

## WORKFORCE ESTIMATES IN NATIONAL ACCOUNTS

### Introduction

- 7.1 For the segments of the economy where adoption of 'production approach' is not feasible due to non-availability of requisite information on output and intermediate inputs, macro-economic aggregates are estimated by using the data on workforce, through the labour input method. In this method, estimates of *value added* for each individual economic activity or group of economic activities are compiled using the *Labour Input* as estimates of workforce and *Productivity of Labour* as estimates of 'value added per worker'. Such synthetic estimates are generally required for unorganized segment of manufacturing, water supply, wholesale and retail trade, hotels and restaurants, transport, storage, business services, legal services, sanitary services, research and scientific services, religious and other community services, personal services, etc. The Labour Input estimates are also used for allocation of national level estimates to state/regional level where direct data or suitable physical indicator is not available.
- 7.2 The definition of labour input used in national accounts compilation and the number of workers as used in working out 'value added per worker' from the enterprise surveys (ES), should be the same. The data from households like those collected in Population Census (PC) and Employment and Unemployment Surveys (EUS) of the NSSO are usually in terms of employment of persons. However, data from enterprises, collected in the ESs, are usually in terms of jobs. The difference between the two is the multiple jobs performed by workers. Therefore, for the labour input method, it is the count of jobs that is relevant for measuring labour input, particularly because the measure of productivity of labour, i.e. *value added per worker (VAPW)*, obtained from the ESs is, in principle, defined in terms of jobs rather than workers.
- Sources for Estimates of Workforce**
- 7.3 The two main data sources on workers and their distribution over economic activities in India are the decennial Population Census (PC) and the Employment & Unemployment Surveys (EUS) of the NSSO. These sources provide information on the entire workforce of the country. Besides these, there are other sources that provide workforce estimates for specified segments. The major data sources and their coverage is given in Table 1.
- 7.4 *Population Census:* In India, the first Population Census was conducted non-synchronously in different parts during 1872. Thereafter Population Censuses are being conducted decennially since 1881. Census operations spawn a large volume of demographic and socio-economic data for the entire population of the country. Among other information, the census publications provide 'Economic Tables', containing detailed data on economic activity of the population, employment status, composition of the workforce, rural-urban distribution, industrial and occupational composition. During the population census, the information is collected *inter alia* on "economic questions" through individual slips. Based on this information, the Office of the RGI compiles the estimates of working force in respect of main workers and marginal workers at four digit level of National Industrial Classification (NIC) separately for rural and urban as well as for male and female workers.
- 7.5 In the 1981 Population Census, a three-fold classification of main workers, marginal workers and non-workers was adopted. For identifying a main worker, the time criterion of engagement in work for the major part of the year, i.e., at least 183 days, was adopted while those who worked for some time during the preceding year but not for the major part were treated as marginal workers. Those who had never worked during the preceding year were non-workers. In addition, information was also collected on secondary work of main workers. Such of the main workers having secondary work were referred to as 'Main Workers with Other Work' (MWOW). The same concept of work was adopted for the 1991 Census too.
- 7.6 In the Population Census (PC), 2001, though there was no change in the three-fold classification of main, marginal and non-workers, information on secondary work was not collected. As a result, the estimates of MWOW are not available from PC 2001 unlike the earlier years. As regards the definition of economic activities, its scope was expanded as follows:
- (i) 'Cultivation' now included all crops except five plantation crops namely, tea, coffee, rubber, coconut and betel nut. In 1991 Census, cultivation included only a few crops. Cultivating crop for self-consumption, as in the

past census, was considered to be economic activity.

- (ii) Production of milk for self-consumption was included within the boundaries of economic activity.

#### 7.7 *NSS Employment and Unemployment Surveys:*

The first survey on employment and unemployment was carried out by the NSSO in its 9<sup>th</sup> Round (1955). From the 32<sup>nd</sup> Round (1977-78), the survey on employment-unemployment has become a part of the quinquennial programme of NSS surveys, with an identical approach being followed in the measurement of employment and unemployment parameters. The quinquennial EUSs of NSSO aim to measure the extent of 'employment' and 'unemployment' in quantitative terms disaggregated by various household and population characteristics. The persons surveyed are classified into various activity categories on the basis of the activities pursued by them during certain specified reference periods. Three reference periods are used in these surveys. These are (i) one year, (ii) one week and (iii) each day of the week. Based on these three periods three different measures are arrived at, of which the one with 365 days reference period, called workforce according to 'usual status' approach, is widely used.

