active partners**

All individual proprietors and partners who are actively engaged in the work of the establishment have been included here.

**c. Unpaid family workers**

All persons living in the household of the owners and working in the establishment, without a regular pay, for at least one third of the normal working time of the establishment and non household members who do work without pay were included.

**d. Operatives**

All paid employees who were directly engaged in the production or related activities of the establishment including any clerical or working supervisory personnel whose function was to record or expedite any step in the production process have been considered as operatives.

**e. Other Employees**

All paid employees excluding those covered as operatives are reported here, eg. Managers, Directors, Laboratory and Research workers, Clerks, Typists etc.

**f. Wages and Salaries**

All payments whether in cash or in kind made by the employers during the year 2006 in connection with the work done to all “employees” had been included here.

i.e.

- i. All regular and overtime cash payments houses and cost of living allowances.
- ii. Wages and salaries paid during vacation sick leaves
- iii. Taxes and social insurance contribution
- iv. Payments in kind.