- 7.8 The usual activity status (It is the activity situation in which a person is found during a reference period that relates to the person's participation in economic and non-economic activities) relates to the activity status of a person during the reference period of 365 days preceding the date of survey. The activity status on which a person spent relatively longer time (major time criterion) during the 365 days preceding the date of survey is considered the principal usual activity status of the person. In this approach, a person is first categorised as belonging to the labour force (Persons, who are either 'working' (or employed) or 'seeking or available for work' (or unemployed) constitute the labour force. Persons who are neither 'working' nor 'seeking or available for work' for various reasons during the reference period are considered as 'out of labour force' or not, according to major time criterion. For the persons belonging to the labour force, the broad activity status of either 'working' or 'not working but seeking and/or available for work' is then assigned on the basis of the relatively longer time spent in the labour force during the 365 days preceding the date of survey. If a person –

whether or not a worker in the principal status - pursues some economic activity more or less regularly for a relatively shorter period during the reference period, he / she is treated to have pursued the economic activity in subsidiary capacity.

7.9 *Employment Market Information Programme of the Ministry of Labour:* Under the Employment Market Information (EMI) Programme, the Directorate General of Employment & Training (DGE&T), Ministry of Labour, publishes data on employment and unemployment in organised part of the economy. The EMI programme, first taken up on a pilot basis during the second Five Year Plan, was strengthened by the provisions of the Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959. The programme covers all establishments in the public sector (except the defence establishments and armed forces) and those establishments in the private sector that employ 25 or more persons on the last day of the quarter under reference. Apart from this, since 1966, the establishments employing 10 to 24 persons are also covered on a voluntary basis. The information is collected, *inter alia*, on number of persons employed, classified by industry and sex, at the end of each quarter.

- 7.10 *Annual Survey of Industries:* The Annual Survey of Industries (ASI), conducted every year by the CSO is another source of employment data. Its coverage is restricted only to the establishments registered as factories under Sections 2m(i) and 2m(ii) of the Indian Factories Act, 1948. However, Departmental units such as Railway workshops, Road Transport Corporation Workshops, Government Mint, Sanitary, water supply, gas, storage etc. are kept out of the coverage, though they may be registered under the Factories Act. Some of these activities when carried out in private factory establishments like cold storage, water supply, gas production and distribution, motion picture production, laundry services, repair of motor vehicles and of other consumer durables are covered under the survey. Until 1997-98, all electricity undertakings engaged in the generation, transmission and distribution of electricity registered with the Central Electricity Authority were also covered under ASI irrespective of their employment size.

#### **Estimates of Workforce for 1999-2000 Series**

- 7.11 The advisory Committee on National Accounts, under the Chairmanship of Prof. S.D. Tendulkar, recommended formation of a

Working Group (WG) to formulate and suggest a detailed methodology of estimating the labour input using the results of EUS, 1999-2000 and PC-2001, for the purpose of national accounts compilation. The Committee submitted its Report in March, 2004 and the same was published by the CSO, entitled "Report of the Working Group on Workforce Estimation for Compilation of National Accounts Statistics with Base Year 1999-2000". This publication is also available on the Ministry of Statistics and Programme Implementation's website at, [http://www.mospi.nic.in/mospi\\_csopubn.htm](http://www.mospi.nic.in/mospi_csopubn.htm).

7.12 The Working Group observed that in the context of national accounting, estimating *labour input* requires estimates of workforce (number of workers) in the base year separately for the organised and unorganised segments of the economy and its distribution over economic activities or groups of economic activities. The workforce is then to be adjusted for multiple jobs in respect of each activity or activity-group so as to measure the *labour input*. These base-year estimates are required to be projected to the subsequent years too. Further, to arrive at the unorganised *labour input*, the organised *labour input* should be appropriately netted out from that of the economy. As the LIM is also used for the estimation of the State Domestic Product (SDP), it is necessary that method of estimating *labour input* comprises estimating *labour input* for SDP compilation as well. The following were the summary of issues identified by the Working Group in estimating labour input for use in national account compilation for unorganised segments:

- (i) Estimating workforce aggregates for the base year,
- (ii) Adjusting for multiple jobs to derive the *labour input*,
- (iii) Distribution of workforce / *labour input* by economic activity,
- (iv) Projecting estimates of *labour input* to subsequent years,
- (v) Netting out the workforce engaged in organised segment of the economy from the estimates of total *labour input*,
- (vi) Estimating workforce / *labour input* for compilation of SDP.

7.13 The above issues were dealt with differently in the various series of the NAS. From the conventional series to the 1980-81 series, the estimates of workforce used for NAS

compilation were mainly based on PC data. A significant departure was made for the 1993-94 series of NAS. The alternative source of data used for obtaining the aggregate estimates of workforce for the first time in NAS is the EUS of the 50<sup>th</sup> Round (1993-94) of the NSSO and the data on population of PC 1991. As mentioned earlier, for compilation of NAS, what matters is not the size of the working population but the amount of labour put in by it in the process of production of goods and services. Thus, what is required is not just the estimate of workforce, which is merely the head count of economically active persons, but a measure of total *labour input* going into production activities of the economy. The use of LIM for estimating *value added* requires reliable estimates of *labour input*, measured as workforce adjusted for multiple employment. The industrial classification used for this purpose, the method of estimating the workforce by industrial classification, and the method of adjusting these estimates to obtain *labour input* have varied from one NAS series to the other. Moreover, in the absence of annual data for estimation of the *value added*, the base year estimates are required to be carried forward to the subsequent years using physical indicators. When more appropriate indicators are not available, the estimates are projected using growth rates of workforce. While the earlier series used the inter-censal growth rates of workforce for this purpose, the 1993-94 series uses the growth rates observed between 43<sup>rd</sup> (1987-88) and 50<sup>th</sup> (1993-94) Round EUSs. Different series of the NAS were generally using the DGE&T data on the employment to net out the organised *labour input* from that of the economy. The methodology adopted for estimating the *labour input* in different NAS series and the data used are presented in Table 2.

7.14 The detailed procedure of obtaining the number of jobs performed in each economic activity from the available data sources, is given in the Report of the Working Group. In this context, the following is quoted from the Report of the Working Group:

*"The WG recommends that the CSO should continue to use the data available from the following sources for estimating labour input at the national level:*

- ❖ Population Census(PC);
- ❖ Employment and Unemployment Survey(EUS) of the NSSO;
- ❖ Employment in the Organised Sector

data of the DGET; and

❖ Annual Survey of Industries.

7.15 For manufacturing and services, the recommended method also specifies the levels at which compilation of national accounts should be attempted – the corresponding activity-groups recommended for this purpose are called compilation categories in this report. The method described below is meant for restricted application only to the segments of the economy comprising the manufacturing and service-producing activities. The following is a step-wise description of the recommended method:

- (i) Obtain the mid-year population from the PC for the four segments of the population, viz. rural male, rural female, urban male and urban female.
- (ii) Obtain the activity-specific rates of *labour input* as the *labour input* per thousand population estimated from EUS for each identified compilation category. The survey-based estimate of *Labour input* would be arrived at as the sum of EUS estimates of (a) persons reporting *principal-capacity* employment, and (b) persons reporting *subsidiary-capacity* employment (usual status) in the respective manufacturing or service-producing activities, separately for the four population segments.
- (iii) Apply the rates of *labour input*, as obtained in Step (ii), on the male and female populations of rural and urban areas, as obtained in Step (i), to get the required estimates of *labour input* in each of the four segments of the population, separately for each of the compilation categories.
- (iv) Obtain the base year estimates of *labour input* for each of the compilation categories as the sum of the respective estimates of *labour input* in the four population segments.
- (v) Extrapolate the base-year estimate of *labour input* for each compilation category using the respective growth rate in *labour*

*input* observed between the two most recent EUSs to arrive at estimated *labour input* for the subsequent years.

- (vi) Finally, for the base year as well as the subsequent years, obtain the estimates of unorganised segment *labour input* in the identified compilation categories using the Employment Market Intelligence(EMI) data of the DGET of the respective years."

7.16 The Working Group also provided national-level estimates of total *labour input* for the recommended compilation categories obtained by applying steps (i) to (iv) mentioned above, in Appendix 4.3 of the Working Group Report. The data presented in the Report under this Appendix refers to the *labour input* for the mid-financial years of 1993-94 and 1999-2000, based respectively on the EUS of the 50<sup>th</sup> and 55<sup>th</sup> Rounds of the NSSO and PC-based population projections, and also the annual compound growth rates derived from these estimates for the compilation categories. On the estimates of labour input and annual growth rates in the labour input, the Working Group observed that these are consistent in most cases with the general perception of developments during the 1990s. However, the Working Group also observed that for some of the activities like selling motor vehicles, wholesale trade except motor vehicles, textile industry and food processing, the growth rates are doubtful, perhaps due to misclassification of the workers and lack of exact concordance between NIC 1987 and NIC 1998. In view of these observations, the Working Group recommended external validation of the *labour input* estimates of all the compilation categories in general and the doubtful cases in particular, using data from other sources like PC 2001 and the contemporary enterprise surveys, whenever these become available.

7.17 In view of the observations of the Working Group, further validation of estimates of workers for some compilation categories was done for the new series using the limited single-digit (industry) level (NIC 1998) workforce data obtained from the RGI (detailed information on workforce was not released by the Office of the Registrar General of India at the time of the release of new series), and the same was compared with the NSS 55<sup>th</sup> Round data obtained from the NSSO. While comparing the two sets of data, the number of workers in both sources

was adjusted to bring them as on 1<sup>st</sup> October, 1999. Since the basic structure of the recommendations and data on workforce provided by the Working Group was to be adopted for the new series, the adoption of alternative sets of data compiled using the NSS and Population Census, 2001 based workforce data [for individual activities, the NSS data was multiplied by 1-digit (NIC 1998) level ratio of workforce from Population Census to the workforce from NSS] was restricted to the doubtful cases mentioned in the Working Group Report, in addition to few others. These compilation categories are (i) sale of motor vehicles, (ii) wholesale trade except for motor vehicles and auctioning activities, (iii) storage and warehousing, (iv) sewage and refuse disposal, sanitation and similar activities, (v) activities of membership organizations, n.e.c.

and social work with accommodation, (vi) recreational, cultural and sporting activities, and (vii) private households with employed persons and the workforce estimates for these 7 categories are from the Population Census, 2001 based workforce data at 1-digit level, distributed to these compilation categories on basis of the distribution of NSS workforce data.

The estimates of overall workforce adopted in the new series for the compilation categories are presented in *Appendix-7.1*. While the estimates of workforce in public sector and private organized sector are available annually from the DGET, those for the unorganized sector are derived as residual by deducting the organized sector workforce estimates from the total workforce of that compilation category.

**Table-1: Sources and coverage of data**

Sl. No.	Source	Coverage
1.	Decennial Population Census	All economic activities of the population, employment status, composition of the workforce, rural-urban distribution, industrial and occupational composition
2.	Employment & Unemployment Surveys of NSSO (quinquennial)	-do-
3.	Employment Market Information Programme of the Ministry of Labour	Employment and unemployment in organised segment of the economy.
4.	Annual Survey of Industries by CSO	Employment data of the factories registered under Sections 2m(i) and 2m(ii) of the Indian Factories Act, 1948.

**Table-2: Workforce estimation**

Issue	Conventional Series	1970-71 series	1980-81 series	1993-94 series
Estimating base year workforce	Population Census 1941 and 1951	PC 1961 and 1971, adjusted by results of the sample survey conducted by the RGI for assessing the impact of different definitions adopted in the two PCs.	PC 1971 and 1981 – applying compound intercensal growth rate of main workers on total workers, separately at 1-digit level of NIC 1970.	Applying EUS estimates at 1-digit level of 50 <sup>th</sup> Round of NSSO on the PC-based population projection.
Adjusting for multiple jobs to derive the labour input	Not found necessary	Not considered necessary	Total labour input = sum of main and marginal workers and subsidiary work.	Using MWOW rates obtained from the PC 1991.
Distribution of WF/labour	Occupational tables of PC 1941 and	Regrouping the 3-digit (NIC 1970)	1-digit level PC figures of	The estimates at 1-digit level of NIC

Issue	Conventional Series	1970-71 series	1980-81 series	1993-94 series
input by economic activity	1951	level figures of workforce available from the PC 1970 into 13 industrial categories and sub-categories	subsidiary and marginal workers distributed to 2- and 3-digit levels using EUS of the 38 <sup>th</sup> Round of NSSO. These were added to the PC figures of main workers at 3-digit level.	1987 were distributed over 2- and 3-digit levels using the distribution of main and marginal workers obtained from PC 1991.
Projecting estimates of labour input to subsequent years	Inter-censal growth rate	Inter-censal growth rate separately for the 13 industrial categories and sub-categories.	Inter-censal growth rate separately for the compilation categories used for the series.	Growth rate derived from the estimates based on EUS separately for the compilation categories.
Netting out the organised workforce	SAMI estimates for manufacture and railways for transport	ASI estimates for manufacturing.	ASI estimates for manufacturing and EMI data of DGE&T for the other industries.	ASI estimates for manufacturing and EMI data of DGE&T for the other industries.
Estimating workforce / labour input for SDP compilation.	—	Same as that for the national-level estimates.	Same as that for the national-level estimates.	Same as that for the national-level estimates.

## Appendix 7.1

**Estimates of Labour Input as on 1<sup>st</sup> Oct 1999 (as used in NAS 1999-2000 series)**

Sl. No.	Nic'98	Description	Rural	Urban	Total
1.	01405	Cotton ginning, cleaning and baling	23,280	66,450	89,730
2.	151	Production, processing and preservation of meat, Fish, fruit vegetables, oils and fats	399,359	403,366	802,725
3.	152	Manufacture of dairy product	137,507	135,007	272,514
4.	153	Manufacture of grain mill products, etc. and animal feeds	2,035,969	724,632	2,760,601
5.	154	Manufacture of other food products	1,355,555	1,130,630	2,486,186
6.	155	Manufacture of beverages	300,209	155,210	455,419
7.	16	Manufacture of tobacco products	3,405,751	1,229,889	4,635,640
8.	171+172+173	Spinning, weaving and finishing of textile+ Other textiles+ Knitted and crocheted fabrics and articles	4,326,122	3,695,857	8,021,979
9.	181-18105	Wearing apparel, except fur apparel and tailoring	1,063,357	1,521,311	2,584,668
10.	182+19	Dressing and dyeing of fur; manufacture of articles of fur and tanning and dressing of leather; manufacture of luggage, handbags saddlery, harness and footwear	338,632	851,397	1,190,030
11.	20	manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw And plating materials	4,156,947	1,177,839	5,334,786
12.	361	Manufacture of furniture	384,237	469,817	854,054
13.	21+22	Manufacture Of Paper And Paper Products and publishing, printing and reproduction of recorded media	265,129	1,024,415	1,289,544
14.	23+25	Manufacture of coke, refined petroleum products and nuclear fuel and rubber and plastic products	366,346	851,908	1,218,254
15.	24	Manufacture of chemical and chemical products	659,708	1,244,604	1,904,312
16.	26	manufacture of other non-metallic mineral products	3,221,519	787,256	4,008,775
17.	271+2731	Manufacture of Basic Iron & Steel+ Casting of iron and steel	184,825	575,308	760,133
18.	272+2732	Manufacture of basic precious and non-ferrous metals + Casting of non-ferrous metals	139,375	249,300	388,675
19.	371+372	Recycling of metal waste and scrap + non-metal waste and scrap	-	20,799	20,799
20.	28	Manufacture of fabricated metal products, except machinery and equipments	997,683	1,408,449	2,406,132
21.	29+30	Manufacture of machinery and equipment n.e.c + office, accounting and computing machinery	428,572	904,296	1,332,868

Sl. No.	Nic'98	Description	Rural	Urban	Total
22.	31+32	Electrical machinery and apparatus n.e.c. + radio, television and communication equipment and apparatus	281,749	865,539	1,147,288
23.	33+369	Manufacture of medical, precision and optical instruments, watches and clocks+ Manufacturing n.e.c	1,104,863	1,600,154	2,705,017
24.	34+35	Manufacture of motor vehicles, trailers and semi-trailers + manufacture of other transport equipment	120,483	497,743	618,226
25.	502+50404	Maintenance and repair of motor vehicles and motor cycles	570,262	1,117,967	1,688,229
26.	50-502-50404	Sale of motor vehicles	73,997	361,580	435,578
27.	51+74991	Whole sale trade except of motor vehicles + Auctioning activities	835,123	3,125,476	3,960,598
28.	526	Repair of personal and household goods	1,588,807	1,785,159	3,373,966
29.	52-526	Retail trade (except motor vehicle)	12,437,950	17,601,910	30,039,860
30.	551	Hotels; camping sites etc.	70,082	305,308	375,390
31.	552	Restaurants, bars and canteens	1,962,971	2,479,229	4,442,200
32.	601	Transport via railways	222,705	894,293	1,116,998
33.	6021	Scheduled passenger land transport	616,859	855,605	1,472,464
34.	60221	Non-scheduled passenger land transport by motor vehicles	1,236,695	1,702,140	2,938,835
35.	60231	Freight transport by motor vehicles	2,051,626	1,773,448	3,825,074
36.	60222	Other non-scheduled passenger land transport	871,329	716,194	1,587,523
37.	60232	Freight transport other than by motor vehicles	1,207,740	941,465	2,149,205
38.	603	Transport via pipelines	17,145	5,656	22,801
39.	61	Water Transport	87,689	113,221	200,910
40.	62	Air transport	4,952	78,704	83,656
41.	6302	Storage and warehousing	47,746	122,456	170,202
42.	63-6302	Supporting & auxiliary transport activities	88,850	333,645	422,494
43.	6411	National post activities	259,558	186,522	446,080
44.	6412	Courier activities	22,336	76,439	98,775
45.	64204	Cable operator	29,225	35,843	65,067
46.	642-64204	other communication	237,514	486,356	723,870
47.	70	Real Estate Activities	47,654	144,280	191,934
48.	71	Renting of machinery & equipment without operator, personal / household goods	146,242	224,353	370,595
49.	72	Computer and Related activities	16,169	306,814	322,983
50.	7411	Legal activities	126,228	373,962	500,190
51.	7412	Accounting, book-keeping	32,304	259,394	291,698

Sl. No.	Nic'98	Description	Rural	Urban	Total
52.	73+7413+7414+742+743+749-74991	Research and development+ market research and public opinion polling+ business and management consultancy activities+ architectural, engineering and other technical activities+ advertising+ business activities n.e.c (-) auctioning activities	238,985	838,523	1,077,508
53.	80903+80904	Coaching centres, (+) Activities of the individuals providing tuition	392,184	599,262	991,446
54.	80-80903-80904	Education-(Coaching centres,(+) Activities of the individuals providing tuition	3,833,266	3,761,649	7,594,915
55.	851+852	Human health activities+ Veterinary activities	1,026,804	1,711,831	2,738,635
56.	90	Sewage And Refuse Disposal, Sanitation And Similar Activities	231,331	264,120	495,452
57.	91+853	Activities Of Membership Organisations n.e.c. + Social work with accommodation	704,749	584,853	1,289,602
58.	92	Recreational, cultural and sporting activities	414,006	567,528	981,534
59.	9301	Washing and cleaning of textile and fur products	1,738,231	742,128	2,480,359
60.	9302	Hair dressing and other beauty treatment	1,419,982	496,148	1,916,130
61.	9303+9309	Funeral and related activities	2,265,428	1,643,963	3,909,391
62.	95	Private Households With Employed Persons	309,145	1,555,795	1,864,941
63.	99	Extra Territorial Organizations And Bodies	227	17,886	18,114

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